LEGACY REPORT

2403

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The Subcommittee on Evaluation has reviewed the data submitted for compliance with the *Standard Building Code©* and Florida Building Code-Building and submits to the Building Official or other authority having jurisdiction the following report. The Subcommittee on Evaluation, and ICC-ES and its staff are not responsible for any errors or omissions to any documents, calculations, drawings, specifications, tests or summaries prepared and submitted by the design professional or preparer of record that are listed in the Substantiating Data Section of this report.

REPORT NO.: 2403

EXPIRES: See the current EVALUATION REPORT INDEX

CATEGORY: ROOF COVERINGS AND ROOF DECK CONSTRUCTION

SUBMITTED BY:

2001 INC.
325 THOMASTON AVENUE
WATERBURY, CONNECTICUT 06702
203-575-9220

1. PRODUCT TRADE NAME

2001 Inc. Two-Component Sprayed in Place Fiberglass Reinforced Urethane Foam Roof Assemblies with "Equalizer Valves"™

2. SCOPE OF EVALUATION

2.1 Roof Covering Fire Classification
2.2 Wind Uplift Resistance
2.3 Weather Resistance

3. USES

2001 Inc. Two-Component Sprayed in Place Fiberglass Reinforced Urethane Foam Roof Assemblies with "Equalizer Valves"™ roofing systems are used as roof coverings systems on new construction.

4. DESCRIPTION

4.1 General

The 2001 Inc. Two-Component Sprayed in Place Fiberglass Reinforced Urethane Foam Roof Assemblies with "Equalizer Valves"™ roofing systems consists of a EPDM membrane and 2001 Inc. Slow Rise Adhesive Foam 591 two-part foam used for adhering the membrane to substrates. The Roofing Systems consist of roofing membranes, approved insulations, flashing, adhesives, sealants, mechanical fasteners, and construction adhesives that are field installed in accordance with manufacturer's specifications to produce an integrated roof system.

4.2 Materials

4.2.1 Membranes: 0.045 inch, 0.060 inch or 0.090 inch thick non-reinforced premium EPDM membrane complying with ASTM D 4637.

4.2.2 Slow Rise Adhesive Foam: 2001 Inc. Slow Rise Adhesive Foam 591, two-part, slow rise polyurethane foam for adhering roof membrane to substrate. Blowing agent shall be HCFC 141 B EPA compliant. The polyurethane foam is installed at a maximum thickness of 1 Inch. The foam plastic has a flame spread index of less than 75 when tested under ASTM E 84 at a thickness of 2 inches (51 mm).

4.2.3 2001 Co. Reinforced Fiberglass Mesh: a reinforced fiberglass open weave scrim.

4.2.4 Isocyanurate Foam Boards: minimum 1.5 inch Isocyanurate board insulation complying with ASTM C 1289 Type II, Class 1, Grade 1. The foam plastic has a flame spread index of less 25 or less under ASTM E 84.

4.3 Fire Classification and Wind Uplift Classification Testing

2001 Inc. Two-Component Sprayed in Place Fiberglass Reinforced Urethane Foam Roof Assemblies with "Equalizer Valves"™ roofing systems were tested as a roof system for fire classification in accordance with ASTM E 108 (UL Standard 790) and for wind uplift resistance in accordance with Factory Mutual Standards 4450/4470 and UL 580. The roofing systems obtained a roof classification when installed as assemblies listed in Sections 5.2 and 5.3.

5. INSTALLATION

5.1 General

2001 Inc. Two-Component Sprayed in Place Fiberglass Reinforced Urethane Foam Roof Assemblies with "Equalizer Valves"™ roofing systems shall be installed by applicators trained and authorized by the manufacturer.

The substrate to which the roof system is to be applied shall be clean, dry, and free from debris or contaminates that will interfere with the adhesion or attachment of the membrane or that will

puncture the membrane. All materials shall be protected against contact with incompatible materials.

The existing roof structure or system shall be reviewed by a structural engineer to verify that the structure to be roofed is structurally sound and properly designed to support and secure the roofing system.

The roof decking and roof framing system are not within the scope of this report. The roof decking and roof framing system shall be designed for the appropriate wind loads determined by Section 1606 of the *Standard Building Code©*.

The manufacturer's published installation instructions, Chapter 15 of the *Standard Building Code©* , and this report shall be strictly adhered to. A copy of the manufacturer's installation instructions shall be available at all times on the job site during installation.

The instructions within this report and the *Standard Building Code©* will govern if there are any conflicts between the manufacturer's instructions and this report or the code.

5.2 Roof Covering Fire Classifications

The 2001 Inc. Two-Component Sprayed in Place Fiberglass Reinforced Urethane Foam Roof Assemblies with "Equalizer Valves"™ roofing systems are classified as Class A, B or C roof coverings under ASTM E 108, UL 790 when installed in accordance with their UL Fire Classification Listing or FM Fire Classification Listing.

The wind assemblies listed in 5.3 are considered Class A roof covering assemblies.

5.3 Wind Uplift Resistant Assemblies

Assembly No. 1.
Uplift resistance:
Maximum allowable = 112.5 psf, ¼" slope

Deck: Steel, min No. 22 MSG, side-lap and butt seams sealed with two-component spray applied foam plastic.
Insulation: Two-component spray applied foamed plastic min 1 in. thick sprayed over 2001 Reinforced Fiberglass Mesh (not UL Classified) stretched across steel deck.
Slip Sheet (Optional): Glass mat, paper, or board type product loose laid or mechanically fastened.
Membrane: Any UL Fire Classified Kelly Co. - 2001, Inc. waterproofing membrane, with specified adhesives and sealants.
Air Seal: The perimeter and penetrations are air sealed with a mechanically fastened, picture frame of Kelly Co. – 2001, Inc. Termination bars, consisting of a 2001 butyl rubber gasket (not UL Classified) with a nominal 5/8" by ¾" cross section and termination bars consisting of ½" wide, 6 ft. long extruded centered on the underside of the membrane on the substrate. A termination bar is fastened over the membrane to the deck with ¼" - 13 screws, to air seal the insulation and membrane, respectively.

Optional air seal termination consists of 6 in. strips of APA rated wood sheeting, 7/16" min, fastened 12 in on center, and 3 in min. No. 221 GSG steel plates and #14 roof screws, instead of termination bars.

Pressure Relief Valve: Kelly-Co. – 2001, Inc. "Equalizer Valves" placed in the wind uplift vortex intensity zones of the roof, to transfer wind generated vacuums to the air sealed substrate.

Assembly No. 2.
Uplift Resistance:
Maximum Allowable = 37.5 psf , ¼" slope

Deck: Steel, min No. 22 MSG, New Construction or reproofing over existing UL Fire Classified Roof Assembly.
Barrier Board: Loose laid or mechanically fastened ½" thick Gypsum board or ¼" thick min. G-P gypsum Dens Deck ®, or and existing UL Classified roof assembly.
Insulation: Two-Component spray-applied foamed plastic insulation formed in two or more layers, min ½" thick each with 2001 Reinforced Fiberglass mesh (not UL Classified) laid over the first layer.
Fastener: Spaced in a 3 ft by 3 ft OC grid consisting of ¼ - 13 steel screws with 3 in. min dia, No. 22 GSG steel plates secured through center of 12 by 12 1/8" hardboard bonding plates.
Membrane: Any UL Fire Classified Kelly Co. – 2001, Inc. waterproofing membrane, with specified adhesives and sealants.
Air Seal: The perimeter and penetrations are air sealed with a mechanically fastened, picture frame of Kelly Co. – 2001, Inc. Termination bars, consisting of a 2001 butyl rubber gasket (not UL Classified) with a nominal 5/8" by ¾" cross section and termination bars consisting of ½" wide, 6 ft. long extruded aluminum bars with pre-punched holes 7 in. on center. The gasket is centered on the underside of the membrane on the substrate. A termination bar is fastened over the membrane to the deck with ¼" – 13 screws, to air seal the insulation and membrane, respectively.

Optional air seal termination consists of 6 in. strips of APA rated wood sheeting, 7/16" in. min, fastened 12 in. on center, and 3 in. min No. 221 GSG steel plates and #14 screws, instead of termination bars.

Pressure Relief Valve: Kelly Co. – 2001, Inc. "Equalizer Valves," placed in the wind uplift vortex intensity zones of the roof, to transfer wind-generated vacuums to the air sealed substrate.

Assembly No. 3.
Uplift Resistance:
Maximum allowable = 37.5 psf, ¼" slope

Deck: Steel, min No. 22 MSG
Existing Roof System: Insulated or non-insulated asphalt built-up or modified bitumen membrane with smooth, granule or gravel surface (swept clean).
Insulation: Two-component spray-applied foamed plastic insulation formed in two or more layers, min ½"" thick each with 2001 Reinforced Fiberglass mesh (not UL classified) laid over first layer.
Fastener: Spaced in a 3 ft. by 3 ft. OC grid consisting of ¼" – 13 steel screws with 3 in min dia, No. 22 GSG steel plates secured through center of 12 by 12 by 1/8" hardboard bond plates.
Membrane: Any UL Fire Classified Kelly Co, - 2001, Inc. waterproofing membrane, with specified adhesives and sealants.
Air Seal: The perimeter and penetrations are air sealed with a mechanically fastened, picture frame of Kelly Co. – 2001, Inc.
Termination bars, consisting of a 2001 butyl rubber gasket (not UL Classified) with a nominal 5/8" by ¾" cross section and termination bars consisting of ½" wide 6ft. long extruded aluminum bars, with pre-punched holes 7 in. on center. The gasket is centered on the underside of the membrane on the substrate. A termination bar is fastened over the membrane to the deck with 1/4" – 13 screws, to air seal the insulation and membrane, respectively.

Optional air seal termination consists of 6 in. strips of APA rated wood sheeting. 7/16" in. min, fastened 12 in. on center, and 3 in. min No. 22 GSG steel plates and #14 roof screws, instead of termination bars.

Pressure Relief Valves: Kelly Co. – 2001, Inc. "Equalizer Valves," placed in the wind up lift vortex intensity zones of the roof, to transfer wind-generated vacuums to the air sealed substrate.

Assembly No. 4.
Uplift Resistance:
Maximum Allowable = 52.5 psf, ¼" slope

Deck: Steel, min No. 22 MSG
Existing Roof System: Insulated or non-insulated asphalt built-up or modified bitumen membrane with smooth granule or gravel (swept clean).
Insulation: Two-component spray-applied foamed plastic insulation formed in two or more layers, min ½" thick each with 2001 Reinforced Fiberglass mesh (not UL Classified) laid over the first layer.
Fasteners: Rows spaced 3 ft. OC. Each row consists of ¼ - 13 steel screws, spaced 3 ft. OC, with 4 in. min dia No. 22 GSG steel plates. Every other fastener also secured through center of 12 by 12 by 1/8" in hard board bond plate.
Membrane: Any UL Fire Classified Kelly Co. – 2001, Inc. waterproofing membrane, with specified adhesives and sealants.
Air Seal: the perimeter and penetrations are air sealed with a mechanically fastened, picture frame of Kelly Co. – 2001, Inc. termination bars, consisting of a 2001 butyl rubber gasket (not UL Classified) with a nominal 5/8" in. by ¾" in. cross section and termination bars consisting of ½" wide, 6 ft. long extruded aluminum bars, with pre-punched holes 7 in. on center. The gasket is centered on the underside of the membrane on the substrate. A termination bar is fastened over the membrane to the deck with ¼" – 13 screws, to air seal the insulation and membrane, respectively.

Optional air seal termination consists of 6 in. strips of APA rated wood sheeting, 7/16" min, fastened 12 in. on center, and 3 in. min No. 22 GSG steel plates and #14 roof screws, instead of termination bars.

Pressure Relief Valve: Kelly Co. – 2001, Inc. "Equalizer Valves," placed in the wind uplift vortex intensity zones of the roof, to transfer wind-generated vacuums to the air sealed substrate.

Assembly No. 5.
Uplift Resistance:
Maximum Allowable = 60 psf, ¼" Slope

Deck: Min 15/32 in. APA rated plywood sheathing, 32/16.
Insulation: Two-component spray-applied foamed plastic insulation formed in two or more layers, min ½ in. thick, with 2001 Reinforced Fiberglass mesh (not UL Classified) laid over first layer.
Membrane: Any UL Fire Classified Kelly Co. – 2001, Inc. waterproofing membrane, with specified adhesives and sealants.
Air Seal: The perimeter and penetration are air sealed with a mechanically fastened, picture frame of Kelly Co – 2001, Inc, termination bars consisting of a 2001 butyl rubber gasket (not UL Classified) with a nominal 5/8" by ¾" cross section and termination bars consisting of ½" wide, 6 ft. long extruded aluminum bars, with pre-punched holes 7 in. on center. The gasket is centered on the underside of the membrane on the substrate. A termination bar is fastened over the membrane to the deck with ¼-13 screws to air seal to the insulation and membrane, respectively.

Optional air seal termination consists of 6 in. strips of APA rates wood sheeting, 7/16 in. min fastened 12 in on center, and 3 in min No. 22 GSG steel plates and #14 screws, instead of termination bars.

Pressure Relief Valve: Kelly Co. – 2001, Inc. "Equalizer Valves," placed in the wind uplift vortex intensity zones of the roof, to transfer wind-generated vacuums to the air sealed substrate.

Assembly No. 6.
Uplift Resistance:
Maximum Allowable = 22.5 psf, ¼" slope

Deck: Min 15/32 in. APA rated plywood sheathing, 32/16.
Existing Roof Systems: Insulated or non-insulated asphalt built-up or modified bitumen membrane with smooth, granule or gravel (swept clean).
Insulation: Two-component spray-applied foamed plastic min 1 in. thick.
Fasteners: Spaced 4 by 4 ft. of OC grid consisting of ¼- 13 steel screws with 3 in min dia. No. 22GSG steel plates secured through center of 12 by 12 by 1/8 in. hardboard bond plates. In addition, a ¼- 13 steel screw with 3 in. min diam No. 22 GSG steel plate is located at the center of each 4 by 4 grid.
Membrane: Any UL Fire Classified Kelly Co.- 2001, Inc. waterproofing membrane, with specified adhesives and sealants.
Air Seal: The perimeter and penetrations are air sealed with a mechanically fastened, picture frame of Kelly Co. – 2001, Inc. termination bars, consisting of a 2001 butyl rubber gasket (not UL Classified) with a nominal 5/8" by ¾" cross section and termination bars consisting of ½" wide, 6 ft long extruded aluminum bars, with pre-punched holes 7 in. on center. The gasket is centered on the underside of the membrane on the substrate. A termination bar is fastened over the membrane to the deck with ¼- 13 screws, to air seal to the insulation and membrane, respectfully.

Optional air seal termination consists of 6 in. strips of APA rates wood sheeting, 7/16 in. min fastened 12 in on center, and 3 in min No. 22 GSG steel plates and #14 roof screws, instead of termination bars.

Pressure Relief Valve: Kelly Co. – 2001, Inc. "Equalizer Valves," placed in the wind uplift vortex intensity zones of the roof, to transfer wind-generated vacuums to the air sealed substrate.

Assembly No. 7.
Uplift Resistance:
Maximum Allowable = 127. 5 psf, ¼" slope

Deck: Steel, min No.22 MSG, side-lap and butt seam sealed over side laps, and into butt seams on roof deck, and under nailers, curbs, and through roof penetrations.
Insulation: 2 in. (min) thick one-pound density expanded or extruded polystyrene, or 1.5 in (min) Isocyanurate insulation boards, embedded in a layer of 2001 Co. slow0rise adhesive foam during the curing process.
Slip Sheets and cover boards (Optional): Glass mat, spun-bound polyester, or nylon mat, poly-films, gypsum, or fiber board, or additional layer of two-component spray applied foam plastic.
Membrane: Any UL Fire Classified Kelly Co.- 2001, Inc. waterproofing membrane, with specified adhesives and sealants.
Air Seal: The perimeter and penetrations are air sealed with a mechanically fastened, picture frame of Kelly Co. – 2001, Inc.

termination bars, consisting of a 2001 butyl rubber gasket (not UL Classified) with a nominal 5/8" by ¾" cross section and termination bars consisting of ½" wide, 6 ft long extruded aluminum bars, with pre-punched holes 7 in. on center. The gasket is centered on the underside of the membrane on the substrate. A termination bar is fastened over the membrane to the deck with ¼- 13 screws, to air seal to the insulation and membrane, respectfully.

Optional air seal termination consists of 6 in. strips of APA rates wood sheeting, 7/16 in. min fastened 12 in on center, and 3 in min No. 22 GSG steel plates and #14 roof screws, instead of termination bars.

Pressure Relief Valve: Kelly Co. – 2001, Inc. "Equalizer Valves," placed in the wind uplift vortex intensity zones of the roof, to transfer wind-generated vacuums to the air sealed substrate, for added wind protection and moisture venting.

6. SUBSTANTIATING DATA

6.1 Manufacturer's specifications, drawings, and installation instructions.

6.1.1 Architectural Guide Specification 2001 Company Slow Rise Adhesive Foam Wind Uplift Vented Roof Assembly EPDM for New Construction - Metal Deck

6.1.2 Installation Procedure, 2001 Co., Two-Component Sprayed in Place Fiberglass Reinforce Urethane Foam Roof Assembly, 1-7-03.

6.2 Test report on uplift resistance of pressure release valve system, Underwriters Laboratories, Inc., File R9734, Project 98NK8094, January 12, 1999, signed by Greg Rezek and James Hatcher.

6.3 Test report on physical properties of EPDM membrane under ASTM D 4637, Underwriters Laboratories Inc., File R8103, Project 98NK7358, October 7, 1998, signed by William G. Marshall and James W. Hatcher.

6.4 Test report on physical properties of non-reinforced and reinforced EPDM membranes under ASTM D 4637, Architectural Testing, Report No. 01-37103.02, dated 3/21/01, signed by Joseph M. Brickner and Todd D. Burroughs.

6.5 Letter report, calculations for placement of Equalizer Valves in a 2001 Co. wind-vented roof assembly, prepared by James T. Kelly, Jr., P.E., P.C., Architect/Engineer, January 27, 2004, signed and sealed by James T. Kelly, Jr., P.E., R.A.

6.6 Letter report on roof covering fire classifications, Underwriters Laboratories Inc., R9734, February 3, 2004, signed by Douglas C. Miller. Includes current listing sheets, TGFU.R9734, Kelly C. -2001 Inc.

6.7 Test report for roof covering fire classification testing under ASTM E 108, Underwriters Laboratories Inc., File R9734, Project 98NK8095, September 17, 2002, signed by Douglas C. Miller and Kenneth D. Rhodes.

7. CODE REFERENCES

Standard Building Code - 1999 Edition

Section 103.7	Alternate Materials and Methods
Section 505	Buildings Located Within A Fire District
Chapter 15	Roof Assemblies and Rooftop Structures
Section 1503	Weather protection
Section 1504	Performance Requirements
Section 1505	Fire Classification
Section 1506	Materials
Section 1508	Roof Coverings with Slopes Less than 2:12
Section 1508.6	Thermoset Single-Ply Roofing
Section 1509	Roof Insulation
Section 1510	Reroofing
Section 1606	Wind Loads
Section 2603	Foam Plastic Insulation
Section F102.2	Other Specific Requirements (Fire Districts)

Florida Building Code-Building - 2001 Edition

Section 103.7	Alternate Materials and Methods
Chapter 15	Roof Assemblies and Rooftop Structures
Section 1503	Weather protection
Section 1504	Performance Requirements
Section 1505	Fire Classification
Section 1506	Materials
Section 1508	Roof Coverings with Slopes Less than 2:12
Section 1508.6	Thermoset Single-Ply Roofing
Section 1509	Roof Insulation
Section 1510	Reroofing
Section 1606	Wind Loads
Section 2603	Foam Plastic Insulation

8. COMMITTEE FINDINGS

The Subcommittee on Evaluation in review of the data submitted finds that, in their opinion, 2001 Inc. Two-Component Sprayed in Place Fiberglass Reinforced Urethane Foam Roof Assemblies with "Equalizer Valves"™ as described in this report conform with or are suitable alternates to that specified in the *Standard Building Code©* and the Florida Building Code-Building or Supplements thereto.

9. LIMITATIONS

9.1 This Legacy Evaluation Report and the installation instructions, when required by the building official, shall be submitted at the time of permit application.

9.2 The roofing system shall be installed only by 2001 Inc. certified installers.

9.3 The roofing system shall not be installed in temperatures below 50° F (10° C).

9.4 Evaluation of insulation material in fire-rated assemblies is outside the scope of this evaluation report.

9.5 All insulation materials used in the roofing system shall have a flame spread index (FSI) of not more than 75 when tested in the maximum thickness intended for use under ASTM E 84.

9.6 Foam plastic insulation used in the roof covering system shall be protected from the interior of the building by an approved thermal barrier providing a minimum 15 minute protection, except where the wood deck complies with the requirements of Chapter 26 of the *Code*. Additionally,

the edge or face of each piece of foam plastic insulation shall bear the label of an approved agency showing either the flame-spread index (FSI) and smoke development index (SDI) of the product at the thickness tested or the use for which the product has been listed.

9.7 The roof systems shall not be used in areas where the design wind uplift pressures exceed the maximum allowable uplift pressures listed under Section 5.3 Wind Resistant Assemblies of this report. Additionally, special wind load considerations, such as exposure category, importance factor, building location and building height are outside the scope of this report. These items shall be addressed by the registered design professional who is specifying the roof membranes referenced herein.

9.8 When applied over existing roofs, documentation of the wind uplift resistance of the roof construction shall be submitted to the authority having jurisdiction. The existing deck shall be reviewed by a structural engineer to verify that the structure to be roofed is structurally sound, has not deteriorated and does not have two or more applications of any roof covering.

9.9 The roof systems shall not be installed on roofs having slopes exceeding those specified under Section 4.0 INSTALLATION.

9.10 Adhesives shall be applied in accordance with the manufacturer's requirements and within the weather limitations prescribed by the manufacturer.

9.11 Openings, penetration and terminations of the roof covering shall be flashed and made weathertight in accordance with the requirements of the membrane manufacturer and the applicable Code.

10. IDENTIFICATION

Packaging of the components for the 2001 Inc. Two-Component Sprayed in Place Fiberglass Reinforced Urethane Foam Roof Assemblies with "Equalizer Valves"™ Roofing Systems shall bear the manufacturer's name and/or trademark, date of manufacture, SBCCI Public Safety Testing and Evaluation Services, Inc.'s seal or initials (SBCCI ES), and the number of this report for field identification.

11. PERIOD OF ISSUANCE

SEE THE CURRENT EVALUATION REPORT INDEX FOR STATUS OF THIS LEGACY EVALUATION REPORT.

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