



ICC Evaluation Service, Inc.
www.icc-es.org

Business/Regional Office ■ 5360 Workman Mill Road, Whittier, California 90601 ■ (562) 699-0543
Regional Office ■ 900 Montclair Road, Suite A, Birmingham, Alabama 35213 ■ (205) 599-9800
Regional Office ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 799-2305

The Subcommittee on Evaluation has reviewed the data submitted for compliance with the *Standard Building Code*® and the *CABO One and Two Family Dwelling Code* and submits to the Building Official or other authority having jurisdiction the following report. The Subcommittee on Evaluation, 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. Portions of this report were previously included in Evaluation Report #9364.

REPORT NO.: 9594

EXPIRES: See the current EVALUATION REPORT INDEX

CATEGORY: ROOF COVERING AND ROOF DECK CONSTRUCTION

SUBMITTED BY:

FLEX MEMBRANE INTERNATIONAL, INC.
2670 LEISCZ'S BRIDGE ROAD
SUITE 400
LEESPORT, PENNSYLVANIA 19533-9433

1. PRODUCT TRADE NAME

Flex Membrane International: Flex FB Elvaloy, Flex MF/R Elvaloy, and Flex MF/FR PVC Roof Covering Systems.

2. SCOPE OF EVALUATION

- Weather Resistance
- Fire Classification
- Wind Uplift Resistance

3. USES

Flex Membrane International's Flex FB Elvaloy, Flex MF/R Elvaloy, and Flex MF/FR PVC Roof Covering Systems are used as single ply roof covering systems on new and existing roofs.

4. DESCRIPTION

4.1 Flex FB Elvaloy

Flex FB Elvaloy is a thermoplastic membrane, based on DuPont's Elvaloy with a synthetic backing. The membrane is designed to be used in adhered roofing systems. The roofing membrane is 1.25 mm (45 mil) thick and the synthetic backing is 4.5 oz/yd² (153g/m²).

4.2 Flex MF/R Elvaloy

Flex MF/R Elvaloy is a PVC roofing membrane designed to be mechanically fastened to the substrate. This roofing membrane is a 1.20 mm (40 mil) thick and single ply flexible PVC sheet reinforced with synthetic fibers. The rolls measure 1.5 m (60 in) wide by 18 m (60 ft) long.

4.3 Flex MF/FR

Flex MF/FR is a 1.50 mm (60 mil) thick PVC roofing membrane reinforced with synthetic fibers. The membrane is designed to be mechanically fastened to the roof substrate. The rolls measure 1.5 m (60 in) wide by 18 m (60 ft) long.

5. INSTALLATION

5.1 General

The Flex FB Elvaloy, Flex MF/R Elvaloy, and Flex MF/FR PVC Roof Covering Systems shall be installed by approved, trained Flex Membrane International roofing contractors in accordance with the manufacturer's published installation instructions, this report, and Chapter 15 of the *Standard Building Code*. Copies of these instructions shall be available at all times on the jobsite during installation. Should there be any conflict between the manufacturer's instructions and this report, the provisions of this report and Chapter 15 of the *Standard Building Code* will govern.

5.2 Fire Classification and Wind Uplift Resistance

The following products meet the ASTM E 108 requirements for Class A roof coverings and Factory Mutual Research Corporation's requirements for a FM I-60 or I-90 windstorm resistance classification:

5.2.1 Flex FB Elvaloy

Deck: 18-20-22 ga. steel or Celcore
Incline: 1/2:12 (maximum)
Insulation: Minimum 1 inch (25 mm) thick FMRC-Approved insulation*
Membrane: Flex FB Elvaloy

The insulation is attached to the deck with either Roofgrip, Dekfast, Dekfast P, Insulfixx S, Insulfixx P, HD Insulfixx, Fabco Type R, Insultite, or Gafite fasteners applied at a rate of one fastener per 2 ft² (0.2 m²). The Flex FB Elvaloy is then totally adhered to the top surface of the insulation with a full mop [20-25 lb/sq ft (9.1-11.3 kg/9.3 m²)] of hot asphalt.

Flex FB Elvaloy can also be adhered to an insulation tested with the assembly with 0032 Rubber Emulsion Adhesive

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manufactured by Monsey Products Co. of Kimberton, PA. The adhesive shall be applied to the insulation with a brush, roller, or squeegee at a rate of approximately 1 gal/60 ft² (0.7 l/m²).

When used over cementitious surfaces, the surface must be primed with a solvent based, asphalt cutback primer manufactured by Monsey Products Co. applied with a brush or sprayed at a rate of 3/4 gal/100 ft² (0.31 l/m²).

* FMRC Approved Insulation

**Wood fiber Multi Max E"NRG"Y-1 Energy Lok Hy-Tec Hy-Therm AP Isotherm R	**ARCO Insulation System **BASF Insulation System **Perlite/urethane composite Perlite/Urethane Top R II Ultragard Gold FMRC Approved Perlite
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** For use with asphalt only.

5.2.2 Flex MF/R Elvaloy and Flex MF/FR

Deck: 18-20-22 ga. steel
Incline: 1/2:12 (maximum)
Insulation: FMRC-Approved insulation*
Membrane: Flex MF/R Elvaloy or Flex MF/FR

The FMRC-Approved roof insulation is mechanically fastened to the deck using two FMRC Approved fasteners for all insulation panels up to 4 ft x 4 ft (1.2 m x 1.2 m) and four FMRC listed fasteners for all insulation panels between 4 ft x 4 ft (1.2 m x 1.2 m) and 4 ft x 8 ft (1.2 m x 2.4 m).

The Flex MF/R Elvaloy and Flex MF/FR membranes are laid out loosely and then secured to the steel deck through the insulation substrate using Flex Membrane 2 inch (51 mm) diameter membrane plates and No. 14 fasteners spaced 6 inches (154 mm) o.c. along the 4-3/4 inch (121 mm) lap seam in rows 55 inches (1.4 m) apart. The lap seams are heat welded on site with a 1.5 (38 mm) wide weld.

* FMRC Approved Insulation

E"NRG"Y-1 Energy Lok Hy-Tec Hy-Therm AP Isotherm R	Multi Max Perlite/Urethane Top R II Ultragard Gold FMRC Approved Perlite
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6. SUBSTANTIATING DATA

- 6.1 Manufacturer's descriptive literature, installation instructions, and specifications.
- 6.2 Test Report on Flagon MF/FR, Tri-Polymer FB, and Tri-Polymer MF/R by Factory Mutual Research, dated February 1, 1991, FMRC Standard 4470.
- 6.3 Test Report on Tri-Polymer MF/R and Flagon MF/FR Roof Cover Systems, prepared by Factory Mutual Research, Report No. J. I. 2W5A3.AM (FMRC Standard 4470), dated December 22, 1993, signed by D. A. Kettle and L. N. D'Angelo.
- 6.4 Factory Mutual Research name change agreements.
- 6.5 Copies of selected portions of FM's Approval Guide Listing.
- 6.6 Letter prepared by Factory Mutual Research, dated July 20, 1995, signed by David A. Kettle.

7. CODE REFERENCES

Standard Building Code - 1994 Edition

Section 103.7	Alternate Materials and Methods
Section 505	Buildings Located Within A Fire District
Section 1509	Roof Coverings
Section 1606	Wind Loads
Section 2603	Foam Plastic Insulation
Section F102.2	Other Specific Requirements

CABO One and Two Family Dwelling Code - 1995 Edition

Section 108	Alternate Materials and Systems
Section 317	Foam Plastic
Chapter 9	Roof Coverings

8. COMMITTEE FINDINGS

The Subcommittee on Evaluation in review of the data submitted finds that, in their opinion, Flex Membrane International's Flex FB Elvaloy, Flex MF/R Elvaloy, and Flex MF/FR PVC Roof Covering Systems as described in this report conform with or are suitable alternates to that specified in the *Standard Building Code* and the *CABO One and Two Family Dwelling Code* 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 Flex Membrane International's roofing covering systems shall be installed only by an approved Flex roofing contractor in strict accordance with the manufacturer's published installation instructions, this report, and Chapter 15 of the *Standard Building Code*.
- 9.3 Class I-90 Windstorm Resistance Classification assemblies shall not be installed in areas where the design wind uplift pressure exceeds 45 pounds per sq ft.
- 9.4 Insulation material shall not be used in fire-rated assemblies unless its performance can be established by fire tests.
- 9.5 All insulation material used in the roofing system shall have a flame spread rating of not more than 75 when tested in accordance with ASTM E 84.
- 9.6 Foam plastic insulation must be separated from the building interior by a minimum 15 minute thermal barrier.

10. IDENTIFICATION

Each package of roofing material shall bear the manufacturer's name and/or trademark, the SBCCI Public Safety Testing and Evaluation Services, Inc. Seal, 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.

For information on this report contact:
Gary G. Nichols, P.E.
205/599-9800