

ICC-ES Evaluation Report

ESR-4668

Reissued August 2024


This report also contains:

- CBC Supplement

Subject to renewal August 2025

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<p>DIVISION: 07 00 00— THERMAL AND MOISTURE PROTECTION</p> <p>Section: 07 56 00— Fluid-Applied Roofing</p> <p>Section: 07 57 00— Coated Foam Roofing</p>	<p>REPORT HOLDER:</p> <p>CONKLIN COMPANY, INC.</p>	<p>EVALUATION SUBJECT:</p> <p>BENCHMARK® AND PUMA® XL ROOF COATING SYSTEMS</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018 and 2015 [International Building Code® \(IBC\)](#)

Properties evaluated:

- Physical properties
- Fire classification
- Wind resistance
- Impact resistance

2.0 USES

The Benchmark® and PUMA® XL roof coating systems described in this evaluation report are used in the construction of classified roof coverings as noted in Tables 1 and 2. The roof covering systems described in this report may be used on buildings of any type of construction.

3.0 DESCRIPTION

3.1 General:

The Benchmark® and PUMA® XL roof coating systems consists of a liquid-applied coating applied over spray-applied polyurethane foam plastic insulation as described in Section 3.3 and 4.4.1 of this report. When installed in accordance with Section 4.0 of this report, the coated foam roof systems have a fire classification as described in Table 1.

The Benchmark® and PUMA® XL roof coating systems consists of a liquid-applied coating applied with or without the reinforcing fabric described in Section 3.4. When installed in accordance with Section 4.0 of this report, the liquid-applied roof systems have a fire classification as described in Table 2.

3.2 Coatings:

3.2.1 Benchmark® Roof Coating: The Benchmark® roof coating is an elastomeric acrylic roof coating complying with ASTM D6083, Type I. The coating is used as a base coating and surface coating. The coating must be stored in tightly closed containers at temperatures no less than 40°F (4.4°C). Benchmark® roof coating is available in white.

3.2.2 PUMA® XL Roof Coating: The PUMA® XL roof coating is a polyurethane modified acrylic roof coating complying with ASTM D6083, Type I. The coating is used as a surface coating. The coating must be stored in tightly closed containers at temperatures no less than 40°F (4.4°C). PUMA® XL roof coating is available in white.

3.3 Spray-applied Foam Plastic Insulation:

3.3.1 BASF Corporation FE348® Series: BASF Corporation FE348® Series (FE348®-2.8 and FE-348®-3.0) are two-component, spray-applied, foam plastic insulations complying with ASTM C1029, Type III, and are produced in densities of 2.8 and 3.0 pcf (44.8 and 48.0 kg/m³), respectively. The foam plastic insulations have a flame-spread index of 75 or less when tested in accordance with ASTM E84 (UL 723) at a maximum thickness of 2.0 inches (51 mm). The foam plastic ingredients (Component A and Component B) are available in 55-gallon (208 L) containers and have a shelf life of three months, when stored unopened at temperatures between 50°F and 80°F (10°C and 26.7°C). BASF Corporation FE348® Series foam plastic insulations are described in [ESR-2298](#).

3.4 Reinforcement:

The fabric reinforcements, Spunflex and Spunflex II Fabric manufactured by Conklin Company, Inc., are a 2.24-ounce-per-square-yard (76 g/m²) and 4.75-ounce-per-square-yard (161.1 g/m²), respectively, knitted polyester, as referenced in Tables 2 and 3.

3.5 Impact Resistance:

The Benchmark® and PUMA® XL roof coating systems described in this report meet the requirements of the Resistance to Foot Traffic Test described in Section 4.6 of FM 4470, as referenced in 2021 IBC Section 1504.8 (2018 and 2015 IBC Section 1504.7).

4.0 INSTALLATION

4.1 Preparation of Substrates:

The substrates to be covered must be free of grease, oil, loose particles, moisture, or any other substances that might interfere with the bond between the foam plastic insulation and the substrate, or between the coating and the substrate. Areas not receiving foam plastic insulation must be masked off or otherwise protected from overspray. Substrates must be prepared in accordance with the spray-applied foam plastic insulation manufacturer's published installation instructions for foam roofing applications or the report holder's published installation instructions when spray-applied foam plastic insulation is not used.

The existing code-complying roof system, if any, must be repaired and made sound and watertight prior to application of the spray-applied foam plastic insulation and roof coatings or liquid-applied roof system. All loose gravel, dirt, dusts, and foreign debris is removed by vacuum, sweeping or power blower. The entire existing roof surface must be washed in accordance with the report holder's published installation instructions to ensure a positive attachment of the coating system.

4.2 Roof Deck Substrates:

4.2.1 Combustible Substrates: Combustible substrates must be minimum ¹⁵/₃₂-inch-thick (11.9 mm), code-complying, exterior-grade, or Exposure 1 plywood. When foam plastic insulation is used, all plywood edges must be supported by blocking or have tongue-and-groove joints in accordance with IBC Section 2603.4.1.5.

4.2.2 Noncombustible Substrates:

4.2.2.1 Concrete Substrates: Structural concrete substrates must have a minimum compressive strength (f_c) of 2500 psi (17.2 MPa).

4.2.2.2 Metal Substrates: Metal substrates must be minimum No. 22 gauge galvanized steel deck [thickness 0.030 inch (0.76 mm)].

4.3 Roof Slopes:

The roofing systems must be applied to provide a minimum slope of ¹/₄:12 (2 percent) and a maximum slope as specified in Tables 1 and 2.

4.4 Application:

4.4.1 Spray-applied Foam Plastic Insulation:

Spray-applied foam plastic insulation must be BASF Corporation FE348® Series described in [ESR-2298](#).

The insulation components must be dispensed at a 1:1 ratio at the temperature and pressures specified in the insulation manufacturer's published installation instructions. Application of the insulation must be as described in the insulation manufacturer's ICC-ES evaluation report [ESR-2298](#).

The total finished thickness of the spray-applied foam plastic insulation specified in Table 1 must be achieved within the same day. The finished surface of the foam plastic insulation must be smooth and free of voids, pinholes, and crevices

4.4.2 Application of Benchmark® and PUMA® XL Coatings:

The coatings must be applied in one or two coats (base coat and surface coat) at the application rate or wet film thickness (WFT) specified in Table 1, 2 or 3, as applicable. The ambient temperature during application must be a minimum of 50°F (10°C) and a maximum of 120°F (49°C). When applied over spray-applied foam plastic insulation, the coating must be applied not less than 2 hours nor more than 72 hours following application of the insulation.

4.5 Fire Classification:

4.5.1 New Construction: The roof covering systems, noted in Tables 1 and 2, are classified roof coverings in accordance with ASTM E108 or UL 790.

4.5.2 Reroofing: Prior to installation of the new roof covering system over the existing roof system, inspection in accordance with 2021 IBC Section 1512 (2018 and 2015 IBC Section 1511), and approval from the code official having jurisdiction, are required. Installation must be over existing uninsulated systems only.

4.6 Wind Resistance:

The allowable wind uplift pressures for the Benchmark® and PUMA® XL roof coating systems described in this report are limited to that permitted by the code for the roof deck and structural framing, except as noted in Table 3.

5.0 CONDITIONS OF USE:

The Benchmark® and PUMA® XL roof coating systems described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The installation and application of the roof coating systems must comply with the applicable code, the report holder's published installation instructions, and this report. If there are any conflicts between the report holder's installation instructions and this report, this report governs.
- 5.2 Installation of the coatings must be by applicators approved by Conklin Company, Inc.
- 5.3 Where moderate or heavy foot traffic occurs for maintenance of equipment, or is otherwise necessary, the roof covering system must be adequately protected to prevent rupture or wearing of the surface.
- 5.4 The allowable wind uplift pressures listed in Table 3 are for the roof coverings only. The deck and supporting structure to which the roof covering is attached must be designed to withstand the applicable wind pressure determined in accordance with ASCE 7 or 2021 and 2018 IBC Section 1609 (2015 Section 1609.6).
- 5.5 When application is over existing roofs, documentation of wind-uplift resistance of the composite roof construction must be submitted to the code official for approval at the time of permit application.
- 5.6 Foam plastic insulation must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2603.4.
- 5.7 Flashing, when required, must be installed in accordance with IBC Section 1503.2.
- 5.8 Use of the foam plastic insulation as a vapor retarder is outside the scope of this report. If required, a vapor retarder must be installed in accordance with the applicable code.
- 5.9 The Benchmark® and PUMA® XL roof coatings are manufactured in Shakopee, Minnesota under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Reports of testing in accordance with ASTM D6083.
- 6.2 Reports of accelerated weathering test in accordance with 2021 IBC Section 1504.7 [2018 and 2015 IBC Section 1504.6].
- 6.3 Reports of "Resistance to Foot Traffic Test" in accordance with Section 4.6 of FM 4470.
- 6.4 Reports of roof classification tests in accordance with ASTM E108 (UL 790).
- 6.5 Reports of wind uplift resistance tests in accordance with UL1897.

7.0 IDENTIFICATION

7.1 Product labeling shall include, the name of the report holder, and the ICC-ES mark of conformity. The listing or evaluation report number (ICC-ES ESR-4668) may be used in lieu of the mark of conformity. Each container of Benchmark® and PUMA® XL are labeled with the manufacturer’s name (Conklin Company Inc.) and address, the product designation, the evaluation report number (ESR-4668), the date of manufacture, the shelf life, and the batch number.

Each container of BASF Corporation FE348® Series spray-applied polyurethane foam plastic insulation must be labeled in accordance with Section 7.0 of the ICC-ES evaluation report number [ESR-2298](#).

7.2 The report holder’s contact information is the following:

CONKLIN COMPANY, INC.
551 VALLEY PARK DRIVE
SHAKOPEE, MINNESOTA 55379
(952) 445-6010
www.conklin.com
jeff.laikind@conklin.com

TABLE 1 –FIRE CLASSIFICATION – COATED FOAM ROOF SYSTEMS

SYSTEM NO.	FIRE CLASS	ROOF DECK ^{1,2}	MAX SLOPE	SPRAY-APPLIED FOAM PLASTIC INSULATION ^{3,4}		COATING		TOP SURFACING
				Designation	Thickness (inches)	Base Coat	Surface Coat	
1	A	Noncombustible	2 ¹ / ₂ :12	BASF FE348®-2.8	1 to 2 inches	Benchmark® applied at 1.5 gallons per 100ft ²	PUMA XL applied at 1.5 gallons per 100 ft ²	---
2	A	Noncombustible	2:12	BASF FE348®-3.0	1 to 2 inches	---	PUMA XL applied at 1.5 gallons per 100 ft ²	---

For SI: 1 inch = 25.4 mm; 1 gallon per 100 ft² =0.41 L/m²; 1 gallon = 3.785 L; 1 ft² = 0.0929 m²

¹Roof deck must be either minimum No. 22 gauge galvanized steel [0.030 inch (76 mm)] or concrete with a minimum compressive strength of 2500 psi as specified in Section 4.2.

²Unless otherwise noted, noncombustible substrates include concrete, light weight concrete, and steel decks.

³All foam plastic insulation must be UL classified foam plastic insulation and must be limited to the maximum thickness specified for the applicable system. Any foam plastic insulation, where used, must bear the label of an approved agency indicating that the foam plastic insulation has a flame-spread index of not more than 75 when tested at the maximum thickness intended for use in accordance with ASTM E84 (UL723), subject to the approval of the code official.

⁴Foam plastic insulation must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2303.4.1.5, except when specifically described in an ICC-ES evaluation report.

TABLE 2 – FIRE CLASSIFICATION – LIQUID-APPLIED ROOF SYSTEMS

SYSTEM NO.	ROOF CLASS	ROOF DECK ^{1,2,3}	MAX SLOPE	INSULATION BOARD ^{4,5,6}	COATING			TOP SURFACING
					Base Coats		Surface Coat	
1	A	Noncombustible	1½:12	1 to 2-inch-thick Atlas Roofing ACFoam II or ACFoam III	Benchmark® at 1.5 gallons per 100 ft² with polyester mat with 4-inch-wide laps embedded between coating layers	Benchmark® at 0.5 gallons per 100 ft²	Benchmark® or PUMA® XL at 1.5 gallons per 100 ft²	No. 11 roofing granules at 50 lb/100ft²
2	A	Combustible with joints covered with double layer of 2 mil thick and 3-inch wide aluminum foil stapled at 12-inches o.c.	1½:12	1 to 2-inch-thick Atlas Roofing ACFoam II or ACFoam III mechanically fastened. Joints caulked with Conklin KWIK KAULK	Benchmark® at 1.5 gallons per 100 ft² with polyester mat with 4-inch-wide laps embedded between coating layers	Benchmark® at 0.5 gallons per 100 ft²	Benchmark® or PUMA® XL at 1.5 gallons per 100 ft²	No. 11 roofing granules at 50 lb/100ft²
3	A	Combustible with joints covered with double layer of 2 mil thick and 3-inch wide aluminum foil stapled at 12-inches o.c.	1:12	1-inch-thick Perlite mechanically fastened followed by 1-inch-thick Atlas Roofing ACFoam II or ACFoam III mechanically fastened. Joints caulked with Conklin KWIK KAULK	Benchmark® at 1.5 gallons per 100 ft² with polyester mat with 4-inch-wide laps embedded between coating layers	Benchmark® at 0.5 gallons per 100 ft²	Benchmark® or PUMA® XL at 1.5 gallons per 100 ft²	(Optional) No. 11 roofing granules at 50 lb/100ft²
4	A	Noncombustible	2:12	1-inch-thick Perlite mechanically fastened followed by 1-inch-thick Atlas Roofing ACFoam II or ACFoam III mechanically fastened. Joints caulked with Conklin KWIK KAULK	Benchmark® at 1.5 gallons per 100 ft² with polyester mat with 4-inch-wide laps embedded between coating layers	Benchmark® at 0.5 gallons per 100 ft²	Benchmark® or PUMA® XL at 1.5 gallons per 100 ft²	(Optional) No. 11 roofing granules at 50 lb/100ft²
5	A	Noncombustible	1½:12	---	Benchmark® at 2 gallons per 100 ft² on longitudinal seams with one ply polyester fabric embedded in coating. Benchmark® at 2 gallons per 100 ft² applied at end seams with one ply of Conklin Spunflex II polyester fabric embedded in coating.	Benchmark® at 2 gallons per 100 ft² with one ply of polyester embedded in coating	Benchmark® or PUMA® XL at 1.5 gallons per 100 ft²	---

For SI: 1 inch = 25.4 mm; 1 gallon per 100 ft² = 0.41 L/m²; 1 gallon = 3.785 L; 1 ft² = 0.0929 m²

¹Roof deck must be either minimum 15/32-inch-thick (11.9 mm) plywood, minimum No. 22 gauge galvanized steel [0.030 inch (76 mm)] or concrete with a minimum compressive strength of 2500 psi as specified in Section 4.2.

²Noncombustible deck classifications are applicable for use over combustible decks (min. 15/32-inch-thick plywood), when minimum 1/2-inch-thick Type X gypsum board or minimum 1/4-inch-thick “Georgia-Pacific Corp.” DensDeck is used directly over the combustible deck with all joints staggered a minimum of 6 inches from plywood joints.

³Unless otherwise noted, noncombustible substrates include concrete, light weight concrete, and steel decks.

⁴All foam plastic insulation must be UL classified foam plastic insulation and must be limited to the maximum thickness specified for the applicable system. Any foam plastic insulation, where used, must bear the label of an approved agency indicating that the foam plastic insulation has a flame-spread index of not more than 75 when tested at the maximum thickness intended for use in accordance with ASTM E84 (UL723), subject to the approval of the code official.

⁵Foam plastic insulation must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2303.4.1.5, except when specifically recognized in an ICC-ES evaluation report.

⁶Polyisocyanurate insulation board must comply with ASTM C1289. Perlite board must comply with ASTM C728.

TABLE 3—WIND RESISTANCE OF COATED ROOF FLUID APPLIED ROOFING SYSTEMS

SYSTEM NO.	ROOF DECK	INSULATION			COATINGS		ALLOWABLE UPLIFT CAPACITY (psf)
		Insulation Board Type, Minimum Thickness ^{1,2}	Attachment	Seams Treatment	Base Coat	Surface Coat	
W1	Min. 15/32-inch plywood	Min. 2-inch-thick polyisocyanurate	Turfast #12DP with Trufast 3" metal insulation plate spaced 32 inches staggered o.c., fasteners and joints must be sealed with Conklin KWIK KAULK	Min 24 mil (WFT) Benchmark [®] on seams followed by Spunflex Fabric with min. 4-inch-wide laps topped with 8 mil (WFT) Benchmark [®]	Min. 24 mil (WFT) Benchmark [®] followed by Spunflex Fabric with min. 2-inch overlap	Min. 27 mil (WFT) Benchmark [®]	105
W2	Min. 15/32-inch plywood	Min. 2-inch-thick polyisocyanurate	Turfast #12DP with Trufast 3" metal insulation plate spaced 32 inches staggered o.c., fasteners and joints must be sealed with Conklin KWIK KAULK	Min 24 mil (WFT) Benchmark [®] on seams followed by Spunflex Fabric with min. 4-inch-wide laps topped with 8 mil (WFT) Benchmark [®]	Min. 24 mil (WFT) Benchmark [®] followed by Spunflex Fabric with min. 2-inch overlap	Min. 27 mil (WFT) PUMA [®] XL	97.5
W3	Min. 3000 psi concrete over min. 22 ga., Type B, Grade 33 Steel	Min. 2-inch-thick polyisocyanurate	Turfast #12DP with Trufast 3" metal insulation plate spaced 32 inches staggered o.c., fasteners and joints must be sealed with Conklin KWIK KAULK	Min 24 mil (WFT) Benchmark [®] on seams followed by Spunflex Fabric with min. 4-inch-wide laps topped with 8 mil (WFT) Benchmark [®]	Min. 24 mil (WFT) Benchmark [®] followed by Spunflex Fabric with min. 2-inch overlap	Min. 27 mil (WFT) PUMA [®] XL	150

For SI: 1 inch = 25.4 mm; 1 gallon per 100 ft² = 0.41 L/m²; 1 gallon = 3.785 L; 1 ft = 0.0929 m²

¹Any foam plastic insulation, where used, must bear the label of an approved agency indicating that the foam plastic has a flame-spread index of not more than 75 when tested at the maximum thickness intended for use in accordance with ASTM E84 (UL723), subject to the approval of the code official. Polyisocyanurate insulation board must comply with ASTM C1289.

²Foam plastic insulation must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2303.4.1.5, except when specifically recognized in an ICC-ES evaluation report.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 56 00—Fluid-Applied Roofing
Section: 07 57 00 —Coated Foam Roofing

REPORT HOLDER:

CONKLIN COMPANY, INC.

EVALUATION SUBJECT:

BENCHMARK® AND PUMA® XL ROOF COATING SYSTEMS

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that BENCHMARK® AND PUMA® XL roof coating systems, described in ICC-ES evaluation report ESR-4668, have also been evaluated for compliance with the code noted below.

Applicable code edition:

- 2022 California Building Code (CBC)

For evaluation of applicable Chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

2.0 CONCLUSIONS**2.1 CBC:**

The BENCHMARK® AND PUMA® XL roof coating systems, described in Sections 2.0 through 7.0 of the evaluation report ESR-4668, comply with CBC Chapters 15, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of Chapters 15, 16 and 26 as applicable.

The products have not been evaluated under Chapter 7A for use in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

2.1.1 OSHPD:

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA:

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

This supplement expires concurrently with the evaluation report, reissued August 2024.