



NATURAL POLYMERS, LLC
14438 East North Avenue
Cortland, IL 60112
www.naturalpolymersllc.com

ULTRA-PURE™ OC SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:

07 21 00 Thermal Insulation

1.0 RECOGNITION

Ultra-Pure™ OC spray-applied polyurethane foam plastic insulation recognized in this report has been evaluated for use as an open-cell, spray-applied polyurethane foam plastic. The attic and crawl space installations, physical characteristics, thermal resistance (R-Values), surface burning characteristics, air permeability, spray-applied polyurethane foam plastic insulation complies with the intent of the provisions of the following codes and regulations:

- 2021, 2018, 2015, and 2012 International Building Code® (IBC)
- 2021, 2018, 2015, and 2012 International Residential Code® (IRC)
- 2021, 2018, 2015, and 2012 International Energy Conservation Code® (IECC)
- 2020 Florida Building Code, Building, (FBC, Building)-supplement attached
- 2020 Florida Building Code, Residential (FBC, Residential)- supplement attached
- 2020 Florida Building Code, Energy Conservation (FBC, Energy Conservation)- supplement attached
- System Trained Installer Program -supplement attached

2.0 LIMITATIONS

Use of the Ultra-Pure™ OC spray-applied foam insulation recognized in this report is subject to the following limitations:

2.1 The insulation shall be installed in accordance with the manufacturer's published installation instructions, this evaluation report, the System Trained Installer Program, and the applicable code. If there are any conflicts between the manufacturer's published installation instructions and this report, the more restrictive governs.

2.2 In accordance with Section 3.4 of this report, the insulation shall be separated from the interior of the building by a code complying thermal barrier.

2.3 As noted in Sections 3.4, 3.5, and 4.1 of this report, the insulation shall not exceed the nominal density and thickness.

2.4 During and after installation, the insulation shall be protected from exposure to weather and site conditions.

2.5 The contractors that will be installing the insulation shall be registered with Natural Polymers, LLC.

2.6 Use of the insulation in areas of "very heavy" termite infestation shall be in accordance with 2018 and 2015 IBC Section 2603.8, and 2012 IBC Section 2603.9, or IRC Section R318.4, as applicable.

2.7 Evaluations for the insulation for use in Type V-B construction under the IBC and dwellings under the IRC have been approved.

2.8 When required by the applicable code, a vapor retarder shall be installed.

2.9 Labeling and jobsite certification of the insulation and coatings shall comply with the following code sections as applicable:

- 2021, 2018, 2015, or 2012 IBC Section 2603.2
- 2021, 2018, 2015, or 2012 IRC Section R316.2
- 2021, 2018, and 2015 IRC Section N1101.10.1.1
- 2012 IRC Section N1101.12.1
- 2021, 2018, 2015, or 2012 IECC Section C303.1.1.1 or R303.1.1.1

2.10 The insulation is manufactured by Natural Polymers, LLC in Cortland, Illinois.

3.0 PRODUCT USE

3.1 General: Ultra-Pure™ OC spray-applied polyurethane foam plastic insulation complies with IBC Section 2603, IRC Section R316, IECC Sections C303, C402, R303, and R402. When installed in accordance with Section 4.0, Ultra-Pure™ OC spray-applied polyurethane foam plastic insulation may be used in wall cavities, floor assemblies or ceiling assemblies, or in attic and crawl spaces as nonstructural thermal insulation material. The spray-applied foam plastic insulation is used in Type V-B construction under the IBC and in one- and two-family dwellings under the IRC.

3.2 Design: Ultra-Pure™ OC spray-applied foam plastic insulation shall comply with requirements in IECC Sections C402.1 and R402. The manufacturer's published installation instructions for Ultra-Pure™ OC spray-applied foam plastic insulation and this report shall be available and strictly adhered to at all times on the jobsite during installation.

3.3 Installation: As referred to in the Natural Polymers, LLC's published installation instructions, the insulation is spray-applied on the jobsite using a volumetric positive

The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.

Copyright © 2023 by International Association of Plumbing and Mechanical Officials. All rights reserved. Printed in the United States. Ph: 1-877-4IESRPT • Fax: 909.472.4171
web: www.uniform-es.org • 4755 East Philadelphia Street, Ontario, California 91761-2816 – USA





displacement pump. The applied insulation is sprayed in multiple passes having a maximum thickness of 6 inches (152 mm) per pass for Ultra-Pure™ OC spray-applied foam plastic up to the maximum insulation thickness specified in this report. The maximum in-service temperature for all areas shall not exceed 180°F (82°C). The spray-applied foam plastic insulation shall not be used in electrical outlets or junction boxes or in contact with rain, water, or soil. The spray-applied foam plastic insulation shall be sprayed onto a substrate that is protected and clean from any debris or weather-related conditions during and after application.

3.4 Installation with an Approved Thermal Barrier:

Ultra-Pure™ OC spray-applied foam plastic insulation shall be separated from the interior by an approved thermal barrier in accordance with IBC Section 2603.4, IRC Section R316.4, as applicable. Based on testing in accordance with NFPA 286 (with the acceptance criteria of 2018 IBC Section 803.1.1.1 and 2015 and 2012 IBC Section 803.1.2.1), Ultra-Pure™ OC spray-applied foam plastic insulation at any thickness for wall cavities and for floor/ceiling cavities are recognized for use with a thermal barrier complying with and installed in accordance with IBC or IRC. Within an attic or crawl space, installation shall be in accordance with Section 3.5 of this report.

3.5 Installation for Attics or Crawl Spaces

3.5.1 Installation with a Prescriptive Ignition Barrier:

Where entry is made only for the service of utilities, Ultra-Pure™ OC spray-applied foam plastic insulation shall be installed within attics or crawl spaces with an ignition barrier in accordance with IBC Section 2603.4.1.6, or IRC Sections R316.5.3 and R316.5.4, as applicable. The maximum thickness is 5/8 inches (143 mm). The ignition barrier shall be installed in a manner such that the foam plastic insulation is not exposed and is consistent with the requirements of the type of construction required by the applicable code. Ultra-Pure™ OC insulation as described in this section may be installed in unvented attics and unvented enclosed rafter spaces in accordance with IRC Section R806.5.

3.5.2 Installation Without a Prescriptive Ignition Barrier

3.5.2.1 General: In accordance with Sections 3.5.2.2 of this report, when Ultra-Pure™ OC spray-applied foam plastic insulation is installed in attics or crawl spaces without a prescriptive ignition barrier, the following conditions apply:

- Entry is only to service utilities in the attic or crawl space and no storage is permitted.
- Attic or crawl space areas shall not be interconnected.
- Air from the attic or crawl space shall not be circulated to other parts of the building.
- Attic ventilation is provided as required by 2021 and 2018 IBC Section 1202.2, 2015 and 2012 IBC Section 1203.2, or IRC Section R806 except where air-impermeable insulation is permitted in unvented attics

and shall comply with the following code sections as applicable:

For Unvented Attics:

- 2021 and 2018 IBC Section 1202.3
- 2015 IBC Section 1203.3
- IRC Section R806.5

For Crawl Spaces:

- 2021 and 2018 IBC Section 1202.4
- 2015 IBC Section 1203.4
- 2012 IBC Section 1203.3
- IRC Section R408.1

- e. In accordance with IMC (International Mechanical Code®) Section 701, combustion air is provided.

3.5.2.2 Installation for the Application of Foam Kote FC 50-50A Intumescent Coating:

Ultra-Pure™ OC spray-applied foam plastic insulation may be spray-applied in attics to the underside of roof sheathing or roof rafters, and vertical surfaces; and may be spray-applied in crawl spaces to the underside of floors and vertical surfaces as described in this section. When applied to the underside of the top of the space, the thickness of the Ultra-Pure™ OC foam plastic shall not exceed 12 inches (305 mm), and when applied to vertical surfaces, the thickness shall not exceed 8 inches (203 mm). The Ultra-Pure™ OC spray-applied foam plastic insulation shall be separated from the interior of the building by a thermal barrier complying with and installed in accordance with IBC or IRC, and from the attic space with Foam Kote FC 50-50A coating as described in Section 4.6 of this report. When installations comply with this section, the ignition barrier specified in IBC Section 2603.4.1.6 and IRC Section R316.5.3, as applicable, may be omitted.

3.5.2.2.1 Foam Kote FC 50-50A Intumescent Coating Application and Curing:

Ultra-Pure™ OC spray-applied foam plastic insulation shall be covered with a required minimum thickness of 10-mil (0.25 mm) wet film [7.5 mils (0.19 mm) dry film] thickness of the Foam Kote FC 50-50A as described in Section 4.5, and applied over the insulation in accordance with the coating manufacturer's published installation instructions and this report. The coating shall be applied in one or two coats by an airless sprayer, brush, or roller at a rate of either 1 gallon per 100 square feet (0.41 L/m²) in one coat or ½ gallon per 100 square feet (0.41 L/m²) per coat in two coats, to obtain the required minimum thickness of 10-mil (0.25 mm) wet film [7.5 mils (0.19 mm) dry film]. The coating has a minimum four-hour curing time per coat, and shall be applied to surfaces that are dry, clean, and free of dirt or any loose debris that could interfere with adhesion of the coating, and when ambient and substrate temperatures are within a range of 50°F (10°C) to 90°F (32°C).

3.5.2.2.2 Installation for the Application of DC-315 Fireproof Paint:

Ultra-Pure™ OC spray-applied foam plastic insulation may be spray-applied in attics to the



underside of roof sheathing, roof rafters and/or vertical surfaces, and in crawl spaces to the underside of floors and/or vertical surfaces as described in this section. When applied to the underside of the top of the space, the thickness of the Ultra-Pure™ OC foam plastic insulation shall not exceed 12 inches (305 mm), and when applied to vertical surfaces, the thickness shall not exceed 8 inches (203 mm). The Ultra-Pure™ OC spray-applied foam insulation shall be separated from the interior of the building by a thermal barrier complying with and installed in accordance with IBC or IRC, or from the attic space with DC-315 Fireproof Paint as described in Section 4.6 of this report. When installation complies with this section, the ignition barrier specified in IBC Section 2603.4.1.6, IRC Section R316.5.3, as applicable, may be omitted.

3.5.2.2.3 DC-315 Fireproof Paint Application and Curing:

Ultra-Pure™ OC spray-applied foam plastic insulation shall be covered with a required minimum thickness of 21-mil (0.53 mm) wet film [14 mils (0.36 mm) dry film] of the DC-315 Fireproof Paint as described in Section 4.6, and applied over the insulation in accordance with the coating manufacturer's published installation instructions and this report. The coating shall be applied in one coat by an airless sprayer, brush, or roller at a rate of 1 gallon (3.38 L) per 73 square feet (6.8 square meters), to obtain the required minimum thickness of 21-mil (0.53 mm) wet film [14 mils (0.36 mm) dry film]. The coating has a minimum 24-hour curing time, and shall be applied to surfaces that are dry, clean, and free of dirt or any loose debris that could interfere with adhesion of the coating, and when ambient and substrate temperatures are within a range of 50°F (10°C) to 90°F (32°C).

3.5.2.3 Application Without Intumescent Coating or Fireproof Paint:

Ultra-Pure™ OC spray-applied foam plastic insulation may be spray-applied without an intumescent coating to the underside of roof sheathing or roof rafters and vertical surfaces of attics and in crawl spaces. When applied to the underside of the top of the space, the thickness of the Ultra-Pure™ OC foam plastic insulation shall not exceed 10 inches (254 mm), and when applied to vertical surfaces, the thickness shall not exceed 8 inches (203 mm). The insulation may be installed in unvented attics as described in this section in accordance with 2021 and 2018 IBC Section 1202.3, 2015 IBC Section 1203.3, or IRC Section R806.5, as applicable.

4.0 PRODUCT DESCRIPTION

4.1 Properties: Ultra-Pure™ OC spray-applied foam plastic insulation is an open-cell, spray-applied, polyurethane foam plastic and complies as low-density insulation in accordance with Section 3.1.1 and Table 1 of AC377. The insulation is a two-component spray foam plastic with a nominal in-place density of 0.5 pcf (8 kg/m³).

The spray-applied insulation is produced in the field by combining a polymeric isocyanate (A component) and a

polymeric resin (B component). The liquid components shall be stored in 55-gallon (208 L) drums at temperatures between 50°F and 90°F (10°C and 32°C). When Component A and Component B are stored in factory-sealed containers at the recommended temperatures, the maximum shelf life is one year.

4.2 Thermal Resistance (R-Values): Ultra-Pure™ OC spray-applied foam plastic insulation has a thermal resistance (R-Values) at a mean temperature of 75°F (24°C) as shown in Table 1 of this report.

4.3 Surface Burning Characteristics: At a maximum thickness of 5⁵/₈ inches (143 mm) and a nominal density of 0.5 pcf (8 kg/m³), the Ultra-Pure™ OC spray-applied foam plastic insulation yields a flame spread index of 25 or less and smoke-developed index of 450 or less when tested in accordance with ASTM E84.

4.4 Air Permeability: When tested in accordance with ASTM E283 at a minimum thickness of 1 inch (25.4 mm), Ultra-Pure™ OC spray-applied foam plastic insulation is classified as air-impermeable insulation in accordance with 2021 and 2018 IBC Section 1202.3, 2015 IBC Section 1203.3, and IRC Section R806.5, as applicable.

4.5 Foam Kote FC 50-50A: Foam Kote FC 50-50A is a water-based intumescent fire-retardant coating, manufactured expressly for the thermal protection of polyurethane foam plastic insulation. Foam Kote FC 50-50A is manufactured by Flame Control Coatings, LLC and is supplied in 1-gallon (4 L) and 5-gallon (19 L) pails. When Foam Kote FC 50-50A is stored in factory-sealed containers at temperatures between 50°F and 90°F (10°C and 32°C), the maximum shelf life is nine (9) months.

4.6 DC-315 Fireproof Paint: DC-315 Fireproof Paint is a water based latex intumescent coating manufactured by International Fireproof Technology, Inc. as described in IAPMO UES ER-499. The coating is supplied in 5-gallon (19L) pails and 55-gallon (208L) drums.

5.0 IDENTIFICATION

The spray foam insulation is identified with the following:

- Manufacturer's name (Natural Polymers, LLC)
- address and telephone number,
- the product trade names (Ultra-Pure™ OC)
- use instructions
- density, and flame-spread and smoke-development indices
- date of manufacture or batch/run number
- thermal resistance values
- the evaluation report number (ER-801)
- the name or logo of the inspection agency

Each container of the Foam Kote FC 50-50A intumescent coating is labeled with the manufacturer's name (Flame



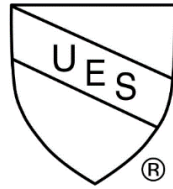
Originally Issued: 11/01/2021

Revised: 11/27/2023

Valid Through: 11/30/2024

Control Coatings, LLC), the product name, and use instructions. Each container of the DC-315 Fireproof paint is labeled in accordance with IAPMO UES ER-499.

The IAPMO Uniform Evaluation Service Mark of Conformity may also be used as shown below:



IAPMO UES ER-801

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, AC377, dated April 2020 (Editorially Revised July 2020).

6.2 Ultra-Pure™ OC spray-applied foam plastic insulation reports of room corner tests in accordance with NFPA 286.

6.3 Test reports are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on Ultra-Pure™ OC spray-applied polyurethane foam plastic insulation to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at locations noted in Section 2.10 of this report under a quality control program with periodic inspections under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org

TABLE 1-Thermal Resistance (R-Values) ¹

Thickness (inch)	Ultra-Pure™ OC R-Value (°f·ft ² ·h/Btu)
1	3.8
2	7.3
3.5	13
4	14
5	18
5.5	20
6	22
7	25
7.5	27
8	29
9	32
9.5	34
10	36
11.5	41
12	43
12.5	45
13	47
13.5	49
14	50

For SI: 1 inch = 25.4 mm, 1°F·ft²·h/Btu = 0.176 110 K·m²/W.
¹R-Values are calculated based on tested K values at 1-inch and 4-inch thicknesses for Ultra-Pure™ OC.



FLORIDA SUPPLEMENT

NATURAL POLYMERS, LLC
14438 East North Avenue
Cortland, IL 60112
www.naturalpolymersllc.com

ULTRA-PURE™ OC SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:

07 21 00 Thermal Insulation

1.0 RECOGNITION

Ultra-Pure™ OC spray-applied foam plastic insulation as evaluated and represented in IAPMO UES Evaluation Report ER-801 and with changes as noted in this supplement is a satisfactory alternative for use in buildings built under the following codes (and regulations) including locations in the High-Velocity Hurricane Zone:

- 2020 Florida Building Code, Building, (FBC, Building)
- 2020 Florida Building Code, Residential (FBC, Residential)
- 2020 Florida Building Code, Energy Conservation (FBC, Energy Conservation)

2.0 LIMITATIONS

Use of Ultra-Pure™ OC spray-applied foam plastic insulation recognized in this report is subject to the following limitations:

2.1 The clearance between the foam insulation installed above grade and exposed earth shall be in accordance with Sections 1403.8 and 2603.8 of the FBC, Building or Sections R318.7 and R318.8 of the FBC, Residential.

2.2 Verification shall be provided that a quality assurance agency audits the manufacturers quality assurance program and audits the production quality of products in accordance with Section (5)(d) of Florida Rule 61G20-3.008. The quality assurance agency shall be approved by the Commission (or the building official when the report holder does not possess an approval by the Commission).

2.3 This supplement expires concurrently with ER-801.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org



SYSTEM TRAINED INSTALLER PROGRAM SUPPLEMENT

NATURAL POLYMERS, LLC
14438 East North Avenue
Cortland, IL 60112
www.naturalpolymersllc.com

ULTRA-PURE™ OC SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:
07 21 00 Thermal Insulation

1.0 RECOGNITION

Ultra-Pure™ OC spray-applied foam plastic insulation as evaluated and represented in IAPMO UES Evaluation Report ER-801, with changes as noted in this supplement, has been evaluated for chemical emissions limits for minimal impact on the indoor environment, as defined in this supplement.

2.0 LIMITATIONS

Installation of Ultra-Pure™ OC cell spray-applied foam plastic insulation recognized in this supplement is subject to the following additional limitations:

2.1 To achieve the chemical emissions values found in this supplement, the foam plastic insulation shall be installed in accordance with the System Trained Installer Program, by a registered installer with Natural Polymers. Information on the requirements of the installation and installer are maintained by Natural Polymers, LLC.

2.2 Verification of the installation shall be maintained by Natural Polymers and upon request will be provided to the building official.

2.3 This supplement expires concurrently with ER-801.

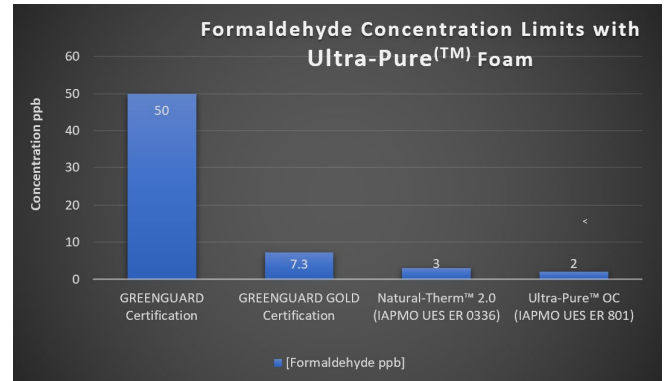
3.0 INSTALLATION

3.1 Installers shall be trained and registered with Natural Polymers. A list of the System Trained Installers is maintained by Natural Polymers on the Ultra-Pure portal. Installation requirements specific to this program include ventilation requirements, instrumentation readings before, during and after installation, and installation in accordance with the System Trained Installer Program. The Ultra-Pure Product Certificate shall be available on the job-site after installation is completed.

4.0 PERFORMANCE

Ultra-Pure™ OC spray-applied foam plastic insulation, when installed in accordance with Section 3.0 of this supplement, has been tested in accordance with UL 2821 and evaluated

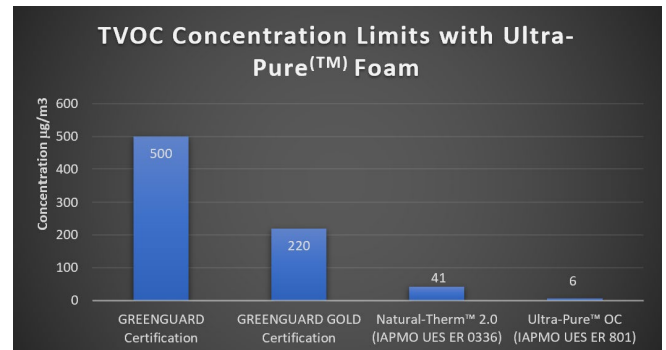
for the chemical emissions as detailed in Figures 1 and 2 of this report. Ultra-Pure™ OC meets the requirements of UL GreenGuard and GreenGuard Gold Certifications as defined in UL 2818.



NOTES:

- 1) Compound identified and quantified by DNPH derivatization and HPLC/UV analysis with multipoint authentic standard as defined UI 2821.
- 2) Results at 168 hours based on testing per CDPH/EHLB/Standard Method V1.1. Office model based on standard design usage of 28.1 m² in a 30.6 m³ room with 0.68 ACH.

FIGURE 1 Ultra-Pure™ OC Performance -Formaldehyde Concentration



Notes:

- 1) "TVOC" (Total Volatile Organic Compounds) is the sum of all VOCs (Volatile Organic Compounds) measured via Thermal Desorption /Gas Chromatography /Mass Spectroscopy which elute between n-hexane (C6) and n-hexadecane (C16) quantified using calibration to a toluene surrogate as defined in UL 2821.
- 2) Results at 168 hours based on testing per CDPH/EHLB/Standard Method V1.1. Office model based on standard design usage of 28.1 m² in a 30.6 m³ room with 0.68 ACH.

FIGURE 2 Ultra-Pure™ OC Performance -TVOC Concentration

5.0 SUBSTANTIATING DATA

5.1 Reports of TVOC and Formaldehyde tests in accordance UL2821 UL GREENGUARD Certification Program Method for Measuring and Evaluating Chemical Emissions from Building Materials, Finishes and Furnishings, Revised April 26, 2018.

5.2 Installer and installation instructions and requirements specific to Natural Polymer's System Trained Installer Program.