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AP-200

CSI Section:
07 21 00 Thermal Insulation

1.0 RECOGNITION

Alpha Polymers AP-200 is an HFO blown spray-applied polyurethane foam plastic insulation recognized in this report which has been evaluated for use as non-structural thermal insulation material. The surface burning characteristics and physical and thermal properties comply with the intent of the provisions of the following codes and regulations:

- 2021, 2018, and 2015 International Building Code® (IBC)
- 2021, 2018, and 2015 International Residential Code® (IRC)
- 2021, 2018, and 2015 International Energy Conservation Code® (IECC)

2.0 LIMITATIONS

Use of AP-200 spray-applied polyurethane foam plastic insulation recognized in this report is subject to the following limitations:

2.1 The insulation shall be installed in accordance with the applicable code, the manufacturer's published installation instructions, and this report. Where there is a conflict, the most restrictive requirements shall govern.

2.2 AP-200 spray-applied polyurethane foam plastic insulation shall be installed by applicators approved by Alpha Polymers. Alternatively, applicators who have a current SPFA PCP certification may be authorized to install.

2.3 AP-200 spray-applied polyurethane foam plastic insulation is used in areas where, in the likelihood termite infestation is "very heavy", it shall be installed in accordance with IBC Section 2603.8 or IRC Section R318.4, as applicable.

2.4 Jobsite labeling and certification of the insulation shall comply with IRC Sections N1101.10 and N1101.10.1.1, and IECC Sections C303.1.1 and C303.1.2, as applicable.

2.5 Where applicable, AP-200 spray-applied polyurethane foam plastic insulation shall be installed with a vapor retarder in accordance with the applicable code.

2.6 Except as indicated in Section 3.3.3.2 of this report or by the applicable code, the insulation shall be separated from the interior of the building by a code approved thermal barrier.

2.7 During installation, the insulation and the surfaces to which it is applied shall be protected from exposure to weather.

3.0 PRODUCT USE

3.1 General: AP-200 insulation is used as a nonstructural thermal insulating material in Types I - V construction under the IBC and dwellings under the IRC. The insulation complies with IBC Section 2603; IRC Section R316; and IECC Sections C303, C402, R303; and R402.

3.2 Design:

3.2.1 Surface Burning Characteristics: AP-200 polyurethane foam plastic insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 2.0 pcf (32 kg/m^3), has a flame spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84.

3.2.2 Thermal Resistance: For uses in accordance with the IECC or other codes, AP-200 spray-applied polyurethane foam plastic insulation has a thermal resistance, R-value, at a mean temperature of 75°F (24°C) as shown in Table 1 of this report.

TABLE 1—AP-200 Thermal Resistance (R-Values)[1]

Thickness (inch)	**AP-200 R-Value** (°F•ft^2•hr/Btu)
1.0	7.2
2.0	14
3.5	25
4.0	27
5.5	38
7.5	51
9.5	65
11.5	78

SI: 1 inch = 25.4 mm; 1 °F•ft^2•hr/Btu = 0.176 °K•m^2•hr/W

[1] R-values are calculated based on tested k-factors at 1- and 3.5-inch thicknesses.

3.3 Installation:

3.3.1 Installation General: AP-200 spray-applied polyurethane foam plastic insulation shall be installed in accordance with the manufacturer's published installation instructions and this report. A copy of these instructions and this evaluation report shall be available on the job site at all times during installation.

3.3.2 Application: AP-200 spray-applied polyurethane foam plastic insulation shall be applied using spray equipment specified by Alpha Polymers. The spray-applied foam plastic insulation shall be sprayed in multiple passes having a maximum thickness of 3.5 inches (89 mm) per pass, at the required conditions between passes, up to the maximum insulation thickness specified in this report.

3.3.3 Thermal Barrier:

3.3.3.1 Application with a Prescriptive Thermal Barrier: AP-200 spray-applied polyurethane foam plastic insulation shall be separated from the interior of the building by an approved thermal barrier of $^1/_2$-inch-thick (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with and installed in accordance with the applicable code.

3.3.3.2 Application with an Alternative Thermal Barrier Assemblies: AP-200 spray-applied polyurethane foam plastic insulation may be installed without a thermal barrier as defined in Section 3.3.3.1 of this report when installed with a fire-protective coating as described in Table 2 of this report based on testing in accordance with NFPA 286.

3.3.4 Attics and Crawl Spaces:

3.3.4.1 Application with a Prescriptive Ignition Barrier:

3.3.4.1.1 General: When AP-200 spray-applied polyurethane foam plastic insulation is installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier shall be installed in accordance with IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, as applicable. The ignition barrier shall be consistent with the requirements for the type of construction required by the applicable code and shall be installed in a manner so that the foam plastic insulation is not exposed. When using a prescriptive ignition barrier, AP-200 is not limited in thickness.

3.3.4.1.2 Unvented Attics: AP-200 spray-applied polyurethane foam plastic insulation, as described in this section, may be installed in unvented attics in accordance with IRC Section R806.4. The attic or crawl space area shall be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 3.3.3 of this report.

3.3.4.2 Application with an Alternative Ignition Barrier Assembly: Where the spray-applied insulation is installed in accordance with the following conditions apply, the prescriptive ignition barrier as required in Section 3.3.4.1 is not required:

a) Entry to the attic or crawl space is to service utilities, and no storage is permitted.
b) There are no interconnected attic or crawl space areas.
c) Air in the attic or crawl space is not circulated to other parts of the building.
d) Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when air impermeable insulation is permitted in unvented attics in accordance with the IRC Section R806.5. Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.
e) Combustion air is provided in accordance with International Mechanical Code® Section 701.
f) Alternative ignition barrier assembly is provided as required in Section 3.3.4.2.1.

3.3.4.2.1 Alternative Ignition Barrier Assembly: AP-200 spray-applied polyurethane foam plastic insulation may be applied at a nominal density of 2.0 pcf to the underside of roof sheathing or roof rafters and vertical surfaces of attics and in crawl spaces without a prescriptive ignition barrier or fire-protective coating. When applied to the underside of the top of the space, the thickness of AP-200 spray-applied polyurethane foam plastic insulation shall not exceed 10 inches (254 mm), and when applied to vertical surfaces or floor, the maximum thickness shall not exceed 6 inches (152 mm).

3.4 Air Permeability: AP-200spray-applied polyurethane foam plastic insulation is classified as air-impermeable insulation when tested in accordance with ASTM E2178 at a minimum thickness of $1^1/_2$ inches (38 mm) in accordance with 2021 and 2018 IBC Section 1202.3, 2015 IBC Section 1203.3, and IRC Section R806.5.

3.5 Water Vapor Transmission: AP-200, when tested in accordance with the ASTM E96 desiccant method, have a permeance of less than 1.0 perms (57.4×10^9 g/Pa·s·m), at a minimum thickness of 1 inch (25.4 mm) and qualifies as a Class II vapor retarder in accordance with IBC Section 202 and IRC Section R202.

3.6 Use in Exterior Walls of Types I, II, III, or IV Construction (IBC)

3.6.1 General: When AP-200 spray-applied polyurethane foam plastic insulation is used in exterior walls of Types I, II, III, or IV construction of any height, the insulation shall comply with IBC Section 2603.5 and Section 4.6.3 of this report.

3.6.2 Complying Exterior Wall Assemblies: Wall assemblies described in Tables 3 and 4 of this report, are in compliance with Section 2603.5.5 of the IBC and this report and may be used in exterior walls of buildings of Type I, II, III, or IV construction of any height.

4.0 PRODUCT DESCRIPTION

AP-200 two-part medium-density spray-applied, closed-cell polyurethane foam plastic insulation has a nominal density of 2.0 pcf (32 kg/m^3). The two components of the insulation are polymeric isocyanate (A-Component) and proprietary resin (B-Component).

5.0 IDENTIFICATION

Both AP-200 is identified by the Alpha Polymers' name address and telephone number, product name, link to installation instructions, density, flame-spread and smoke-development indices, date of manufacture, lot number, shelf life, link to storage and handling instructions, and evaluation report number (ER-960).

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

IAPMO UES ER-960

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), including Appendix X.

6.2 Reports of room corner fire testing in accordance with NFPA 286.

6.3 Reports of fire propagation in accordance with NFPA 285.

6.4 Reports of air permeance testing in accordance with ASTM E2178.

6.5 Reports of testing for water vapor transmission with ASTM E96, desiccant method.

6.6 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 Alpha Polymers' AP-200 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 under a quality control program with periodic inspection 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 2 – ALTERNATIVE THERMAL BARRIER ASSEMBLY – AP-200

TYPE	MINIMUM THICKNESS (mils)	THEORETICAL APPLICATION RATE (COATINGS ONLY)	WALLS AND VERTICAL SURFACES	CEILING AND OVERHEAD SURFACES
DC315[2]	18 WFT (12 DFT)	1.1 gal/100 ft^2	7.25	7.25
Plus ThB[3]	14 WFT (9 DFT)	0.87 gal/100 ft2	8	10
Flame Control[4] 60/60A	14 WFT (9 DFT)	0.87 gal/100 ft2	8	10

For **SI:** 1 inch = 25.4 mm, 1 gallon = 3.785 L, 1 ft^2 = 0.0929 m^2

[1] Fire-protective coatings and coverings shall be applied over all exposed SPF surfaces in accordance with the coating/covering manufacturer's instructions and this report.

[2] International Fireproof Technology, Inc, recognized in IAPMO UES ER-499 and tested to the requirements of NFPA 286.

[3] No-Burn, Inc., recognized in IAPMO UES ER-305 and tested to the requirements of NFPA 286.

[4] Flame Control Coatings, recognized in IAPMO UES ER-596 and tested to the requirements of NFPA 286.

TABLE 3 – NFPA 285 COMPLYING EXTERIOR WALL ASSEMBLIES WITH AP-200 INSTALLED IN WALL CAVITY

Wall Component	Materials
Base Wall System (BWS)-	1. Concrete Wall. 2. Concrete Masonry Wall. 3. 1 layer of $^{5}/_{8}$-inch-thick Type X gypsum wallboard installed on the interior side of minimum $3^{5}/_{8}$-inch deep, minimum 25-gauge equivalent thick steel studs spaced a maximum of 24 inches on center. Lateral bracing installed minimum every 4 foot vertically or as required.
Perimeter Fire Barrier System	4 pcf mineral wool in each stud cavity at each floor line, attached with Z-clips or friction fit.
Interior Insulation	$3^{5}/_{8}$ inches or less of AP-200applied using exterior gypsum sheathing as the substrate and covering the width of the cavity and the inside of the steel wall stud framing flange.
Exterior Sheathing	$^{5}/_{8}$-inch-thick exterior type gypsum sheathing (for BWS 3 above).
Exterior wall covering [2] – use either 1, 2 or 3	1. Any non-combustible exterior wall covering material using any standard installation technique. 2. Any non-combustible exterior wall covering system with a combustible water-resistive barrier (WRB) that has successfully been tested in accordance with NFPA 285. 3. Any combustible exterior wall covering system with or without a combustible WRB that has successfully been tested in accordance with NFPA 285.
Flashing of window, door, and other exterior wall penetrations	As an option, flash around window, door, and other exterior wall penetrations with limited amounts of maximum 12-inch-wide flashing tape (acrylic, asphalt or butyl based) or liquid applied membrane material with or without fiber mesh reinforcement.
Window Perimeter	The window header, jambs and sill are covered with minimum 0.080-inch aluminum flashing. The edges and top of the assembly were sealed with steel flashing. Windows and doors shall be framed as required for the base wall.

For **SI:** 1 inch = 25.4 mm; 1lb/ft^3=16 kg/m^3

[1] Fireblocking per Section 718 of the IBC thermal barrier material requirements shall be met for BWS 1 and 2, as required by specific wall construction details when combustible concealed space is created on the exterior side of the exterior wall assembly.

[2] Combustible exterior wall coverings shall be installed in accordance with the manufacturer's installation requirements.

TABLE 4 – NFPA 285 COMPLYING EXTERIOR WALL ASSEMBLIES WITH AP-200 INSTALLED ON THE EXTERIOR SIDE OF THE WALL ASSEMBLY

Wall Component	Materials
Base Wall System (BWS)- Use either 1, 2, or 3	1. Concrete Wall. 2. Concrete Masonry Wall. 3. 1 layer of $^{5}/_{8}$-inch-thick Type X gypsum wallboard installed on the interior side of minimum $3^{5}/_{8}$-inch deep, minimum 25-gauge equivalent thick steel studs spaced a maximum of 24 inches on center. Lateral bracing installed minimum every 4 foot vertically or as required.
Perimeter Fire Barrier System Use 1 or 2.	1. A perimeter fire barrier system complying with Section 715.4 of the IBC shall be installed, as applicable, to fill the void between the edge of the concrete floor slab and the interior surface of the exterior wall assembly. 2. Wall stud cavities shall be filled at each floor line with minimum 4 lb/ft^3 mineral wool friction fit between steel wall studs, attached with Z-clips or friction fit.
Exterior Sheathing – use either 1 or 2	1. None (for BWS 1 or 2 above) 2. $^{5}/_{8}$-inch -thick Type X exterior type gypsum sheathing (for BWS 3 above)
Exterior Insulation	Maximum 3-inch thickness of AP-200
Exterior wall covering	1. Brick – Standard type brick veneer anchors, installed a maximum of 24 inches on center, vertically on each stud with maximum 1-inch air gap between exterior insulation and brick. Brick to be standard nominal 4-inch-thick clay brick installed in a running bond pattern using Type S mortar. 2. Stucco – Minimum ¾-inch thick, exterior plaster and lath. A secondary water resistive barrier (WRB) can be installed between the exterior insulation and lath. The secondary WRB shall not be full coverage asphalt or butyl based self-adhered membranes. 3. Minimum 2-inch-thick natural stone (granite, limestone, marble, or sandstone) Any standard non-open joint installation technique shall be used. 4. Minimum $1^{1}/_{2}$-inch-thick concrete masonry unit (CMU), precast concrete or artificial cast stone. Any standard non-open jointed method shall be used. 5. Minimum $1^{1}/_{4}$-inch-thick terra cotta non-open jointed. Any standard non-open jointed installation technique shall be used.
Window Perimeter	The window header, jambs and sill are covered with minimum 0.080-inch steel flashing. The edges and top of the assembly were sealed with steel flashing. Windows and Doors shall be framed as required for the base wall.