Code Compliance Research Report
CCRR-0379

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DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION
Section: 07 21 00 – Thermal Insulation

DIVISION: 31 00 00 – EARTHWORK
Section: 31 23 00 – Excavation and Fill

REPORT HOLDER:
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REPORT SUBJECT:
Airfoam Expanded Polystyrene (EPS) Insulation Products:
- **Korolite® Expanded Polystyrene (EPS) Thermal Insulation**
- **Airboard™ Laminated Rigid Cellular Polystyrene Insulation Board**
- **Expanded Polystyrene (EPS) Geofoam**

1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:
- 2024, 2021, 2018 *International Building Code®* (IBC)
- 2024, 2021, 2018 *International Residential Code®* (IRC)
- 2024, 2021, 2018 *International Energy Conservation Code (IECC)*

NOTE: This report references the most recent version of the noted Code editions. Section numbers in earlier versions may differ.

1.2 Properties Evaluated:

1.2.1 Korolite® EPS Insulation and Airboard™ Insulation have been evaluated for the following properties (see Table 1):
- Surface-burning characteristics
- Physical properties
- Thermal resistance

1.2.2 EPS Geofoam has been evaluated for the following properties (see Table 1):
- Surface-burning characteristics
- Physical properties

1.3 Uses:

1.3.1 Korolite® EPS Insulation and Airboard™ Insulation have been evaluated for the following uses (see Table 1):
- Non-structural thermal insulation in wall assemblies, ceiling or floor assemblies, and door or window cavities
- As a sandwich panel core where EPS insulation complying with ASTM C578 is required for the sandwich panel core.
- Exterior walls in Types I – IV construction
- Type V construction
- Attic and crawl space installation

1.3.2 EPS Geofoam has been evaluated for the following uses (see Table 1):
- Structural fill in structural floor slabs in interior of buildings of Types I, II, III, IV and V construction

2.0 STATEMENT OF COMPLIANCE

Korolite® EPS Insulation, Airboard™ Insulation, and EPS Geofoam products comply with the Codes listed in Section 1.1, for the properties stated in Section 1.2, and uses stated in Section 1.3, when installed as described in this report, including the Conditions of Use stated in Section 6.0.

2.1 2024 IBC and IRC Evaluation Reports: The Intertek CCRR is an *Evaluation Report* for approval of an alternate material, design, or method of construction in accordance with Section 104.2.3.6.1 of the 2024 IBC and Section R104.2.2.6.1 of the 2024 IRC.

3.0 DESCRIPTION

3.1 Korolite® EPS Insulation: Korolite® EPS Insulation complies with ASTM C578, Types I, VIII, II, II+, IX, XIV, and XV, with minimum densities of 0.90 pcf, 1.15 pcf, 1.35 pcf, 1.50 pcf, 1.80 pcf, 2.40 pcf, and 3.00 pcf, respectively.

3.2 Airboard™ Insulation: The Airboard™ Insulation is a Korolite® EPS Insulation product that is covered with one layer of reflective laminating film on each side of the board.

The Airboard™ product complies with ASTM C578, Types I, II, and IX.

3.3 EPS Geofoam: EPS Geofoam complies with ASTM D6817 designations EPS15, EPS19, EPS22, EPS29, EPS39, and EPS46, having minimum densities of 0.90 pcf, 1.15 pcf, 1.35 pcf, 1.80 pcf, 2.40 pcf, 2.85 pcf, respectively.

4.0 PERFORMANCE CHARACTERISTICS

4.1 Surface Burning Characteristics: Korolite® EPS Insulation, Airboard™ Insulation, and Geofoam have a flame-spread index not exceeding 25 and a smoke-developed index not exceeding 450 for thicknesses up to 6 inches when tested in accordance with UL 723, as required by Section 2603.3 of the IBC or Section R303.3 of the IRC, as applicable.

4.2 Thermal Resistance: Korolite® EPS Insulation and Airboard™ Insulation have thermal resistance values as listed in Table 4.

4.3 Compressive Resistance: Compressive resistance of the EPS Geofoam at 1 percent strain for EPS15, EPS19, EPS22, EPS29, EPS39, and EPS46 is 3.6, 5.8, 7.3, 10.9, 15.0, and 18.6 psi respectively, as determined in accordance with ASTM D6817.

5.0 INSTALLATION

5.1 General: Korolite® EPS Insulation, Airboard™ Insulation, and EPS Geofoam must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. A copy of the manufacturer's instructions must be available on the jobsite during installation.

Korolite® EPS Insulation and Airboard™ Insulation must be separated from the interior of the building by a thermal barrier complying with IBC Section 2603.4 or IRC Section R303.4, as applicable, except when installed per Section 5.2.

EPS Geofoam must be separated from the building interior with a minimum 1-inch-thick layer of concrete or masonry on all faces as required by IBC Section 2603.4.1.1, except in buildings of Type V construction where separation may be by a minimum nominal 1/2-inch-thick wood structural panel when installation is in accordance with IBC Section 2603.4.1.14. Where the thermal barrier consists of a minimum 1-inch-thick layer of concrete or masonry, the thickness of the EPS Geofoam in the floor assembly may exceed 4 inches. The design of the concrete or masonry covering is outside the scope of this report.

5.2 Attic and Crawl Spaces: Korolite® EPS Insulation and Airboard™ Insulation may be used for walls and ceilings of attic or crawl spaces without an ignition barrier required by IBC Section 2603.4.1.6, or IRC Sections R303.5.3 or R303.5.4 when all of the following conditions are met:

- Entry to the attic or crawl space is only to service utilities, and no storage is permitted. Utilities include, but are not limited to, mechanical equipment, electrical wiring, fans, and gas or electric hot water heaters, and furnaces.
- There are no interconnected attic or basement areas.
- Air in the attic or crawl space is not circulated to other parts of the building.
- Attic ventilation is provided when required by IBC Section 1202.2 or IRC Section R806, as applicable.
- Under-floor (crawl space) ventilation is provided that complies with IBC Sections 1202.4 or IRC Section R408.1, as applicable.
- Combustion air is provided in accordance with IMC (*International Mechanical Code*) Section 701.
- The insulation is limited to the Type and thickness specified in Table 3.

5.3 Exterior Walls in Buildings Required to be of Types I, II, III, and IV Construction: Korolite® EPS Insulation and Airboard™ Insulation may be used on or in exterior walls in Types I, II, III, or IV construction when it is a part of an exterior assembly qualified in accordance with the requirements of IBC Section 2603.5.

Korolite® EPS Insulation and Airboard™ Insulation may be used in Types I, II, III, and IV construction when installed as described in the Airfoam Industries Design Listing AFI/FBI 30-01.

5.4 Protection Against Termites: Korolite® EPS Insulation, Airboard™ Insulation, and EPS Geofoam may be used on the interior face or under interior or exterior foundation walls or slab foundations except where the probability of termite infestation is "very heavy" as described in IBC Section 2603.8 and IRC Section R305.4. The clearance between foam

plastics installed above grade and exposed earth shall be not less than 6 inches.

6.0 CONDITIONS OF USE

6.1 Installation must comply with this Research Report, the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict, this report governs.

6.2 Exterior walls must be protected by a water-resistive barrier complying with IBC Section 1403.2 or IRC Section R703.2, and by wall coverings that provide the necessary structural wind and seismic resistance between the wall framing members.

6.3 The insulation boards must not be used as a nailing base for siding materials. All fasteners must penetrate through the insulation into the existing wall framing or structural sheathing as required by the wall covering manufacturer's instructions or the applicable Code.

6.4 The following conditions of use apply for the use of EPS Geofoam Insulation:

6.4.1 The RCPS geofoam must be separated from the building interior as described in Section 5.1.

6.4.2 Use of the geofoam is limited to floor applications where the uniform and localized loading, as determined in accordance with the IBC, does not exceed the compressive resistance reported in Section 4.3.

6.4.3 Design calculations and details for specific applications must be furnished to the Code official, verifying compliance with this report and applicable Codes. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

6.4.4 Use of the RCPS geofoam is limited to applications where the geofoam will not be subjected to direct exposure to hydrocarbons.

6.4.5 Penetrations through the thermal barrier described in Section 5.1 shall be subject to approval by the Code official.

6.4.6 Use of the geofoam in a fire-resistance-rated floor assembly is outside the scope of this report.

6.5 The Korolite® EPS Insulation, Airboard™ Insulation, and EPS Geofoam are manufactured under a quality control program with inspections by Intertek Testing Services NA, Inc.

7.0 SUPPORTING EVIDENCE

7.1 Reports of tests in accordance with ASTM C578, ASTM D6817, and UL 723.

7.2 Thermal resistance data in accordance with US-FTC CFR Title 16 Part 460.

7.3 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised May 2016).

7.4 Data in accordance with the ICC-ES Acceptance Criteria for Rigid Cellular Polystyrene (RCPS) Geofoam Used in Interior Floor Applications (AC452), dated October 2013.

7.5 Intertek Listing Report "Airfoam - Airfoam Expanded Polystyrene (EPS) Products", on the Intertek Directory of Building Products.

8.0 IDENTIFICATION

The Korolite® EPS Insulation, Airboard™ Insulation, and EPS Geofoam products are identified with the manufacturer's name (Airfoam Industries Ltd.), address and telephone number, the product names, manufacturing location, EPS types, thermal resistance values, the Intertek Mark as shown below, and the Code Compliance Research Report number (CCRR-0379).

9.0 OTHER CODES

This section does not apply

10.0 CODE COMPLIANCE RESEARCH REPORT USE

10.1 Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

10.2 Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.

10.3 Reference to the https://bpdirectory.intertek.com is recommended to ascertain the current version and status of this report.

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TABLE 1 – PROPERTIES EVALUATED – INTERNATIONAL CODES

PROPERTY	2024 IBC SECTION	2024 IRC SECTION	2024 IECC SECTION
Physical properties	Table 1508.2	R906.2	N/A
Surface burning characteristics	2603.3	R303.3	N/A
Type I – IV construction	2603.5	N/A	N/A
Thermal resistance	1301	N1101.12, N1102	C303, C402, R303, R402
Attic and crawl space	2603.4.1.6 2603.9	R303.5.3 R303.5.4	N/A
Termite resistance	2603.8	R305.4	N/A
Thermal barrier/ignition barrier	2603.4	R303.4	N/A

TABLE 2 – MINIMUM INSULATION BOARD PROPERTIES AND REQUIRED THERMAL BARRIER

ASTM C578 TYPE	THERMAL BARRIER	ALLOWABLE EPS THICKNESS
TYPE I, VIII, II, IX, XIV, XV	Thermal barrier material as permitted in IBC Section 2603.4 or IRC Section R303.4	Max. 6 inches (152 mm)

TABLE 3 – MAXIMUM INSULATION THICKNESS FOR USE IN ATTICS OR CRAWL SPACES

ASTM C578 EPS TYPE	MAXIMUM THICKNESS (in.)
Type I	4.0
Type VIII	3.2
Type II	2.66
Type IX	2.00
Type XIV	1.67
Type XV	1.33

TABLE 4 – THERMAL RESISTANCE

EPS TYPE	MINIMUM DENSITY (pcf)	R-VALUE (RSI)[1] @ 75°F (24°C) Mean Temperature $ft^2 \cdot h \cdot {}^oF/BTU$ per inch ($m^2 \cdot {}^oC/W$ per 25.4 mm)
Type I	0.90	3.6 (0.63)
Type VIII	1.15	3.8 (0.67)
Type II	1.35	4.0 (0.70)
Type II+	1.50	4.0 (0.70)
Type IX	1.80	4.2 (0.74)
Type XIV	2.40	4.2 (0.74)
Type XV	3.00	4.3 (0.76)

[1]RSI is the R-value defined in SI units.