Code Compliance Research Report
CCRR-1021

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

REPORT HOLDER:
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REPORT SUBJECT:
GreenGuard®, GreenGuard®LG, and GreenGuard® RCY Extruded Polystyrene Insulation Boards

1.0 SCOPE OF EVALUATION

This Research Report addresses compliance with the following Codes:

- 2018, 2015, and 2012 *International Building Code®* (IBC)
- 2018, 2015, and 2012 *International Residential Code®* (IRC)
- 2018, 2015, and 2012 *International Energy Conservation Code®* (IECC)
- 2020 *Florida Building Codes* (excluding High-Velocity Hurricane Zones) (see Section 8.0)

Note: this report references the 2018 codes. Earlier versions of the code may have different code sections.

The insulation boards described in this report have been evaluated for the following properties:

- Physical properties
- Surface-burning characteristics
- Thermal resistance (R-Value)
- Alternative to water-resistive barriers
- Air permeability

See Table 1 for applicable Code sections related to these properties.

2.0 USES

The GreenGuard® insulation board products described in this report are extruded polystyrene (XPS) foam plastic boards used as a non-structural thermal insulation in wall assemblies, ceiling/floor assemblies, door cavities, at the perimeter of foundations and basements, or in structures constructed in accordance with the IRC. The insulation boards may be used as an alternative to the water-resistive barrier required in IBC Section 1403.2 and IRC Section R703.2 when installed as described in Section 4.3.3.

The insulation boards may be used as air barrier materials when installed as described in Section 4.3.2.

3.0 DESCRIPTION

3.1 GreenGuard®, GreenGuard®LG, and GreenGuard® RCY:

The insulation boards comply with ASTM C578, Type IV (1.45 pcf minimum density), Type VI (1.8 pcf minimum density) at 1/2 to 4 inch thicknesses, and Type VII (2.2 pcf minimum density), at 1/2 to 3 inch thicknesses.

3.2 Surface-Burning Characteristics:

The insulation boards have a flame-spread index of 25 or less and a smoke-developed index of 450 or less, when tested in accordance with ASTM E84 at a maximum thickness of 4 inches for Types IV and VI, and maximum thickness of 3 inches for Type VII.

3.3 Thermal Resistance:

The insulation boards have a thermal resistance (R-Value) of 5.0 per inch of thickness.

3.4 Air Permeability:

The insulation boards, at a minimum thickness of 1 inch, are considered air-impermeable for installations in accordance with IBC Section 1203.3 (2018 and 2015 only) and IRC Section R806.5, based on testing in accordance with ASTM E2178.

4.0 INSTALLATION

4.1 General:

The extruded polystyrene foam plastic insulation boards must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. The manufacturer's published installation instructions and this Research Report must be strictly adhered to, and a copy of the instructions must be available on the jobsite during installation.

4.2 Interior of Building Application:

The interior of the building must be separated from the insulation boards with a 15-minute thermal barrier as required by IBC Section 2603.4 and IRC Section R316.4 or as specifically permitted by R316.5.

4.3 Exterior of Building Application:

4.3.1 General: The insulation boards must not be used as a nailing base for exterior siding. Nailing of exterior siding must penetrate through the boards into the wall framing or structural sheathing. Fasteners for insulation boards that are thicker than 1-1/2 inches must be considered for lateral resistance to ensure support for the exterior wall covering. The insulation boards must not be used structurally to resist transverse, vertical or in-plane loads.

Wall bracing must be provided in accordance with the applicable Code.

The use of the insulation boards in areas of "very heavy" termite probability must comply with IBC Section 2603.8 or IRC Section R318.4.

A water-resistive barrier must be provided in accordance with IBC Section 1403.2 or IRC Section R703.2 unless the insulation board is installed as described in Section 4.3.3.

4.3.2 Air Barrier: The insulation boards may be used as air barrier materials as defined in IRC Section N1101.6 and as permitted in IRC Table N1102.4.1.1, and in accordance with IECC Sections C402.5.1.2.1 and R402.4 (Table 402.4.1.1). When used as an air barrier material, the insulation boards must be installed in accordance with the Kingspan Insulation, LLC installation instructions and this Research Report.

4.3.3 Alternative to Water-resistive Barrier: Minimum 1/2-inch-thick GreenGuard®, GreenGuard®LG, and GreenGuard® RCY Insulation Boards may be used as alternatives to the water-resistive barrier requirements of IBC Sections 1403.2 and 2510.6, and IRC Section R703.2 when installed in accordance with Section 4.3.3.1.

4.3.3.1 Panels must be installed vertically. Vertical joints must occur over framing members or be backed. Gaps at penetrations must be sealed using a silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25 or using an expanding spray foam sealant complying with AAMA 812. Horizontal and vertical insulation board joints must be sealed with GreenGuard® Seam Tape.

5.0 CONDITIONS OF USE

The GreenGuard®, GreenGuard®LG, and GreenGuard® RCY insulation boards described in this Research Report comply with, or are suitable alternatives to, what is specified in those Codes listed in Section 1.0 and Table 1 of this report, subject to the following conditions:

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

5.2 The insulation boards must be covered with an approved exterior wall covering in accordance with the applicable Code.

5.3 The insulation boards must be covered with an approved interior 15-minute thermal barrier in accordance with the applicable Code.

5.4 The insulation boards are produced in Winchester, VA under a quality control program with inspections by Intertek.

6.0 SUPPORTING EVIDENCE

6.1 Reports of tests in accordance with ASTM C578, ASTM E2178, and ASTM E84.

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

6.3 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation Used as Water-resistive Barriers (AC71), dated February 2003 (editorially revised January 2016).

6.4 Intertek Listing Report "Kingspan - GreenGuard Insulation Boards".

7.0 IDENTIFICATION

The GreenGuard®, GreenGuard®LG, and GreenGuard® RCY insulation boards described in this Research Report are identified by a marking on the product or packaging label bearing the report holder's name (Kingspan Insulation, LLC), the flame-spread and smoke-developed indices, the manufacturing location, the date of manufacture, the Intertek Mark, and the Code Compliance Research Report number (CCRR-1021).

8.0 OTHER CODES

8.1 Florida Building Code:

8.1.1 Scope of Evaluation: The GreenGuard®, GreenGuard®LG, and GreenGuard® RCY insulation boards were evaluated for compliance with the 2020 *Florida Building Code – Building, Florida Building Code – Residential* and *Florida Building Code – Energy Conservation.*

8.1.2 Conclusion: The GreenGuard®, GreenGuard®LG, and GreenGuard® RCY insulation boards, described in Sections 2.0 through 7.0 of this Research Report, comply with the 2020 *Florida Building Code – Building, Florida Building Code – Residential* and *Florida Building Code – Energy*, subject to the following conditions:

- Use of the insulation boards for compliance with the High-Velocity Hurricane Zone provisions of the 2020 *Florida Building Code – Building* and the *Florida Building Code – Residential* has not been evaluated and is outside the scope of this Research Report.

- Intertek is an approved evaluation entity and quality assurance entity pursuant to Florida Statute 553.842 – *Product Evaluation and Approval*

9.0 CODE COMPLIANCE RESEARCH REPORT USE

9.1 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.

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

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

TABLE 1A – PROPERTIES EVALUATED – 2018 I-Codes and 2020 Florida Building Code

PROPERTY	IBC	FBC – BUILDING	IRC	FBC – RESIDENTIAL	IECC	FBC - ENERGY
Physical properties	Not required	Not required	Not required	Not required	Not required	Not required
Surface-burning characteristics	2603.3	2603.3	R316.3	R316.3	Not applicable	Not applicable
Thermal resistance	1301	1301	N1101.10	See FBC - Energy	C303.1.1, C303.1.4, R303.1.1., R303.1.1.4	C303.1.1, C303.1.4, R303.1.1., R303.1.1.2
Water-resistive barrier	1404.2	1404.2	R703.2	R703.2	Not applicable	Not applicable
Air permeability	1202.3, 1301	1202.3	R806.5	R806.5	C402.5.1.2.1, R402.4 Table R 402.4.1.1	C402.5.1.2.1, R402.4 Table R402.4.1.1

TABLE 1B – PROPERTIES EVALUATED – 2015 and 2012 I-Codes

PROPERTY	IBC[1]	IRC[1]	IECC[1]
Physical properties	Not required	Not required	Not required
Surface-burning characteristics	2603.3	R316.3	Not applicable
Thermal resistance	1301	N1101.12 N1102 [N1101.1]	C303.1.1 C303.1.4 R303.1.1 R30301.4 [102.1.1 102.2.11]
Water-resistive barrier	1404.2	R703.2	Not applicable
Air permeability	1301	IRC: R806.5 [R806.4]	IECC: C402.4 and R402.4

[1]Section numbers in parenthesis apply to the 2012 Codes, where different.