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ACCEPTANCE CRITERIA FOR RIGID CELLULAR POLYSTYRENE (RCPS) GEOFOAM USED IN INTERIOR FLOOR APPLICATIONS

AC452

Approved October 2013

PREFACE

Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes. (Some reports may also reference older code families such as the BOCA National Codes, the Standard Codes, and the Uniform Codes.) Section 104.11 of the *International Building Code*® reads as follows:

> **The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.**

This acceptance criteria has been issued to provide interested parties with guidelines for demonstrating compliance with performance features of the codes referenced in the criteria. The criteria was developed through a transparent process involving public hearings of the ICC-ES Evaluation Committee, and/or on-line postings where public comment was solicited.

New acceptance criteria will only have an "approved" date, which is the date the document was approved by the Evaluation Committee. When existing acceptance criteria are revised, the Evaluation Committee will decide whether the revised document should carry only an "approved" date, or an "approved" date combined with a "compliance" date. The compliance date is the date by which relevant evaluation reports must comply with the requirements of the criteria. See the ICC-ES web site for more information on compliance dates.

If this criteria is a revised edition, a solid vertical line (|) in the margin within the criteria indicates a change from the previous edition. A deletion indicator (→) is provided in the margin where any significant wording has been deleted.

ICC-ES may consider alternate criteria for report approval, provided the report applicant submits data demonstrating that the alternate criteria are at least equivalent to the criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. ICC-ES retains the right to refuse to issue or renew any evaluation report, if the applicable product, material, or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause injury or unreasonable damage.

NOTE: The Preface for ICC-ES acceptance criteria was revised in July 2011 to reflect changes in policy.

Acceptance criteria are developed for use solely by ICC-ES for purposes of issuing ICC-ES evaluation reports.

ACCEPTANCE CRITERIA FOR RIGID CELLULAR POLYSTYRENE (RCPS) GEOFOAM USED IN INTERIOR FLOOR APPLICATIONS (AC452)

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for rigid cellular polystyrene (RCPS) geofoam, consisting of a block or planar rigid foam polymeric material consisting of either expanded or extruded foam plastic, used as a lightweight structural fill in floor cavities in the interior of buildings, to be recognized in an ICC Evaluation Service, LLC (ICC-ES), evaluation report under the 2012 *International Building Code*® (IBC) and the 2012 *International Fire Code*® (IFC). Bases of recognition is IBC Section 104.11, IFC Section 104.11 and IBC Section 2603.

The reason for the development of this criteria is that the codes do not specifically address the use of foam plastics for this use.

1.2 Scope: This criteria applies to RCPS geofoam used as a lightweight structural fill applied over structural floor slabs and encapsulated on all sides by noncombustible construction, for the purpose of achieving a change in finished floor elevation in the interior of buildings of Types I, II, III, IV and V construction.

1.3 Codes and Referenced Standards:

1.3.1 Codes:

1.3.1.1 2012 *International Building Code*® (IBC), International Code Council.

1.3.1.2 2012 *International Fire Code*® (IFC), International Code Council.

1.3.2 Referenced Standards:

1.3.2.1 ASTM International (ASTM):

1.3.2.1.1 ASTM D6817-11, Standard Specification for Rigid Cellular Polystyrene Geofoam.

1.3.2.1.2 ASTM D7557-09, Standard Practice for Sampling of Expanded Polystyrene Geofoam Specimens.

1.3.2.1.3 ASTM E84-~~07~~09, Test Methods for Surface Burning Characteristics of Building Materials.

1.3.2.1.4 ASTM E119-08a, Test Methods for Fire Tests of Building Construction and Materials.

1.3.2.2 UL LLC:

1.3.2.2.1 UL 263-03, Standard for Fire Test of Building Construction and Materials, with revisions through October 2007.

1.3.2.2.2 UL 723-08, Test for Surface Burning Characteristics of Building Materials.

2.0 BASIC INFORMATION

2.1 General: The following information shall be submitted:

2.1.1 Product Description: Complete information concerning material specifications, thickness, size and the manufacturing process.

2.1.2 Installation Instructions: Installation details and limitations, including methods for providing separation of the RCPS geofoam from occupied spaces.

2.1.3 Packaging and Identification: A description of the method of packaging and field identification of the RCPS geofoam. Identification provisions shall include the evaluation report number and the name or logo of the inspection agency, as well as the labeling information required by IBC Section 2603.2 and Section 12 of ASTM D6817.

2.1.4 Field Preparation: A description of the methods of field-cutting, application and finishing.

2.2 Testing Laboratories: Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

2.3 Test Reports: Test reports shall comply with AC85.

2.4 Product Sampling: Sampling of the RCPS geofoam for tests under this criteria shall comply with Section 3.1 of AC85 and Section 6.1 of ASTM D7557.

3.0 TEST AND PERFORMANCE REQUIREMENTS

3.1 Flame-spread Index: The RCPS geofoam shall exhibit a maximum flame-spread index of 25 when tested at a thickness of 4 inches (102 mm) and at the density intended for use in accordance with ASTM E84 or UL 723.

3.2 Smoke-developed Index: The RCPS geofoam shall exhibit a maximum smoke-developed index of 450 when tested at a thickness of 4 inches (102 mm) and at the density intended for use in accordance with ASTM E84 or UL 723.

3.3 Physical Properties: The RCPS geofoam, including products into which reprocessed polystyrene foam (regrind) material is introduced, shall comply with the requirements in ASTM D6817 for the specific type for which recognition is sought, as follows:

3.3.1 Reports of testing shall be submitted demonstrating compliance with the density, compressive resistance, and flexural strength requirements of ASTM D6817 for each RCPS geofoam Type for which recognition is sought, from each manufacturing location.

3.3.2 Reports of testing shall be submitted demonstrating compliance with the oxygen index requirements of ASTM D6817 for each type and grade of resin used.

3.4 Fire Resistance (Optional): When recognition is sought of the use of the RCPS geofoam in buildings of Types IA, IB, IIA, IIIA and VA construction or, as a component of a fire-resistance-rated floor assembly, the product shall be tested as a component of that specific assembly in accordance with ASTM E119 (UL 263).

4.0 QUALITY CONTROL

4.1 Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted for each facility manufacturing or labeling products that are to be recognized in the ICC-ES evaluation report.

4.2 Products shall be manufactured under an approved quality control program with inspections by an inspection agency accredited by the International Accreditation Service (IAS) or otherwise acceptable to ICC-ES.

4.3 A qualifying inspection shall be conducted at each manufacturing facility in accordance with the requirements of the ICC-ES Acceptance Criteria for Inspections and Inspection Agencies (AC304).

4.4 The quality control program shall assure continued compliance with ASTM D6817. At each inspection, the inspection agency shall verify the following:

- For expanded polystyrene, compressive resistance, density and the presence of fire-retardant. Over time, the testing shall incorporate tests to address all types and resin grades.
- For extruded polystyrene, compressive resistance, density and the presence of fire-retardant.

4.5 The inspection agency shall provide reasonable assurance, through quality control procedures outlined in the approved quality manual and through inspections, that the manufactured product is the same as samples used in qualifying tests. Use of regrind material in finished RCPS geofoam shall be addressed in the quality control procedures.

5.0 EVALUATION REPORT RECOGNITION

5.1 The evaluation report shall include, at a minimum, the IBC within the evaluation scope.

5.2 The evaluation report must include the following conditions of use:

5.2.1 The RCPS geofoam must be separated from the building interior with a minimum 1-inch-thick (25.4 mm) 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 ½-inch-thick (12.7 mm) 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 (25.4 mm) layer of concrete or masonry, the thickness of the RCPS geofoam in the floor assembly may exceed 4 inches (102 mm).

5.2.2 The design loads to be resisted by the RCPS geofoam must be determined in accordance with the IBC. The evaluation report shall state the compressive resistance of the RCPS geofoam at 1 percent strain as determined in accordance with ASTM D6817.

5.2.3 Design calculations and details for the 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.

5.2.4 The use of the RCPS geofoam is limited to use in floor applications where the uniform and localized loading does not exceed the compressive resistance of the geofoam at 1 percent strain.

5.2.5 The design of the concrete or masonry covering noted in Section 5.2.1 is outside the scope of this report and must comply with all applicable code requirements for the occupancy and type of construction for the specific project.

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

5.2.7 Penetrations through the thermal barrier described in Section 5.2.1 shall be subject to approval by the code official. When the RCPS is used in a fire-resistance-rated floor assembly evaluated under Section 3.4, penetrations through the assembly must be protected in accordance with 2012 IBC Section 714.4. If used, through-penetration firestop systems must be tested in accordance with ASTM E814 or UL 1479, as required by 2012 IBC Section 714.4.1.1.2.

5.3 When optional testing is submitted as described in Section 3.4, the evaluation report shall include details of the tested assemblies.■