Technical Evaluation Report
TER 1303-01
Use of STYROFOAM™ Brand Insulation in Areas of "Very Heavy" Probability of Termite Infestation

DuPont Performance Building Solutions

Product:
STYROFOAM™ Brand Insulation

Issue Date:
September 5, 2013
Revision Date:
July 2, 2019
Subject to Renewal:
July 1, 2020
1 PRODUCT EVALUATED

1.1 STYROFOAM™ Brand Insulation

2 APPLICABLE CODES AND STANDARDS

2.1 Codes

2.1.1 IBC—12, 15, 18: International Building Code®

2.1.2 IRC—12, 15, 18: International Residential Code®

2.2 Standards and Referenced Documents

2.2.1 ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

3 PERFORMANCE EVALUATION

3.1 This TER evaluates the use of STYROFOAM™ brand insulation in areas designated by the applicable building code as requiring protection from subterranean termites.
3.2 This report also examines the use of STYROFOAM™ brand insulation in areas designated by the applicable building code as “very heavy” probability of termite infestation.

3.3 Specifically, STYROFOAM™ brand insulation is evaluated for use in the following applications:

3.3.1 Under slab foundations below grade
3.3.2 On the interior or exterior face of foundation walls
3.3.3 Under interior or exterior foundation walls

3.4 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

3.5 Any engineering evaluation conducted for this TER was performed on the dates provided in this TER and within DrJ’s professional scope of work.

4 PRODUCT DESCRIPTION AND MATERIALS

4.1 STYROFOAM™ brand insulation is:

4.1.1 Made from extruded polystyrene (XPS) conforming to ASTM C578 for Type IV material
4.1.2 Available in various lengths and widths
   4.1.2.1 Typically supplied in widths up to 48″ and lengths of 96″, 108″, and 120″
4.1.3 Available in various thicknesses up to 4″
4.1.4 Minimum R-value of 5.0 per inch of thickness

5 APPLICATIONS

5.1 STYROFOAM™ brand insulation complies with IBC Chapter 26 and IRC Section R316 for the use of foam plastics in building construction.

5.2 STYROFOAM™ brand insulation is used as continuous insulation as required in some climate zones on wood-frame walls, basement walls, crawl space walls, and under slabs (IRC Table N1102.1.24 and IECC Table R402.1.2). STYROFOAM™ brand insulation is often used in these applications due to its high resistance to thermal energy loss per inch of thickness.

5.3 The IRC requires wood-framed buildings to be protected from termite damage, no matter what sheathing or cladding is applied.

   R318.1 Subterranean termite control methods.
In areas subject to damage from termites as indicated by Table R301.2(1), methods of protection shall be one, or a combination, of the following methods:
1. Chemical termicide treatment in accordance with Section R318.2
2. Termite-baiting system installed and maintained in accordance with the label.
3. Pressure-preservative-treated wood in accordance with the provisions of Section R317.1.
5. Physical barriers in accordance with Section R318.3 and used in locations as specified in Section R317.1.
6. Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.

5.4 The IBC does not contain a similar list of termite control methods. However, IBC Section 2304.12 describes methods to protect wood framing against decay and termites. These methods are outside the scope of this document since they do not relate to the use of foam plastic insulating sheathing (FPIS).

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4 2012 IRC Table N1102.1.1
5 2012 IBC Section 2304.11
5.5 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

5.6 Both the *IBC* and *IRC* define the probability of termite infestation with the maps shown below.

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**IBC Figure 2603.8:** Termite Infestation Probability Map

**IRC Figure R301.2(6):** Termite Infestation Probability Map

5.7 Beyond the general provisions for protection of wood structures against termites, use of foam plastic insulation in areas subject to “very heavy” termite infestation probability is found in both the *IBC* and *IRC*.

*IBC Section 2603.8 Protection against termites.*

In areas where the probability of termite infestation is very heavy in accordance with Figure 2603.8, extruded and expanded polystyrene, polyisocyanurate and other foam plastics shall not be installed on the exterior face or under interior or exterior foundation walls or slab foundations located below grade. The clearance between foam plastics installed above grade and exposed earth shall be at least 6 inches (152 mm).

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6. *2012 IBC Figure 2603.9*

7. *2012 IBC Section 2603.9*
Exceptions:

1. Buildings where the structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or preservative-treated wood.
2. An approved method of protecting the foam plastic and structure from subterranean termite damage is provided.
3. On the interior side of basement walls.

IRC Section R318.4 Foam plastic protection.
In areas where the probability of termite infestation is "very heavy" as indicated in Figure R301.2(6), extruded and expanded polystyrene, polyisocyanurate and other foam plastics shall not be installed on the exterior face or under interior or exterior foundation walls or slab foundations located below grade. The clearance between foam plastics installed above grade and exposed earth shall be at least 6 inches (152 mm).

Exceptions:

1. Buildings where the structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-preservative treated wood.
2. When in addition to the requirements of Section R318.1, an approved method of protecting the foam plastic and structure from subterranean termite damage is used.
3. On the interior side of basement walls.

5.8 Specifically, the use of FPIS in three locations is addressed as needing special consideration:

5.8.1 Under slab foundations below grade
5.8.2 On the exterior face of foundation walls
5.8.3 Under interior or exterior foundation walls

5.9 In areas subject to "very heavy" termite infestation probability, the use of foam plastic insulation is permitted in the following circumstances, per the exceptions given in IBC Section 2603.8 and IRC Section R318.4:

5.9.1 Exception #1 – Where the structure in its entirety is made of noncombustible materials or pressure-preservative treated wood.

5.9.2 Exception #2 – In addition to the requirements of IRC Section R318.1, where an approved method of protecting the foam and the structure is used.

5.9.3 Exception #3 – In cases where continuous insulation is required on basement walls, that it be installed on the interior side.

5.10 The following methods can be considered for approval for the protection of the FPIS in "very heavy" termite infestation probability areas (Exception #2).

5.10.1 Use of STYROFOAM™ brand insulation that incorporates a termiticide, like STYROFOAM™ BLUEGUARD™.

5.10.1.1 This product exceeds the performance requirements set forth by the U.S. EPA, which enables code approval for use in below-grade applications in very heavy termite infested areas.

5.10.2 Chemical termiticide treatment of the soil with retreatment as required, per the termiticide label (IRC Section R318.2), and which is approved for use in very heavy termite infested areas.

5.10.3 Protection of STYROFOAM™ brand insulation with a physical barrier product that is approved for use in very heavy termite infested areas and that prevents access by the termites to the foam plastic insulation is required (IRC Section R318.3). These products may include:

5.10.3.1 Approved applied coverings or coatings that prevent access to the foam by termites
5.10.3.2 Termite-resistant soils, gravels or sands
5.10.3.3 Use of termite barriers that prevent termites from accessing the wood framing through hidden pathways

5.11 FPIS is not a food source for the termites. However, FPIS may serve as a pathway for termites to travel through causing damage that is not visible for inspection.
5.12 Products called termite shields generally provide only a physical deterrent to termites and may also expose their activity, but do not, by themselves, necessarily protect against termites, but make inspection easier. These products need to be used in conjunction with another method of protection in accordance with IRC Section R318.3.

R318.3 Barriers. Approved physical barriers, such as metal or plastic sheeting or collars specifically designed for termite prevention, shall be installed in a manner to prevent termites from entering the structure. Shields placed on top of an exterior foundation wall are permitted to be used only if in combination with another method of protection.

5.13 The following details show the use of STYROFOAM™ brand insulation on the exterior side of foundation walls and are compliant with the IBC and IRC for use in areas of “very heavy” probability of termite infestation.

5.13.1 With stucco veneer (Figure 1)
5.13.2 With stone veneer (Figure 2)

Figure 2. Detail with stone veneer

6 INSTALLATION

6.1 Installation shall comply with the manufacturer’s installation instructions and this TER. In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.

6.2 For application details not covered in this TER, use of STYROFOAM™ brand insulation is permitted, provided the application is approved and meets the intent of the applicable code.

6.3 Installation in areas designated as very heavy termite infestation probability must comply with IBC Section 2603.8\(^8\) or IRC Section R318.4.

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\(^8\) 2012 IBC Section 2603.9
7 TEST ENGINEERING SUBSTANTIATING DATA

7.1 Some information contained herein is the result of testing and/or data analysis by other sources which conform to IBC Section 1703 and relevant professional engineering law. DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.

7.2 Where appropriate, DrJ’s analysis is based on design values that have been codified into law through codes and standards (e.g., IBC, IRC, NDS®, and SDPWS). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8 FINDINGS

8.1 STYROFOAM™ brand insulation may be installed below grade in areas designated as very heavy termite infestation probability in the following locations:

8.1.1 Under slab foundations below grade
8.1.2 On the interior or exterior face of foundation walls
8.1.3 Under interior or exterior foundation walls

8.2 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material 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, not less than the equivalent of that prescribed in this code…Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

8.3 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this evaluation, they are listed here.

8.3.1 No known variations

9 CONDITIONS OF USE

9.1 When used, termiticides shall be applied in accordance with the manufacturer's installation instructions and shall comply with all applicable state and federal regulations pertaining to their use.

9.2 Installation of the methods of protection shall be in accordance with the installation instructions provided by the manufacturer of the product used for protection.

9.3 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.

9.4 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.

9.5 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the Building Designer (e.g., owner or registered design professional).

9.6 At a minimum, this product shall be installed per Section 6 of this TER.
9.7 This product is manufactured under a third-party quality control program in accordance with IBC Section 104.4 and 110.4 and IRC Section R104.4 and R109.2.

9.8 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent. Therefore, the TER shall be reviewed for code compliance by the building official for acceptance.

9.9 The use of this TER is dependent on the manufacturer’s in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer’s instructions, the building official’s inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10 IDENTIFICATION

10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer’s name, product name, TER number, and other information to confirm code compliance.

10.2 Additional technical information can be found at dupont.com/building.

11 REVIEW SCHEDULE

11.1 This TER is subject to periodic review and revision. For the most recent version of this TER, visit drjcertification.org.

11.2 For information on the current status of this TER, contact DrJ Certification.