



- Compliance with International Codes
- Compliance with State Codes

ICC-ES Evaluation Report ESR-3089

Reissued July 2022

This report is subject to renewal July 2024.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 21 00—Thermal Insulation

Section: 07 25 00—Water-resistive Barriers/Weather Barriers

Section: 07 27 00—Air Barriers

REPORT HOLDER:

DUPONT DE NEMOURS, INC.

EVALUATION SUBJECT:

TUFF-R™; TUFF-R™ C; SUPER TUFF-R™; SUPER TUFF-R™ C AND ISOCAST™ R THERMAL INSULATION BOARDS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2018, 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2018, 2015, 2012 and 2009 *International Energy Conservation Code*® (IECC)
- Other Codes (see Section 8.0)

Properties evaluated:

- Physical properties
- Surface-burning characteristics
- Water vapor transmission
- Air permeability
- Attic and crawl space installation
- Thermal resistance
- Water-resistive barrier
- Air barrier

2.0 USES

The DuPont de Nemours, Inc. insulation boards (TUFF-R™, Tuff-R™ C, Super TUFF-R™, Super TUFF-R™ C and ISOCAST™ R) are used as nonstructural thermal insulating materials on the exterior walls of Type V construction (IBC) and in structures constructed in accordance with the IRC.

Under the IRC, the insulation may be used as air-impermeable insulation under 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4), when installed in accordance with Sections 3.6 and 4.4.

The boards may be used as an alternative to the water-resistive barrier specified in 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section 1404.2) and IRC Section R703.2 when installed in accordance with Section 4.3.

The boards, when installed in accordance with Sections 3.6 and 4.4, may be used as an air barrier to limit air infiltration in accordance with 2018 and 2015 IECC Sections C402.5.1 and R402.4 [(2012 IECC Sections C402.4.1 and R402.4 (2009 IECC Sections 402.4.1 and 502.4.3)].

3.0 DESCRIPTION

3.1 General:

The insulation boards have a rigid polyisocyanurate foam plastic core that may be reinforced with a glass fiber, and have facers on both sides. The facers consist of one or more of the following layers: a nominally 0.9-mil or thicker aluminum foil; a minimum 0.27-mil unsupported aluminum foil; a plastic film, a metalized plastic film or a kraft layer. The insulation boards listed in this evaluation report are available in various lengths and widths and in thicknesses up to 2 inches (51 mm) and are classified as Type I materials in accordance with ASTM C1289.

3.2 DuPont™ Styrofoam™ Brand Tape:

DuPont™ Styrofoam™ Brand Tape is nominally 27/8 inches wide and is used to seal joints between two or more edges of the insulation boards, when the boards are used as a water-resistive barrier. The installation must be as described in Section 4.3.

3.3 Surface-burning Characteristics:

The foam plastic core has a flame-spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 at a maximum thickness of 2 inches (51 mm). Only the insulation board cores were tested; therefore, installation in concealed spaces is limited as noted in Section 5.4 of this report.

3.4 Thermal Resistance, R-values:

The insulations have thermal resistance (R-values) at a mean temperature of 75°F (24°C) as shown in Table 1.

3.5 Vapor Retarder:

At a minimum thickness of 1/4 inch (6.4 mm), the insulation boards have a vapor permeance of less than 0.1 perm

[5.7×10^{-12} kg/(Pa-s-m²)], when tested in accordance with the ASTM E96 desiccant method (Procedure A) and qualify as Class I vapor retarder.

3.6 Air Permeability:

At a minimum thickness of 1/2 inch (12.7 mm), the insulation boards are considered air-impermeable in accordance with 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4), based on testing in accordance with ASTM E283.

4.0 INSTALLATION

4.1 General:

The insulation boards must be installed in accordance with DuPont de Nemours, Inc. published installation instructions, the applicable code and this report. The manufacturer's published installation instructions must be available on the jobsite at all times during installation.

The insulation boards, at a maximum thickness of 2 inches (51 mm), may be used as nonstructural insulating material on any or all surfaces in the exterior walls of Type V construction (IBC). The insulation boards must 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, IBC Section 2603.4 or IRC Section R316.4, as applicable, except where installation is in attics and crawl spaces as described in Section 4.2.

The insulation boards must be attached with fasteners spaced a maximum of 16 inches (406 mm) on center in field and 12 inches (305 mm) on center on the perimeter.

4.2 Attics and Crawl Spaces:

The TUFF-R™, TUFF-R™ C, Super TUFF-R™ and Super TUFF-R™ C insulation boards, at a maximum thickness of 1 inch (25.4 mm), may be installed in unvented attics and crawl spaces without the ignition barriers required by IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, subject to the following conditions:

- a. Entry to the attic or crawl space is only 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. Under-floor (crawl space) ventilation is provided when required by 2018 IBC Section 1202.4 (2015 IBC Section 1203.4, 2012 and 2009 IBC Section 1203.3) or IRC Section R408.1, as applicable.
- e. Attic ventilation is provided when required by 2018 IBC Section 1202.2 (2015, 2012 and 2009 IBC Section 1203.2) or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).
- f. Combustion air is provided in accordance with IMC (*International Mechanical Code*®) Section 701.

4.3 Water-resistive Barrier:

The insulation boards may be used on exterior walls as an alternative to the water-resistive barrier prescribed in 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section 1404.2) and IRC Section R703.2, when installed as described in this section.

The insulation boards are installed horizontally or vertically with edge joints in contact with one another. The insulation boards must be installed directly on framing members spaced a maximum of 24 inches (610 mm) on center. The insulation boards must be attached with fasteners spaced a maximum of 16 inches (406 mm) on center in the field and 12 inches (305 mm) on center on the perimeter.

When the insulation boards are attached to steel studs, the boards must be attached with a tapered screw with a drill point and plastic washer. The screws must be long enough to penetrate the framing a minimum of 0.45 inch (11.4 mm).

When the insulation boards are attached to wood studs, the boards must be attached using nails, screws or staples. Nails and screws must be used with 1-inch-diameter (25.4 mm) washers or plastic caps. The fastener must be long enough to penetrate the framing members a minimum of 3/4 inch (19.1 mm).

The horizontal and vertical seams and joints of the insulation boards must be covered with a minimum 27/8-inch-wide (73 mm) DuPont™ Styrofoam™ Brand Tape. Flashing of penetration items must be in accordance with the manufacturer's published installation instructions. Penetrations in exterior walls must be sealed with GREAT STUFF™ Gaps & Cracks sealant ([ESR-1961](#)), equivalent expanding foam sealant or an elastomeric sealant. See Figures 1–3.

4.4 Air Barrier:

When used as an air barrier material, the insulation boards must be installed in accordance with DuPont de Nemours, Inc.'s installation instructions and this report.

5.0 CONDITIONS OF USE

The TUFF-R™, TUFF-R™ C, Super TUFF-R™, Super TUFF-R™ C and ISOCAST™ R insulation boards described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report governs.
- 5.2 The insulation boards must 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, IBC Section 2603.4 or IRC Section R316.4, as applicable, except where installation is in attics and crawl spaces as described in Section 4.2.
- 5.3 The insulation boards are evaluated for use on the exterior walls of Type V construction.
- 5.4 If used in concealed spaces (wall studs, floors/ceilings assemblies), the insulation boards must be installed such that the board facing is in complete contact with the unexposed surface of the wall, floor or ceiling finish, or the cavities must be filled with an approved insulation material to eliminate any voids between the facings and the gypsum wallboard used as a thermal barrier.
- 5.5 The insulation boards must not be used as a nailing base for exterior siding materials. All nailing must be into the wall framing as required by the siding manufacturer's instructions or the applicable code.

- 5.6 The wall covering placed over the foam plastic boards must be structurally adequate to resist transverse loads. All walls must be braced in accordance with 2018 and 2015 IBC Section 2308.6 (2012 and 2009 IBC Sections 2308.9.3 and 2308.12.4) or IRC Section R602.10, as applicable.
- 5.7 Jobsite certification and labeling of the insulation must comply with 2018 and 2015 IRC Section N1101.10, 2012 IRC Section N1101.12, 2009 IRC Section N1101.4 and 2018, 2015 or 2012 IECC Sections C303.1, R303.1 and R401.3 or 2009 IECC Sections 303.1 and 401.3, as applicable.
- 5.8 The insulation boards must be covered by a wall covering and water-resistive barrier except that a water-resistive barrier is not required when the foam boards are installed in accordance with Section 4.3.
- 5.9 Use of insulation in areas where the probability of termite infestation is “very heavy” must be in accordance with 2018, 2015 and 2009 IBC Section 2603.8 (2012 IBC Section 2603.9) or IRC Section R318.4. In these areas, the insulation must not be installed on the exterior of the foundation walls or below floor slabs on grade or in contact with soil. Also, in these areas, there must be a clearance of 6 inches (152 mm) or greater between the foam plastic insulation and exposed earth.
- 5.10 The insulation boards are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised December 2020); including testing in accordance with Appendix B.
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Weather-resistive Barriers (AC71), dated February 2003 (editorially revised March 2021).
- 6.3 Reports of air leakage tests in accordance with ASTM E283.
- 6.4 Reports of water vapor transmission testing in accordance with ASTM E96.

7.0 IDENTIFICATION

- 7.1 The insulation boards are identified by a label on the board or package with DuPont de Nemours, Inc.

name, the product name, the flame-spread and smoke-developed indices, and the evaluation report number (ESR-3089).

DuPont™ Styrofoam™ Brand Tape is identified with DuPont de Nemours, Inc. name and address and the product name.

- 7.2 The report holder’s contact information is the following:

DUPONT DE NEMOURS, INC.
1501 LARKIN CENTER DRIVE
MIDLAND, MICHIGAN 48642
(812) 212-4429
www.dupont.com

8.0 OTHER CODES

In addition to the codes referenced in Section 1.0, the products described in this report were evaluated for compliance with the requirements of the following codes:

- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IRC)
- 2006 *International Energy Conservation Code*® (2006 IECC)

The products comply with the above-mentioned codes as described in Sections 2.0 to 7.0 of this report, with the revisions noted below:

- **Attics and Crawl Spaces:** See Section 4.2, except attics must be vented in accordance with Section 1203.2 of the 2006 IBC or Section R806 of the IRC; and crawl space ventilation must be in accordance with Section 1203.3 of the 2006 IBC or Section R408 of the IRC, as applicable.
- **Jobsite Certification and Labeling:** See Section 5.7, except jobsite certification and labeling must comply with Sections 102.1.1 and 102.1.11, as applicable, of the 2006 IECC.
- **Protection Against Termites:** See Section 5.9, except use of the insulation in areas where the probability of termite infestation is “very heavy” must be in accordance with Section R320.5 of the 2006 IRC.

TABLE 1—THERMAL RESISTANCE (R-VALUES)

THICKNESS (inches)	R-VALUE °F.ft².h/Btu at 75°F MEAN TEMPERATURE
1.0	6.5
1.5	9.8
2.0	13.0

For SI: 1 inch = 25.4 mm; 1°F.ft².h/Btu = 0.176 °K.m²/W

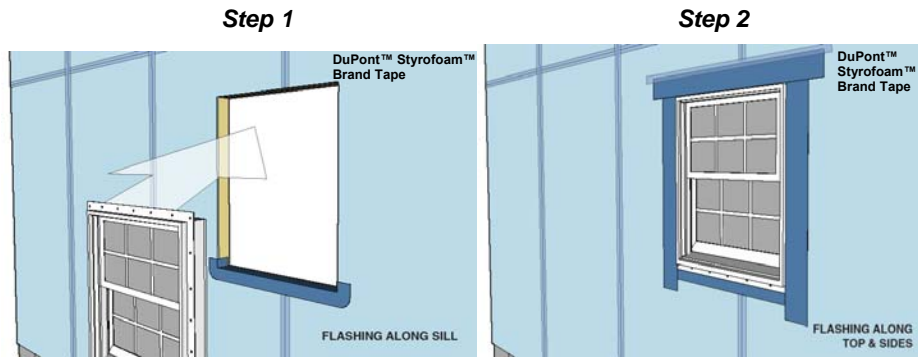


FIGURE 1—TYPICAL WINDOW FLASHING DETAIL

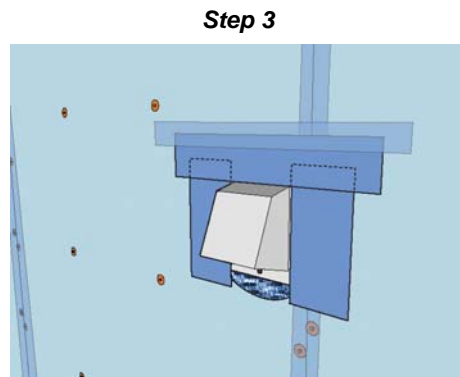
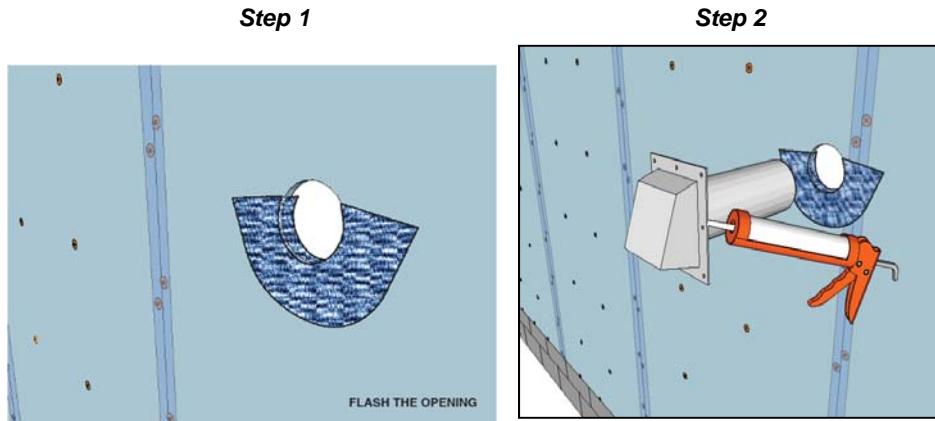


FIGURE 2—TYPICAL PENETRATION FLASHING DETAIL – FLANGED

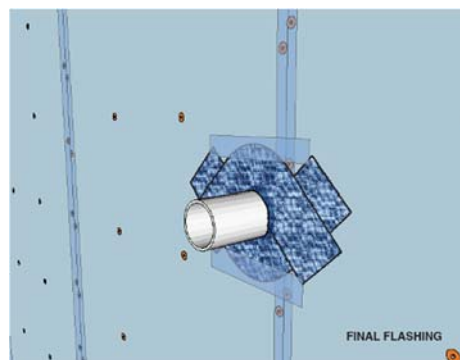


FIGURE 3—TYPICAL FLASHING DETAIL – UNFLANGED

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1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that DuPont de Nemours, Inc. insulation boards (TUFF-R™; TUFF-R™ C; SUPER TUFF-R™; SUPER-TUFF-R™ C AND ISOCAST™ R), described in ICC-ES evaluation report ESR-3089, have also been evaluated for compliance with the codes noted below.

Applicable code edition(s):

- 2019 *California Building Code*® (CBC)

For evaluation of applicable Chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code*® (CRC)
- 2019 *California Energy Code*® (CEC)

2.0 CONCLUSIONS

2.1 CBC and CRC:

The DuPont de Nemours, Inc. insulation boards (TUFF-R™; TUFF-R™ C; SUPER TUFF-R™; SUPER-TUFF-R™ C AND ISOCAST™ R), described in Sections 2.0 through 7.0 of the evaluation report ESR-3089, comply with 2019 CBC and 2019 CRC, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) and 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report.

2.1.1 OSHPD: The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA: The applicable DSA Sections and Chapters of the CBC are beyond the scope of this .

2.2 CEC:

The DuPont de Nemours, Inc. insulation boards (TUFF-R™; TUFF-R™ C; SUPER TUFF-R™; SUPER-TUFF-R™ C AND ISOCAST™ R), described in Sections 2.0 through 7.0 of the evaluation report ESR-3089, comply with 2019 CEC, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) and 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report.

2.2.1 Condition of Use:

In accordance with Section 110.8 of the 2019 California Energy Code, verification of certification by the Department of Consumer Affairs, Bureau of Household Goods and Services, must be provided to the code official, demonstrating that the

insulation conductive thermal performance is approved pursuant to the California Code of Regulations, Title 24, Part 12, Chapter 12-13, Article 3, "Standards for Insulating Material." Certification can be verified with the DCA Bureau of Household Goods and Services using the following link to the bureau's Directory of Certified Insulation Materials: https://bhgs.dca.ca.gov/consumers/ti_directory.pdf

This supplement expires concurrently with the evaluation report, reissued July 2022.