



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

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REPORT HOLDER:

DUPONT DE NEMOURS, INC.

EVALUATION SUBJECT:

STYROFOAM™ BRAND INSULATION BOARDS AND DUPONT FAN-FOLD PRODUCTS

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2021, 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2021, 2018, 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2021, 2018, 2015, 2012 and 2009 *International Energy Conservation Code*® (IECC)
- Other Codes (see Section 8.0)

Properties evaluated:

- Surface burning characteristics
- Attic installations
- Crawl space installations
- Air barrier
- Water-resistive barrier
- Thermal resistance
- Exterior walls in Types I-IV Construction
- Wind resistance (ANSI/FS 100)

1.2 Evaluation to the following green code(s) and/or standards:

- 2019 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2021, 2018, 2015 and 2012 *International Green Construction Code*® (IgCC)

- 2020, 2017, 2014 and 2011 ANSI/ASHRAE/USGBC/IES Standard 189.1—Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings

- 2020, 2015, 2012 and 2008 ICC 700 *National Green Building Standard*™ (ICC 700-2020, ICC 700-2015, ICC 700-2012 and ICC 700-2008)

Attributes verified:

See Section 2.0.

2.0 USES

Styrofoam™ brand insulation boards are extruded polystyrene foam plastic boards used as nonstructural thermal insulating material in buildings of all construction types under the 2018, 2015, 2012 and 2009 IBC; in Type V construction under the 2021, 2018, 2015, 2012 and 2009 IBC; and dwellings under the IRC. The insulation is for use in wall assemblies, ceiling/floor assemblies, door cavities, roofs, foundations, attic and crawlspaces.

DuPont fan-fold products are extruded polystyrene foam plastic boards used as nonstructural thermal insulation in roofs, on foundations or on walls constructed in accordance with the IBC or IRC.

Styrofoam™ Duramate™ Plus, Styrofoam™ Residential Sheathing, Styrofoam™ Residing Board, Styrofoam™ Utilityfit, Styrofoam™ Scoreboard, Styrofoam™ Sheathing Material, Styrofoam™ Square Edge, Styrofoam™ Tongue and Groove, Styrofoam™ Cavymate™ Ultra, Styrofoam™ Ultra SL, DuPont High Performance Underlayment, Bluecor™, and DuPont Protection Board III brand insulation boards may be used as alternatives to the water-resistive barriers specified in the IBC and IRC when installed in accordance with Section 4.4 and have been verified as conforming to the provisions of (i) CALGreen Section 5.407.1 for water-resistive barriers and Section A4.407.5 for air barriers; (ii) 2021 IgCC Section 701.3.1.2, 2018 IgCC Section 701.3.1.1 and 2015 and 2012 IgCC Section 605.1.2.1 for air barriers; (iii) 2020 ASHRAE 189.1 Section 7.3.1.2, 2017 and 2014 ASHRAE 189.1 Section 7.3.1.1 and 2011 ASHRAE 189.1 Section 7.4.2.9 for air barriers; (iv) ICC 700-2020 Sections 602.1.8, 11.602.1.8, 1202.6 and 13.104.1.4; ICC 700-2015 Section 602.1.8, 11.602.1.8 and 12.6.602.1.8; ICC 700-2012 Section 602.1.8, 11.602.1.8 and 12.5.602.1.8; and ICC 700-2008 Section 602.9 for water-resistive barriers.

The attributes of the insulation have also been verified as conforming to the provisions of ICC 700-2008 Section 703.2.1.1.1(c) as an air impermeable insulation. Note that decisions on compliance for those areas rest with the user

of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.0 DESCRIPTION

3.1 Styrofoam™ Brand Insulation Boards:

Styrofoam™ brand insulation boards are extruded polystyrene foam plastic complying with ASTM C578. The boards are available as various products having the product names and properties detailed in Table 1. The boards are available in various lengths and widths and in thicknesses up to 4 inches. The actual board thickness provided is determined based on the *R*-value stated for the product.

3.2 DuPont Fan-fold Products:

DuPont fan-fold products are extruded polystyrene foam plastic insulation provided in “fan-folded” bundles. The boards are available in various lengths and widths and in thicknesses up to 1/2 inch (12.7 mm). Table 2 details the physical properties of the fan-fold products. The actual board thickness provided is determined based on the *R*-value stated for the product.

3.3 Joint-sealing:

DuPont™ Styrofoam™ Brand Tape is nominally 27/8 inches wide and is used in conjunction with Styrofoam™ brand insulation boards and DuPont fan-fold products to seal joints between two or more edges of the boards, when the insulation boards are installed as a water-resistive barrier. The installation must be as described in Section 4.4 of this report.

Weathermate™ Flashing Tape with a minimum 4-inch (102 mm) width, and Great Stuff™ Pro Gaps & Cracks sealant ([ESR-1961](#)), are used in conjunction with Styrofoam™ brand insulation boards to seal joints between two or more edges of boards, when insulation boards are installed as an air barrier assembly. The installation must be as described in Section 4.6.2 of this report.

LiquidArmor™ CM applied in a minimum 2-inch-wide (51 mm) band with a minimum 45 wet mils and Great Stuff™ Gaps & Cracks sealant ([ESR-1961](#)), are used in conjunction with Styrofoam™ brand insulation boards to seal joints between two or more edges of the boards, when the insulation boards are used as a water-resistive barrier or an air barrier assembly. The installation must be as described in Section 4.4 or Section 4.6.2 of this report, respectively.

LiquidArmor™ LT applied in a minimum of 1-inch-wide (25.4 mm) band with a minimum 25 wet mils are used in conjunction with Styrofoam™ brand insulation boards to seal joints between two or more edges of the boards, when the insulation boards are used as a water-resistive barrier or an air barrier assembly. The installation must be as described in Section 4.4 or Section 4.6.2 of this report, respectively.

LiquidArmor™ QS applied in a minimum of 2-inch-wide (51 mm) band with a minimum 45 wet mils are used in conjunction with Styrofoam™ brand insulation boards to seal joints between two or more edges of the boards, when the insulation boards are used as a water-resistive barrier or an air barrier assembly. The installation must be as described in Section 4.4 or Section 4.6.2 of this report, respectively.

3.4 Surface Burning Characteristics:

Styrofoam™ brand insulation boards, insulation boards and DuPont fan-fold products have a flame-spread index (FSI) of 25 or less and a smoke-developed index (SDI) of 450 or less when tested in accordance with ASTM E84

(UL 723) at a maximum thickness of 4 inches (102 mm) and a maximum density of 4.0 pcf (64 kg/m³).

3.5 Thermal Resistance:

Styrofoam™ brand insulation boards and have a thermal resistance (*R*-value) as noted in Table 1. DuPont fan-fold products have a thermal resistance (*R*-value) as noted in Table 2.

3.6 Air Permeability

At a minimum thickness of 1/4 inch (6.4 mm), the Styrofoam™ brand insulation boards are considered air-impermeable in accordance with 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2021, 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

Styrofoam™ brand insulation boards and DuPont fan-fold products must be installed in accordance with the manufacturer’s published installation instructions and this report. For the purposes of this report, the term “insulation board” is intended to refer to both Styrofoam™ brand insulation boards and DuPont fan-fold products.

The installation of the insulation boards in areas of “very heavy” termite infestation probability must comply with 2021, 2018 and 2015 IBC Section 2603.8 [2012 IBC Section 2603.9 (2009 IBC Section 2603.8)] or IRC Section R318.4. Under the IBC, protection against condensation must be provided in accordance with 2021 and 2018 IBC Section 1402.2 (2015, 2012 and 2009 IBC Section 1403.2); under the IRC, a vapor retarder must be provided in accordance with 2021, 2018, 2015 and 2012 IRC Section R702.7 (2009 IRC Section R601.3). Insulation boards must not be used as a nailing base for finish materials or wall covering materials. Fasteners used to attach exterior finish material over insulation boards must comply with a current ICC-ES evaluation report for proprietary wall covering materials, 2021 and 2018 IBC Section 1403 or 1402.4 (2015, 2012 or 2009 IBC Section 1404 or 1405), 2021, 2018 and 2015 IRC Table R703.3(1) (2012 and 2009 IRC Table R703.4), and the installation instructions from the finish manufacturer. For cementitious exterior wall coating applications, fasteners for insulation board thicker than 1 1/2 inches (38 mm) must be considered for lateral resistance to ensure support for the exterior wall coatings.

Exterior wall assembly, exterior finish or a wall covering in conjunction with insulation boards must be structurally adequate to resist horizontal forces perpendicular to the wall. All walls must be braced in accordance with 2021 and 2018 IBC Section 2308 [2015 IBC Section 2308.6 (2012 and 2009 IBC Sections 2308.9.3 and 2308.12.4)], or IRC Section R602.10, as applicable. The insulation boards have been tested in with the requirements of 2021, 2018 and 2015 IBC Section 2603.10 and ANSI/FS 100 for wind resistance when installed in accordance with Section 4.7.

When the insulation boards are applied over open framing, vertical butt joints must be over framing members. Vertical tongue-and-groove or shiplap joints need not be over framing members, provided joints are staggered a minimum of one stud space from adjacent courses. For cementitious exterior wall coating systems, unbacked joints are permitted only when specified in the ICC-ES evaluation report on the cementitious exterior wall coating system.

When installation is in an attic or crawl space, that attic or crawl space area must be separated from the interior of the building by an approved 15-minute thermal barrier.

The foam must be installed as described in Section 4.3. Styrofoam™ brand insulation boards may be installed in unvented attics when the maximum thickness of the insulation boards does not exceed 1/4 inch (6.35 mm) in accordance with 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3), as applicable.

4.2 Thermal Barrier Requirements:

4.2.1 Application with a Prescriptive Thermal Barrier: Except as described in Section 4.2.2, Styrofoam™ brand insulation boards and DuPont fan-fold products must be separated from the interior of the building by an approved 15-minute thermal barrier as required in IBC Section 2603.4, or IRC Section R316.4.

4.2.2 Application without a Prescriptive Thermal Barrier: ASTM C578 Type X and Type IV Styrofoam™ Brand insulation boards may be installed without a prescriptive 15-minute thermal barrier required by the applicable code when the maximum thickness does not exceed 2 inches (51 mm). ASTM C578 Type VI and VII Styrofoam™ brand insulation boards must be installed with code-prescribed thermal barrier. See Section 4.3 for conditions related to the use of insulation in attics and crawl spaces. **Exception:** Styrofoam™ Deckmate™ Plus, Styrofoam™ Deckmate™ Plus FA, Styrofoam™ Panel Core 20 (grey in color), Styrofoam™ Utilityfit™, Styrofoam™ Ultra SL and Styrofoam™ Cavitymate™ Ultra must be installed with a prescriptive thermal barrier in accordance with Section 4.2.1.

4.3 Attics and Crawl Spaces – Ignition Barrier Requirements:

4.3.1 Application with a Prescriptive Ignition Barrier: Except as described in Section 4.3.2, when Styrofoam™ brand insulation boards are installed within attics or crawl spaces, where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 or IRC Section R316.5.3 or R316.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable code and must be installed in a manner so that the foam plastic insulation is not exposed.

4.3.2 Installation without a Prescriptive Ignition Barrier: Where ASTM C578 Type X and ASTM C578 Type IV Styrofoam™ brand insulation boards, with the maximum nominal thickness of 2 inches (51 mm), are installed in an attic or crawl space the prescriptive ignition barrier required by IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4 may be omitted where the following conditions apply:

1. Attic ventilation is provided when required by 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.2) or IRC Section R806, as applicable; except unvented attic assemblies are permitted under the conditions prescribed in 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).
2. Under-floor (crawl space) ventilation is provided when required by 2021 and 2018 IBC Section 1202.4 [2015 IBC Section 1203.4 (2012 and 2009 IBC Section 1203.3)] or IRC Section R408.1, as applicable, except unvented crawl spaces are permitted under the conditions prescribed in IRC Section R408.3.
3. Combustion air is provided in accordance with IMC (*International Mechanical Code*®) Section 701

ASTM C578 Type VI and VII Styrofoam™ Brand insulation boards must be installed with code-prescribed ignition

barrier in accordance with Section 4.3.1.

Styrofoam™ Deckmate™ Plus, Styrofoam™ Deckmate™ Plus FA, Styrofoam™ Panel Core 20 (grey in color), Styrofoam™ Utilityfit™, Styrofoam™ Ultra SL and Styrofoam™ Cavitymate™ Ultra insulation boards must also be installed with code-prescribed ignition barrier in accordance with Section 4.3.1.

4.3.3 Attics Only – Installation without a Prescriptive Ignition Barrier: ASTM C578 Type X and ASTM C578 Type IV Styrofoam™ brand insulation boards, with a maximum nominal thickness of 1 inch (25.4 mm), covered with a water-resistive barrier (Weathermate [\[ESR-2862\]](#), Weathermate Plus [\[ESR-3401\]](#) or Tyvek [\[ESR-2375\]](#)) exposed to the interior of the attic space, may be installed on the walls of an attic (including gable ends and knee walls) (the attic may contain utilities, including but not limited to, mechanical equipment; electrical wiring; fans; plumbing; gas or electric hot water heaters; gas or electric furnaces; etc.) with no coverings (no thermal or ignition barrier) applied, when all of the following conditions are met:

1. Entry to the attic is only to service utilities and no storage is permitted.
2. There are no interconnected attic areas.
3. Air in the attic is not circulated to other parts of the building.
4. Attic ventilation is provided when required by 2021 and 2018 IBC Section 1202.2 (2015, 2012 and 2009 IBC Section 1203.2) or IRC Section R806, as applicable; except unvented attic assemblies are permitted under the conditions prescribed 2021, 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).
5. Combustion air is provided in accordance with IMC Section 701.

Exception: Styrofoam™ Deckmate™ Plus, Styrofoam™ Deckmate™ Plus FA, Styrofoam™ Panel Core 20 (grey in color), Styrofoam™ Utilityfit™, Styrofoam™ Ultra SL and Styrofoam™ Cavitymate™ Ultra must be installed with a code-prescribed ignition barrier in accordance with Section 4.3.1.

4.4 Water-resistive Barrier:

The noted Styrofoam™ brand insulation boards (Styrofoam™ Cavitymate™, Styrofoam™ Cavitymate™ Plus, Styrofoam™ Cavitymate™ SC, Styrofoam™ Cavitymate™ Ultra, Styrofoam™ Ultra SL, Styrofoam™ Duramate™ Plus, Styrofoam™ Residential Sheathing, Styrofoam™ Residing Board, Styrofoam™ Utilityfit, Styrofoam™ Scoreboard, Styrofoam™ Sheathing Material, Styrofoam™ Square Edge and Styrofoam™ Tongue and Groove) and DuPont fan-fold products (DuPont High Performance Underlayment, Bluecor™, and DuPont Protection Board III) may be used as alternate water-resistive barriers as prescribed in 2021 and 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section 1404.2) or IRC Section R703.2, when installed on exterior walls as described in following sections:

4.4.1 Styrofoam™ brand insulation boards measuring 4 feet by 8 to 10 feet are installed horizontally or vertically with long joints in contact with one another. Boards measuring 2 feet by 8 feet are installed horizontally. When installed directly on framing members, framing members are spaced a maximum of 24 inches on center. The insulation boards are attached using 3/8-inch-head (9.5 mm) galvanized nails, 1-inch-crown (25.4 mm) galvanized staples or 1-inch-head (25.4 mm) plastic cap nails or

equivalent fasteners long enough to penetrate framing a minimum of $\frac{3}{4}$ inch. Nails or staples must not be over-driven. Fastener spacing for boards measuring 4 feet by 8 to 10 feet is a minimum of 12 inches on center around the perimeter and 16 inches on center in the field; for 2-foot-by-8-foot boards, fastener spacing is a minimum of 12 inches on center on each stud (three fasteners per stud). For window installation, the installation must be in accordance with the window manufacturer's instructions. Minimum 3-inch-wide flashing is used to seal the sill of windows, and minimum 2-inch-wide flashing is used to seal jambs and heads. Fasteners for window installation must be sufficient length to achieve $1\frac{1}{4}$ inch (31.8 mm) embedment into framing. See also Figure 1.

DuPont fan-fold products must be installed over wood structural sheathing with long joints butted tightly together. The insulation foam board joints must be staggered relative to joints in the structural sheathing. The remainder of the installation is as described above for rigid boards.

For the Styrofoam™ brand insulation boards and DuPont fan-fold products mentioned in this section, seams and joints between boards must be covered by minimum $2\frac{7}{8}$ -inch-wide (73 mm) DuPont™ Styrofoam™ Brand Tape or equivalent. Penetrations in exterior walls must be sealed with Great Stuff™ Gaps & Cracks sealant ([ESR-1961](#)), or an equivalent expanding spray foam sealant, or an elastomeric sealant. See Figures 2 and 3.

4.4.2 Styrofoam™ brand insulation boards with a minimum thickness of 1 inch (25.4 mm) are installed horizontally or vertically with edge joints in contact with one another. The insulation boards must be installed directly on steel studs spaced a maximum of 16 inches (406 mm) on center. The insulation boards must be attached with screws with diameter of 2 inches (51 mm) plastic caps or washers, long enough to penetrate the framing a minimum of 0.45 inch (11.4 mm) and spaced a maximum of 16 inches (406 mm) on center in the field and 12 inches (305 mm) on center on the perimeter.

The horizontal and vertical seams and joints of the insulation boards must be covered with LiquidArmor™ CM applied in a minimum of 2-inch-wide (51 mm) band with a minimum 45 wet mils and Great Stuff™ Gaps & Cracks sealant ([ESR-1961](#)), LiquidArmor™ LT applied in a minimum of 1-inch-wide (25.4 mm) band with a minimum 25 wet mils or LiquidArmor™ QS applied in a minimum of 2-inch-wide (51 mm) band with a minimum 45 wet mils.

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 and covered with LiquidArmor™ CM, LiquidArmor™ LT or LiquidArmor™ QS. See Figures 4 through 6.

4.5 Use on Exterior Walls in Types I, II, III and IV Construction Under the 2018, 2015, 2012 and 2009 IBC:

When used on exterior walls of Types I, II, III and IV construction under the 2018, 2015, 2012 and 2009 IBC, and when installed in accordance with this report, the assembly must comply with Section 2603.5 of the 2018, 2015, 2012 and 2009 IBC and must be as described in Table 3; the insulation boards must be installed in a single layer of insulation board at a maximum thickness of 3 inches. Alternatively, the insulation boards may be used in Types I, II, III and IV construction when specifically named in another ICC-ES evaluation report, in which case the insulation boards must be installed as described in that report. The potential heat of the ASTM C578 Type X and ASTM C578

Type IV Styrofoam™ foam plastic insulation boards and is 2849 Btu/ft² per inch of thickness (30.0 MJ/m²).

4.6 Air Barrier:

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

4.6.2 Air Barrier Assemblies:

4.6.2.1 When installed on exterior walls as described in this section, the ASTM C578 Type X and ASTM C578 Type IV Styrofoam™ foam plastic insulation is part of an air barrier assembly in accordance with 2021 IECC Section C402.5.1.2.4, [(2018 and 2015 IECC Section C402.5.1.2.2 (2012 IECC Section C402.4.1.2.2)], based on testing in accordance with ASTM E2357. The assembly qualifies as a continuous air barrier as prescribed in 2021, 2018 and 2015 IECC Section C402.5.1 (2012 IECC Section C402.4.1).

The Styrofoam™ brand insulation boards, in widths of 1.5 to 4 feet (457 to 1219 mm) and lengths of 8 to 10 feet (2438 to 3048 mm), are installed horizontally over gypsum sheathing or concrete block wall.

When the insulation boards are installed over gypsum sheathing, the boards must be mechanically attached to the wood or steel framing using nails, staples, plastic cap nails or screws. The fasteners must be long enough to penetrate wood framing members a minimum of 0.45 inch (11.4 mm) and steel framing members a minimum of $\frac{3}{4}$ inch (19.1 mm).

When installed directly over concrete block walls, the insulation boards are attached to the block wall with mechanical fasteners or Great Stuff™ Pro Gaps & Cracks sealant ([ESR-1961](#)). The boards are installed between the rows of brick ties.

Seams and joints between the boards must either be sealed with Great Stuff™ Pro Gaps & Cracks sealant ([ESR-1961](#)) or covered by minimum 4-inch-wide (102 mm) Weathermate™ Flashing Tape.

Penetrations in the air barrier assembly must be sealed in accordance with Item 3 of 2021, 2018 and 2015 IECC Section C402.5.1.1 (2012 IECC Section C402.4.2).

Wall coverings must be mechanically attached through the insulation to wall framing or sheathing.

4.6.2.2 When installation on exterior walls as described in this section, Styrofoam™ brand insulation boards with a minimum thickness of 1 inch (25.4 mm) is part of an air barrier assembly in accordance with 2021, 2018 and 2015 IECC Section C402.5.1.2.2 (2012 IECC Section C402.4.1.2.2), based on testing in accordance with ASTM E2357. Wall coverings must be mechanically attached through the insulation to wall framing or sheathing.

The insulation boards are installed horizontally or vertically with edge joints in contact with one another and directly on steel studs with screws with diameter of 2 inches (51mm) plastic caps or washers, long enough to penetrate the framing a minimum of 0.45 inch (11.4 mm).

When seams and joints between the board are covered with LiquidArmor™ CM, LiquidArmor™ CM must be applied in a minimum of 2-inch-wide (51 mm) band with a minimum 45 wet mils. When seams and joints between the board are covered with LiquidArmor™ LT or LiquidArmor™ QS, LiquidArmor™ LT must be applied in a minimum of 1-inch-wide (25.4 mm) band with a minimum 25 wet mils and LiquidArmor™ QS must be applied in a minimum of 2-inch-wide (51 mm) band with a minimum 45 wet mils.

Penetrations in the air barrier assembly must be sealed in accordance with Item 3 of 2021, 2018 and 2015 IECC Section C402.5.1.1 (2012 IECC Section C402.4.2). The assemblies qualify as a continuous air barrier as prescribed in 2021, 2018 and 2015 IECC Section C402.5.1 (2012 IECC Section C402.4.1).

4.7 Wind Resistance:

The Styrofoam™ brand insulation boards have the wind resistance values noted in Table 4 based on testing in accordance with ASTM E330 and ANSI/FS 100 as specified in 2021, 2018 and 2015 IBC Section 2603.10. The values are based on direct attachment to the type and spacing of wall framing described in Table 4. The design and construction of the wall framing must comply with the applicable requirements of the IBC or IRC, as applicable, and Table 4.

Attachment of the cladding over the Styrofoam™ brand insulation boards must be in accordance with 2021 and 2018 IBC Section 2603.13 and Table 2603.13.1.

5.0 CONDITIONS OF USE

The Styrofoam™ brand insulation boards and DuPont fan-fold products 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 Styrofoam™ brand insulation boards and DuPont fan-fold products must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. In the event of a conflict between the installation instructions and this report, this report governs.
- 5.2 This evaluation report and the manufacturer's published installation instructions, when required by the code official, must be submitted at the time of permit application.
- 5.3 A water-resistive barrier complying with the requirements of the applicable code must be provided except when installation is as described in Section 4.3 of this report.
- 5.4 Use of the insulation boards to structurally resist transverse, racking-shear or vertical loading is outside the scope of this report. The walls must be braced in accordance with the requirements of the applicable code.
- 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 insulation boards must be separated from the interior of the building by an approved 15-minute thermal barrier, except as described in Section 4.2.
- 5.7 Where required by the applicable code, a vapor retarder system, which may include the foam plastic insulation, must be installed in the exterior wall, floor, and/or roof ceiling assembly.
- 5.8 Jobsite certification and labeling of the insulation must comply with 2021, 2018 and 2015 IRC Section N1101.10.1 [2012 IRC Section N1101.12 (2009 IRC Section N1101.4)] and 2021, 2018, 2015 and 2012 IECC Sections C303.1.1, R303.1.1 and R401.3 (2009 IECC Section 303.1 and 401.3), as applicable.
- 5.9 Use of insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with 2021, 2018, 2015 and 2009 IBC Section 2603.8 (2012 IBC Section 2603.9) or IRC

Section R318.4. When use is on exterior walls of buildings of Type I, II, III, or IV under the 2018, 2015, 2012 and 2009 IBC, construction must be as described in Section 4.4 and Table 3.

- 5.10 Under the 2021 IBC, use of Styrofoam™ brand insulation boards on exterior walls of Types I, II, III and IV construction is outside the scope of this evaluation report.
- 5.11 Installation in unvented attics, when equipped with vapor diffusion ports in accordance with Section 1202.3, Item 5.2 of the 2021 IBC and Section 806.5, Item 5.2 of the 2012 and 2018 IRC, is outside the scope of this report.
- 5.12 Styrofoam™ brand insulation boards and DuPont fan-fold products are manufactured in Burley, Idaho; Dalton, Georgia; Channahan, Illinois; Pevely, Missouri; Varennes, Quebec; and Wyoming, Michigan, under a quality-control program with inspections by ICC-ES.
- 5.13 Weathermate™ Flashing Tape has not been evaluated by ICC-ES for use as flashing under 2021 and 2018 IBC Section 1404.4 (2015, 2012 and 2009 IBC Section 1405.4).

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).
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water-resistive Barriers (AC71), dated February 2003 (editorially revised March 2021).
- 6.3 Report of room corner fire tests in accordance with NFPA 286.
- 6.4 Reports of room corner fire tests in accordance with NFPA 286, AC12 Appendix B, for attics and crawlspace in Section 4.2.
- 6.5 Reports of air leakage tests in accordance with ASTM E283 and ASTM E2357.
- 6.6 Reports of potential heat tests in accordance with NFPA 259.
- 6.7 Reports of fire propagation tests in accordance with NFPA 285.
- 6.8 Data in accordance with ANSI/FS 100 for wind resistance.

7.0 IDENTIFICATION

- 7.1 The Styrofoam™ brand insulation boards, and fan-fold products described in this report are identified by a label on the board or packaging material bearing the DuPont de Nemours, Inc. name, product name, plant code or manufacturing address, other information to confirm code compliance, and the ICC-ES evaluation report number (ESR-2142); except for those products that are used in Types I, II, III, and IV construction, which must have the above-noted labeling printed on the board.

DuPont™ Styrofoam™ Brand Tape, Weathermate™ Flashing Tape, LiquidArmor™ CM, LiquidArmor™ LT, and LiquidArmor™ QS are identified with the product names.

- 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/building

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 through 7.0 of this report, with the revisions noted below:

- **General:** See Section 4.1, except the approved thermal barrier must be installed in accordance with Section R314.4 or R314.5 of the 2006 IRC.
- **Protection against Termites:** See Sections 4.1 and 5.9, except use of the insulation in areas where the probability of termite infestation is “very heavy” must be in

accordance with Section 2603.8 of the 2006 IBC and Section R320.5 of the 2006 IRC.

- **Protection against Condensation:** See Section 4.1, except a vapor barrier must be provided in accordance with Sections R318 and N1102.5 of the 2006 IRC.
- **Application without a Prescriptive Ignition Barrier.** See Sections 4.2.2, except attics must be vented in accordance with 2006 IRC Section R806.4 and combustion air must be provided in accordance with 2006 IMC Sections 701 and 703. Additionally, the prescriptive ignition barrier required by Sections R314.5.3 and R314.5.4 of the 2006 IRC may be omitted.
- **Application without a Prescriptive Thermal Barrier:** See Section 4.2. The prescriptive thermal barrier may be omitted based on testing in accordance with 2006 IBC Section 2603.9 and 2006 IRC Section R314.6.
- **Jobsite Certification and Labeling:** See Section 5.8, except jobsite certification and labeling must comply with Section 102.1.2 of the 2006 IECC, when applicable.

TABLE 1—STYROFOAM BRAND INSULATION BOARDS

PRODUCT NAME	ASTM C578 TYPE ¹	R-VALUE, R / INCH (unless otherwise noted) at 75°F (ft ² -hr-°F/Btu)
Styrofoam™ Ag Board	IV	5.0
Styrofoam™ Cavitymate™	X	5.0
Styrofoam™ Cavitymate™ Plus	IV	5.0
Styrofoam™ Cavitymate™ SC	X	5.0
Styrofoam™ Cavitymate™ Ultra	IV	10.0 at nominal 1 ³ / ₄ " 12.0 at nominal 2 ¹ / ₈ " 14.0 at nominal 2 ¹ / ₂ " 16.8 at nominal 3" 19.6 at nominal 3 ¹ / ₂ "
Styrofoam™ Deckmate™ Plus	IV	5.0
Styrofoam™ Deckmate™ Plus FA	IV	5.0
Styrofoam™ Duramate™ Plus R2	X	2.0 at nominal 3/ ₈ "
Styrofoam™ Duramate™ Plus	X	3.0 at nominal 1/ ₂ "
Styrofoam™ Freezermate™	IV	5.0
Styrofoam™ Brand Freezermate™ 30	IV	5.0
Styrofoam™ Brand Freezermate™ 40	VI	5.0
Styrofoam™ Brand Freezermate™ 60	VII	5.0
Styrofoam™ High Load 40	VI	5.0
Styrofoam™ High Load 60	VII	5.0
Styrofoam™ Lightguard Feedstock	VI	5.0
Styrofoam™ Panel Core	VI, VII IV, X	5.0
Styrofoam™ Panel Core 20	X	5.0
Styrofoam™ Panelmate™ Plus	IV	5.0
Styrofoam™ Perimate™	IV	5.0
Styrofoam™ Plazamate™	VII	5.0
Styrofoam™ Residential Sheathing R5	X	5.0 at nominal 1"
Styrofoam™ Residential Sheathing R4	X	4.0 at nominal 3/ ₄ "
Styrofoam™ Residential Sheathing R3	X	3.0 at nominal 1/ ₂ "
Styrofoam™ Residing Board	X	2.8 at nominal 1/ ₂ "
Styrofoam™ Ribbed Roofmate™	VI	5.0
Styrofoam™ Roofmate™	VI	5.0
Styrofoam™ Scoreboard	IV	5.0
Styrofoam™ Sheathing Material	X, IV	5.0
Styrofoam™ Square Edge	IV	5.0
Styrofoam™ Square Edge R3	IV	3.0 at nominal 1/ ₂ "
Styrofoam™ Square Edge R4	IV	4.0 at nominal 3/ ₄ "
Styrofoam™ Tongue and Groove	IV	5.0

Styrofoam™ Ultra SL	IV	10.0 at nominal 1 ³ / ₄ " 12.0 at nominal 2 ¹ / ₈ " 14.0 at nominal 2 ¹ / ₂ " 16.8 at nominal 3" 19.6 at nominal 3 ¹ / ₂ "
Styrofoam™ Utilityfit™	X	5.0
Styrofoam™ Wallmate™	X	5.0

For **SI**: 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m³, 1°F·ft²·hr/Btu = 0.176 m²·K/W, 1°F = 1.8°C+32.

¹Type IV has a minimum density of 1.45 pcf, Type VI has a minimum density of 1.80 pcf.

²Type VII has a minimum density of 2.20 pcf, Type X has a minimum density of 1.30 pcf.

TABLE 2—DUPONT FAN-FOLD PRODUCTS

PRODUCT NAME	NOMINAL THICKNESS (inch)	THERMAL RESISTANCE (R-VALUE) at 75°F (ft ² ·hr·°F/Btu)
DuPont High Performance Underlayment	1/4	1.0
	3/8	1.5
	1/2	2.0
Bluecor™	1/4	1.0
DuPont Protection Board III	1/4	1.0
Styrofoam™ Recovermate™ CR	3/8	1.5

For **SI**: 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m³, 1°F·ft²·hr/Btu = 0.176 m²·K/W, 1°F = 1.8°C+32.

TABLE 3—NFPA 285 COMPLYING WALL ASSEMBLIES FOR MAXIMUM 3-INCH-THICK ASTM C578 TYPE IV STYROFOAM™ INSULATION BOARD^{3,4}

Base Wall System – Use either 1, 2, or 3	1 – Concrete Wall 2 – Concrete masonry wall 3 – 1 layer of 1/2-inch or 5/8-inch Type X Gypsum Wall Board (on interior), installed over steel studs (minimum 3 ⁵ / ₈ -inch deep, minimum No. 20-gage, maximum 16-inch o.c., lateral bracing every 4 ft. vertically)
Floorline Firestopping	4 pcf mineral wool in each stud cavity and at each floorline. Mineral wool to be attached with Z-clips or equivalent (See Figure 7).
Cavity Insulation – Use either 1, 2, or 3	1 – None 2 – Fiberglass batt insulation (faced or unfaced) 3 – Any non-combustible material
Exterior Sheathing – Use either 1, 2 or 3	1 – None 2 – 1/2-inch thick, exterior type gypsum sheathing 3 – 5/8-inch thick, Type X, exterior-type gypsum sheathing
Weather-Resistive Barrier Applied to Exterior Sheathing – Use 1 or 2	1 – None 2 – Any of the following ¹ : a. Air Bloc 31MR ² – Henry Co. b. AIR-SHIELD™ LMP ² (black only) – W.R. Meadows c. Backstop® NT ² – Dryvit d. Barritech™ VP ² – Carlisle e. CCW-705FR with CCW-702WB Primer ² – Carlisle f. Fire-Resist Barritech™ NP ² – Carlisle g. Green Guard® Max Building Wrap – Pactiv h. Perm-A-Barrier® Aluminum Wall Membrane with WB Primer ² – Grace Construction Products i. Perm-A-Barrier® VPS ² – Grace Construction Products j. Tyvek® CommercialWrap® (ESR-2375) k. Tyvek® Fluid Applied WB+™ – DuPont l. Wall Guardian™ FW100A ² – STS Inc. m. WEATHERMATE™ (ESR-2862) n. WEATHERMATE™ Plus (ESR-3401) Note: All barriers to be installed at recommended application rates per manufacturer's installation instructions.
Exterior Insulation	ASTM C578 Type IV Styrofoam™ insulation board: 1/2-inch (minimum) to 3-inch (maximum). Insulation board joints may be covered with 4-inch (maximum) wide asphalt or butyl-based flashing tape
Flashing	Flash all exterior insulation joints and veneer tie penetrations with one of the following: 1 – LiquidArmor™ CM – Minimum 2-inch-wide with a minimum 45 wet mils 2 – LiquidArmor™ LT – Minimum 1-inch-wide with a minimum 25 wet mils 3 – LiquidArmor™ QS – Minimum 2-inch-wide with a minimum 45 wet mils
Weather-Resistive Barrier ¹ Applied to Exterior Insulation – Use 1, 2, 3, 4 or 5	1 – None 2 – Green Guard® Max Building Wrap – Pactiv 3 – Tyvek® CommercialWrap® (ESR-2375) 4 – WEATHERMATE™ (ESR-2862) 5 – WEATHERMATE™ Plus (ESR-3401)

Exterior Veneer – Use 1, 2, 3, 4, 5 or 6	<p>1 – Brick. Use standard nominal 4-inch thick, clay brick. Use standard brick veneer anchors installed vertically on each stud at a maximum of 24-inch o.c. creating a 2-inch maximum air gap between the exterior insulation and brick.</p> <p>2 – Concrete – Minimum 2-inch thick, with a 2-inch maximum air gap between exterior insulation and concrete.</p> <p>3 – Concrete masonry units - minimum 4-inch thick, with a 2-inch maximum air gap between exterior insulation and concrete masonry units.</p> <p>3 – Limestone – minimum 2-inch thick installed using any standard non-open-joint installation technique such as shiplap.</p> <p>4 - Natural stone veneer – minimum 2-inch thick installed using any standard non-open-joint installation technique such as shiplap.</p> <p>5 – Pre-cast artificial stone complying with ICC-ES AC51 – minimum 1 1/2-inch thick installed using any standard non-open-joint installation technique such as shiplap.</p> <p>6 – Terracotta cladding – minimum 1 1/4-inch thick installed using any standard non-open-joint installation technique such as shiplap.</p>
Special Conditions	Use header treatment shown in Figures 5, 6 and 7 for all window and door openings in wall.

¹A code-complying water-resistive barrier must be provided, either over the sheathing or over the exterior insulation.

²This material was evaluated by ICC-ES to comply with Section 2603.5 of the IBC, when used as part of the wall assemblies outlined in Table 3, but has not been evaluated for use as a water-resistive barrier under Section 1404.2 of the IBC and Section R703.2 of the IRC.

³When used on exterior walls of Types I, II, III or IV construction, the specific wall assembly must comply with 2018, 2015, 2012 and 2009 IBC Section 2603.5.

⁴The exterior wall assemblies described in Table 3 comply with 2018, 2015, 2012 and 2009 IBC Section 2603.5.5.

TABLE 4—WIND PRESSURE RESISTANCE OF STYROFOAM BRAND INSULATION BOARDS

PRODUCT NAME	THICKNESS (in.)	FASTENER SPACING ¹ (in.)	FRAMING SPACING ^{2,3}	ALLOWABLE DESIGN LOAD (PSF) ² [PEF=1.0]	DESIGN WIND SPEED (MPH) ² [PEF=1.0]
Styrofoam™ Duramate™ Plus	1/2	12 Perimeter/16 Field	16 o.c.	22	120
Styrofoam™ Residential Sheathing	1/2	6 Perimeter/12 Field	16 o.c.	29.9	140
Styrofoam™ Utilityfit™	1	12 Perimeter/16 Field	16 o.c.	53.7	180

For SI: 1 inch = 25.4 mm, 1 psf = 4.8 kg/m², 1mph = 1.609 k/h.

¹Fasteners must be minimum 2 1/2" x 0.113" ring-shank nails with 1" plastic cap washers.

²Framing consists of minimum 2" x 4" wood studs, SPF species, Stud or No. 2 grade with the spacing as noted.

³Insulation must be installed with all edges supported by framing or blocking.

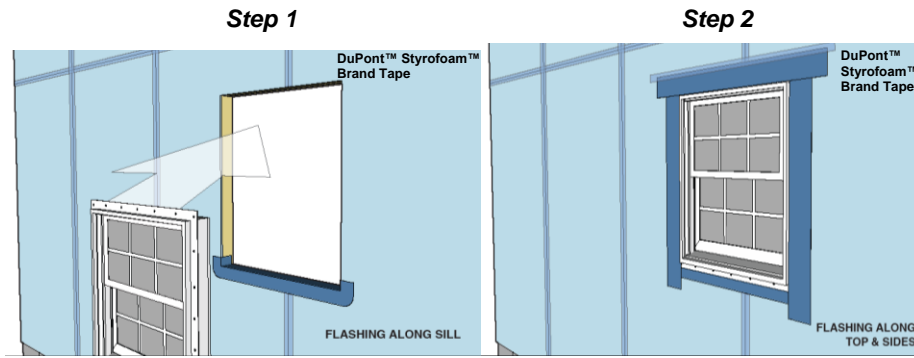


FIGURE 1—TYPICAL WINDOW FLASHING DETAIL

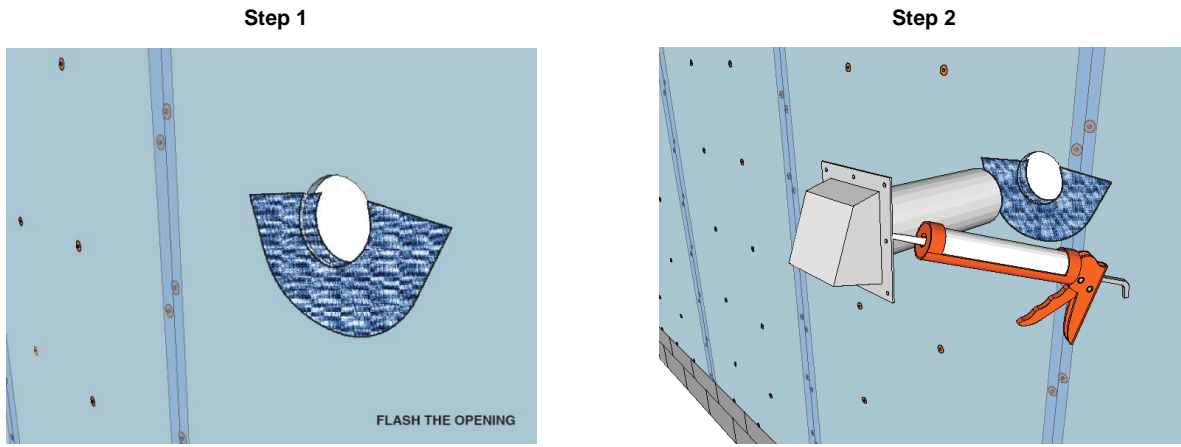


FIGURE 2—TYPICAL PENETRATION FLASHING DETAIL - FLANGED

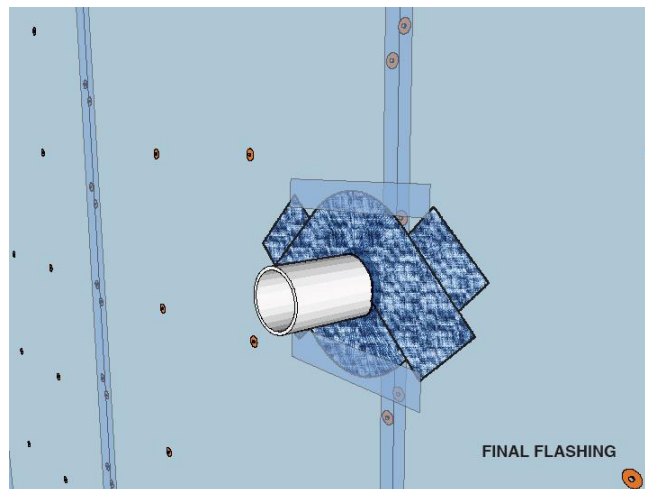


FIGURE 3—TYPICAL FLASHING DETAIL - UNFLANGED

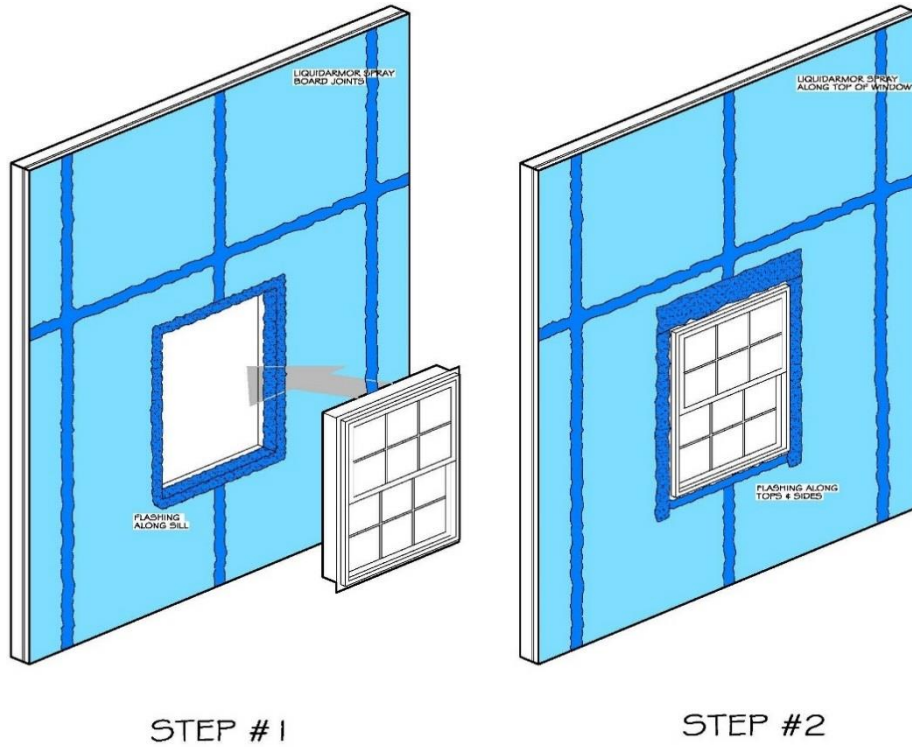


FIGURE 4—TYPICAL WINDOW FLASHING DETAIL

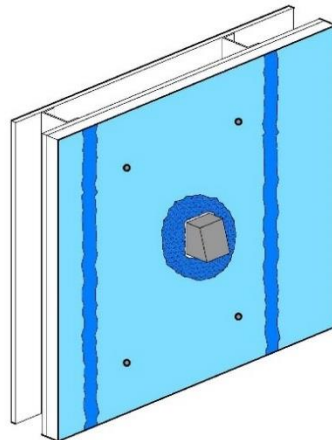


FIGURE 5—TYPICAL PENETRATION FLASHING DETAIL—FLANGED

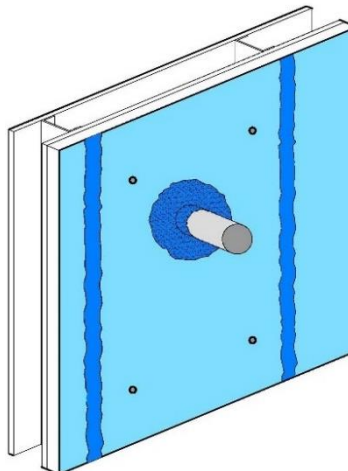


FIGURE 6—TYPICAL FLASHING DETAIL—UNFLANGED

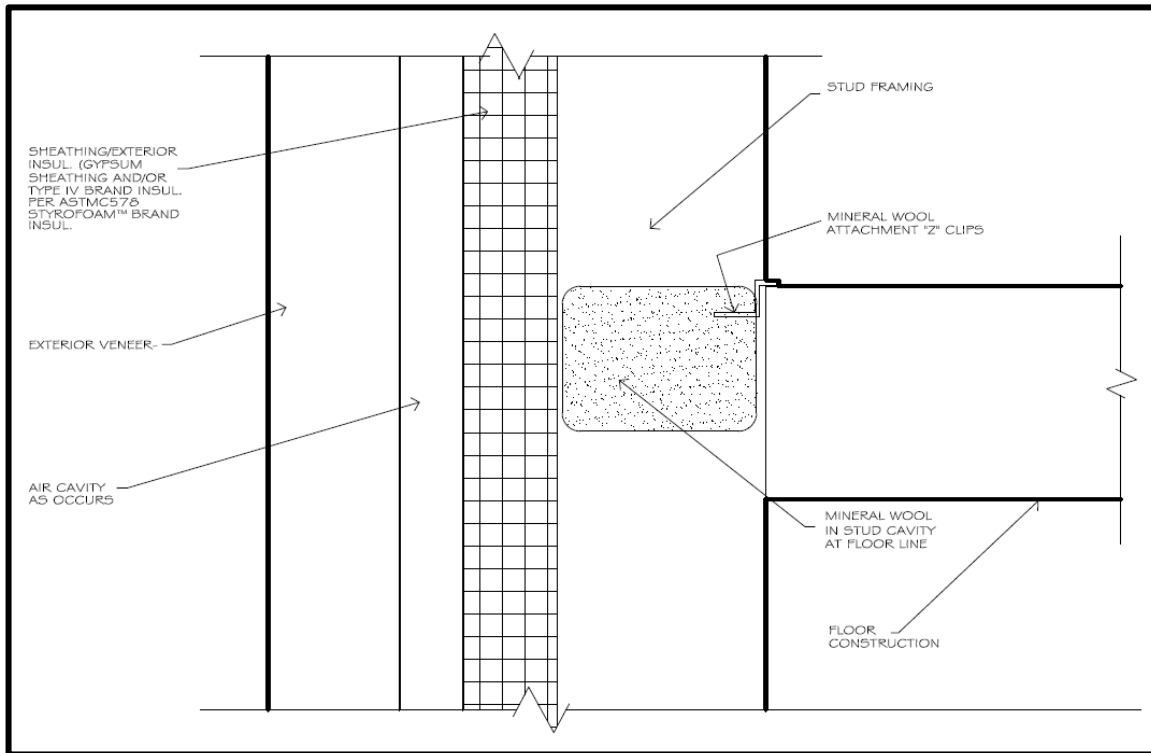


FIGURE 7—FLOORLINE FIRESTOPPING

STEEL STUD/BRICK VENEER – WINDOW HEAD DETAIL

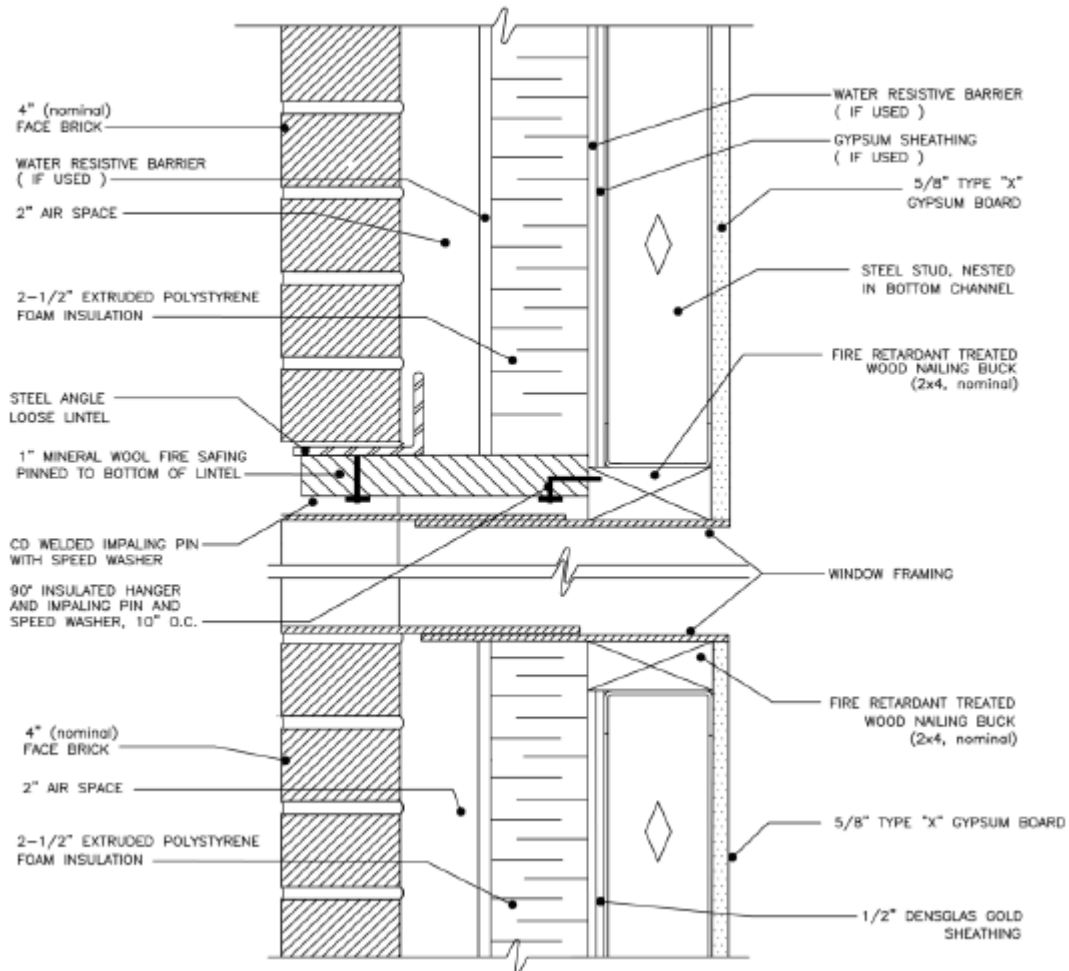


FIGURE 8—WINDOWSILL AND JAMB DETAIL—MINERAL WOOL

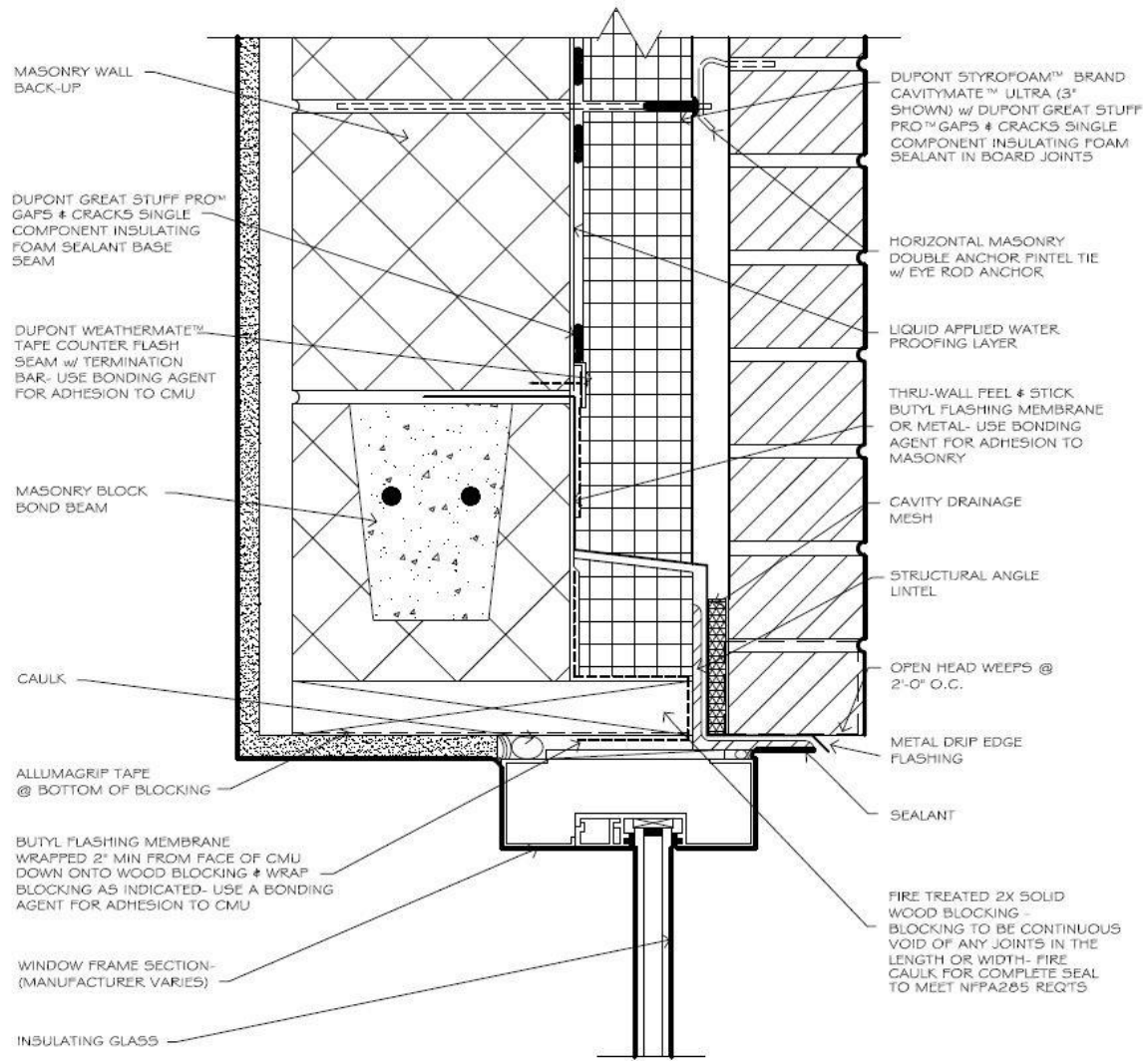


FIGURE 9—WINDOW HEAD DETAIL—FRTW WOOD BLOCKING—MASONRY WALL

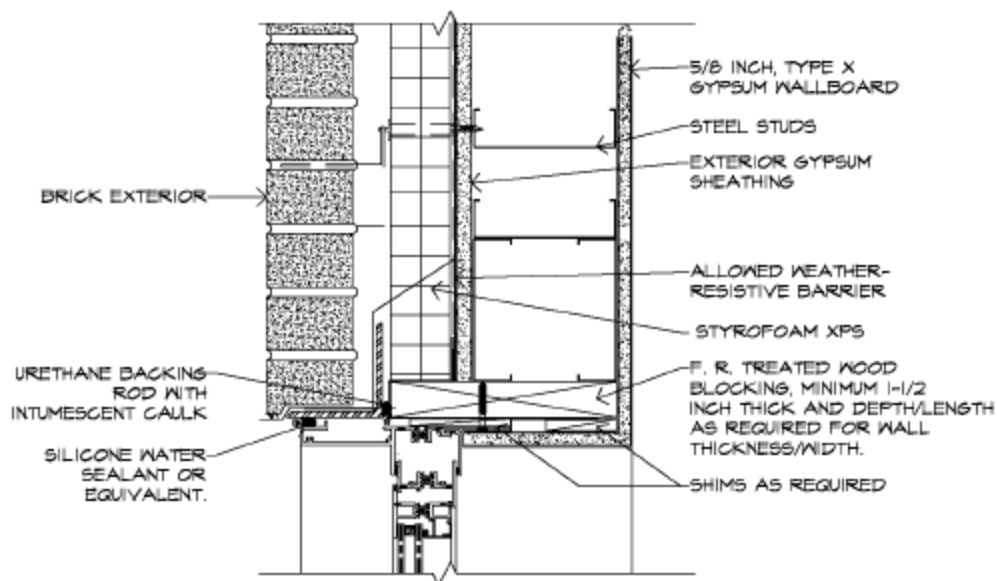


FIGURE 10—WINDOW HEAD DETAIL—FRTW WOOD BLOCKING—FRAMED WALL