ICC-ES Evaluation Report

ESR-3228

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Subject to renewal January 2026

This report also contains:

- **SI Supplement**

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION Section: 07 21 00—Thermal Insulation Section: 07 27 00—Air Barriers	REPORT HOLDER: DUPONT DE NEMOURS, INC.	EVALUATION SUBJECT: FROTH-PAK™ FOAM SYSTEM	

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2024, 2021, 2018, 2015, and 2012 *International Building Code®* (IBC)
- 2024, 2021, 2018, 2015, and 2012 *International Residential Code®* (IRC)
- 2024, 2021, 2018, 2015, and 2012 *International Energy Conservation Code®* (IECC)

Properties evaluated:

- Physical properties
- Surface-burning characteristics
- Air permeability
- Thermal resistance
- Attic and crawl space installation

1.2 Evaluation to the following green standard:

- 2008 ICC 700 *National Green Building Standard™* (ICC 700-2008)

Attributes verified:

- See Section 3.1

2.0 USES

FROTH-PAK™ Foam System is a polyurethane foam insulation system used as nonstructural thermal insulating material in Type V construction under the IBC and in dwellings under the IRC. The insulation is for use in wall cavities, floor/ceiling assemblies, attics and crawl spaces, sill plates, band joists and headers when installed in accordance with this report. The insulation is air-impermeable and may be used to seal the joints in site-fabricated metallic air ducts under the IRC when installed as described in Section 4.4; and may be used in any type of construction as an air barrier material when installed as described in Section 4.5. Use in attics and crawl spaces is described in Section 4.7.

3.0 DESCRIPTION

3.1 General:

FROTH-PAK™ Foam System is a two-component, closed-cell, spray-applied, medium-density, polyurethane foam plastic having a nominal density of 1.75 pcf (28.1 kg/m^3). The insulation is produced in the field by combining a polymeric isocyanate (component A) with a resin base (component B), at a 1:1 ratio by volume. The product is available in multiple size packages that include pressurized "A" and "B" cylinders, a dispensing gun/hose assembly and accessories. The insulation components when stored in unopened containers at temperatures between 60°F (15.5°C) and 120°F (49°C) are best if used by the specified date on the label.

The attributes of the insulation have 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.

3.2 Surface-burning Characteristics:

At a maximum thickness of 2 inches (51 mm) and a nominal density of 1.75 pcf (28.1 kg/m^3), the insulation has a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84.

3.3 Thermal Resistance, *R*-values:

The insulation has thermal resistance (*R*-value) at a mean temperature of 75°F (24°C) as shown in Table 1.

3.4 Air Permeability:

The insulation, at a minimum thickness of $^1/_2$ inch (12.7 mm), is considered air-impermeable insulation in accordance with 2024, 2021, and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) and 2024, 2021, 2018, 2015 and 2012 IRC Section R806.5, based on testing in accordance with ASTM E2178.

3.5 DC 315 Coating:

DC 315 Coating, manufactured by International Fireproof Technology, Inc. (ESR-3702), is a single-component, water-based, liquid-applied intumescent coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of one year when stored in factory-sealed containers at temperatures between 50°F (10°C) and 80°F (27°C).

4.0 DESIGN AND INSTALLATION

4.1 General:

The insulation must be installed in accordance with the manufacturer's 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.

4.2 Application:

The insulation is spray-applied at a one-to-one ratio to a maximum 2-inch (51 mm) thickness, as specified in the manufacturer's published installation instructions.

The maximum service temperature must be no greater than that specified in DuPont de Nemours, Inc. installation instructions. The insulation must not be sprayed onto a substrate that is wet, or covered with frost or ice, loose scales, rust, oil, or solvents. The insulation must not be used in electrical outlet or junction boxes, or on heaters, furnaces, fireplaces, chimneys, vents, recessed light fixtures or other applications where the foam may come in contact with heat-conducting surfaces. The insulation must be protected from the weather during and after application. Where used as an air-impermeable insulation, the insulation must be installed at a minimum thickness of $^1/_2$ inch (12.7 mm).

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: The insulation 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 thermal barrier complying with IBC Section 2603.4 or 2024 IRC Section R303.4 (2021, 2018, 2015, and 2012 IRC Section R316.4), as applicable, except where installation is as described in Sections 4.3.2, 4.4, 4.5 and 4.6. Within an attic or crawl space, installation must be in accordance with Section 4.7.

4.3.2 Application without a Prescriptive Thermal Barrier: The code-prescribed thermal barrier may be omitted when installation is in accordance with the following requirements:

- The insulation must be covered on all surfaces with a fire protective coating at the minimum thickness set forth in Table 2.

- The maximum installed thickness of the insulation must not exceed the thicknesses set forth in Table 2.
- The coating must be applied over the insulation in accordance with the coating manufactuer's installation instructions and this report

4.4 Joint Sealant on Metallic Air Ducts:

The insulation, installed at a maximum thickness of 2 inches (51 mm) and width of 6 inches (152 mm), may be used to seal the joints of non-factory-made (non-listed) air ducts, in accordance with Section M1601.4.1 of the IRC. See Figure 1.

4.5 Applications as Air Barrier Material:

FROTH-PAK™ Foam System may be used in any type of construction as an air barrier material for wall/floor and roof/wall intersections in the exterior building envelope when installed at a maximum thickness of 2 inches (51 mm) and width of 6 inches (152 mm) (the length is unlimited). See Figures 2 and 3.

In wall/floor intersections, the foam plastic may be applied over a fire-resistant joint without affecting the fire-resistance rating provided the foam plastic installation is limited to 2 inches by 2 inches (51 mm by 51 mm) and unlimited length.

4.6 Use on Sill Plates, Band Joists and Headers:

The FROTH-PAK™ Foam System with a maximum thickness of 2 inches (51 mm) may be applied to sill plates, band joists and headers without a thermal barrier or ignition barrier in Type V construction in accordance with IBC Section 2603.4.1.13 and 2024 IRC Section 303.5.11 (2021, 2018, 2015, 2012 IRC Section R316.5.11).

4.7 Attics and Crawl Spaces:

4.7.1 Application with a Prescriptive Ignition Barrier: When FROTH-PAK™ Foam System is installed within attics or crawl spaces, where entry is made only to service utilities, an ignition barrier must be installed on the interior of the attic or crawl space in accordance with IBC Section 2603.4.1.6 or IRC Sections R303.5.3 and R303.5.4(2021, 2018, 2015, 2012 IRC Sections R316.5.3 and R316.5.4), as applicable. The ignition barrier must be consistent with the requirements for the applicable code, and must be installed in a manner so that the foam plastic insulation is not exposed. The attic or crawl space area must be separated from the interior, habitable space of the building by an approved thermal barrier. The insulation may be installed in unvented attics as described in this section in accordance with 2024, 2021, and 2018 IBC Section 1202.3 and (2015 IBC Section 1203.3); and IRC Section R806.5.

4.7.2 Application without a Prescriptive Ignition Barrier: FROTH-PAK™ Foam System may be installed in attics and crawl spaces without a prescriptive ignition barrier in accordance with Section 4.7.2.1 and Table 3 when all of the following conditions apply:

1. Entry to the attic or crawl space is only for the service of utilities and no storage is permitted.
2. There is no interconnected attic or crawl space areas.
3. Air in the attic or crawl space is not circulated to other parts of the building.
4. Attic ventilation is provided when required by 2024, 2021 and 2018 Section 1202.2 (2015 IBC Section 1203.2) or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with 2024, 2021 and 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) or IRC Section R806.5.
5. Underfloor (crawl space) ventilation is provided when required by 2024, 2021 and 2018 IBC Section 1202.4 (2015 and 2012 IBC Section 1203.3) or 2024 IRC Section R408.2 (2021, 2018, 2015 and 2012 IRC Section R408.1), as applicable.
6. Combustion air is provided in accordance with IMC (*International Mechanical Code®)* Section 701.

4.7.1.2 Application with an Intumescent Coating: In attics and crawl spaces, FROTH-PAK™ Foam System may be spray-applied to the underside of roof sheathing and/or rafters, and the underside of wood floors and/or floor joists in crawl spaces as described in this section. The thickness of the foam plastic applied to the underside of the wood floor or roof sheathing surfaces shall not exceed the values in Table 3. Insulation must be covered on all surfaces with a fire protective coating at the minimum thickness set forth in Table 3 in accordance with the coating manufacturer's installation instructions.

5.0 CONDITIONS OF USE:

The FROTH-PAK™ Foam System described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The insulation must be installed in accordance with the manufacturer's published installation instructions, this evaluation report, and the applicable code. The instructions within this report govern if there are any conflicts between the manufacturer's published installation instructions and this report.

5.2 The insulation must be separated from the interior of the building by an approved thermal barrier as described in Section 4.3, except as described in Sections 4.4, 4.5, 4.6 and 4.7.

5.3 The insulation must be applied by installers certified by DuPont de Nemours, Inc. or by the Spray Polyurethane Foam Alliance (SPFA) for the installation of spray polyurethane foam insulation.

5.4 A vapor retarder must be installed when required by the applicable code.

5.5 The insulation must be protected from the weather during and after application.

5.6 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with 2024, 2021, 2018, and 2015 IBC Section 2603.8 (2012 IBC Section 2603.9) or 2024 IRC Section R305.4 (2021, 2018 ,2015 IRC Section R318.4), as applicable.

5.7 Installation in unvented attics, when equipped with vapor diffusion ports in accordance with Section 1202.3, Item 5.2 of the 2024, 2021 IBC and Section R806.5, Item 5.2 of the 2024, 2021 and 2018 IRC, is outside the scope of this report.

5.8 Jobsite certification and labeling of the insulation must comply with 2024, 2021, and 2018 IRC Sections N1101.10.1 and N1101.10.1.1; 2015 IRC Section N1101.10.1.1; 2012 IRC Sections N1101.12.1 and N1101.12.1.1; IECC Sections C303.1.1, C303.1.1.1, R303.1.1 and R303.1.1.1.

5.9 FROTH-PAK™ Foam System must not be used as a component of a fire-resistant joint system. The integrity of all fire-resistant joints must be inspected and verified. The insulation may be applied over the top of a fire-resistant joint system, as described in Section 4.5.

5.10 The insulation components (parts A and B) are produced by DuPont de Nemours, Inc., 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 Spray-applied Foam Plastic Insulation (AC377), dated June 2023 (editorially revised June 2024).

6.2 Reports on air leakage tests in accordance with ASTM E2178.

6.3 Reports of modified room corner tests in accordance with NFPA 286.

6.4 Report of room corner test in accordance with NFPA 286.

6.5 Engineering analysis addressing use as an air barrier material and duct joint sealant.

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-3228) along with the name, registered trademark, or registered logo of the report holder (DuPont de Nemours, Inc.) must be included in the product label.

7.2 In addition, the components of FROTH-PAK™ Foam System are identified with the manufacturer's address; the product name (A Component - Isocyanate; B Component - Polyol); lot number; use and application instructions; the flame-spread and smoke-development indices.

7.3 The report holder's contact information is the following:

DUPONT DE NEMOURS, INC.
1501 LARKIN CENTER DRIVE
MIDLAND, MICHIGAN 48642
(866) 583-2583
www.dupont.com/building

TABLE 1—THERMAL RESISTANCE (*R*-VALUES)

THICKNESS (inches)	*R*-VALUE[1] (°F.ft².h/Btu)
1	6.2
2	12

For **SI:** 1 inch = 25.5 mm; 1°F ft².h/Btu = 0.176 110°K.m²/W.

[1]Calculated *R*-values are calculated based on tested k-values at 1- and 2-inch thicknesses.

Table 2—Use of Insulation without a Prescriptive Thermal Barrier[1]

Spray Foam Insulation	Fire Protective Coating/Covering			Maximum SPF Thickness (inch)		Test Method
	Type	Minimum Thickness (mils)	Minimum Application Rate	Walls and Vertical Surfaces	Ceiling and Overhead Surfaces	
FROTH-PAK™ Foam System	DC315[2]	20 WFT (14 DFT)	1.25 gal/100 ft^2	3 1/2	3 1/2	NFPA 286

For SI: 1 inch = 25.4 mm, 1 mill = 0.0254 mm, 1 gallon – 3.38 L, 1 ft^2 = 0.093 m^2

[1]Fire-protective coatings and coverings shall be applied over all exposed SPF surfaces in accordance with the coating/covering manufacturer's installation instructions and this report.

[2]International Fireproof Technology Inc. recognized in ESR-3702.

Table 3—Attic or Crawl Space Assemblies without a Prescriptive Ignition Barrier[1]

Spray Foam Insulation	Fire Protective Coating/Covering			Maximum SPF Thickness (inch)		Test Method
	Type	Minimum Thickness (mils)	Minimum Application Rate	Walls and Vertical Surfaces	Ceiling and Overhead Surfaces	
FROTH-PAK™ Foam System	DC315[2]	20 WFT (14 DFT)	1.25 gal/100 ft^2	3 1/2	3 1/2	ICC-ES AC377 Appendix D (modified NFPA 286)

For SI: 1 inch = 25.4 mm, 1 mill = 0.0254 mm, 1 gallon – 3.38 L, 1 ft^2 = 0.093 m^2

[1]Fire-protective coatings and coverings shall be applied over all exposed SPF surfaces in accordance with the coating/covering manufacturer's installation instructions and this report.

[2]International Fireproof Technology, Inc. recognized in ESR-3702.

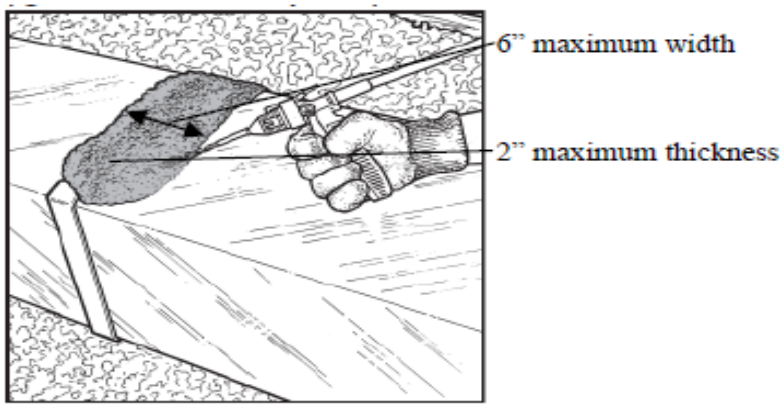

Figure 1—Example of duct joint sealing application of foam

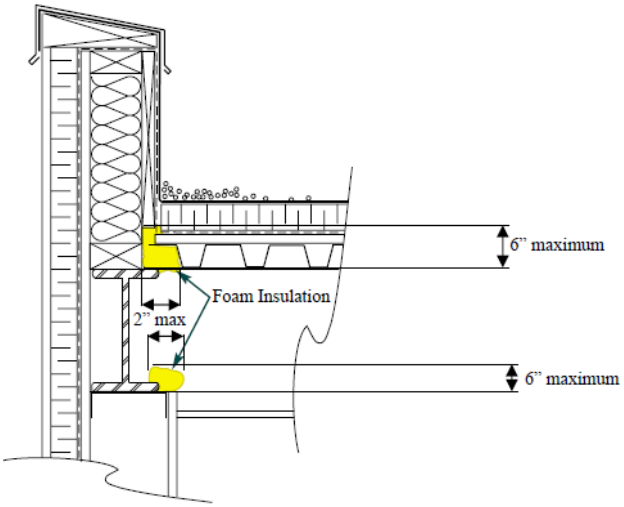

FIGURE 2—EXAMPLE OF ROOF/WALL JUNCTURE APPLICATION OF FOAM

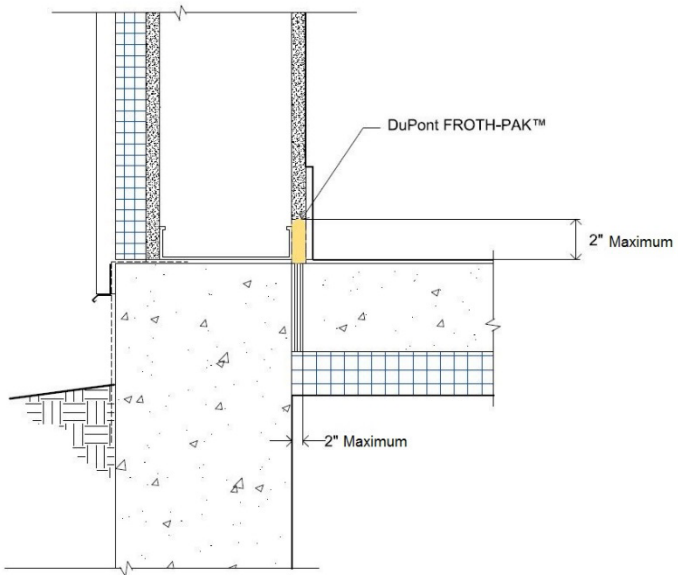

FIGURE 3—EXAMPLE OF WALL/FLOOR JUNCTURE APPLICATION OF FOAM

ICC-ES Evaluation Report

ESR-3228 Seal & Insulate with ENERGY STAR® Supplement

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

REPORT HOLDER:

DUPONT DE NEMOURS, INC.

EVALUATION SUBJECT:

FROTH-PAK™ FOAM SYSTEM

1.0 EVALUATION SCOPE

Conformance to the following requirements:

Seal and Insulate with ENERGY STAR® Program, *Definitions and Testing Requirements for Residential Insulation, Version 1.0*

Properties evaluated:

- Thermal resistance
- Surface-burning characteristics

2.0 PURPOSE OF THIS SUPPLEMENT

This supplement is issued to certify that the insulation product described in Sections 2.0 through 7.0 of the evaluation report ESR-3228 has been reviewed for compliance with the applicable codes noted in Section 1.0 of the evaluation report and with the requirements set forth in the Seal and Insulate with ENERGY STAR® Program *Definitions and Testing Requirements for Residential Insulation, Version 1.0*. The insulation product covered by this supplement is defined as "Spray or Pour Foam Insulation."

The requirements for testing laboratory qualifications and product sampling, as well as the specific material and test standards and editions used in this evaluation, are as set forth in the applicable documentation noted in Section 6.0 of the evaluation report.

3.0 DEFINITIONS

The following definitions are from the *Definitions and Testing Requirements for Residential Insulation, Version 1.0,* and are applicable to the subject of this report.

3.1 General Definitions:

Insulation: Any material mainly used to slow down heat flow. It may be mineral or organic, fibrous, cellular, or reflective (aluminum foil). It may be in rigid, semi-rigid, flexible, or loose-fill form.

Residential Buildings: Single family homes (attached or unattached), multifamily buildings with 4 units or fewer, or multifamily buildings (condominiums, apartments) with 3 stories or less in height above grade.

3.2 Insulation Product Definitions:

Spray or Pour Foam Insulation: A thermal insulating material that is sprayed or poured (as a gel or foamy liquid) into place, and expands or sets into a cellular foam and cures at the point of installation through a chemical reaction. Foamed materials include, but are not limited to polyurethane, polyisocyanurate, phenolic, and cementitious insulation.

3.3 Insulation Performance Definitions:

***R*-value:** The inverse of the time rate of heat flow through a body from one of its bounding surfaces to the other surface for a unit temperature difference between the two surfaces, under steady state conditions, per unit area. For the purposes of the Seal and Insulate with ENERGY STAR program, Imperial units will only be accepted [(h·ft^2·°F)/Btu].

Smoke-Development Index: The characteristic of a material to emit smoke when exposed to flame or fire compared to red oak and inorganic cement.

Flame-Spread Index: The characteristic of a material to resist the spreading of flames when exposed to flame or fire compared to red oak and inorganic cement.

3.4 Thermal Resistance:

The insulation has the thermal resistance *R*-values as noted in Table 1 of ESR-3228, based upon testing. The use of additional insulation may be needed to meet the minimum wall *R*-values set forth in the IECC. The use of additional insulation materials is outside the scope of this report.

3.5 Installation

3.5.1 General: The installation of the insulation must be in accordance with the requirements set forth in Sections 4.2, 4.3, 4.7 and 5.0 (as applicable) of ESR-3228. The insulation is installed on-site by spray polyurethane foam applicators meeting the qualification requirements set forth in Section 5.3 of ESR-3228. The following personal protective equipment and ventilation requirements are reprinted from DuPont de Nemours, Inc. published installation instructions and are reprinted in this report for informational purposes:

"Wear Personal Protective Equipment (PPE)

1. Always wear chemically resistant gloves (e.g., nitrile).
2. Always wear long sleeves and pants for full body covering.
3. Always wear goggles or safety glasses.
4. Wear a respirator. If there is any doubt about the amount of exposure to MDI possible in any given situation, wear a respirator with an organic vapor sorbent and P100 particulate filter. This is especially important when spraying in confined areas or areas with low ventilation like attics and crawl spaces, when spraying overhead, or when using a wide or fan spray nozzle.

Keep Others Out of Work Area

1. Section off the work area to keep non-essential workers and others out of the spray area.
2. Use plastic sheeting to protect from overspray."

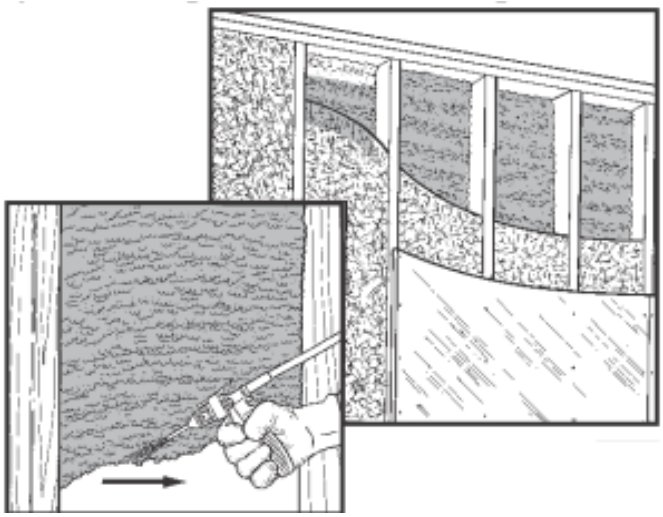
3.5.2 Occupancy time after installation: The re-entry or re-occupancy time shall be in accordance with the manufacturer's installation instructions, which state:

"It is important to ensure that the spray area is well ventilated during application. Ventilation in Air Changes per Hour (ACH):

- During application a minimum of 10 ACH is required. Cross ventilation is recommended with negative pressure in the spray area and exhaust to a secured empty area. A commercial ventilation unit is recommended for increased ventilation rates.
- Continue to ventilate area for at least 1 hour after the job is completed at no less than 10 ACH.
- Re-entry into an application site in the occurring less than 1-hour post spray with proper ventilation requires the use of an approved air purifying respirator equipped with an organic vapor sorbent and a particle filter."

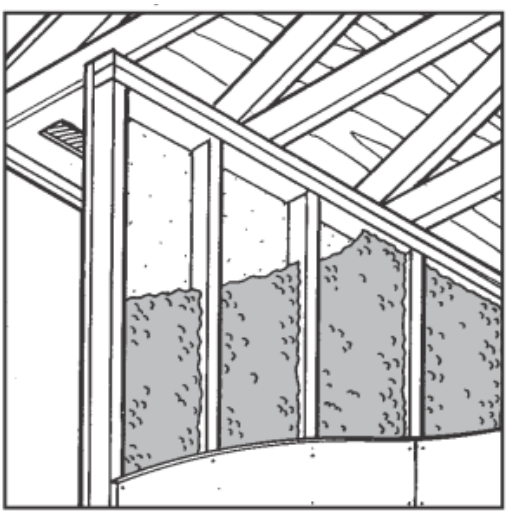
3.5.3 Figures: The figures shown represent general installations of the insulation in two types of full wall application. These figures are for illustration purposes and are not to be construed or used as construction documents.

This supplement expires concurrently with the evaluation report, reissued January 2025 and revised February 2025.



Flash & Batt Vertical Exterior Wall Application:

FROTH-PAK is spray-applied to the interior face of the exterior sheathing in each stud cavity at a thickness between $^1/_2$ to 1 inch (12.7 to 25.4 mm). After FROTH-PAK has cured a layer of glass fiber batt insulation is installed in each cavity over the FROTH-PAK. A minimum 15-minute thermal barrier, in accordance with the Section 4.3 of ESR-3228 must be provided.



Vertical Exterior Wall Application:

FROTH-PAK is spray-applied to the interior face of the exterior sheathing in each stud cavity at a maximum thickness of 2 inches (51 mm). A minimum 15-minute thermal barrier, in accordance with the Section 4.3 of ESR-3228 must be provided.