

# EXPANDED POLYSTYRENE (EPS) INSULATION BOARD SPECIFICATIONS

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DSC131

## 1. SCOPE

- 1.1 This specification covers the type, physical properties and dimensions of Expanded Polystyrene Insulation Board intended for use in Dryvit Exterior Insulation and Finish Systems (EIFS).
- 1.2 The use of the Expanded Polystyrene Insulation Board covered by this specification is regulated by building codes.

## 2. APPLICABLE DOCUMENTS

### 2.1 Standards:

- ASTM-C 177 OR C518 – Thermal Resistance
- ASTM-C 203 - Flexural Strength
- ASTM-C 273 - Shear Test in Flatwise Plane of Flat Sandwich Constructions or Sandwich Cores
- ASTM-C 578 - Preformed, Cellular Polystyrene Thermal Insulation
- ASTM-D 1621 - Compressive Strength
- ASTM-D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- ASTM-D 2842 – Water Absorption
- ASTM-D 2126 – Dimensional Stability
- ASTM-D 2863 - Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
- ASTM-E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- ASTM-E 96 – Vapour Permeability
- ASTM-E 2430 – Expanded Polystyrene (EPS) Thermal Insulation Boards for Use in Exterior Insulation and Finish Systems (EIFS)
- ULC-S701 Annex A - Thermal Insulation, Polystyrene board for EIFS
- ULC-S102 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

2.2 Dryvit Systems Canada Requirements for Insulation Board Suppliers, as per letter of approval provided to each individual supplier.

2.3 Quality Control Manual and Inspection Procedures for Molders Supplying Dryvit Systems Canada

## 3. TERMINOLOGY

### 3.1 Description of terms specific to this specification.

- 3.1.1 Dryvit Exterior Insulation and Finish System (EIFS) - a nonload bearing exterior wall cladding system consisting of an insulation board, an adhesive and/or mechanical attachment of the insulation board to the substrate, an integrally reinforced base coat on the face of the insulation board, a protective finish applied to the surface of the base coat and applicable accessories that interact to form an energy-efficient exterior wall.
- 3.1.2 EPS - Expanded Polystyrene, as per Canadian Standard, ULC-S701- Annex A.
- 3.1.3 PB System - a class of EIFS where the base coat varies in thickness depending on the number of layers or thickness of reinforcing material. The thickness can range from a nominal 1.6 mm (1/16 in) to 3.2 mm (1/8 in). The reinforcing material is typically glass fiber mesh, which is embedded in the base coat at the time of installation.
- 3.1.4 PM System - A class of EIFS where the reinforcing material is typically glass fiber mesh, which is applied over the insulation board and mechanically fastened to the substrate. The base coat is applied over the reinforcing mesh at a nominal thickness of 4.8 mm (3/16 in) to 6.4 mm (1/4 in) and contains fiber reinforcement.

## 4. CLASSIFICATION

4.1 This specification covers Type I Expanded Polystyrene Insulation Board (as per ULC-S701 and ASTM C578) intended for use in Dryvit Exterior Insulation and Finish Systems (EIFS).

## 5. ORDERING INFORMATION

5.1 Standard board sizes. The following are nominal dimensions. See Section 8 for dimensions and permissible variations. Specify:

- 5.1.1 Thickness: 19 mm (3/4 in) min.
- 5.1.2 Width: 610 mm (24 in)
- 5.1.3 Length: 1219 mm (48 in) for PB Systems; 2438 mm (96 in) for PM Systems

**5.2 Number of pieces and thickness required****5.3 Job name****5.4 Job address****5.5 Shipping address****5.6 Required delivery date****5.7 Contractor name****5.8 Contractor address****5.9 Billing information****5.10 Certificate of Compliance****5.11 Special Shapes**

5.11.1 In addition to the ordering information required in Sections 5.1 through 5.10 above, dimensioned drawings or sketches shall be furnished for all special shapes.

5.12 All requests for insulation boards larger than the standard sizes or thicker than 102 mm (4 in) listed in Sections 5.1.2 and 5.1.3 above must be approved in writing by Dryvit Systems Canada Engineering Services Department.

5.13 EIF System to be used.

**6. MATERIALS AND MANUFACTURE**

6.1 Insulation board shall be formed by steam expansion of polystyrene resin beads in a closed mold. The insulation board shall be of uniform density and have essentially closed cells. All insulation board shall contain sufficient flame-retardants to meet the oxygen index, flammability and smoke development requirements of this specification. See Table I.

6.2 All insulation boards shall be molded from modified grade, expandable polystyrene beads listed in accordance with the requirements of the building code having jurisdiction.

**7. PHYSICAL REQUIREMENTS****7.1 Inspection Requirements**

7.1.1 In accordance with the Third Party Certification and Quality Assurance Program.

7.1.2 As otherwise deemed necessary by Dryvit Systems Canada

7.1.3 Physical properties shall be in accordance with Table I. Shear modulus and tensile strength values are only required to be evaluated at the beginning of the program.

**7.2 Qualification Requirements**

7.2.1 All dimensional requirements are described in Section 8.

7.2.2 All workmanship, finish and appearance requirements are described in Section 9.

7.2.3 Combustibility Characteristics - Insulation board is an organic material and is, therefore, combustible. It should not be exposed to flames or other ignition sources. The values obtained by ULC-S701, ASTM D 2863, and ASTM E 84/UL723/ULC-S102 do not necessarily indicate or describe the fire risk of the materials in end use configuration and are used in this specification primarily to distinguish between insulation formulated with flame retardants and those not so formulated.

7.2.4 Molded billets shall be dimensionally stable prior to being cut into boards or special shapes.

7.2.4.1 Molded billets shall be conditioned in accordance with Section 7.2.4.1.1, 7.2.4.1.2, 7.2.4.1.3, or 7.2.4.1.4

7.2.4.1.1 Molded billets shall be aged (air dried) in ambient conditions for a minimum of six (6) weeks.

7.2.4.1.2 Molded billets shall be heat dried for a minimum of five (5) days at a constant temperature of 60 °C (140 °F)

7.2.4.1.3 Molded billets shall be air dried at ambient conditions for a minimum of 12 days when the billets are manufactured using low pentane EPS resin (<4.5% pentane) and vacuum molding technology.

7.2.4.1.4 Molded billets shall be air dried at ambient conditions for a minimum of 18 days when the billets are manufactured using full pentane resin (nominal 6% pentane) and using vacuum molding technology.

## 8. DIMENSIONS AND PERMISSIBLE VARIATIONS

8.1 Insulation board covered by this specification shall conform to the nominal dimensions in Section 5.1.

8.2 Dimensional Tolerances:

Length: +/- 1.6 mm (+/-1/16 in)

Width: +/- 1.6 mm (+/-1/16 in)

Thickness: 25 mm (1 in) + 1.6 mm (+1/16 in); >25 mm (1 in) +/- 1.6 mm (+/-1/16 in)

8.3 Edge Trueness - Unless otherwise specified and approved by Dryvit Systems Canada, insulation board shall be furnished with true edges. Edges shall not deviate more than 0.8 mm (1/32 in) in 305 mm (12 in).

8.4 Face Flatness - Insulation board shall be furnished flat and shall not exhibit any bowing of more than 0.8 mm (1/32 in) in the length.

8.5 Squareness - Insulation board shall not deviate from squareness by more than 0.8 mm (1/32 in) in 305 mm (12 in) of total length or width.

## 9. WORKMANSHIP, FINISH AND APPEARANCE AT TIME OF DELIVERY

9.1 Defects - Insulation board shall have no defects that will adversely affect its service qualities. It shall be of uniform texture and free from foreign inclusions, broken edges or corners, slits or objectionable odors.

9.2 Crushing and Depressions - Insulation board shall have no crushed or depressed areas on any surface exceeding 1.6 mm (1/16 in) in depth on more than 5% of the total surface area.

9.3 Voids - Insulation board shall have no more than 8 voids having dimensions larger than 3.2 mm (1/8 in) x 3.2 mm (1/8 in) x 3.2 mm (1/8 in) per 0.74 m<sup>2</sup> (8 ft<sup>2</sup>) of surface area.

9.4 Projections - Insulation board shall be free of surface projects or wire marks in excess of 1.6 mm (1/16 in).

## 10. SAMPLING AND INSPECTION

10.1 Sampling shall be in accordance with the Third Party Certification and Quality Assurance Program.

10.2 As otherwise deemed necessary by Dryvit Systems Canada

## 11. REJECTION

11.1 Material that fails to conform to the requirements of this specification shall be rejected.

11.1.1 Rejection shall be reported in writing within five (5) days to the producer or supplier and Dryvit Systems Canada

11.2 The insulation board supplier may resubmit rejected materials after removal of that portion not conforming to this specification.

11.2.1 The reinspection and resubmittal shall be completed within three (3) days of notification by telephone or written communication.

## 12. CERTIFICATION

12.1 Upon request, certification of compliance with this specification shall promptly be forwarded to Dryvit Systems Canada or their designee.

## 13. PRODUCT MARKING

13.1 Insulation boards shall be marked (stamped) in accordance with the requirements of this section.

13.1.1 Each board shall be marked on one edge.

13.1.2 In addition, one board in each package shall be marked on both faces.

13.2 Stamp design and layout shall be in accordance with the requirements of the applicable building code.

**NOTE: Suppliers may add their company name if they so desire.**

## 14. PACKAGING

14.1 All insulation boards shall be packaged in polyethylene bags as required by Dryvit Systems Canada

14.2 Alternate methods of packaging shall be submitted to Dryvit Systems Canada and approved in writing prior to use.

14.3 The supplier shall mark the lot number on each package as required.

**15. INDEMNIFICATION**

15.1 Insulation board supplier shall agree to indemnify and hold harmless Dryvit Systems Canada for any loss, cost or damage incurred by Dryvit Systems Canada as a result of the Insulation Board Supplier's and/or the insulation board's failure to meet these specifications.

**TABLE I****Properties and Requirements of EPS for Use in Dryvit EIFS**

Classification (ASTM C 578)	Type 1
Density, lb./ft <sup>3</sup> (kg/m <sup>3</sup> )	0.95 (15.2) min. 1.25 (20.0) max.
Thermal Resistance of 25.4 mm (1.00 in) thickness, min. F·ft <sup>2</sup> ·h/Btu (K·m <sup>2</sup> /W)	
4.4 °C (40 °F)	4.00 (0.70)
23.9 °C (75 °F)	3.60 (0.63)
Compressive strength, min., psi (kPa)	10.0 (69)
Tensile strength, min., psi (kPa)	15.0 (103)
Flexural strength, min., psi (kPa)	25.0 (172)
Shear modulus, max., psi (kPa)	400 (2758)
Water vapor permeance of 25.4 mm (1.00 in) thickness, max., perm (ng/Pa·s·m <sup>2</sup> )	5.0 (287)
Water absorption by total immersion, max., volume %	4
Dimensional stability (change in dimensions), max. %	2.0
Oxygen index, min., volume %	24.0
Flame spread	
Max. as per ASTM-E84	25.0
Max. as per ULC-S102.2	500.0
Smoke development, max.	500
Board thickness, Class PB and PM	
Maximum	See Note*
Minimum	19 mm (3/4 in)
Board width, max.	
Class PB	610 mm (24 in)
Class PM	610 mm (24 in)
Board length, max.	
Class PB	1219 mm (48 in)
Class PM	2438 mm (96 in)

\* **NOTE: Contact Dryvit Systems Canada Technical Department for thicknesses exceeding 6 inches.**