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Standard Specification for Rigid Cellular Polystyrene Geofoam¹

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1. Scope

1.1 This specification covers the types, physical properties and dimensions of rigid cellular polystyrene intended for use as geofoam.

1.2 This specification does not cover the layout, placement and workmanship for proper installation and performance of rigid cellular polystyrene geofoam.

1.3 Rigid cellular polystyrene geofoam covered by this specification may need protection from certain chemicals, environmental exposure, and concentrated loads. Additional design considerations may include thermal conductivity and buoyancy. Guidelines regarding these end use considerations are included in [Appendix X1](#).

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- [C165 Test Method for Measuring Compressive Properties of Thermal Insulations](#)
- [C203 Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation](#)
- [C303 Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation](#)
- [C390 Practice for Sampling and Acceptance of Thermal Insulation Lots](#)
- [C578 Specification for Rigid, Cellular Polystyrene Thermal Insulation](#)
- [D1621 Test Method for Compressive Properties of Rigid Cellular Plastics](#)

¹ This specification is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.03 on Permeability and Filtration.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[D1622 Test Method for Apparent Density of Rigid Cellular Plastics](#)

[D2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics \(Oxygen Index\)](#)

[E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

3. Terminology

3.1 Definitions:

3.1.1 Terms used in this specification are defined in Terminology D4439.

3.1.2 *geofoam*—block or planar rigid cellular foam polymeric material used in geotechnical engineering applications.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *EPS, XX*—number designation for expanded polystyrene geofoam Type(s) having a minimum density of XX kg/m³ (lb/ft³).

3.2.2 *XPS, XX*—number designation for extruded polystyrene geofoam Type(s) having a minimum density of XX kg/m³ (lb/ft³).

3.2.3 *RCPS*—letter designation for EPS and XPS rigid cellular polystyrene geofoam covered by this specification.

4. Ordering Information

4.1 Acquisition documents shall specify the following:

4.1.1 Title, number and year of this specification.

4.1.2 Type, as per [Table 1](#), or minimum density required.

4.1.3 Total product volume required of each Type, or minimum density.

5. Materials and Manufacture

5.1 RCPS geofoam shall be formed by the expansion of polystyrene resin beads or granules in a molding process (EPS) or by the expansion of polystyrene base resin in an extrusion process (XPS). RCPS geofoam may be manufactured with reprocessed polystyrene foam (regrind).

5.2 RCPS geofoam shall be of uniform density and have essentially closed cells. RCPS geofoam is an organic material and is considered combustible. It should not be exposed to flames or other ignition sources.

TABLE 1 Physical Property Requirements of RCPS Geof foam^{A, B}

Type	EPS12	EPS15	EPS19	EPS22	EPS29	EPS39	EPS46	XPS20	XPS21	XPS26	XPS29	XPS36	XPS48
Density, min., kg/m ³ (lb/ft ³)	11.2 (0.70)	14.4 (0.90)	18.4 (1.15)	21.6 (1.35)	28.8 (1.80)	38.4 (2.40)	45.7 (2.85)	19.2 (1.20)	20.8 (1.30)	25.6 (1.60)	28.8 (1.80)	35.2 (2.20)	48.0 (3.00)
Compressive Resistance, min., kPa (psi) at 1 %	15 (2.2)	25 (3.6)	40 (5.8)	50 (7.3)	75 (10.9)	103 (15.0)	128 (18.6)	20 (2.9)	35 (5.1)	75 (10.9)	105 (15.2)	160 (23.2)	280 (40.6)
Compressive Resistance, min., kPa (psi) at 5 %	35 (5.1)	55 (8.0)	90 (13.1)	115 (16.7)	170 (24.7)	241 (35.0)	300 (43.5)	85 (12.3)	110 (16.0)	185 (26.8)	235 (34.1)	335 (48.6)	535 (77.6)
Compressive Resistance, min., kPa (psi) at 10 % ^A	40 (5.8)	70 (10.2)	110 (16.0)	135 (19.6)	200 (29.0)	276 (40.0)	345 (50)	104 (15.0)	104 (15.0)	173 (25.0)	276 (40.0)	414 (60.0)	690 (100.0)
Flexural Strength, min., kPa (psi)	69 (10.0)	172 (25.0)	207 (30.0)	240 (35)	345 (50.0)	414 (60.0)	517 (75.0)	276 (40.0)	276 (40.0)	345 (50.0)	414 (60.0)	517 (75.0)	689 (100.0)
Oxygen index, min., volume %	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

^AIf yield occurs prior to 10% deformation, report compressive resistance and deformation at yield in addition to the compressive resistance at 1%, 5% and 10% deformation.
^BFor products that have an external skin, testing shall be undertaken with skins intact.