

EPS NO. 1010

SUBJECT: ASTM STANDARD

DATE: JANUARY 2008 (REVISED JANUARY 2019)

R-Shield® insulation is a rigid cellular expanded polystyrene material that is used for building insulation, geotechnical applications (geofoam), as a component of structural insulated panels, as a component of exterior insulation finish systems, and a

number of other applications. Expanded polystyrene in each of these end use applications requires different performance properties upon which a product selection would be made.

In order to promote uniformity of specification for expanded polystyrene in these various applications, ASTM has developed multiple standard specifications for polystyrene foam. This bulletin describes the three main ASTM standard specifications that cover foam products.

ASTM C578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

ASTM C578 is the standard that is referenced in the design and applicability of expanded polystyrene materials for general insulation needs. This specification covers the types, physical properties, and dimensions of cellular polystyrene intended for use as thermal insulation.

R-Shield insulation is available in 7 different “Types” as specified in ASTM C578. These are Type XI, I, VIII, II, IX, XIV, and XV. In addition to thermal properties, such as R-value; physical properties such as compressive resistance, flexural strength, water vapor permeance, and water absorption are requirements of ASTM C578. The performance requirements for the various Types of R-Shield insulation can be seen in the tables attached to this bulletin.

ASTM E2430 Standard Specification For Expanded Polystyrene (“EPS”) Thermal Insulation Boards For Use In Exterior Insulation and Finish Systems (“EIFS”)

ASTM E2430 is a standard for boards used in Exterior Insulation and Finish Systems (“EIFS”). The specification covers requirements for board dimensions and manufacturing requirement

specific to the EIFS industry. The boards are specified to be 2’ in width and 4’ in length, the standard size required for the EIFS

industry. Boards in compliance with ASTM E2430 must fully comply with the Type I requirements of ASTM C578. No additional material properties are required by ASTM E2430.

Thus, the Type I referenced properties from ASTM C578 are applicable to expanded polystyrene manufactured in conformance with ASTM E2430.

ASTM D6817 Standard Specification for Rigid Cellular Polystyrene Geofoam















The title for ASTM D6817 is clear that this specification is for Geofoam applications. Geofoam is the commonly accepted term for lightweight foam materials used in geotechnical applications. ASTM D6817 specifically defines geofoam as a “block or planar rigid cellular foam polymeric material used in geotechnical engineering applications.” ASTM D6817 is the definitive standard that should be referenced in the design and applicability of expanded polystyrene materials for geotechnical applications. This specification covers the types and physical properties of cellular polystyrene intended for use as Geofoam.

R-Shield Geofoam is available in 7 different “Types” as specified in ASTM D6817. These are Type EPS12, EPS5, EPS19, EPS22, EPS29, EPS39, and EPS46. The key material property specified by ASTM D6817 is the compressive resistance at 1% deformation. This is the normally accepted design load for geofoam.

In addition to compressive resistance at 1% deformation, compression resistance at 5% and 10% is also available. The compression resistance at these higher percentage of compression are applicable to the very specific design and use of expanded polystyrene in compressible application. Flexural strength, a key quality control measure, is also included. The performance requirements for the various Types of R-Shield Geofoam are shown in the tables attached to this bulletin. Please also refer to R-Shield Geofoam technical bulletin no. 5001.

The standards referenced in this bulletin are copyrighted by ASTM. If you require of any of the above reference standards, please visit ASTM at their website, www.astm.org to purchase a copy.

This table outlines a few key physical properties of R-Shield expanded polystyrene insulation in accordance with ASTM C578, “Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation” compared to R-Shield Geofoam in accordance with ASTM D6817, “Standard Specification for Rigid Cellular Polystyrene Geofoam”.

PRODUCT		 50	 100	 130	 150	 250	 400	 600	 EPS12	 EPS15	 EPS19	 EPS22	 EPS29	 EPS39	 EPS46
ASTM C578 ² Compliance, Type		XI	I	VIII	II	IX	XIV	XV							
ASTM D6817 ¹ Compliance, Type									EPS12	EPS15	EPS19	EPS22	EPS29	EPS39	EPS46
Density ^{1,2} , min., ASTM C303	lb/ft ³ (kg/m ³)	0.70 (12)	0.90 (15)	1.15 (18)	1.35 (22)	1.80 (29)	2.40 (38)	3.0 (48)	0.70 (11)	0.90 (15)	1.15 (18)	1.35 (22)	1.80 (29)	2.40 (38)	2.85 (46)
Compressive Strength @10% ² , min., ASTM D1621	psi (kPa)	5 (35)	10 (69)	13 (90)	15 (104)	25 (173)	40 (276)	60 (414)							
Compressive Resistance @1% deformation ¹ , min., ASTM D1621	psi (kPa)								2.2 (15)	3.6 (25)	5.8 (40)	7.3 (50)	10.9 (75)	15.0 (103)	18.6 (128)
R-value ² , Thermal Resistance, per inch, ASTM C518	°F·ft ² ·h/Btu (°K·m ² /W)	3.2 (0.56)	3.9 (0.68)	3.9 (0.69)	4.2 (0.73)	4.4 (0.77)	4.4 (0.77)	4.5 (0.78)							
Flexural Strength ^{1,2} , min. ASTM C203	psi (kPa)	10 (69)	25 (173)	30 (208)	35 (242)	50 (345)	60 (414)	75 (517)	10 (69)	25 (172)	30 (207)	35 (240)	50 (345)	60 (414)	75 (517)
Oxygen Index ^{1,2} , min.	vol. %	24	24	24	24	24	24	24	24	24	24	24	24	24	24

¹ Please refer to ASTM D6817 specification for complete information.

² Please refer to ASTM C578 specification for complete information.