

GEOFOAM NO. 5001

SUBJECT: UNDERSTANDING ASTM STANDARDS FOR GEOFOAM

DATE: JANUARY 2003 (REVISED JANUARY 2019)

ASTM D6817, "Standard Specification for Rigid Cellular Polystyrene Geofoam" was published by ASTM late in 2002. This standard was developed through the ASTM consensus process with input from researchers, third party agencies, users, general interest members, and manufacturers of geotechnical products.















ASTM D6817 addressed the need for a standard which is suitable for geofoam applications. Until this standard was issued, specifiers of expanded polystyrene products for geotechnical applications had to rely on ASTM C578, "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation." ASTM C578 provides information on thermal insulation and not geotechnical applications. Of particular note, the compressive resistance in ASTM C578 is listed at 10% deformation, a level that is not suitable for geotechnical load bearing applications.

ASTM D6817 provides the compressive resistance at 1% deformation for Geofoam. The compressive resistance at 1% deformation is often used in the design of geofoam projects. ASTM D6817 also includes the non mandatory 5% and 10% compressive resistance values as some specialty applications are designed to deform under loading.

ASTM D6817 provides a standard on which to specify the performance of geofoam.

The attached table outlines a few key physical properties of R-Shield Geofoam in accordance with ASTM D6817, "Standard Specification for Rigid Cellular Polystyrene Geofoam" compared to R-Shield insulation in accordance with ASTM C578, "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation".

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Product		 12	 15	 19	 22	 29	 39	 46	 50	 100	 130	 150	 250	 400	 600	
ASTM D6817 ¹ Compliance, Type		EPS12	EPS15	EPS19	EPS22	EPS29	EPS39	EPS46								
ASTM C578 ² Compliance, Type									XI	I	VIII	II	IX	XIV	XV	
Density ^{1,2} , min., ASTM C303	lb/ft ³ (kg/m ³)	0.70 (11)	0.90 (15)	1.15 (18)	1.35 (22)	1.80 (29)	2.40 (38)	2.85 (46)	0.70 (12)	0.90 (15)	1.15 (18)	1.35 (22)	1.80 (29)	2.40 (38)	3.0 (48)	
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)								
Compressive Strength @10% ² , min., ASTM D1621	psi (kPa)								5 (35)	10 (69)	13 (90)	15 (104)	25 (173)	40 (276)	60 (414)	
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 (172)	30 (207)	35 (240)	50 (345)	60 (414)	75 (517)	10 (69)	25 (173)	30 (208)	35 (242)	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.