Beaver Plastics

TERRAFOAM® EPE

Non-collapsing, rebounding fill suitable for Hydrocarbon Exposures

TERRAFOAM EPE is a foamed polyethylene void form product that can be used in a wide variety of construction applications, including the protection of grade beams, structural slabs, and pile caps. Its purpose is to absorb strain from swelling clays and freezing moist sub-grade materials through elastic compression before damage to structures occur. TERRAFOAM EPE is made from low density closed cell extruded polyethylene, providing all-weather installation and operational performance. It is perhaps the only choice for certain hydrocarbon exposures.

TERRAFOAM EPE does not collapse or crush with compression, but has excellent recovery from compression, thereby preventing water collection and subsequent expansive forces from ice formation under concrete elements. It has long term buoyancy characteristics, with very low water absorption. TERRAFOAM EPE also functions as thermal insulation, with a resistance rating of approximately RSI 0.56 per 25 mm (R-3.2 per inch).

CHEMICAL RESISTANCE PROPERTIES

Substance	Behaviour@20°C	Behaviour@60°C
Acetone	Limited Resistance	Not Resistant
Benzene	Limited Resistance	Not Resistant
Bitumen	Resistant	Limited Resistance
Crude Oil	Resistant	Limited Resistance
Diesel Fuel	Resistant	Not Resistant
Fuel Oil	Limited Resistance	Not Resistant
Gasoline	Limited Resistance	Not Resistant
Kerosene	Limited Resistance	Not Resistant
Ketones	Limited Resistance	Not Resistant
Methanol	Resistant	Resistant
MEK	Limited Resistance	Not Resistant
Petroleum	Limited Resistance	Not Resistant
Toluene	Limited Resistance	Not Resistant
Xylene	Limited Resistance	Not Resistant

Note: Chemical resistance properties are taken from industry-developed accepted data for LDPE exposures.

PHYSICAL PROPERTIES

Property		Test Method	EPE-15	EPE-22	EPE-40	EPE-60
Density	kg/m^3	–	27.2 kg/m^3	35.2 kg/m^3	68.8 kg/m^3	100.9 kg/m^3
	lbs/ft^3	–	1.7 lb/ft^3	2.2 lb/ft^3	4.3 lb/ft^3	6.3 lbs/ft^3
Compressive Strength	kPa	ASTM D-3575 25%	45-55 (6-8)	50-60 (7-9)	90-140 (13-20)	179-207 (26-30)
	(lb/in^2)	SUFFIX D 50%	95 (14)	90-110 (13-16)	110-165 (16-24)	248 – 296 (36-43)
Water Absorption	kg/m^3	ASTM D-3575	0.96	0.64	0.32	0.32
	lbs/ft^3	SUFFIX L	0.06	0.04	0.02	0.02
Thermal Stability	(%)	ASTM D-3575	< 2	< 2	< 2	< 2
Service Temperature	C	–	-35 to 85	-35 to 85	-35 to 85	-35 to 85
	F	–	-30 to 180	-30 to 180	-30 to 180	-30 to 180
Compressive Creep	(%)	ASTM D-3575 SUF-BB	6	6	0.8	0.8
Compressive Set	% 2 hrs	ASTM D-3575 SUF-B	21	22	9	10
	24 hrs		16	16	6	7

SPECIFYING POLYETHYLENE FOAM FOR GEOTECHNICAL APPLICATIONS

Specifying the thickness of polyethylene foam to protect a foundation requires an understanding of the total deflection that occurs as concrete is placed, and continuing until the structure becomes self-supporting, some hours after final set.

TERRAFOAM EPE 8 HOUR DEFORMATION				
kPa	EPE15	EPE22	EPE40	EPE60
120				20.0%
96			14.4%	8.5%
72			6.5%	4.1%
48	49.0%	47.4%	3.8%	2.9%
24	28.6%	26.7%	2.1%	1.4%
12	14.5%	14.0%	1.1%	
7.2	7.0%	5.8%		
4.8	5.1%	4.8%		
3.6	3.8%	3.2%		

Standardized industry test methods do not predict the performance of polyethylene foam used as void fill, as these tests (ASTM D1621 and D3575) produce only instantaneous data points from rapid deformation in a laboratory. These test methods are quality control measures and can be helpful when comparing competitive products. However, the actual compressive response to concrete placing loads is much different than indicated by these short term lab tests. Beaver Plastics has produced accurate compressive response data by applying sustained loads to void form products and measuring deformation rates until the time that the concrete structure becomes self-supporting, with the void form initial load deformation then complete.

Compressive creep and compressive set data is also created in a comfortable laboratory. The actual amount of creep and set will be considerably less than measured, as the yearly average operating temperatures in most geotechnical applications will ordinarily be much less than 23°C. A greater amount of compression likely occurs at times of higher soil swell (winter), and thus would have less creep and set effects due to the lower temperatures of that season.

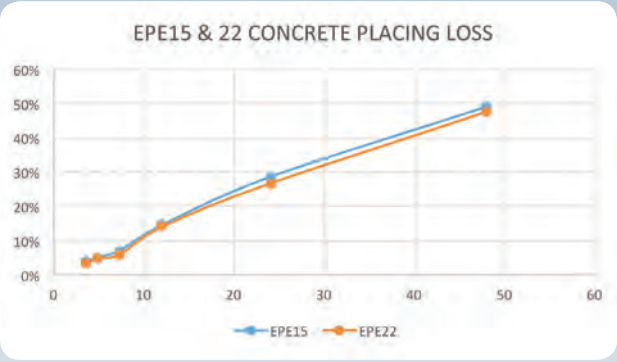
Considering all, we recommend the minimum thickness of L.D. polyethylene foam void form be 3 times the amount of anticipated soil swell, with the void thickness determined after 8 hours deformation from the initial concrete placing load.

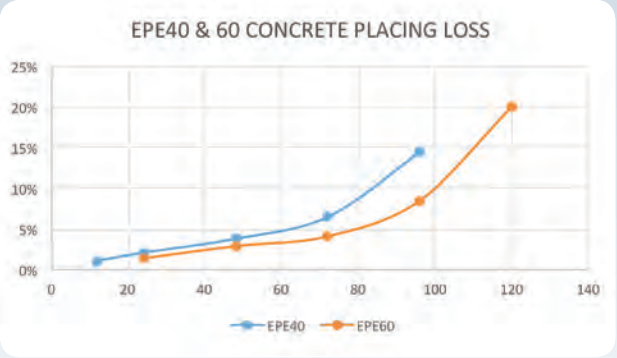
Calculating the Required Thickness of TERRAFOAM EPE Void Form

Example: Terrafoam EPE22 thickness is being determined for use under a pile cap.

a.	Maximum anticipated frost heave or clay soil swell.	50	mm
b.	Thickness of the pile cap.	750	mm
c.	Calculate the pressure from the weight of the fresh concrete load. (.750 x 23.6)	17.7	kPa
d.	Void form thickness remaining after 8 hour concrete placing load (100% minus % loss)	80	%
e.	Required product thickness = triple soil swell (a) divided by remaining thickness (a. x 3) / d.	188	mm

TERRAFOAM EPE THICKNESS LOSSES AT VARIOUS CONCRETE LOADS (kPa)





Beaver Plastics

11581-272 Street, Acheson, Alberta, Canada T7X 6E9
6333 Unsworth Rd, Chilliwack, British Columbia, Canada V2R 5M3

Phone: **780 962-4433**
Fax: **780 962 4640**
Toll Free: 1 **888 453 5961**