Fabricated Geomembranes for EPS Geofoam Applications

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What is EPS Geofoam?

- Expanded Polystyrene
- Light-weight cellar plastic (commonly called stryrofoam)
- Molded in blocks used for construction purposes
Geofoam Manufacturing

Courtesy of EPSFoamPro.com
Block Molding of EPS

Courtesy of Tri State Foam
# EPS Properties

## ASTM D6817 Physical Property Requirements of EPS Geofoam

<table>
<thead>
<tr>
<th>Property</th>
<th>EPS12</th>
<th>EPS15</th>
<th>EPS19</th>
<th>EPS22</th>
<th>EPS29</th>
<th>EPS39</th>
<th>EPS46</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density, min., kg/m³ [lb/ft³]</td>
<td>11.2 [0.70]</td>
<td>14.4 [0.90]</td>
<td>18.4 [1.15]</td>
<td>21.6 [1.35]</td>
<td>28.8 [1.80]</td>
<td>38.4 [2.40]</td>
<td>45.7 [2.85]</td>
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<tr>
<td>Oxygen index, min., volume %</td>
<td>24.0</td>
<td>24.0</td>
<td>24.0</td>
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</tbody>
</table>

*Courtesy EPS Alliance*
EPS Embankment

UTA Light Rail – Salt Lake City, Utah

SR 519 Project – Seattle, Washington
Common Uses of EPS Geofoam

• Reduce settlement to protect buried utilities and adjacent structures on soft ground

• Improve stability and bearing capacity of embankments,

• Improve stability landslides and cut slopes

• Rapid construction in time critical areas
Settlement Reduction and Buried Utilities

NEW FILL

Buried Pipeline

Ruptured Pipeline
Settlement Reduction and Buried Utilities

Geofoam Embankment from State St. to 200 W. Interstate I-80, Salt Lake City, Utah
Improving Bearing Capacity and Stability

EPS geofoam blocks

Landscaping/soil

Geomembrane/separation layer (if required)

Sand-leveling course

Drainpipe
Improve Bearing Capacity and Stability

Reinforced Slope
Soil Nails, Soil Anchors, or Other Reinforcement

Cut slope or landslide
Rapid Construction
(Comparison of Construction Time)

![Bar chart comparing construction time for conventional and Geofoam methods.
- Preparation: Conventional 30, Geofoam 25
- Settlement: Conventional 35, Geofoam 20
- Total: Conventional 65, Geofoam 45]

Construction Time (Weeks)
Design Considerations

- Type
- Dimensions
- Density
- Compressive Strength
- Allowable Load & Creep
- Interface Friction
- Stability of Internal Slope
- Bedding Material & Compaction
- Concentrated Loads
- Moisture Absorption
- Buoyancy
- Thermal Resistance
- Differential Icing
- **Chemical Attack**
- Flammability
- Insect Infestation
- Ultra Violet
- Degradation
- Durability
Design Considerations
(Prevention of Chemical Attack)

• Solvents that Dissolve Geofoam
  • Gasoline
  • Diesel
  • Other Petroleum Based Fuels
  • Organic Fluids

• Protection Against Accidental Spills
  • Concrete Load Distribution Slab
  • Geomembrane
  • Fascia Panel Wall with Coping
Prevention of Chemical Attack

EPS geofoam can be damaged when exposed to certain hydrocarbon chemical and may need protection.

Geomembranes compatible with EPS:

- polypropylene
- polyethylene
- chlorosulphonated polyethylene (CSPE)
- ethylene interpolymer alloys (EIAs)
Prevention of Chemical Attack

Rural Highway in Minnesota, Courtesy of MNDOT
Prevention of Chemical Attack

Protection of side slope, UTA Frontrunner, Corner Canyon
Chemical Attack - Protective Barriers
I-15 Design

Concrete Pavement (35 cm)

Load Distribution Slab (15 cm - Reinforced)

Geomembrane Petroleum Resistant (3 component) for exposed side slope only

Tilt-up Panel Wall
Chemical Attack - Protective Barriers
I-15 Design

• Tripolymer Geomembrane
  • Polyvinyl Chloride
  • Ethylene Interpolymer Alloy
  • Polyurethane

• 9 mm thickness minimum (total)
Chemical Attack – Protective Barriers
Storm Drains and Utilities
Geofoam Handbook

Expanded Polystyrene (EPS)
Geofoam Applications & Technical Data

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Questions