



Beaver Plastics

**G-TEC[®] ELASTICIZED
EXPANDED POLYSTYRENE**

Geotechnical Protection for
Concrete Structures

PRODUCT DESCRIPTION

G-TEC is manufactured from inert closed cell expanded polystyrene (EPS) that has been elasticized for service in geotechnical applications. This special process improves yield and rebound capacity for cycling soil movement, permitting mobilization of soil shear strength. The extended range of flexibility can increase design safety factors for retaining walls, foundation walls, culverts, buried pipe, integral abutments and other structures affected by earth pressure, excessive compaction, freeze/thaw and thermal expansion stresses, surcharge loads like construction traffic and seismic activity.

Definitions:

- At Rest earth pressure develops when a wall experiences no lateral movement. This typically occurs when a wall is fully restrained, such as a basement wall supported at the top and bottom by a floor framing system and concrete slab.
- Active State earth pressure develops when a wall is free to move outward, allowing the soil mass to stretch, mobilizing its shear strength. Lateral pressure against the wall decreases with wall movement until the minimum Active State is achieved.
- Passive State earth pressure develops when a wall is moved into the soil, compressing the soil mass, as might occur along a section of wall that is below grade and on the opposite side from the higher section.

APPLICATIONS

Some walls may be designed to move (or rotate about the toe) approximately 0.5% to 1.0% of wall height. This can reduce earth lateral pressure to the Active State, thereby permitting considerable reduction in mass, structural requirements and cost of the wall. However Passive State earth pressure may develop as a result of wall movement. Alternately, walls that cannot move must generally be designed for At Rest earth pressures. G-TEC can provide a compressible inclusion between earth fill and the wall, absorbing stresses from cyclical soil expansion and contraction. The wall then can be designed for Active State earth pressure, even though no movement of the wall occurs.

G-TEC should be specified in a thickness that will accommodate the required movement when compressed to 10 to 20% of its original thickness. 10% maximum compression should be specified when rapid (near daily) earth movement is anticipated. Up to 20% compression may satisfactorily serve less frequent cycling forces.

E.G.: Problem - to provide the equivalent of 0.5% movement capacity of a 2-meter high wall. Use $H \times M / C = T$, where H is wall height in mm, M is desired equivalent movement in %, C is maximum compression of G-TEC in % and T is the required G-TEC panel thickness in mm.

Therefore, $2000 \times 0.5\% / 10\% = 100$ mm thick G-TEC panels.

G-TEC has excellent resistance to freeze/thaw and has low moisture absorption properties. It is not biodegradable, and has no pest nutrient value. G-TEC may also help to reduce earth pressure by providing thermal insulation to the structure.

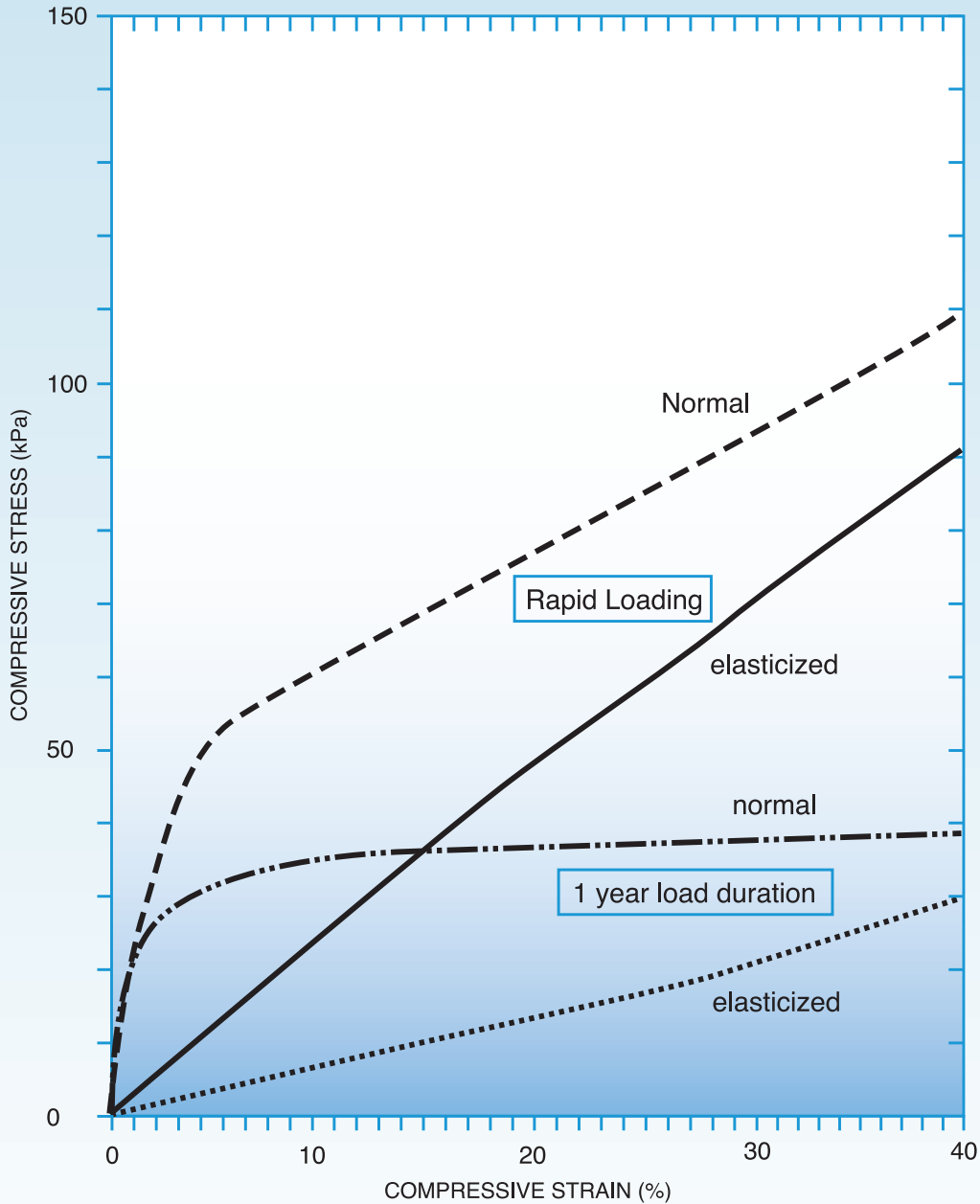
G-TEC can be economically produced with drainage channels to eliminate hydrostatic water pressure behind the wall. Consult Beaver Plastics for more information.

QUANTITIES/SIZES

G-TEC is available in 1220-mm x 1220-mm panels (4' x 4'), in the required thickness.

STRESS-STRAIN CURVES FOR EPS AND EEP

Rapid and 1 Year Duration Testing



Effect of load duration on the stress-strain behavior of normal (EPS) and elasticized (EEP) expanded polystyrene block in unconfined axial compression.

J.S. Horvath, (1998) The Compressible-Inclusion Function of EPS Geofoam: Analysis and Design Methodologies, Research Report CEIGE-98-2, Manhattan College, Bronx, New York



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