

## Cold Weather Performance of Grasspave2 and Gravelpave2

Grasspave2 and Gravelpave2 have many advantages for use in cold climates over hard surface impermeable pavements, such as asphalt and concrete.

Porous Paving is more resistant to freezing. Damp underlying soils hold heat beneath the paved surface (Backstrom 2000). Porous pavement exhibits increased speed in thawing compared to conventional pavements, due to the ability of melted water to flow directly through the pavement, increasing the temperature in the cross-section (2003, "N.E.M.O.").

Grasspave2 and Gravelpave2 are made from flexible, High Density Polyethylene (HDPE) plastic with UV inhibitors, which withstands repeated freeze-thaw cycles and continuous subzero temperatures without cracking. HDPE resists aggressive chemicals such as road salts, motor oils and fuels. HDPE is highly abrasion-resistant and is unaffected by extremes in pH (Eastpoint Oltean Co & Plastic Pipe Institute).

The expansion and contraction of the HDPE in Grasspave2 and Gravelpave2 caused by temperature variations will not affect the performance of the systems. Flexibility in the snap fitting connectors and in the connecting grid, absorb the thermal expansion/contraction due to temperature fluctuations. Since, Grasspave2 and Gravelpave2 are only 6% plastic per volume (of the top 1.25" section), with a coefficient of expansion of 0.00007 [HDPE] (Eastpoint Oltean Co.), these products will not experience any noticeable expansion.

A proper base course material, 3/4 inch minus sandy gravel (25 to 35% void space), will also absorb much of the expansion due to temperature fluctuations, relieving most upward forces. Unlike concrete and asphalt, Grasspave2 and Gravelpave2 can flex and move with the remaining vertical forces imposed by expanding base course and subsoils. The flexible ring and grid structures were engineered to conform to natural undulations and variation in the site contours. This property also applies to shifting in the subsoils and base course due to freeze-thaw cycles.

Quicker thaw times and resistance to freezing, via porous paving, result in less de-icing chemicals and less plowing compared to impermeable hard surfaces. All season maintenance is also reduced with Grasspave2 and Gravelpave2.

In cold climates, Grasspave2 and Gravelpave2 have lifespans of 60 and 25 years, respectively, whereas impermeable asphalt and concrete have projected lifespans of 8 to 15 and 18 to 25 years, respectively.

Backstrom M. 2000. "Ground Temperature in Porous Pavement during Freezing and Thawing." *Journal of Transportation Engineering – ASCE* 126(5) (September – October): 375-381.

Backstrom M, and Viklander M. 2000. "Integrated Stormwater Management in Cold Climates." *Journal of Environmental Science and Health Part A Toxic/Hazardous Substances & Environmental Engineering* 35(8): 1237-1249.

Moser, Emily 2002, "Porous Pavements A Review of Literature," published by Penn State University "Thermal Expansion and Contraction in Plastics Piping Systems, PPI TR-21 / 2001" Plastic Pipe Institute. <http://www.plasticsusa.com/hdpe.html>, plasticsusa.com is published by Eastpoint Oltean Co [http://nemo.uconn.edu/reducing\\_runoff/questions.htm](http://nemo.uconn.edu/reducing_runoff/questions.htm) is published by the University of Connecticut



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