

# TECH SOLUTIONS 609.0 STYROFOAM™ BRAND HIGHLOAD 40 INSULATION FOR INSULATED CULVERT CONSTRUCTION



## INTRODUCTION

Frost heaving of soil around a culvert can severely crack or damage the culvert. Frost heaving can also compromise the quality of the roadway. Because of this, considerable expense is incurred annually in attempts to prevent culvert frost heaving.

Including STYROFOAM™ Brand Extruded Polystyrene Insulation in a culvert design can help reduce the damage incurred from frost heaving. Research conducted in Steinbach, Manitoba, in 1978 shows how STYROFOAM™ Brand HIGHLOAD 40 Insulation\* protected a culvert test installation from frost heave.

## STYROFOAM™ BRAND HIGHLOAD 40 INSULATION

STYROFOAM™ Brand HIGHLOAD 40 Insulation is an extruded polystyrene foam insulation board with high compressive strength developed specifically for in-ground applications. STYROFOAM™ Brand HIGHLOAD 40 Insulation features:

- exceptional moisture resistance
- high R-value\*\* retention
- strong compressive creep and fatigue resistance
- long-term compressive strength

Like all STYROFOAM™ Brand Extruded Polystyrene Insulation products, STYROFOAM™ Brand HIGHLOAD 40 Insulation is durable, versatile and reusable – making it a preferred choice for a variety of high-load applications. Designed for use in low-temperature applications where moderately heavy loads are expected, STYROFOAM™ Brand HIGHLOAD 40 Insulation is recommended for insulating highway and culvert installations as a long-term solution to ground frost problems.

## CULVERT TEST INSTALLATION, STEINBACH, MANITOBA – 1978

### Background

A joint project between the Manitoba Department of Highways and Dow Chemical Canada ULC investigated the effects of using 2" (50 mm) STYROFOAM™ Brand HIGHLOAD 40 Insulation in a culvert design (Figure 1).

## Findings

The culvert test area temperature and elevation were monitored for two years. This study concluded that:

- 2" (50 mm) STYROFOAM™ Brand HIGHLOAD 40 Insulation was effective in preventing frost heave. Freezing temperatures were eliminated below the insulation.
- STYROFOAM™ Brand HIGHLOAD 40 Insulation prevented frost from penetrating the culvert subgrade during the 1978-79 winter, when the air-freezing index exceeded the design value of 2" = 50 mm = R-10.

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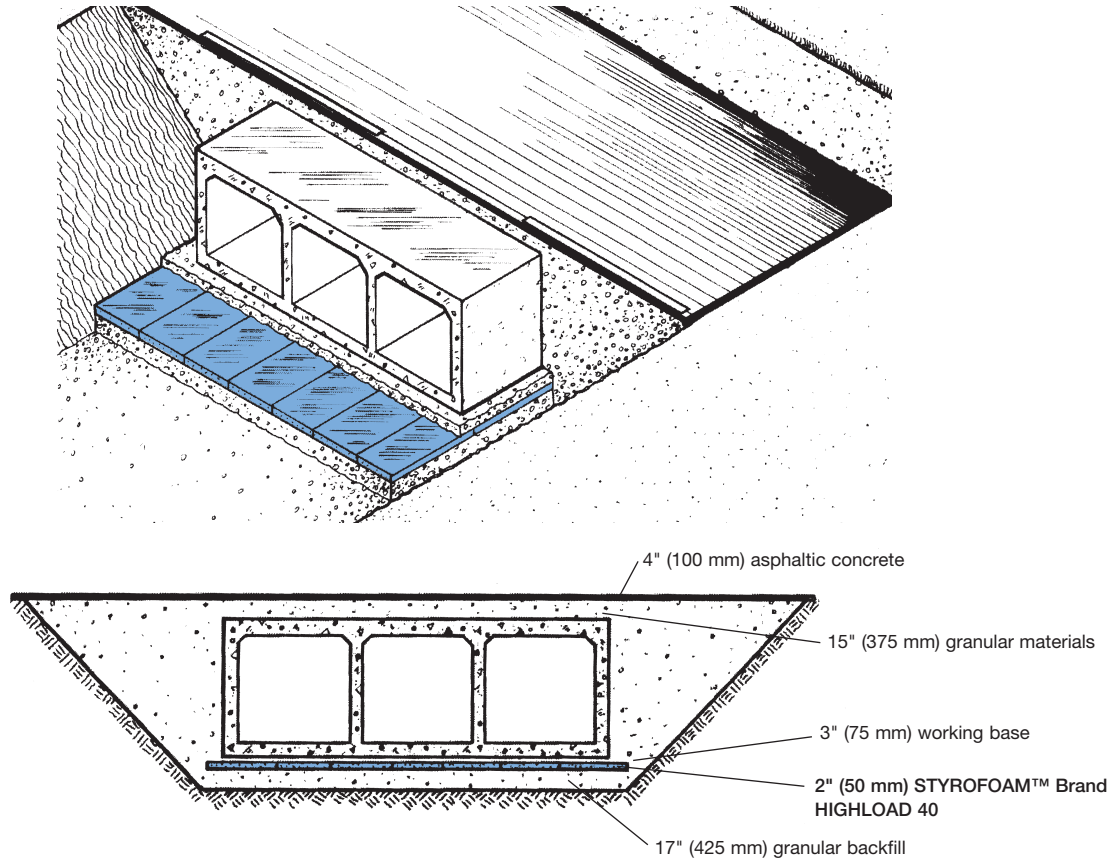
\*STYROFOAM™ Brand HIGHLOAD 40 Insulation was called STYROFOAM™ Brand HI-35 at the time of this test.

\*\*R-value means resistance to heat flow. The higher the R-value or RSI, the greater the insulating power.

RSI (R-value Système Internationale) is the metric equivalent of R-value.

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Figure 1: Poured-in-Place Reinforced Concrete Box Culvert Design



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