To calculate the amount of insulation needed to protect highways, railroads, airport runways, utility lines and building foundations against frost heave, it’s important to know the amount of frost penetration. There are two ways to calculate frost penetration: theoretically or actual field monitoring. Dow uses both methods. A theoretical formula that predicts frost depth with freezing index information provides a quick estimate. Obtaining actual field data provides the most accurate information.

The freezing index is defined as the number of degree-days (above and below 32°F [0°C]) between the highest point in the autumn and the lowest point in the spring on the cumulative degree-day time curve for one winter season. Or, simply the total number of degree-days of freezing for a given winter.

To help with calculations, this information sheet includes:
- maps of Canada showing the normal (mean) value of freezing index
- listings of normal freezing index data for major areas across Canada
- charts showing the relationship between freezing index and frost penetration as prepared by the Ministry of Transportation of Ontario

Figure 1: Freezing Index Map for Canada
Calculating Insulation Needs to Fight Frost Heave by Comparing Freezing Index and Frost Depth

Figure 2: Freezing Index Map for Southern Ontario

Figure 3: Freezing Index Map for Northern Ontario
Calculating Insulation Needs to Fight Frost Heave by Comparing Freezing Index and Frost Depth

Figure 4:
Relationship between air freezing index, surface cover and frost penetration into homogeneous soils

Figure 5:
Relationship between air freezing index, surface cover and frost penetration into a granular soil overlying a fine-grained soil

Figure 6:
Frost Penetration in Ontario 1970-1975
### Table 1: Freezing Indices for Canada

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(1) A indicates an airport data station.
Calculating Insulation Needs to Fight Frost Heave  
by Comparing Freezing Index and Frost Depth

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For Technical Information: 1-866-583-BLUE (2583) (English) 1-800-363-6210 (French)  
For Sales Information: 1-800-232-2436 (English) 1-800-565-1255 (French)  
DOW CHEMICAL CANADA ULC . Dow Building Solutions . 450 – 1st St. SW . Suite 2100 . Calgary, AB T2P 5H1  
www.dowbuildingsolutions.com  

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