

FROST PROTECTED FOUNDATIONS FOR NORTHERN MINNESOTA

Minnesota Department of Labor and Industry

Minimum foundation depth requirements in Minnesota

Required foundation depths for frost protection are the same today as they were 40 years ago. However, since the early 1980s, at least two relevant factors have changed; increased foundation insulation requirements and a slight increase in the average outdoor temperature. As a result, the Minnesota Department of Labor and Industry and the Construction Codes Advisory Council have re-examined current foundation depth requirements for northern Minnesota. The purpose of this fact sheet is to highlight another code-complying method for protecting foundations based upon a standard referenced in the Minnesota State Building Code.

Frost Protected Shallow Foundations

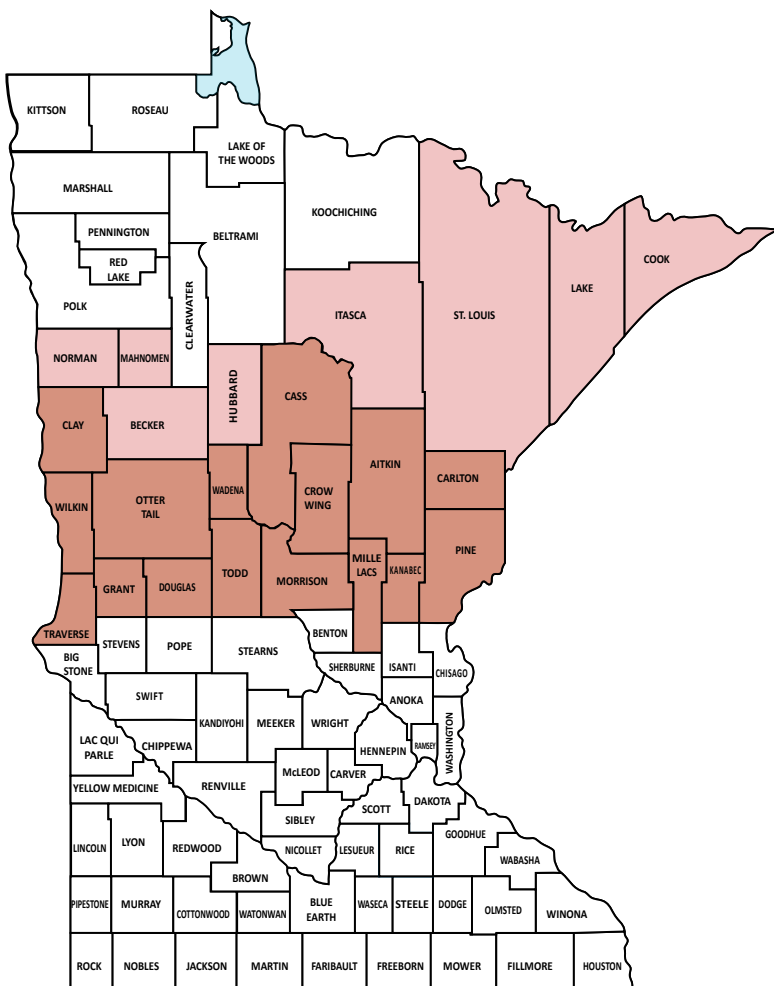
The Minnesota Residential Code and the Minnesota Building Code both recognize and allow a less traditional method of reducing the required foundation depth in accordance with ASCE 32 - *Standard for Frost Protected Shallow Foundations*. This method saves construction costs by reducing the excavation depth, the amount of concrete, and size of foundation forms.

Air Freezing Index (AFI)

The ASCE Standard 32 uses an AFI to determine where frost protected shallow foundations may be used in the state. The AFI measures the magnitude and duration of below-freezing temperatures, including estimating ground frost penetration. The most recent data collected from the National Oceanic and Atmospheric Association shows a general decrease in freezing severity in some northern Minnesota counties. These changes are reflected in the adjacent map.

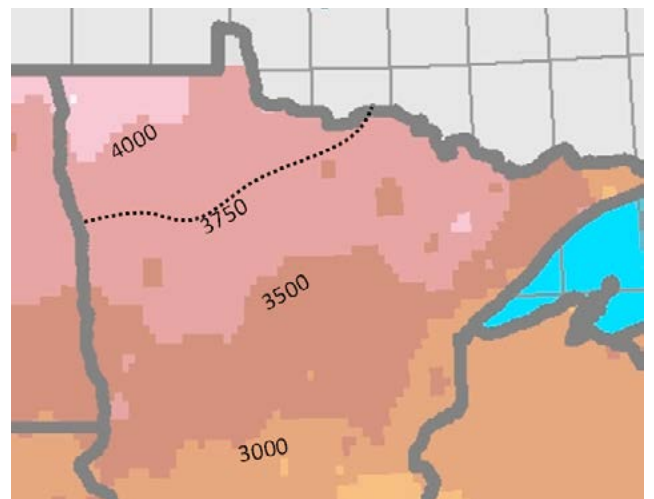
Applying AFI to other areas

As determined by the authority having jurisdiction (AHJ), the 3500 AFI can apply where shown on the map below to portions of St. Louis, Lake and Cook counties.



≤ 3750 Counties with AFI ≤ 3750

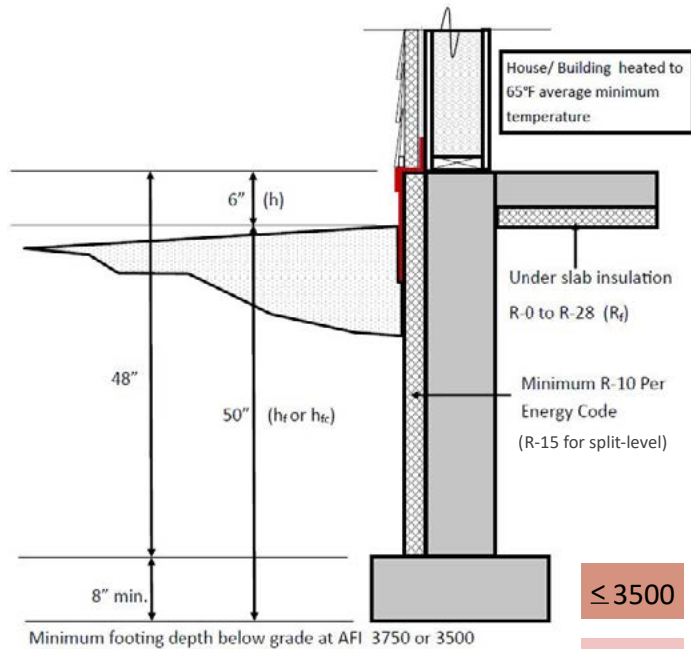
≤ 3500 Counties with AFI ≤ 3500



Complying foundation designs

The following foundation designs comply with the Minnesota Residential Code and Minnesota Building Code. Variations from these details must be based on justifying site-specific factors. If to be constructed in a code-enforced municipality, variations must be approved by the building official as an “alternate method.”

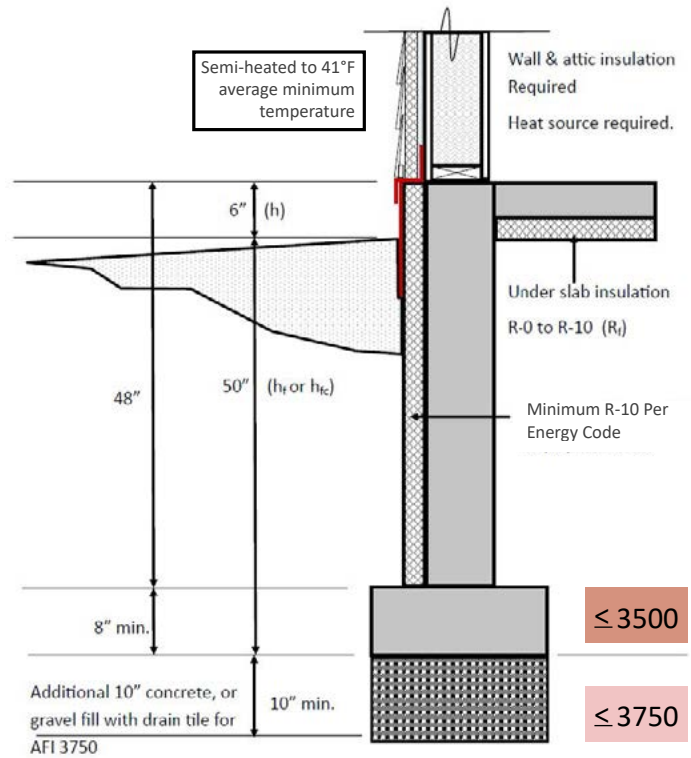
Heated building foundation (slab-on-grade or split-level)



≤ 3500

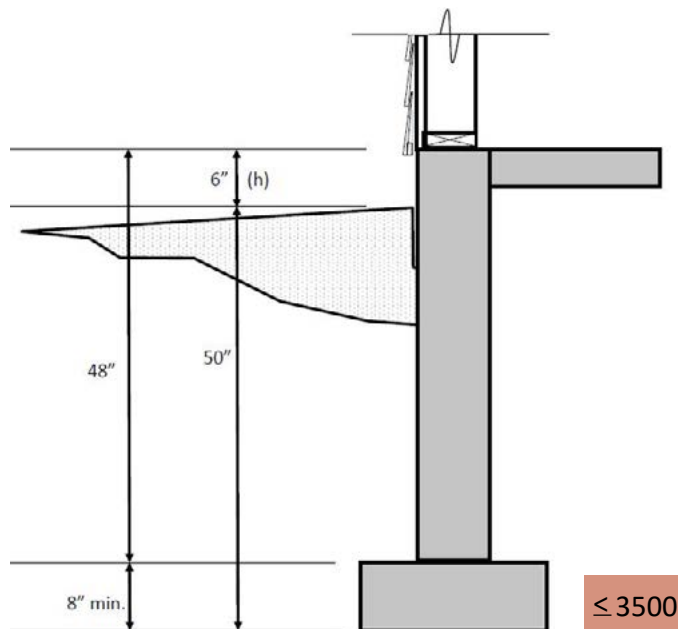
≤ 3750

Semi-heated attached-garage foundation



≤ 3500

≤ 3750



≤ 3500

Unheated attached-garage foundation

50-inch deep foundation is permitted if each of the following conditions are met:

- AFI is 3500 or less
- Ground water table is 60 inches below grade
- Soils beneath the foundation are crystalline bedrock, sedimentary and foliated rock, sandy gravel and/or gravel, sand, or other soil that provides equivalent protection from frost.