



In the heart of the Payne-Phalen neighborhood in St. Paul stands Johnson Senior High School. Established in 1897, it sits in a densely populated neighborhood near the core of the city making it a candidate for a geothermal well field when it needed a new heating, cooling, and humidity control system. TCC Materials manufactures a geothermal grout that meets the Minnesota Department of Health’s stringent rules – meaning it is safe for contact with potable ground water.

Geothermal grout is a thermally conductive cementitious grout that offers low absorption as well as a rigid seal. This prevents contamination and mixing with the groundwater aquifers that are a critical component of geothermal heating and cooling systems.



Site Photo Showing Location of Geothermal Well Field

Depending on the size, geothermal systems can consist of dozens of wells drilled in the ground. Geothermal grout is installed in those wells. Below ground, the earth’s temperature remains constant at 58 degrees year-round allowing geothermal systems to work by moving warm and cool water rather than burning a fuel to heat or cool a building. A geothermal system consists of three parts:

- Ground loop – piping system and the wells.
- Heat pump/exchanger – moves warm/cold water between the building and the wells
- Distribution system – duct work inside the building

The geothermal system works because the fluid in the system absorbs the heat from the surrounding earth. This fluid is pumped in pipes to the heat pump located in the building. On the heat pump is a heat exchanger that uses the energy to warm the air that passes through the unit. The heated air circulates through the duct work in the building. To cool the building, the heat exchanger extracts the heat from the air. The heat pump moves the hot fluid back into the ground to be cooled and then brings the cool water into the system to cool the building.

