

**567—49.29(455B) Closed circuit vertical heat exchangers.** These provisions apply to closed circuit vertical heat exchanger construction.

**49.29(1)** Piping used must be 160 psi pressure-rated high-density polyethylene or polybutylene.

**49.29(2)** Connection to piping must use socket fusion or butt fusion joining methods.

**49.29(3)** Piping must be pressure-tested with air or potable water for 15 minutes at a pressure of 1.5 times the system operating pressure after installation in the borehole.

**49.29(4)** The annular space between the vertical heat exchanger piping and the borehole must be grouted as required in subrule 49.9(3) using an approved grouting method and material. Grout shall be placed at least in the top 40 feet. Any confining layers between aquifers shall be replaced with grout. Grouting must be performed within 24 hours of completion of the borehole.

**49.29(5)** Only food-grade or USP-grade propylene glycol or calcium chloride may be used as heat transfer fluid. Any other materials or additives must be NSF-approved for drinking water applications. A permanent sign must be attached to the heat pump specifying that only approved heat transfer fluids may be used.

**49.29(6)** A flow measurement device must be installed on each system.

**49.29(7)** Water make-up lines to the vertical heat exchanger must be protected with a backflow prevention device.