

4727.1250 PERMANENT SEALING OF EXPLORATORY BORINGS.

Subpart 1. **Permanent sealing required.** The explorer must permanently seal an exploratory boring that is not temporarily sealed or that is required to be permanently sealed under part 4727.1100, subpart 2.

Subp. 2. **Sealing with grout.** An exploratory boring must be permanently sealed by filling the boring, including any open annular space, with grout. The grout must be pumped through a tremie pipe or the casing from the bottom of the annular space or boring upward to within two feet of the established ground surface. The bottom of the tremie pipe must remain submerged in grout while grouting.

Subp. 3. **Removal of obstruction, debris.** Materials, debris, and obstructions that may interfere with permanent sealing must be removed from the exploratory boring. Casing may be salvaged, except casing that has been cemented in place.

Subp. 4. **Grouting an annular space.** Open annular space surrounding a casing must be grouted by:

- A. filling the annular space with grout according to subpart 2;
- B. removing the casing and filling the boring with grout. If casing is to be removed from a collapsing formation, grout must be inserted so the bottom of the casing remains submerged in grout;
- C. perforating the casing with a minimum of one 1/2-square-inch hole in each foot of casing and forcing grout through the perforations; or
- D. ripping a minimum of five feet of casing for every 20 feet of casing and forcing grout through the ripped casing, except that casing must be ripped through the entire length of a confining layer.

Subp. 5. **Additional sealing requirements; unconsolidated materials.** The additional requirements in items A and B apply to the permanent sealing of a boring in unconsolidated materials.

A. The portion of a boring in unconsolidated material must be filled with high solids bentonite grout or neat cement grout. Concrete grout is approved for grouting only in the dry portion of the hole. The grout must be pumped through a tremie pipe or the casing from the bottom of the boring upward to within two feet of the established ground surface.

B. The portion of a boring in kaolin clay may be sealed with kaolin clay in addition to the grout materials in item A. Up to 20 percent water by volume may be added to the kaolin clay to allow for placement. The kaolin clay, or kaolin clay and water mixture, must be inserted through a tremie pipe or the casing.

Subp. 6. **Additional sealing requirements; bedrock.** The additional requirements in items A and B apply to the permanent sealing of a boring in bedrock.

A. The portion of a boring in bedrock must be filled and sealed through the entire interval of the bedrock with neat cement grout, except that:

(1) concrete grout may be used above the water level;

(2) in that portion of igneous or metamorphic bedrock that does not contain water-bearing fractures or voids and that is at least 250 feet below the top of the igneous or metamorphic bedrock, a plug or packer may be installed. The bore hole above the packer must be filled with grout and the bore hole below the packer may be left without grout; and

(3) if the grout level fails to rise after insertion of more than one cubic yard of grout or the quantity of grout necessary to fill ten vertical feet of hole, or if a cavity more than twice the diameter of the bore hole exists, then the following grouting materials and methods may be used in the portions where the conditions exist:

(a) pouring a mixture of gravel or stone aggregate not larger than one-half inch in diameter while simultaneously pumping neat cement grout or concrete grout in a ratio not to exceed five parts aggregate to one part grout;

(b) pumping a mixture of gravel or stone aggregate not larger than one-half inch in diameter and concrete grout or neat cement grout in a ratio not to exceed five parts gravel to one part Portland cement; or

(c) alternately pumping concrete or neat cement grout and pouring gravel or stone aggregate not larger than one-half inch in diameter in layers of equal thickness. Individual layers of aggregate must not exceed ten feet in thickness. Aggregate must not be placed in a confining layer.

B. Neat cement grout or concrete grout must be pumped through the casing or a tremie pipe. The aggregate must be poured into the bore hole at a rate that prevents bridging.

Subp. 7. **Sealing flowing boring.** An exploratory boring from which groundwater flows above the established ground surface must be permanently sealed with neat cement grout. The discharge from a flowing exploratory boring must be stopped and the boring sealed according to this part.

Statutory Authority: *MS s 1031.101*

History: *28 SR 147*

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