



Ohio Department of Natural Resources
Division of Soil and Water Resources
Fact Sheet

Fact Sheet 93-19

Dry Driven Grout Method

Drilling contractors are genuinely concerned about maintaining and preserving the quality of ground water—our most valuable natural resource. Dry grouting while driving casing for the construction of wells using a cable tool drilling rig is one way to protect our water supply. Although grouting casing while driving is not new to the water well construction industry, its application should be more widespread, and for very good reasons. Dry grouting while driving well casing requires little effort, yet it provides many benefits.

Resource Protection

The primary reason for grouting a driven well casing is the same as for other types of well construction. The driving of the casing into the ground creates a “micro” annular space between the casing and the geologic material. By placing an impervious layer of material in the annulus (space between the casing and borehole), the probability of surface water intruding the aquifer is minimized. When the annulus is properly sealed, water is restricted from flowing from one aquifer to another. Proper grouting techniques result in the best well construction possible. This fact sheet, and others pertaining to well construction, will help you learn how to protect everyone’s ground water.

The methods used to grout and drive well casing may vary, but the following procedures cover the basic technique.

Techniques

Initially, a 3-foot-deep borehole should be drilled approximately four to five inches wider than the drill pipe being used. Next, the casing is placed into the borehole and the annulus is filled with a dry grouting material. As drilling continues, the well casing is then driven into the ground approximately 12 feet while grouting material is continually placed around the drill pipe at the surface. The grouting material simply moves down the annulus along the casing. As additional well casing is driven, each coupling drags and pulls the grout down along the exterior of the casing filling the annulus.

Water used for drilling operations may spill onto the area where the dry grout is being placed. This makes the grout swell creating a temporary seal at the surface. This is corrected by shoveling off the thin top layer of the moistened grout and exposing the underlying dry grout. If the grout hangs up (bridges) during driving operations, and no longer moves down the annulus, it is necessary to pull the well casing back two or three feet. By pulling the well casing back, the bridging of the grout is eliminated, and drilling and driving procedures may continue.

Grout Material

The type of grouting material used directly affects the quality of the grout job. Bentonite is advantageous to use because it incorporates the most important properties of the various grouting materials available.

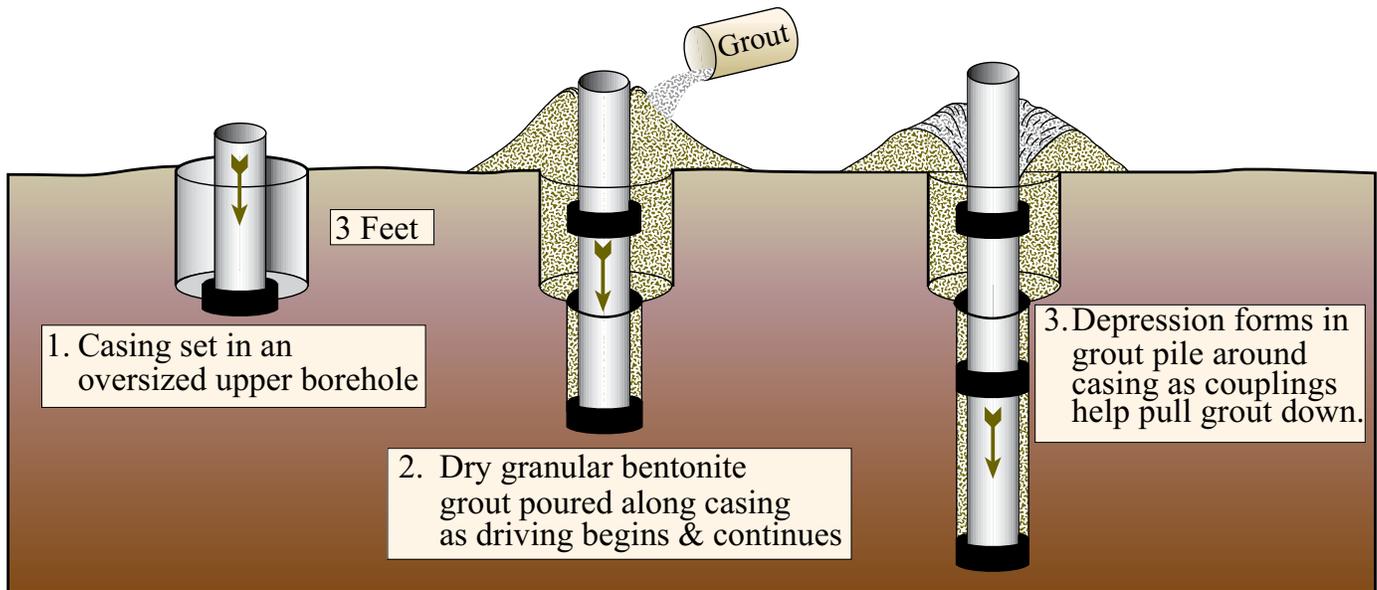
Two different kinds of bentonite are suggested for use with this method. The most popular bentonite is the granular form. Experience has shown this type of bentonite readily fills the annulus with minimal bridging and blocking. The other type of bentonite is the drilling mud type of bentonite that comes in a powdered form. Powdered bentonite, however, tends to swell rapidly when exposed to water and thus placement may be restricted due to bridging and premature swelling.

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Cost

The cost of dry grouting while driving well casing must also be considered. The cost of grouting is contingent upon the size of the well casing, type of grouting material used and the geologic formations encountered. The average cost of material (at the time this article was written) to properly grout a 5+ inch well constructed in glacial till is 50 cents per foot. This cost is based on using granular bentonite grout and an application rate of 150 pounds per 50 feet of hole.

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Advantages

The cost of grouting driven well casing is minimal in relation to the advantages. Most Ohioans express a concern for the quality of their ground water and are not reluctant to pay the additional expense when the benefits of grouting are explained to them.

Bentonite Seals

The most obvious benefit of grouting a well is that the probability of surface water or any other substance entering the aquifer is minimized. Grouting also helps prevent cross-contamination or mixing between aquifers with different water quality. There are other benefits to the consumer and driller from using this grouting technique.

Bentonite Lubricates

Bentonite grout enables well casing to move more freely in the hole. Well screen installation in a cable tool drilled well requires that the well casing move freely so that the driller can pull the casing up to expose the screen. By using the bentonite grout method it is easier to pull back the well casing. Bentonite also allows casing to be driven to greater depths and in significantly less time.

Bentonite Protects

Another benefit of using this grouting technique is the way in which the outside of the well casing is protected from corrosion. By placing an inert material

around the casing, corrosive elements are kept from direct contact with the casing, preventing break down of the molecular structure of the well casing.

Dry grouting while driving well casing can help to preserve ground water resources and provide efficient construction. Therefore, current Ohio Department of health rules require dry grouting of cable tool wells. We strongly urge all drilling contractors to implement a grouting program directed at preserving our most valuable natural resource.

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