



MONTGOMERY COUNTY HEALTH DEPARTMENT

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MONTGOMERY COUNTY HEALTH DEPARTMENT INDIVIDUAL WATER SUPPLY WELL CONSTRUCTION SPECIFICATIONS

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Amendments effective August 1, 2003*

All such water supplies are subject to Montgomery County Health Department (MCHD) inspection for the construction criteria listed below. At least twenty-four (24) hours notice to MCHD must be given prior to commencement of well installation. **FAILURE TO COMPLY WITH THIS OR ANY OTHER REQUIREMENT WILL RESULT IN ENFORCEMENT ACTION AND MCHD PROHIBITION ON USE OF THE WATER SUPPLY.**

1. Casing

- A. All wells supplying individual water supplies shall be equipped with water-tight steel casing of a minimum thickness of .28 inch and weight of nineteen (19) lbs./ft. The casing shall be carried to a minimum depth of thirty (30) feet or five (5) feet into hard bedrock or other impervious strata, whichever is deeper, and grouted in place. A minimum annular clearance of 1.5 inches must be maintained so that grout may be placed in accordance with the provisions of Section 3. The criteria established in AWWA Standard A 100-90 must be followed.
- B. Steel casings shall be new pipe meeting ASTM or API specifications for water well construction. If minimum thickness is not considered sufficient to assure reasonable life expectancy of the well, additional thickness will be provided. Steel casing will be equipped with a drive shoe, if needed, and have full circumference welds or threaded pipe joints.
- C. Any casing other than steel may be used only after receiving prior MCHD written approval. Failure to receive such approval for use of alternate casing types will result in enforcement action and MCHD prohibition on use of the water supply.
- D. Water-tight well casing and grout must be placed at a sufficient depth to prevent the entrance of pollution from surface run-off and polluted aquifers.
- E. The casing shall extend above the finished grade a minimum of twelve (12) inches or to such height as is necessary to prevent entrance of surface water from run-off or flooding, whichever is greater.
- F. All casing shall be fitted with a vermin resistant well cap.

2. Grout Materials and Location

- A. All grout information (i.e., type of grout and number of bags of material used for grouting) must be submitted in writing on the required MCHD form by the PADCNR licensed water well driller within twenty-four (24) hours of completion of the well drilling process.
- B. In all well installations an annular space shall be provided between the well casing and the earth formation. The annular space shall be completely filled with approved grout materials in one continuous operation from the bottom to the natural land surface within twenty-four (24) hours after completion of the drilling. Before placement of grout, the annular space shall be completely cleared of all obstructions prior to the placement of the grout material and exterior grouting methods must be used. The casing shall be sealed effectively against entrance of water from water bearing zones which are subject to pollution. During the installation of a pitless adaptor, grout material may be removed from the exterior of the casing in order to provide a water-tight seal between the casing and the pitless adaptor.
- C. When drilling is to be continued after grouting, a curing time of twelve (12) hours must be provided during which drilling is not permitted, unless a bentonite plug with cement grout or bentonite grout is used.
- D. The annular space of all well installations must be filled with one of the following grout materials listed in E-G. The approximate minimum quantities of cement required to grout a ten (10) foot section of annular space is given in Appendix A.
- E. Neat cement grout shall consist of a mixture of portland cement Type I, II or III and water in the ratio of 0.67 cu. ft. (five (5) gallons) of water per ninety-four (94) pound sack weighing approximately 228 lbs/cu. ft. A maximum of six (6) percent by weight bentonite and two (2) percent by weight of calcium chloride may be added.
- F. Sand cement grout shall consist of a mixture of portland cement Type I or III sand and water in the proportion of not more than two (2) parts by weight of sand to one (1) part of cement with not more than six (6) gallons of water per 94 lb. sack of cement.
- G. Bentonite or sealing clay shall consist of a manufactured clay product that expands in contact with moisture to form a seal that prevents the movement of water. Bentonite must be activated with water prior to resumption of drilling.
- H. In all well installations, if rapid loss of grout material occurs during placement, coarse fill material (e.g., sand, gravel, crushed stone, dry cement) may be used in the zone(s) in which the rapid loss is occurring. The remainder of the annular space shall be grouted as provided below. In no case shall pouring, dumping, or shoveling of grout material into the annular space be deemed an approved method of grout placement.

3. Grout Placement

A. Grout Pipe Outside Casing

- i. The annular space shall be a minimum of 1.5 inches (the diameter of the drilled hole shall be greater than or equal to the casing outer diameter plus three (3) inches). All grout shall be placed by pumping through the grout pipe. The entire interval to be grouted shall be open and without obstructions. Washing or jetting with water is recommended for cleaning the borehole and may serve to remove obstructions caused by caving, which otherwise would prevent a proper grout. It is required that the grout pipe extend from the surface to the bottom of the interval to be grouted. The grout pipe may remain extended to the bottom of the interval during and after grouting, or it may be raised slowly as the grout is placed provided that the discharge end of the grout pipe remains submerged in the emplaced grout at all times until grouting is completed. In the event of interruption in the grouting operations, the bottom of the grout pipe shall be raised above the grout level and should not be re-submerged until the air and water have been displaced from the grout pipe.
- ii. With grouting depths of forty (40) feet and less, grout may be placed slowly from the surface provided that the entire interval to be grouted is clearly visible from the surface and is dry. An annular space larger than the minimum 1.5 inches may be required to assure visibility from the surface. Any bridging of grout material must be cleared by removing the casing or rodding prior to placement of grout above the bridged area.

B. Unstable Formations (i.e., fractured limestone, saturated soils, etc.)

- i. When drilling through an unconsolidated formation that caves in, steel casing and a steel drive shoe shall be required.
- ii. If caving conditions are experienced on wells, the annular space shall be kept open with an outer casing and shall be grouted from the bottom of the inner casing, which shall be at least ten (10) feet below where caving occurred.

C. Other

Other grouting methods and materials may be used subject to prior written approval from MCHD.

4. Packers

Packers shall be of materials that will not impart taste, odor, toxic substances or bacterial contamination to the well water.

5. Pitless Installations

Pitless installations where the casing terminates above the ground surface and the well pump discharges through a buried adapter fitting shall be of a design which provides an effective seal against the entrance of ground or surface water into the well. All buried suction lines shall be effectively encased, or otherwise protected to prevent external damage or contamination. Pitless installations must be so designed as to be structurally sound and to provide for ready removal of drop piping without excavation. The access casing shall be effectively protected against corrosion and shall extend at least twelve (12) inches above the natural ground surface and to a point below the frost line. The ground level at this point shall be elevated above the adjacent ground level and graded to drain away in all directions. The top of the access shall be effectively sealed against the entrance of water, insects, and rodents with a vermin resistant cap. The pitless adaptor shall not be submerged in water or used in areas where automobiles and other vehicles are used unless adequately protected.

6. Pump Installations

All pump information must be completed on the required form and submitted to MCHD within thirty (30) days of installation of the pump.

7. Disinfection

A. Following completion of construction of an individual water supply and installation of the pumping equipment, or alternations, repair or maintenance work, the well shall be pumped continuously until the water discharged is clear. The well, pump, piping system, and other fixtures, shall be filled with water containing a concentration of not less than fifty (50) parts per million (ppm) of free chlorine. A portion of the chlorine solution shall be recirculated directly to the well in order to insure proper agitation. The water shall not be used for a period of twenty-four (24) hours. Other combinations of concentration and time intervals may be used if demonstrated to be equally effective.

B. One-half ounce of dry calcium hypochlorite (seventy (70) percent available chlorine) dissolved in fifty-two and one-half (52.5) gallons of water, makes a fifty (50) ppm strength disinfectant solution. Various proportions can be worked out using the approximate quantities shown in the following table:

Diameter of the Well Casing	Water Standing in Well	Amount of Dry Powder (HTH or Equivalent) to Make at Least Fifty (50) ppm Chlorine Solution
6 Inches	100 Feet (147 Gallons)	3.5 Tablespoonfuls or 1/4 Cup
8 Inches	100 Feet (261 Gallons)	6 Tablespoonfuls or 3/8 Cup
10 Inches	100 Feet (408 Gallons)	5/8 Cup
12 Inches	100 Feet (587 Gallons)	7/8 Cup

Disposal of the purged water shall be at a point so as to minimize adverse effects to aquatic life, and further, the purged water shall not be discharged into any subsurface sewage disposal system.