

3701-28-07 Procedures for the sealing of private water systems.

- (A) Upon completion of testing, a test hole shall either be permanently sealed or converted into a well, construction of which shall comply with all applicable requirements of this chapter.
- (B) All wells that are not in service shall either be sealed in accordance with this rule and rule 3701-28-071 of the Administrative Code or maintained in strict compliance with all applicable requirements of this chapter.
- (C) All dry holes shall be sealed in accordance with the provisions of this rule and rule 3701-28-071 of the Administrative Code.
- (D) All cisterns and hauled water storage tanks that are permanently out of service shall be emptied of all accumulated water. At least one wall of the cistern or hauled water storage tank shall be removed to prevent the accumulation of water. All entrances and drains into the cistern or hauled water storage tank shall be disconnected and sealed. The cistern or hauled water storage tank shall be completely filled with an inert solid material to prevent collapse, except when the cistern is beneath a dwelling or a part of a dwelling foundation, or is to be converted to a room intended to be used as part of the dwelling.
- (E) A well taken out of service when a replacement private water system or a public water supply system is installed shall be sealed pursuant to the provisions of this rule and rule 3701-28-071 of the Administrative Code within thirty days, unless the well owner demonstrates to the satisfaction of the department that the well will not cause or contribute to contamination of the ground water supply, present a safety hazard or present a public health nuisance and the well taken out of service is and will be maintained in compliance with this chapter.
- (F) Except as provided in paragraph (G) of this rule, the owner of property on which a permanently out of service well is located shall be responsible for the sealing of the well, unless a written contract between the property owner and a registered contractor provides otherwise.
- (G) If the department determines that a registered contractor has improperly located or constructed a well, the water system contractor shall be responsible for sealing the well or bringing the well into compliance.
- (H) Information regarding the construction characteristics of the well or dry hole shall be obtained by the registered contractor intending to perform the work prior to the sealing of the well or dry hole. This information may be obtained from one or more of the following:

- (1) The well log and drilling report filed in accordance with section 1521.05 of the Revised Code.
  - (2) Surveys of the well or dry hole completed by using a borehole video camera, casing depth indicator, caliper log, or other geophysical logging equipment approved by the director.
- (l) In accordance with the requirements of rule 3701-28-071 of the Administrative Code and Appendix A of this rule one of the following materials shall be used for sealing wells and dry holes:
- (1) Cement grouts which meet current ASTM standard C150 and NSF standard sixty and include:
    - (a) Type I, general purpose cement;
    - (b) Type II, for use in waters with moderate sulfate content, and conditions requiring lower heat of hydration;
    - (c) Type III, for use in conditions requiring high early strength;
    - (d) Type IV, for use in conditions requiring low heat of hydration;
    - (e) Type V, for use in ground waters with a high sulfate content;
    - (f) Concrete grout for special sealing conditions identified in Table 1.
  - (2) Bentonite based grouts which meet NSF standard sixty and include:
    - (a) High solids bentonite grout using powdered bentonite-clay or granular bentonite.
    - (b) Coarse grade bentonite.
    - (c) Pelletized bentonite.
  - (3) Clean clay, sand, or gravel when used in accordance with rule 3701-28-071 of the Administrative Code.
  - (4) Any other material determined by the director to have permeability and sealing

characteristics sufficient to protect groundwater and public health.

- (J) All wells to be sealed, dry holes, test holes, or test holes shall be sealed in accordance with the following requirements, as applicable:
- (1) All obstructions shall be removed from the well including pumps and related equipment, drop pipes, pitless adaptors, suction lines, trash or other debris. Pumps that cannot be removed shall be pushed to the bottom of the well, if possible or left in place if it is not possible to push it to the bottom of the well.
  - (2) The casing in the well should be removed, ripped or perforated to allow for sealing of the annular space.
  - (3) If there is water flowing from around the outside of the well casing or there is gravel packing connecting two or more hydraulic zones the well shall be overdrilled.
  - (4) The well or dry hole shall be disinfected by adding sodium hypochlorite or calcium hypochlorite to achieve a concentration of at least one thousand milligrams per liter in the water in the well. Where the well is dry, a minimum of ten gallons of chlorine solution at one thousand milligrams per liter shall be prepared and the sides of the casing or borehole shall be rinsed.
  - (5) The materials, described in paragraph (I) of this rule, shall be processed and placed in the well in accordance with the following requirements:
    - (a) Grout shall be placed from the bottom of the well or dry hole upwards in one continuous operation until cement or bentonite based grout of approximately the same density as the grout being pumped is coming out of the top of the well or dry hole.
    - (b) When using cement based grouts the following requirements shall be met:
      - (i) Cement grouts shall be mixed using potable water according to the following specifications:
        - (a) Type I, II, IV, and V cement shall be mixed by adding six gallons of water per ninety-four pounds of cement with a minimum density of fifteen pounds per gallon.
        - (b) Type III cement shall be mixed by adding 6.3 to seven gallons of water per ninety-four pounds of cement.

- (c) Concrete shall be mixed by adding ninety-four pounds of cement, an equal amount of sand, and no more than six gallons of water with a minimum density of 17.5 pounds per gallon.
    - (d) Cement that has calcium chloride added as an accelerator to speed up the rate of curing shall be mixed by adding two to four pounds of calcium chloride per ninety-four pounds of cement and six gallons of water with a minimum density of fifteen pounds per gallon.
  - (ii) Except as provided in paragraph (j)(5)(b)(iii) of this rule cement grouts shall be placed into a well by the conductor pipe pumped method of pressure grouting.
  - (iii) Cement based grouts may be gravity poured into a dry hole where no water is present in the well or borehole.
- (c) When using bentonite based grout, the following requirements shall be met:
- (i) Bentonite based grout slurries shall be mixed according to the manufacturers recommendations to achieve a minimum density of 9.25 to 9.4 pounds per gallon, and a solids content of twenty-five to thirty percent bentonite by weight of water. Synthetic organic polymers that meet ansi/NSF standard sixty may be added to bentonite slurries to suppress hydration of the bentonite particles and shall be mixed according to the manufacturer's recommendations.
  - (ii) Bentonite grout shall be placed into the well by pressure grouting using the conductor pipe-pumped method of pressure grouting.
- (d) When using course grade or pelletized bentonite the following requirements shall be met:
- (i) The total volume of sealing materials used shall be within five per cent of the total volume of the well or dry hole.

- (ii) Coarse grade or pelletized bentonite shall be poured slowly into the top of the well or dry hole to prevent bridging in the casing or borehole, in accordance with the following procedures:
    - (a) Coarse grade or pelletized bentonite shall be poured over a wire mesh screen to keep the fine bentonite powder from entering the well or dry hole.
    - (b) Course grade or pelletized bentonite shall be poured at a continuous rate no faster than three minutes per fifty pounds.
    - (c) The pouring process shall be halted intermittently to lower a weighted measuring tape into the well to determine the top of the sealing products and confirm that bridging has not occurred. A tamping device shall be used where possible to break any bridges that may form.
  - (iii) fine bentonite particles that accumulate in the shipping container shall not be used.
- (6) After the sealing material has been placed into the well, dry hole or test hole the sealing material shall be left a minimum of twelve hours to assess whether any settling of the sealing material has occurred. If settling has occurred, then additional grout shall be placed into the remaining void space.
- (7) Any remaining casing shall be cut off to a minimum depth of two feet below grade.
- (8) The remaining hole shall be filled with clean soil and mounded to ensure that water drains away from the sealed well or dry hole.
- (9) A well sealing report as required under section 1521.05 of the Revised Code shall be filed with the department, the department of natural resources, a copy provided to the well owner, and a copy retained by the registered contractor.

Table 2 volume of borehole per foot		
Hole diameter in inches	Gallons per foot	Hole volume in cubic foot/ foot depth
2	0.17	0.022
3	0.38	0.049
4	0.67	0.087
5	1.00	0.136
6	1.51	0.196
7	2.05	0.267
8	2.70	0.349
9	3.40	0.442
10	4.20	0.545
11	5.00	0.660
12	6.00	0.785
15	9.50	1.227
18	13.60	1.767
20	16.80	2.181
25	26.00	3.409
30	38.00	4.909
60	152.00	20.322

Replaces: 3701-28-07

Effective date: January 1, 2000

R.c. 119.032 rRview Date: 1/1/05; 9/1/99

Certified:

                  /s/                    
Jodi Govern, Secretary  
Public Health Council

          9/17/99            
Date

Promulgated under: chapter 119.  
Rule authorized by:           3701.34  
Rule amplifies:               3701.344  
Prior effective date: 1/1/81