

**OHIO ADMINISTRATIVE CODE  
CHAPTER 3701-28**

***PRIVATE WATER SYSTEMS RULES***



**OHIO DEPARTMENT OF HEALTH  
Bureau of Local Services  
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## OHIO DEPARTMENT OF HEALTH

### Ohio Administrative Code Chapter 3701-28 Private Water Systems Rules

| Rule Number | Rule Title   | Page |
|-------------|--|------|
| 3701-28-01  | <u>Definitions</u>   | 2    |
| 3701-28-02  | <u>Scope, responsibility for compliance, and applicability of rules</u>  | 10   |
| 3701-28-03  | <u>Permits</u>   | 12   |
| 3701-28-04  | <u>Inspection: water sample collection and analysis</u>  | 17   |
| 3701-28-05  | <u>Approval to enforce</u>   | 21   |
| 3701-28-06  | <u>Fees</u>  | 23   |
| 3701-28-061 | <u>Fee categories</u>  | 25   |
| 3701-28-062 | <u>Cost methodology</u>  | 27   |
| 3701-28-07  | <u>Procedures for the sealing of private water systems</u>   | 29   |
| 3701-28-071 | <u>Special sealing requirements based on well type and geologic conditions</u>   | 35   |
| 3701-28-08  | <u>Cross-connection and backflow</u>   | 40   |
| 3701-28-09  | <u>Continuous disinfection</u>   | 41   |
| 3701-28-10  | <u>Location, operation, and maintenance of private water systems</u>   | 44   |
| 3701-28-11  | <u>Miscellaneous provisions for the construction of private water systems, sampling faucets and distribution water service lines</u> | 48   |
| 3701-28-111 | <u>Materials used in drilling and construction of wells</u>  | 49   |
| 3701-28-12  | <u>Construction, surface design, maintenance, and modification of wells</u>  | 55   |
| 3701-28-121 | <u>Well construction, special geologic conditions</u>  | 64   |
| 3701-28-122 | <u>Well development</u>  | 67   |
| 3701-28-13  | <u>Construction and surface design of cisterns, hauled water storage tanks, and roof washers</u>                                     | 69   |
| 3701-28-14  | <u>Construction and surface design of springs</u>  | 72   |
| 3701-28-15  | <u>Location and construction of ponds</u>  | 74   |
| 3701-28-16  | <u>Piping</u>  | 79   |
| 3701-28-17  | <u>Startup and operation of new, repaired and altered private water systems</u>  | 80   |
| 3701-28-18  | <u>Hauled water</u>  | 84   |
| 3701-28-19  | <u>Orders to improve water systems</u>   | 86   |
| 3701-28-20  | <u>Registration and bonding of water systems contractors</u>   | 87   |
| 3701-28-21  | <u>Variance or waiver of certain provisions of this chapter</u>  | 93   |

3701-28-01 Definitions.

- (A) "Alter or alteration" means to make a major change in the type of construction or configuration of a private water system, including without limitation, adding a disinfection or treatment device, for the purpose of disinfecting or treating the water source for a private water system due to contamination; converting a well with a buried seal to a well with a pitless adapter or well house installation; extending a distribution system to a dwelling or dwellings; converting a well that uses a well pit to a well with a pitless adapter or well house type of construction; extending the casing above ground; deepening a well; changing the type of pumping equipment when the change requires making new holes or sealing or plugging existing holes in the casing or wall of a well; or repairing, extending, or replacing any portion of the inside or outside casing or wall, or the walls of a spring or cistern, that extend below ground level.
- (B) "ANSI" means the American national standards institute.
- (C) "API" means American petroleum institute.
- (D) "Annular space" means the space between two cylindrical objects, one of which surrounds the other, such as the space between a borehole wall and the casing or casing coupling of a well, the space between a casing pipe and liner pipe, or the space between a temporary casing and a permanent casing.
- (E) "Aquifer" means a consolidated or unconsolidated geologic formation or series of formations that are hydraulically interconnected and that have the ability to receive, store, or transmit water.
- (F) "ASTM" means the American society for testing and materials.
- (G) "Bentonite" means a plastic, colloidal clay which has an extensive ability to absorb water and swell in volume, and which is composed predominantly of the mineral montmorillonite.
- (H) "Bentonite grout" means a slurry of bentonite and water which has a high solids concentration and a minimum density of bentonite in a pelletized or course grade form.
- (I) "Board of health" means the board of health of a city or general health district created by or under the authority of Chapter 3709. of the Revised Code, the authority having the duties of a board of health in any city as authorized under section 3709.05 of the Revised Code, or the authorized representative of such a board or authority.
- (J) "Casing" means an impervious durable pipe that is placed in a well and is used to prevent the walls from caving, exclude surface drainage, undesirable water or other fluids, or unwanted or harmful materials from a well.

- (K) "Coarse grade bentonite" means bentonite that has been crushed to a size of three-eighths to three-quarters of an inch.
- (L) "Coliform bacteria" means all of the aerobic and facultive anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas formation within forty-eight hours at thirty-five degrees celsius.
- (M) "Conductor pipe" or "tremie pipe" means a small diameter pipe used to place a grout slurry into the annular space of a well.
- (N) "Conductor pipe-pumped" means pressure grouting with a conductor pipe that is lowered to the bottom of the annular space with grout pumped from the bottom up in a continuous operation. The end of the conductor pipe remains submerged and full of grout at all times.
- (O) "Confined aquifer" means an aquifer bounded above and below by beds of distinctly lower permeability than that of the aquifer itself and which contains ground water under pressure greater than that of the atmosphere.
- (P) "Consolidated" means lithified geologic formation materials. In Ohio these materials constitute formations such as sandstone, dolomite, limestone, shale, siltstone and coal.
- (Q) "Contaminant" means any biological, chemical, physical, or radiological constituent in water that is or may become injurious to public health, safety or welfare.
- (R) "Contamination" means the presence of any contaminant into the private water system or ground water which renders the water unfit for human consumption.
- (S) "Department" means the department of health or board of health of a health district approved by the director to administer and enforce this chapter.
- (T) "Develop or development" means to physically remove all fine materials, and sediment generated during construction of the well, by means including but not limited to surging, air surging or lifting, over pumping, backwashing, high velocity jetting or bailing of the completed well.
- (U) "Director or director of health" means the director of the department of health of the state of Ohio and includes any authorized representative of the director.
- (V) "Disinfect or disinfection" means the addition or use of chlorine or other disinfectant or process to the private water system to neutralize or destroy the growth of harmful bacteria.

- (W) "Diversion ditch" means a shallow ditch, swale, earthen embankment, or other excavation to divert surface water away from a water source or supply.
- (X) "Dry hole" means an open borehole or cased borehole that does not produce water in sufficient quantity for the intended use.
- (Y) "Dwelling unit" means the place which is occupied by a person or persons.
- (Z) "Formation" means a rock unit distinguished from adjacent deposits by a common characteristic.
- (AA) "Formation stabilizer or filter pack" means siliceous, well-rounded, clean and uniform sand or gravel that is free of contaminants and foreign matter, properly sized, washed and disinfected and placed between the borehole wall and the well screen to prevent formation material from entering through the screen and to stabilize the borehole.
- (BB) "Granular bentonite" means bentonite that has been processed to coarse granular particles ranging in size from thirty-three to ninety-three thousandths of an inch.
- (CC) "Ground water" means all water occurring in an aquifer.
- (DD) "Grout" means the materials set forth in or approved under paragraph (I) of rule 3701-28-07 of the Administrative Code.
- (EE) "Grout displacement method" means placing a calculated volume of grout sufficient to fill the annular space plus fifteen percent extra grout into the borehole through a conductor pipe. A drillable plug is then attached to the bottom of the permanent casing and the permanent casing lowered through the grout into the borehole allowing the grout to be forced up the annular space. If necessary, pressure is applied to the top of the casing to hold it in place until the grout is set.
- (FF) "Grout shoe-continuous injection" means pressure grouting by using a grout shoe with a check valve installed in the bottom of the permanent well casing and connected by a conductor pipe to the surface through which grout is pumped until the entire annular space is filled with grout. The conductor pipe is removed, the permanent casing set at the bottom of the borehole, and the grout allowed to set until cured.
- (GG) "Halliburton" means pressure grouting by filling the casing and annular space with water, mud or a bentonite slurry and using a single plug or double plugs inserted watertight into the bottom or top of the permanent casing through which a calculated volume of grout sufficient to fill the annular space and the bottom ten feet of casing is pumped with a conductor pipe through a watertight seal. The grout is then displaced by using water pressure or pressure from the drill stem to advance the plug or plugs.

Pressure is maintained in the casing until the grout has set.

- (HH) "Hauled water storage tank" means any tank used to store potable water for use as a private water supply.
- (II) "Health district" means a city or general health district as created by or under the authority of Chapter 3709. of the Revised Code.
- (JJ) "Hydrostatic head" means the height of the free surface of a body of water above a given subsurface point or a reflection of the ground water level plus the pressure head.
- (KK) "Liner" means a permanent well casing installed within another permanent well casing and may extend into the borehole to support the walls of the borehole.
- (LL) "NSF" means the national sanitation foundation.
- (MM) "Nominal diameter or nominal pipe size" means the inside diameter of pipe for pipe sizes one-inch through twelve inch diameter and means the outside pipe diameter for pipe sizes greater than twelve inches in diameter.
- (NN) "One hundred year flood" means a flood having a one percent chance of being equaled or exceeded in any given year.
- (OO) "One hundred year flood plain" means a portion of a designated flood plain that may be inundated by a one hundred year flood.
- (PP) "Oversized or enlarged borehole" means a borehole larger in diameter than the well casing pipe.
- (QQ) "Packer" means a rubber or inflatable device used to temporarily or permanently seal off a portion of the borehole, annular space or well casing.
- (RR) "Pelletized bentonite" means bentonite that has been processed into pellets or tablets that have a diameter of one-fourth to one-half inch.
- (SS) "Permanent casing" means durable, impervious pipe placed or driven into the borehole and left in place to maintain the well opening.
- (TT) "Person" includes the state, a political subdivision, individual, corporation, business trust, estate, trust, partnership, association, or any legal entity defined as a person under section 1.59 of the Revised Code.
- (UU) "Pitless adapter" means an assembly of parts which permits water to pass through the

casing or extension thereof; provides access to the well and to the parts of the water system within the well; and provides for the transportation of the water and the protection of the well and water therein from surface or near surface contaminants.

- (VV) "Pitless unit" means an assembly which extends the upper end of casing to above grade and prevents the entrance of contaminants into the well, to conduct water from the well, to protect water from freezing or extremes of temperature and to allow access to the well and components of the pumping equipment.
- (WW) "Potable water" means water which is satisfactory for all drinking, culinary, and domestic purposes.
- (XX) "Powdered bentonite" means a mixture of bentonite clays and other clay in a powdered form.
- (YY) "Pressure grouting" means any of the following methods of placing a grout slurry into a well or the annular space of a well:
- (1) Conductor pipe-pumped
  - (2) Grout shoe - continuous injection
  - (3) Well seal with conductor pipe- pumped
  - (4) Halliburton method
  - (5) Grout displacement method.
- (ZZ) "Private water system" means any water system, other than a public water supply system, for the provision of water for human consumption, if the system has fewer than fifteen service connections and does not regularly serve an average of at least twenty-five individuals daily at least sixty days each year. A private water system includes any well, spring, cistern, pond, or hauled water and any equipment for the collection, distribution, transportation, filtration, disinfection, treatment, or storage of water extending from and including the source of the water to the point of discharge from any pressure tank or other storage vessel; to the point of discharge from the water pump where no pressure tank or other storage vessel is present; to the point where the distribution line enters the foundation of the building or dwelling, where the pressure tank is outside of the building or dwelling; or, in the case of multiple service connections serving more than one dwelling, to the point of discharge from each service connection where the service connection enters the foundation of the dwelling. A private water system does not include the water service line extending from the point of discharge to a structure.

- (AAA) "Public water supply system" has the same meaning as in division (A) of section 6109.01 of the Revised Code.
- (BBB) "Registered contractor", "registered water systems contractor" or registrant means a person who is registered as a water systems contractor in accordance with division (B)(3) of section 3701.344 of the Revised Code and Chapter 3701-28 of the Administrative Code.
- (CCC) "Repair" means any work performed on a private water system for the purpose of servicing or replacing with a like component. Repair includes, without limitation, servicing or replacing pumps or pumping equipment, filtration or disinfection equipment, storage or pressure tanks, belts, couplings, switches, or fuses. Repair does not include an alteration to the casing or wall of a water well or the walls of a spring box, hauled water storage tank, or cistern.
- (DDD) "Seal" means to close a well, cistern or hauled water storage tank or to close a portion of a well or the annular space of a well.
- (EEE) "Service connection" means that point at which the private water system enters any structure used for agricultural purposes, building, or dwelling. Where no structure used for agricultural purposes, no building, or no dwelling exists, each water outlet shall be considered a service connection.
- (FFF) "Shale basket means" a conical shaped rubber packer that is attached to the bottom of the casing to seal the annular space and prevent grout from entering the open borehole or screened area of the well.
- (GGG) "Source" means the site from which water is extracted for the purpose of supplying water to a private water system. Source includes a well, pond, spring box, cistern or water hauler.
- (HHH) "Spring" means a place where ground water flows naturally from rock or soil onto the land surface or into a body of water.
- (III) "Standard weight pipe" or "standard weight" means a class of pipe weight designated by ANSI which is equivalent to schedule forty for nominal pipe sizes ranging from one-eighth of an inch to ten inches in diameter, and varies with pipe dimension for greater pipe diameters.
- (JJJ) "Static water level" means the level of the water when measured from the established ground surface to the water surface in a well that is neither being pumped nor under the influence of pumping, or that is flowing under artesian pressure.

- (KKK) "Temporary casing" means durable pipe placed or driven into a borehole to maintain an open annular space around the permanent casing during the construction of a well.
- (LLL) "Test hole" means any excavation, regardless of design or method of construction, done for the purpose of determining the most suitable site for removing ground water from an aquifer for use in a private water system.
- (MMM) Thermoplastic means polyvinyl chloride plastic (PVC) or acrylonitrile butadiene styrene (ABS).
- (NNN) "Unconsolidated" means geologic formation composed of materials that are loose and not lithified.
- (OOO) "Water systems contractor" or "contractor" means a person who constructs or develops a well for use as or as a part of a private water system or otherwise constructs a private water system, installs pumping equipment for a private water system, alters a private water system, repairs a private water system, seals a private water system, or performs any combination of those activities for hire; or, who inspects or evaluates private water systems for hire.
- (PPP) "Well" means any excavation regardless of design or method of construction that is done or used for any of the following purposes:
- (1) Removing ground water for the provision of water for human consumption; or
  - (2) Determining the quality, quantity, or level of ground water in or the stratigraphy of an aquifer, excluding borings for instrumentation in dams, dikes or levees or highway embankments.
- (QQQ) "Well cap" or "cap" means a device used to enclose the atmospheric termination of the well casing.
- (RRR) "Well screen" or "screen" means an intake structure with uniform openings designed to retain the aquifer formation, prevent collapse of the borehole adjacent to the screen, and accommodate a yield adequate for the intended use of the well.
- (SSS) "Well seal with conductor pipe-pumped" means pressure grouting by setting the permanent casing just above the bottom of the borehole and filling the casing and annular space with water, drilling mud or a bentonite slurry. Conductor pipe is then set inside the casing to the bottom of the borehole either through a watertight well seal or packer. Grout is pumped into the annular space displacing all other fluids in the annular space and the permanent casing set in place.

(TTT) "Well vent or vent" means a screened opening in a well seal or cap to allow atmospheric pressure to be maintained in the well.

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Certified:

          /S/            
Jodi Govern, Secretary  
Public Health Council

          9/17/99            
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3701-28-02 Scope, responsibility for compliance, and applicability of rules.

- (A) The definition of private water system as stated in paragraph (ZZ) of rule 3701-28-01 of the Administrative Code shall apply to all systems regardless of the date of construction, development, installation, or alteration. All private water systems constructed prior to the effective date of this rule shall comply with the rules in effect at the time of construction, unless otherwise required by this chapter.
- (B) Chapter 3701-28 of the Administrative Code shall apply to the following:
  - (1) All private water systems, constructed, after the effective date of this rule; and,
  - (2) Except as provided in paragraphs (D),(E),(F), and (G) of this rule, all private water systems constructed prior to the effective date of this rule when altered.
- (C) Wells used as private water systems, constructed prior to the effective date of this rule and in violation of any of the requirements of rule 3701-28-12 of the Administrative Code shall be improved to meet the requirements of paragraphs (J) to (Q) of rule 3701-28-12 of the Administrative Code if repaired or one of the following conditions occur;
  - (1) If the top of the casing is buried, when excavation is done to expose the top of the casing for purposes other than the performance of an alteration, or
  - (2) Whenever a drilling rig is placed over the well for purposes other than the performance of an alteration.
- (D) Paragraph (Q) of rule 3701-28-12 of the Administrative Code and rules 3701-28-07 and 3701-28-071, of the Administrative Code shall apply to all private water systems, regardless of the date of construction.
- (E) Wells constructed prior to the effective date of this rule with casing that terminates at least eight inches above grade need not be extended to twelve inches above grade.
- (F) Ponds in use as a private water system prior to the effective date of this rule shall not be required to comply with the pond volume standards and watershed area requirements of paragraph (C)(1) of rule 3701-28-15 of the Administrative Code.
- (G) Pitless adapters and pitless units installed in wells prior to the effective date of this rule need not be replaced, provided the pitless adapter remains functional and has not deteriorated.
- (H) When the average number of individuals regularly served by a private water system cannot be readily determined, a determination for the purpose of applying these rules shall be made as follows:

- (1) 3.14 individuals per dwelling unit served by the water system. For purposes of this rule dwelling unit includes a lot in a manufactured home park, as defined in rule 3701-27-01 of the Administrative Code, and a campsite in a park or camp as defined in paragraph (l) of rule 3701-25-51 of the Administrative Code.
  - (2) In the case of a building as defined by section 3781.06 of the Revised Code, the number of individuals as determined by the certificate of occupancy.
- (l) Unless otherwise specified in a rule, the responsibility for compliance with these rules shall be as follows:
- (1) In the design, construction, installation, or in allowing access for inspection for final approval of a new private water system or the alteration of an existing system, the property owner and any contractor performing the services will be responsible for compliance with the applicable rules and the terms of the permit, jointly and individually, and compliance may be by either party or both. The department may enforce the applicable rules against the property owner or any contractor who performed the services or both.
  - (2) In the repair of an existing system, or the sealing of a test hole or private water system, the property owner and any contractor performing the services will be responsible for the compliance with the applicable rules, jointly and individually, and compliance may be by either party or both. The department may enforce the applicable rules against the property owner or any contractor who performed the services or both.
  - (3) In the operation and maintenance of a private water system, the property owner and any person in control of the property will be responsible for the compliance with the applicable rules, jointly and individually, and compliance may be by either party or both. The department may enforce the applicable rules against the property owner or any person in control of the property or both.
  - (4) Where any requirement in these rules is not within paragraph (l)(1), (l)(2), OR (l)(3) of this rule, the property owner and any person in control of the property shall be responsible for compliance jointly or individually.

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Public Health Council

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3701-28-03 Permits.

- (A) No person shall construct, alter or seal a private water system unless a valid permit for the system has been issued by the department pursuant to this rule.
- (1) Any person intending to construct, alter or seal a private water system or component thereof, shall, either in person or through a designated agent, make application to the department for a permit. Except as provided in paragraph (H) of this rule, no work shall commence until a valid permit has been issued. Each application shall be accompanied by the appropriate fee established under this chapter and all information required under this rule. The applicant shall sign the application form, and shall indicate the name of any registered contractor intending to do the work, if known.
- (2) If a plan is not required to be submitted under paragraph (E) of this rule the department shall determine whether the proposed construction, alteration, or sealing is in compliance with the provisions of this chapter within ten business days of receipt of a complete application and the appropriate fee. If a plan is required to be submitted under paragraph (E) of this rule the department shall determine whether the proposed construction or alteration is in compliance with the provisions of this chapter within thirty business days of receipt of a complete application and the appropriate fee.
- (a) If the department determines that the proposed construction, alteration, or sealing of a private water system or test hole is in compliance with this chapter, the department shall issue a permit to the applicant. If a registered contractor was not indicated at the time of application, the applicant shall notify the department prior to the commencement of work on the private water system of the name of any registered contractor who intends to do the work.
- (b) If the department determines that the proposed construction, alteration, or sealing does not comply with this chapter the department shall deny the permit. The applicant and the registered contractor, if known, shall be notified of the denial in writing by the department.
- (c) Within thirty days after the denial of a permit to construct, alter or seal a private water system, the property owner or his designated agent shall be provided with an opportunity to appeal the decision and a hearing shall be provided if requested.
- (B) Each application to construct a private water system shall contain information about the location, design, construction, installation and development of the private water system or installation of test holes. The application shall include a site plan designating the location or area of the proposed or existing private water system or test hole, and

distances from roadways, road rights-of-way, buildings, driveways, sewage disposal systems, sewers, existing or properly sealed water supply wells, oil and gas wells, above ground or underground fuel oil, liquid petroleum, chemical or gasoline storage tanks, streams, lakes, ponds or ditches, leaching pits and privies, manure ponds, lagoons or piles, lot lines, and easements and any other information required by the department.

- (C) Each application for the alteration of a private water system shall contain all pertinent information required by the department about the alteration of the private water system.
- (D) Each application for a permit to seal a private water system shall contain all information required by the department about the sealing of the private water system.
- (E) In addition to the requirements of this rule, an owner or his designated agent proposing to construct, or alter a private water system that meets one of the following criteria shall submit plans relating to the work and equipment of the water system to the department in duplicate:
  - (1) A private water system servicing a building as defined in section 3781.06 of the Revised Code;
  - (2) A private water system servicing other than one single-family dwelling; or
  - (3) A private water system that uses a pond as a source of water.
- (F) Plans required under paragraph (E) of this rule shall:
  - (1) Include relevant information as to the number of individuals to be served;
  - (2) Be legible and drawn to scale with a north directional arrow;
  - (3) Include relevant elevations;
  - (4) Show the locations, layout, and type of all water system equipment;
  - (5) Include a listing of all materials to be used in construction, installation, or alteration of the water system;
  - (6) Show the layout and profile of the water distribution piping from the source to the service connections; and
  - (7) Include any other information required by the department.

- (G) The department shall not approve any plan that does not conform to the requirements of this chapter. No permit shall be issued until the plans have been approved by the department. Modifications of approved plans that conform to the requirements of this chapter may be made by contacting the department.
- (H) When an emergency exists work may be commenced on the construction or alteration of a private water system prior to obtaining a permit, provided a permit is applied for to the department within two working days after commencement of the construction or alteration. For purposes of this paragraph an emergency means that the existing private water system fails to produce an adequate amount of potable water which poses an immediate threat to health and safety and no alternative potable water source exists.
- (I) If a permit has been issued for the construction, of a well to be used for a new private water system, and the first attempt to drill the well is unsuccessful, then additional wells may be drilled within the area designated on the permit or the drilling site without obtaining additional permits, provided the original permit has not expired. All dry holes shall be sealed according to rules 3701-28-07 and 3701-28-071 of the Administrative Code and a well sealing report as required under section 1521.05 of the Revised Code shall be filed for each dry hole with the Ohio department of natural resources, division of water, the department, a copy provided to the private water system owner, and a copy retained by the registered contractor who performed the sealing.
- (J) Permit applications, permits and completion forms shall be on forms prescribed or approved by the director. The department shall specify in such permits the date upon which the permit expires and that the issuance of the permit is conditioned upon the right of the department to enter upon the premises of the private water system identified in the permit at any reasonable time prior to, during, or after completion of the work specified in the permit for the purpose of determining compliance with this chapter.
- (K) A permit shall be obtained for any non-potable well that is to be converted into a private water system and shall be regarded as a new construction. A non-potable well is a well where the water is not used for human consumption, or the preparation of food, dishwashing or cleaning. The converted system shall meet all requirements of this chapter.
- (L) A person intending to seal a well, and construct a new well on the same premises to replace the well to be sealed, shall only be required to obtain one permit.
- (M) If the private water system has not been constructed, sealed or altered within one year from the date of permit issuance, the permit shall automatically expire. The department may extend the permit period for an additional six months.

- (N) For purposes of this rule, “date of completion” means the date on which the installation of the pump or pumping equipment is completed, or the date on which the private water system is completed if a pump or pumping equipment will not be installed or will be installed by a person other than the contractor identified on the permit. Within thirty days of the date of completion of a private water system, a completed completion form shall be submitted to the department in the following situations:
- (1) When a private water system uses a cistern, spring, or pond for a source of water; or
  - (2) When a person other than the person who installs a well installs the pump and pitless adapter.
- (O) Within thirty days of the date of completion of a well, a copy of the well log required to be filed with the Ohio department of natural resources, division of water, as required under section 1521.05 of the Revised Code shall also be submitted to the department, to the private water system owner, and the registered contractor shall retain a copy.
- (P) Within thirty days of the date of completion of an alteration that does not require a well log to be filed under section 1521.05 of the Revised Code, the person who performs the alteration shall notify the department of the completion of the alteration.
- (Q) Upon receipt of the completed completion forms, or the notice required by paragraph (P) of this rule the department shall collect a water sample(s) in accordance with rule 3701-28-04 of the administrative code. The sample shall be tested for nitrates and total coliform. The department may prescreen the water sample for nitrates using a method approved by the director. The department shall report the findings of water tests which indicate a presence of escherichia coli, or nitrates in excess of maximum contaminant levels, as set forth in rule 3701-28-04 of the Administrative Code, to the director.
- (R) If the sample obtained from the private water system indicates the presence of total coliform. The private water system shall not be approved, unless continuous disinfection or other effective remediation measures to eliminate the total coliform are approved for the private water system after an investigation has been performed under paragraph (D) of rule 3701-28-17 of the Administrative Code.
- (S) If the sample obtained from the private water system indicates that the maximum contaminant level for nitrates has been exceeded the department shall provide information to the private water system owner on the health risks of nitrates, and options for the treatment of the private water system to reduce the nitrates to acceptable levels.

- (T) After the receipt of the results of the water samples(s), and upon the basis of the department's inspection(s), the water sample results, and all other pertinent data relative to the private water system, the department shall either approve or disapprove the private water system. The private water system shall not be used for human consumption or other potable uses until the private water system has been approved by the department.
- (U) A private water system shall not be approved unless a water sample from the private water system demonstrates an acceptable level of indicator organisms. For purposes of this paragraph "indicator organisms" are any of the microscopic pathogenic or non-pathogenic organisms that may be used to indicate the potential presence of disease causing organisms.
- (V) Once the department approves the private water system the permit is invalid.
- (W) Any private water system constructed, altered or sealed by a person who has not obtained a registration, as required under rule 3701-28-20 of the Administrative Code, or is not exempt from registration pursuant to paragraph (E) of rule 3701-28-20 of the Administrative Code shall not be approved.

Replaces: 3701-20-03

Effective date: January 1, 2000

R.C. 119.032 review date: 1/1/05; 9/1/99

Certified:

\_\_\_\_\_/S/  
 Jodi Govern, Secretary  
 Public Health Council

\_\_\_\_\_  
 10/4/99  
 Date

Promulgated under: Chapter 119.  
 Rule authorized by: 3701.34  
 Rule amplifies: 3701.344  
 Prior effective date: 1/1/84;10/1/82,1/1/81

3701-28-04 Inspection; water sample collection and analysis.

- (A) The department may perform inspections as often as necessary to determine satisfactory compliance with this chapter. For purposes of this rule inspection means the observation and documentation of the location, construction, or physical condition of a private water system or any component of such a system and includes, without limitation, water sampling for the detection of any contaminants, the documentation of a violation of construction standards, technical procedures, or any other requirement established under this chapter.
  
- (B) The department shall inspect each private water system constructed after the effective date of this rule to determine compliance with this chapter. The inspection shall include an examination of at least the following, as applicable:
  - (1) The well casing for proper ASTM, API, or ANSI/NSF designations, casing type, wall thickness, and height above final grade.
  - (2) The surface condition of the annular space around the casing to determine the presence of grout, and the absence or presence of subsidence, or other visual indication of the surface condition of the annular space.
  - (3) All isolation distance requirements as provided in rule 3701-28-10 of the Administrative Code and any other potential sources of contamination.
  - (4) The well cap for type and proper installation and venting.
  - (5) The complete disinfection system.
  - (6) Filters used for continuous filtration.
  - (7) For cisterns and hauled water storage tanks; tank size, tank standards and specifications, manhole covers for safety, and intakes.
  - (8) Pond intakes, watershed area, wet side slope, and pond size.
  
- (C) where the department determines that any of the following conditions exist at a well, the registered contractor performing the work or the well owner may be required to excavate the well head for verification of proper grouting.
  - (1) A visible open annular space surrounding the well casing.
  - (2) Grout is not detected at or below the water service line connection to the casing.
  - (3) The detection of dye in the well water after placement of tracer dye around the

casing at or near the ground surface.

- (4) A well log which indicates that the well has not been grouted or which lacks information or contains incomplete or erroneous information pertaining to the grouting of a well.
- (D) The department shall inspect every registered contractor that constructs a private water system within a health district at least once per calendar year, except those registered contractors inspected in another health district within the calendar year. The inspection shall take place during the drilling and construction process to determine that the private water system is being constructed in compliance with this chapter. Inspections shall be recorded on inspection report forms prescribed or approved by the director, and a copy shall be provided to the director and the registered contractor. Inspections of registered contractors shall include an examination of at least the following:
- (1) The well casing for proper ASTM, API, or ANSI/NSF designations, casing type, and wall thickness, and the installation of well screens.
  - (2) The grout materials, related tools and methods for placing grout into the annular space, and observation of the actual grouting process.
  - (3) The pitless adaptor or pitless unit connection to the well casing for water tightness.
  - (4) All isolation distance requirements, as provided in rule 3701-28-10 of the Administrative Code, and potential sources of contamination.
  - (5) The well cap for type and proper installation and venting.
  - (6) Materials used in the distribution system for the private water system.
- (E) The department shall collect and process water samples after completion of the private water system or when the private water system is determined to be in compliance with this chapter. Water samples shall be collected and processed according to the following procedures:
- (1) Information regarding the private water systems owner, address of the property, and date of sampling shall be recorded. A sanitary survey shall be performed of the site for a pre-existing private water system that is being sampled for purposes of an inspection or bond claim.
  - (2) Water samples from private water systems shall be collected a minimum of forty-eight hours after the private water system has been chlorinated and

completely flushed to remove all residual chlorine from the system. Water to be tested shall be checked for the presence of chlorine prior to analysis.

- (3) No water samples shall be collected from hoses or yard hydrants. An initial sample shall be collected at a convenient sample port, faucet or spigot that is closest to the point of human consumption of the water supply. If the water sample is positive for total coliform, then any subsequent sampling shall be taken at the source of the water supply prior to or at the water pressure tank, water heater, or any water treatment unit and the sampling method shall include detection for escherichia coli in addition to total coliform.
  - (4) The water system shall be purged a minimum of ten minutes, or in the case of a cistern or spring, purge enough water to remove all water standing in the distribution system prior to collecting the sample.
  - (5) The faucet, spigot, tap, or sampling port shall be sanitized with a chlorine solution containing a minimum of four hundred parts per million chlorine or an isopropyl alcohol solution of not less than seventy percent by spraying or flushing the faucet, spigot, tap, or sampling port or by using other methods approved by the director.
  - (6) Water samples shall be collected in a sterile sample container provided by the laboratory that will perform the analysis. The sample bottle shall not be rinsed prior to the collection of the sample. The lip or sides of the sample bottle or lid shall not come into contact with any sources of contamination.
  - (7) Water samples to be tested for nitrates, shall be stabilized at the site or transported to the laboratory within thirty hours.
  - (8) Water samples to be tested for bacteria, including total coliform and escherichia coli shall be kept cool and transported to the laboratory within thirty hours.
  - (9) All water samples, except samples to be tested for nitrates that have been prescreened and indicate the presence of nitrates to be five milligrams per liter or less, shall be tested at a laboratory approved for the testing of microbiological contaminants, and nitrates and nitrites under Chapter 3745-89 of the Administrative Code.
- (F) The department may charge the private water system owner a fee for each water sample collected by the department for the purpose of determining the presence of any contaminants.

- (G) The director of health shall provide for making the bacteriological examinations, including the testing for coliform and escherichia coli, and the determination of the presence of nitrates in its laboratories of water samples required by these rules at the cost set forth in the fee schedule established in chapter 3701-49 of the Administrative Code for each bacteriological, examination and nitrate analysis performed, and shall establish a system to receive such water samples at its laboratories, and to make such charges therefor; provided, however, these rules do not prohibit such examination from being made by other laboratories approved by the Ohio department of health.
  
- (H) The following maximum contaminant levels (MCL) apply to all private water systems:
  - (1) The presence of total coliform or escherichia coli is the maximum contaminant level.
  
  - (2) The maximum contaminant level for nitrates is ten milligrams per liter

Replaces: 3701-28-04

Effective date: January 1, 2000

R.C. 119.032 review 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

3701-28-04

5

Prior effective date: 1/1/84;1/1/81

3701-28-05 Approval to enforce.

- (A) The director of health shall survey each private water systems program of the city and general health districts, or the authorities having the same duties as a board under section 3709.05 of the Revised Code, at least once every three years to determine their adequacies for carrying out the provisions of Chapter 3701-28 of the Administrative Code. The health district or authority shall provide the director with all requested information to complete the survey.
- (B) A survey methodology shall be developed by the director and provided to each health district or authority and shall include:
  - (1) A review of any regulations for consistency with this chapter, the administrative aspects of the private water systems program including application and permitting, staff resources and knowledge of the technical aspects of the program, cost analysis and fee adoption, plan review, inspections and reports, sampling, investigations, and enforcement; and
  - (2) A field review of the inspection of private water systems during construction and after completion to evaluate overall compliance with the private water systems construction, sampling, alteration and sealing requirements set forth under this chapter.
- (C) The director shall survey the private water systems program in accordance with the survey methodology and shall determine whether the health district or authority is qualified to administer and enforce this chapter. After the survey is complete, the director shall classify the health district or authority as either approved or disapproved, and shall provide a survey report to the health district or board.
- (D) Upon determining that a health district or authority is so qualified, the director shall approve the district or authority and place such district or authority upon an approved list. The director of health may resurvey any approved district or authority when, in his opinion, such resurvey is necessary and remove from such approved list any district or authority found not to be adequately carrying out the provisions of this chapter.
- (E) If after a survey as provided for in this rule, the director of health determines that a health district or authority is not qualified to carry out the provisions of this chapter, he shall certify that fact to the board of health and disapprove the health district or authority to administer and enforce the private water systems program. If a health district or authority is not eligible to be placed on the approved list, the director may designate another qualified health district or authority as the department in such health district or shall administer and enforce this chapter in such health district.
- (F) If a health district is removed from the approved list, the board of health shall pay to the director or to the board of health designated by the director to serve as the department



3701-28-06      **Fees.**

- (A) Boards of health of city or general health districts may establish fees in accordance with section 3709.09 of the Revised Code for the purpose of administering and enforcing the requirements of this chapter. The fees shall be established using the categories prescribed by rule 3701-28-06.1 of the Administrative Code and the cost methodology prescribed by rule 3701-28-06.2 of the Administrative Code. Except for fifty dollars of the fee for each new private water system installation, as prescribed in paragraph (C) of this rule, no portion of any fee for administering and enforcing this chapter shall be returned to the Ohio department of health.
- (B) The fees paid to a board of health of a health district under this chapter shall be paid to the treasurer and deposited in a special account for the health district to pay the cost of administering and enforcing this chapter as provided in sections 3701.344 and 3701.347 of the Revised Code. All fees paid to the director under this chapter shall be used by the director to pay the cost of administering and enforcing this chapter as provided in sections 3701.344 and 3701.347 of the Revised Code.
- (C) Fifty dollars of each new installation permit fee collected by a board of health shall be transmitted by the board of health to the director for deposit into the general operations fund created by section 3701.83 of the Revised Code to pay his cost of administering and enforcing this chapter.
- (D) In the event that the director administers and enforces this chapter in a health district in accordance with section 3701.344 of the Revised Code and paragraph (D) of rule 3701-28-05 of the Administrative Code, the following schedule of fees shall be in effect for the purpose of administering and enforcing the requirements of this chapter.
  - (1) An application fee of twenty-five dollars for the proposed construction of a new private water system serving a single-family dwelling, including a manufactured home as defined by section 4501.01 of the Revised Code, and an application fee of thirty dollars for the proposed installation of a new private water system serving a nonsingle-family dwelling or building, including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of rule 3701-25-51 of the Administrative Code or building.
  - (2) An application fee of five dollars for the proposed alteration of a private water system serving a single-family dwelling including a manufactured home as defined by section 4501.01 of the Revised Code and an application fee of ten dollars for the proposed alteration of a private water system serving a nonsingle-family dwelling or building, including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of rule 3701-25-51 of the Administrative Code.
  - (3) A permit fee of forty dollars for the construction of a new private water system serving a single-family dwelling including a manufactured home as defined by section 4501.01 of the Revised Code and a permit fee of fifty

dollars for the construction of a new private water system serving a nonsingle-family dwelling or building, including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of rule 3701-25-51 of the Administrative Code.

- (4) A permit fee of twenty-five dollars for the alteration of a private water system serving a single-family dwelling including a manufactured home as defined by section 4501.01 of the Revised Code and a permit fee of thirty dollars for the alteration of a private water system serving a nonsingle-family dwelling or building including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of rule 3701-25-51 of the Administrative Code.
- (5) A water sample collection fee of ten dollars, provided that sample collection is not included as part of a valid alteration or new installation permit.
- (6) An application fee of twenty five dollars for the proposed sealing of a private water system for a single family dwelling including a manufactured home as defined by section 4501.01 of the Revised Code and an application fee of thirty dollars for the proposed sealing of a private water system for a non-single family dwelling, including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of 3701-25-51 of the Administrative Code or building.
- (7) A permit fee of forty dollars for the proposed sealing of a private water system for a single family dwelling including a manufactured home as defined by section 4501.01 of the Revised Code and a permit fee of fifty dollars for the proposed sealing of a private water system for a non-single family dwelling, including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of 3701-25-51 of the Administrative Code or building.
- (8) A water hauler vehicle inspection fee of ten dollars per vehicle.
- (9) The issuance of a variance under rule 3701-28-21 of the Administrative Code. Fees for variances are not refundable.

Effective: 11/15/2004

R.C. 119.032 review dates: 07/26/2004 and 11/15/2009

CERTIFIED ELECTRONICALLY  
Certification

06/11/2004

Date

Promulgated Under: 119.03  
Statutory Authority: 3701.34, 3701.344  
Rule Amplifies: 3701.344, 3701.346  
Prior Effective Dates: 10/31/1993, 1/1/00,  
7/1/02

3701-28-061 Fee categories.

- (A) Fees established by a board of health of a city or general health district pursuant to section 3709.09 of the Revised Code for private water systems shall be specified in accordance with the following categories:
- (1) The construction of a new private water system for a single family dwelling including a manufactured home as defined by section 4501.01 of the Revised Code.
  - (2) The construction of a new private water system for a non-single family dwelling, including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of rule 3701-25-51 of the Administrative Code, or a building.
  - (3) The alteration of a private water system for a single family dwelling, including a manufactured home as defined by section 4501.01 of the Revised Code.
  - (4) The alteration of a private water system for a non-single family dwelling, including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of rule 3701-25-51 of the Administrative Code, or a building.
  - (5) The sealing of a private water system for a single family dwelling including a manufactured home as defined by section 4501.01 of the Revised Code.
  - (6) The sealing of a private water system for a non-single family dwelling, including a manufactured home park as defined in paragraph (N) of rule 3701-27-01 of the Administrative Code, or a park or camp as defined in paragraph (I) of 3701-25-51 of the Administrative Code, or a building.
  - (7) The issuance of a variance under rule 3701-28-21 of the Administrative Code. Fees for variances are not refundable.
  - (8) A water hauler vehicle inspection conducted under paragraph (C) of rule 3701-28-18 of the Administrative Code.
  - (9) An amount to be added to the applicable fees established under paragraphs (A)(1) to (A)(6) of this rule when the board of health determines that installation of a private water system has commenced prior to a permit being issued for the installation or alteration. This additional fee shall not be charged for an alteration or new construction performed in compliance with paragraph (H) of rule 3701-28-03 of the Administrative Code.
- (B) In addition to the fees established by a city or general health district under paragraph

(A) of this rule, a board of health of a city or general health district may specify fees for the collection and examination of any necessary water samples taken.

Effective date: January 1, 2000

R.C. 119.032 review 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: 12/7/90; 8/31/90 (emer.)

- (A) The actual cost to a city or general health district of maintaining the private water systems program shall be calculated through utilization of the following data from its previous fiscal year:
- (1) The list of all inspecting sanitarians working in the private water systems program;
  - (2) The percentage of time worked in the private water systems program by each inspecting sanitarian calculated by dividing the amount determined under paragraph (A)(2)(a) of this rule by the amount determined under paragraph (A)(2)(b) of this rule.
    - (a) Total hours worked in the private water systems program by each inspecting sanitarian.
    - (b) The total hours for which each inspecting sanitarian was paid in the last year;
  - (3) The total annual wages or salary paid to each inspecting sanitarian;
  - (4) The total amount for fringe benefits paid on behalf of each inspecting sanitarian;
  - (5) The total travel costs for each inspecting sanitarian;
  - (6) The support costs for the program as determined by one of the following methods:
    - (a) Use of actual support cost items which may include but are not limited to the salary and fringe benefits of the health commissioner, the director of environmental health, supervisory staff, clerical staff, utilities, rent, supplies, equipment, liability insurance, and training. Actual support costs of the private water systems program are calculated by multiplying the amount determined under paragraph (A)(6)(a)(i) of this rule by the amount determined under paragraph (A)(6)(a)(ii) of this rule.
      - (i) The portion of total departmental support costs allocated to the environmental health subdivision.
      - (ii) The percentage of total time worked in the private water systems program by all inspecting sanitarians;

- (b) Use of an indirect cost rate of thirty per cent of the wages or salaries and fringe benefits of inspecting sanitarians attributable to the private water systems program. The wages or salaries and fringe benefits of inspecting sanitarians attributable to the private water systems program shall be determined by multiplying the amounts determined for each sanitarian under paragraphs (A)(3) and (A)(4) of this rule by the percentage for that sanitarian determined under paragraph (A)(2) of this rule and adding the products;
  - (c) Application of a negotiated indirect cost rate and calculation method approved by an agency of the federal government for the local health district to the private water systems program; and
- (7) The laboratory costs for the private water systems program.
- (B) The costs for the private water systems program may also include but are not limited to the amounts of any known or anticipated increases in costs or expenses for such items as rent, utilities, equipment, and current personnel, as well as the costs for additional personnel identified by the board of health of the city or general health district after the performance of a personnel needs analysis by the director of health.
- (C) The total private water systems program costs shall be calculated in the following manner:
  - (1) For each inspecting sanitarian, multiply the amount of total annual wages or salary determined under paragraph (A)(3) of this rule by the percentage determined pursuant to paragraph (A)(2) of this rule. Sum the products;
  - (2) For each inspecting sanitarian, multiply the fringe benefits determined under paragraph (A)(4) of this rule by the percentage determined pursuant to paragraph (A)(2) of this rule. Sum the products;
  - (3) For each inspecting sanitarian, multiply the total travel costs determined under paragraph (A)(5) of this rule by the percentage determined pursuant to paragraph (A)(2) of this rule. Sum the products. As an alternative, the actual travel cost for each inspecting sanitarian attributable to the private water systems program may be used. Sum the actual costs;

- (4) Add the amounts determined under paragraphs (A)(6), (A)(7), and (B) of this rule to the totals calculated in paragraphs (C)(1), (C)(2), and (C)(3) of this rule. This total is the cost for the private water systems program.

Effective date: January 1, 2000

R.C. 119.032 review 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  
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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/<br>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

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Certified:

                  /s/                    
Jodi Govern, Secretary  
Public Health Council

          9/17/99            
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3701-28-071

Special sealing requirements based on well type and geologic conditions.

- (A) The following types of wells and dry holes and shall be sealed in accordance with the requirements of this rule, in addition to the requirements of rule 3701-28-07 of the Administrative Code, unless otherwise indicated in this rule:
- (1) Dug or bucket drilled wells or dry holes. For purposes of this rule, “dug or bucket drilled well or dry hole” means a well consisting of a large diameter hole, deeper than it is wide, constructed into the ground, usually by hand, but if by mechanical means, by methods other than drilling, jetting, auguring or boring, and within which the side walls are supported by stone, brick, tiles or other similar materials;
  - (2) Wells and dry holes drilled through single unconsolidated aquifers, single consolidated aquifers, unconfined, unconsolidated aquifers or confined, unconsolidated aquifers that are not flowing at the surface;
  - (3) Wells and dry holes drilled through multiple unconsolidated and consolidated aquifers;
  - (4) Wells that are flowing; and
  - (5) Wells and dry holes drilled through fractured or cavernous formations or mine shafts.
- (B) All dug or bucket drilled wells and dry holes shall be sealed in accordance with the following requirements:
- (1) Notwithstanding paragraph (J)(2) of rule 3701-28-07 of the Administrative Code, the upper three to five feet of liner or casing material shall be removed.
  - (2) The static water level shall be measured and the well pumped dry if possible.
  - (3) The sides of the dug or bucket drilled well shall be rinsed, with the chlorine solution described in paragraph (J)(4) of rule 3701-28-07 of the Administrative Code.

- (4) If the dug or bucket drilled well is greater than twenty-four inches in diameter, twenty-five feet or less in depth, and the static water level is less than five feet below the ground surface then the following additional requirements shall be met:
- (a) The well shall be filled with clean clay or cement grout to the elevation of the static water level.
  - (b) A one foot layer of bentonite or cement grout shall be placed in the well at the elevation of the static water level. If the well is dry and bentonite is used, it shall be hydrated with five gallons of water per fifty pounds of bentonite.
  - (c) Notwithstanding paragraphs (J)(2) and (J)(7) of rule 3701-28-07 of the Administrative Code the liner shall be removed to the depth of the static measured water level, as measured pursuant to paragraph (B)(2) of this rule, and excavated six inches beyond the original outside diameter of the well.
  - (d) The remaining hole shall be filled with clean soil as required under paragraph (J)(8) of rule 3701-28-07 of the Administrative Code.
- (5) If the dug or bucket drilled well is greater than twenty-four inches in diameter, and twenty-five feet or less in depth, and the static water level is greater than five feet below the ground surface the well shall be sealed in accordance with the following additional requirements:
- (a) The well shall be filled with clean clay or cement grout to the elevation of the static water level.
  - (b) A one foot thick layer of bentonite grout or cement grout shall be placed in the well at the elevation of the measured static water level. If the well is dry and bentonite is used, it shall be hydrated with five gallons of water per fifty pounds of bentonite.
  - (c) A layer of clean clay or cement grout shall be added until the level in the well is three feet below the ground surface.

- (d) Notwithstanding paragraph (J)(2) of rule 3701-28-07 of the Administrative Code the top three feet of casing, wall or liner material shall be removed and the area shall be excavated six inches beyond the original borehole.
  - (e) A one foot thick layer of bentonite or cement grout shall be added at the level at which the casing, wall, or liner material was removed and the bentonite shall be hydrated with five gallons of water per fifty pounds of bentonite if the well is dry.
  - (f) The remainder of the well shall be filled with clean soil as required under paragraph (J)(8) of rule 3701-28-07 of the Administrative Code.
- (C) Wells drilled through single unconsolidated aquifers, single consolidated aquifers, unconfined, unconsolidated aquifers or confined, unconsolidated aquifers that are not flowing at the surface shall be sealed in accordance with the following requirements:
  - (1) Clean sand or gravel may be placed from the bottom of the well to the top of the aquifer or to twenty-five feet below ground surface, whichever is encountered first.
  - (2) The well shall then be pressure grouted with cement grout in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code or bentonite grout in accordance with paragraph (J)(5)(c) of rule 3701-28-07 of the Administrative Code or coarse grade bentonite shall be poured in accordance with paragraph (J)(5)(d) of rule 3701-28-07 of the Administrative Code to the surface while the casing is being removed or perforated where possible.
- (D) Wells drilled through multiple unconsolidated and consolidated aquifers that are not flowing at the surface shall be sealed in accordance with one of the following requirements, as applicable:
  - (1) The well shall be pressure grouted using cement grout in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code or bentonite grout in accordance with paragraph (J)(5)(c) of rule 3701-28-07 of the Administrative Code.

- (2) If the well is less than two-hundred feet deep and greater than four inches in diameter, coarse grade bentonite products may be poured into the well in accordance with paragraph (J)(5)(d) of rule 3701-28-07 of the Administrative Code;
  - (3) If the well is less than one-hundred feet deep and greater than four inches in diameter pelletized bentonite or coarse grade bentonite may be poured into the well in accordance with paragraph (J)(5)(d) of rule 3701-28-07 of the Administrative Code;
  - (4) If detailed construction and geologic data is available, then clean sand or gravel may be placed adjacent to the aquifer zones with grout placed adjacent to the confining units. The well shall then be sealed from the top of the uppermost aquifer to the surface with cement grout in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code or bentonite grout in accordance with paragraph (J)(5)(c) of rule 3701-28-07 of the Administrative Code.
- (E) Wells that are flowing shall be sealed in accordance with the following requirements, as applicable:
- (1) If possible, the casing shall be extended until the flow of water over the top of the casing stops.
    - (a) The well shall be pressure grouted using cement grout in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code or bentonite grout in accordance with paragraph (J)(5)(c) of rule 3701-28-07 of the Administrative Code; or
    - (b) If the well is less than two hundred feet deep, coarse grade or pelletized bentonite may be poured into the well in accordance with paragraph (J)(5)(d) of rule 3701-28-07 of the Administrative Code.
  - (2) If the hydrostatic head is too high to permit casing extension, one of the following requirements shall be met:

- (a) An inflatable packer shall be installed at the top of the producing formation to stop or restrict the flow of water. The well shall then be pressure grouted using cement grout in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code or bentonite grout in accordance with paragraph (J)(5)(c) of rule 3701-28-07 of the Administrative Code through the packer from the bottom of the hole to the bottom of the packer. The packer shall then be deflated and pressure grouting shall continue to the surface;
  - (b) A shut-in device shall be installed at the top of the well to prevent flow. A conductor pipe shall be inserted through the shut-in device and the well shall be pressure grouted using cement grout in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code or bentonite grout in accordance with paragraph (J)(5)(c) of rule 3701-28-07 of the Administrative Code from the bottom of the well to the ground surface;
  - (c) Disinfected gravel shall be poured into the well to reduce the flow of water and the well shall then be pressure grouted using cement grout in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code or bentonite grout in accordance with paragraph (J)(5)(c) of rule 3701-28-07 of the Administrative Code from the top of the gravel to the ground surface; or
  - (d) Cement grout slurries with additives to increase the density of the cement shall be used to control the flow of water. Cement grout shall be placed in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code and appropriate placement techniques shall be used to ensure that separation of the cement does not occur during the grouting process.
- (F) Wells drilled through fractured or cavernous formations, or mine shafts shall be sealed in compliance with the following requirements:
- (1) The depth and thickness of the fractured, cavernous zone or mine shaft shall be determined, if possible, and the fractures, cavernous zone or mine shaft shall be sealed in accordance with the following requirements:

- (a) Where the fractured, cavernous zone or mine shaft is greater than twenty-five feet from the ground surface, the intersection of the borehole and the fractured or cavernous zone shall be filled with clean disinfected gravel, or a plug consisting of a packer, shale basket, or other similar device shall be installed above the fractured or cavernous formation.
  - (b) Where the fractured, cavernous zone or mine shaft is less than twenty-five feet from the ground surface, then the well shall be filled with cement grout with additives that promote bridging across the fractured, cavernous zone or mine shaft.
- (2) The remainder of the well shall then be pressure grouted using cement grout in accordance with paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code or bentonite grout in accordance with paragraph (J)(5)(c) of rule 3701-28-07 of the Administrative Code.

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Certified:

          /S/            
 Jodi Govern, Secretary  
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3701-28-08 Cross-connection and backflow.

- (A) For purposes of this rule:
- (1) A “backflow prevention device” is any device, method or type of construction to prevent backflow of water, liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source other than its intended source.
  - (2) “Cross connection” means any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other; gas, water, or other liquid of unknown or questionable quality or safety, whereby water may flow from one system to the other, the direction of flow depending on the pressure differential between the two systems.
- (B) No person shall install or maintain a private water system where physical cross-connections to another public or private water system exist unless:
- (1) The private water system is constructed as a combination of one or more types of water supply sources; and
  - (2) The private water system has an approved backflow prevention device or approved check valve installed in line prior to any connections from other water sources to prevent the backflow of one water source into another.
- (C) No person shall install or maintain a connection within a private water system which could pollute the water system or provide a cross-connection between a source of contamination and the water system unless an approved backflow prevention device is installed.
- (D) An approved backflow prevention device shall be installed to protect all service connections, yard hydrants, or where necessary to prevent a potential health or contamination hazard.
- (E) All backflow prevention devices shall meet the criteria of and be installed in accordance with the applicable standards listed in table 609.1 of rule 4101:2-61-09 of the Administrative Code.

Replaces: 3701-28-08



3701-28-09 Continuous disinfection.

All private water systems using continuous disinfection shall conform to the requirements of this rule.

- (A) Private water systems using ponds, springs, or cisterns constructed in compliance with this chapter shall be provided with continuous disinfection, as provided in this rule. Wells that have been determined to be contaminated with bacteria shall only be required to be provided with continuous disinfection if the construction of the well is known to be in compliance with this chapter and the aquifer is suspected of being bacteriologically contaminated.
- (B) Where continuous disinfection is required pursuant to this chapter the means of disinfection shall be measurable and it shall conform to the following requirements:
  - (1) All chemical disinfectants shall be readily available;
  - (2) The residual of the chemical disinfectant shall be measurable by the user; and
  - (3) Ultraviolet light disinfection system dosage shall be measured as microwatts per second per centimeter squared.
- (C) Disinfectants shall be applied prior to the water storage tank or retention tank to obtain the contact time required for the specific disinfectant used.
- (D) If chlorination is the means of disinfection, it shall conform to the following requirements:
  - (1) Sufficient chlorine shall be added to satisfy the demand;
  - (2) The Ct value (contact time multiplied by the free chlorine residual) for disinfection shall be four; and
  - (3) The free chlorine residual in the water piping system shall be at least two-tenths milligram per liter.
- (E) If an ultraviolet light system is used as the primary means of disinfection it shall meet all of the requirements of ANSI/NSF standard fifty-five for class A ultraviolet light treatment systems. Ultraviolet light systems that meet only ANSI/NSF standard fifty-five class B shall not be used for continuous disinfection of private water systems. An ultraviolet light system used as the primary means of disinfection shall also meet the following criteria:
  - (a) It shall be installed after any equipment used to soften the water or to remove

iron or manganese;

- (b) An absolute filter size of one to two microns shall be installed prior to treatment of the water by the ultraviolet equipment.
  - (c) Where a private water system provides water to more than one service connection, and ultraviolet is used as the primary means of disinfection, then continuous disinfection shall be installed to maintain a chlorine residual of at least two-tenths milligrams per liter in the water distribution lines.
- (F) If iodination is the means of disinfection, it shall conform to the following requirements:
- (1) Sufficient iodine shall be added to satisfy the demand;
  - (2) The Ct value (contact time multiplied by the free iodine residual) for disinfection shall be ten; and
  - (3) The free iodine residual in the water piping system shall be between five-tenths and one milligram per liter.
- (G) If ozonation is the means of disinfection it shall conform to the following requirements:
- (1) Sufficient ozone shall be added to satisfy the demand and the Ct value shall be no less than 0.6 at pH seven and five degrees celsius (Ct equals residual ozone concentration multiplied by the contact time);
  - (2) Ozone must have a minimum detectable residual of 0.1 milligram per unit after six minutes of contact;
  - (3) Ozone generators shall have air drawn through the system under a vacuum in order to prevent ozone gas leakage into the house;
  - (4) Ozone generators shall have air flow meters installed before the ozone generation chamber to insure proper air flow and to help detect down stream injection tubing cracks or breaks;
  - (5) All ozone generation chambers shall be constructed of stainless steel or of a material of equivalent resistance to destruction from ozone;
  - (6) Ozone generators shall have corona arc indicating lights;
  - (7) Gas injection tubing, gaskets, valves, and sealants shall be of material that resists the strong oxidation potential of ozone such as stainless steel and teflon



3701-28-09

4

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3701-28-10 Location, operation, and maintenance of private water systems.

- (A) Each private water system shall be properly maintained and operated according to the requirements of this chapter. In the case where two or more dwellings are serviced by a private water system, the entire private water system shall be owned, operated and maintained by one person.
- (B) A private water system shall be located only where the system and its surroundings can be maintained in a sanitary condition, and only where surface and subsurface conditions will not permit contamination of the private water system or aquifer. Where available, hydrogeologic data shall be used to select the location of a well or spring. Any well or spring used as a source of water for a private water system shall be located hydraulically upgradient of any potential or known sources of contamination. A well or spring shall be located the maximum practical distance from a known or suspected source of contamination.
- (C) A private water system shall be located so that it is accessible for cleaning, treatment, repair, alteration, testing, and such other attention as may be necessary. A well, or cistern, hauled water storage tank, or any other water source for a private water system shall not be located within the foundation of any building, except within a building designed and constructed solely to house pumping and water system equipment. The walls of a cistern or hauled water storage tank shall not share a common wall with another structure or be used as a supporting structure.
- (D) A private water system shall not be located within a one hundred year flood plain, except when the department determines that the requirements of rule 3701-28-21 of the Administrative Code are met;
- (E) A well, or cistern, hauled water storage tank, spring box or pond shall not be located within ten feet of the foundation of a building or dwelling, except within a building designed and constructed solely to house pumping and water system equipment.
- (F) A water source shall not be located within a minimum of fifty feet of any known or possible source of contamination, except as specified in paragraph (G) of this rule. A water source shall be located at least ten feet from all lot lines and easements and at least five feet from the edge of any private driveway.
- (G) A water source shall be located according to the following minimum distance requirements:

|  |     |
|--|-----|
| Sewers and drains--watertight pipe   | 10' |
| Underground fuel oil, liquid petroleum, chemical or gasoline storage tanks<br>(less than 1100 gallons) | 50' |

|  |       |
|--|-------|
| Underground fuel oil, liquid petroleum, chemical or gasoline storage tanks<br>(greater than 1100 gallons with secondary containment)     | 150'  |
| Underground fuel oil, liquid petroleum, chemical or gasoline storage tanks<br>(greater than 1100 gallons without secondary containment)  | 300'  |
| Sewage tanks   | 50'   |
| Sewage absorption fields   | 50'   |
| Leaching pit   | 100'  |
| Vault privies  | 50'   |
| Stables, manure piles, etc.  | 50'   |
| Leaching privies   | 100'  |
| Streams, lakes, ponds, ditches   | 25'   |
| Municipal solid waste, residual waste, industrial waste, and construction<br>and demolition debris waste landfills                       | 1000' |
| Roads and highways   | 25'   |
| Properly sealed well   | 10'   |
| Existing properly constructed water well   | 10'   |
| Structures, buildings and foundations  | 10'   |
| Above ground fuel oil, liquid petroleum, chemical or gasoline storage tanks<br>(less than 1100 gallons)                                  | 25'   |
| Above ground fuel oil, liquid petroleum, chemical or gasoline storage tanks<br>(greater than 1100 gallons with secondary containment)    | 5'    |
| Above ground fuel oil, liquid petroleum, chemical or gasoline storage tanks<br>(greater than 1100 gallons without secondary containment) | 50'   |
| Vertical or horizontal geothermal loop systems with low toxicity heat<br>transfer fluid  | 25'   |

|   |      |
|---|------|
| Vertical or horizontal geothermal loop systems with high toxicity heat transfer fluid | 50'  |
|   | 150' |
| Storage or preparation area for fertilizers or pesticides                             | 100' |
| Drainage wells  | 300' |
| Manure lagoons  | 100' |
| Animal or poultry yards (less than 1000 animal units)                                 | 500' |
| Animal or poultry yards (greater than 1000 animal units)                              | 100' |
| Land application of septage waste or sludge   | 200' |
| Composting facilities   | 100' |
| Oil and gas wells   | 100' |
| Salt storage piles  |      |

- (H) For purposes of determining compliance with the minimum distance requirements of this rule all measurements shall:
- (1) Be performed on site;
  - (2) Be within ten percent of the required minimum distances; and
  - (3) Be measured from the boundary of the water source closest to the boundary of the structure or potential source of contamination.
- (I) The department may set isolation distance requirements in excess of those set forth in this rule if conditions are known to exist where the distance set forth in this rule is considered insufficient to protect the public health and the private water system from contamination.
- (J) The department may order the replacement or sealing of any private water system existing before the effective date of this rule that does not meet the current isolation distance requirements if it has been determined that a potential health threat exists from the continued use of the system. The department may order that the contamination source be removed in order to continue to use the private water system.

- (K) No potential source of contamination may be constructed or permanently placed within the above cited isolation distances from a water supply of a private water system. A private water system owner shall be responsible for maintaining isolation distances within property owned by the water system owner.

Replaces: 3701-28-10

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3701-28-11 Miscellaneous provisions for the construction of private water systems, sampling faucets and distribution water service lines.

- (A) A private water system using a well shall be equipped with a downturned faucet not less than eight inches above the floor in such a fashion that water samples may be obtained at a point in the water system at the pressure tank or on the well side of the pressure tank and before any treatment or disinfection of the water takes place.
- (B) All water storage tanks shall meet the criteria of paragraphs (A) and (B) of rule 3701-28-13 of the Administrative Code and also comply with all other applicable provisions of rule 3701-28-13 of the Administrative Code.
- (C) Any private water system requiring continuous disinfection shall be equipped with a down turned sampling faucet at least eight inches off the floor in a convenient location just after the retention tank or ultraviolet disinfection system. In the case of a well requiring continuous disinfection this means a sampling faucet shall be installed before and after treatment.
- (D) If a storage reservoir is used in a water supply system, it shall meet the requirements for a hauled water storage tank under rule 3701-28-13 of the Administrative Code. For the purpose of this rule, a storage reservoir does not include a pressure tank.
- (E) When a water system is constructed with a combination of water supplies, such as wells, springs, ponds, cisterns, and hauled water storage tanks, each corresponding supply component shall meet the requirements of this chapter for that type of water supply component.
- (F) All pipe used in the water piping system outside of a building and other parts of the distribution system shall be of shall be protected from freezing.
- (G) All private water systems shall be constructed with components that meet ANSI/NSF standard number sixty-one. This includes, but is not limited to products listed in table B.1 of ANSI/NSF standard sixty-one.

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3701-28-111 Materials used in drilling and construction of wells.

- (A) Materials used in the drilling process shall meet the following requirements:
- (1) Materials that are in contact with ground water shall be free of matter that may adversely affect the aquifer or water pumped from the well and shall not support microbiological growth.
  - (2) All drilling muds, additives, lubricants shall meet ANSI/NSF standards sixty or sixty-one and shall not be discharged to surface water. Drilling fluids or additives that contain guar gum or other biodegradable organic materials shall not be used during the drilling of a well.
  - (3) Water that is used for drilling purposes, other than water from the well itself, shall be potable water and shall be conveyed in containers that are clean and capable of being maintained in a clean condition. Surface water shall not be used for drilling purposes unless it is obtained from a public water supply. Storage tanks used to haul water for drilling shall be periodically disinfected by the registered contractor.
- (B) Materials used in the construction of wells shall meet the following requirements:
- (1) Steel pipe or tubing used as permanent well casing, liners, well screen risers, blanks, or tail pipes which are directly connected to the well screen by welding or threading shall:
    - (a) Be new pipe or tubing or pipe that meets the requirements of paragraph (c) of this rule,
    - (b) Be manufactured in compliance with the standards of ASTM specification A53, A106, A589, A500 or in compliance with the standards of API specification 5L;
    - (c) Have a minimum wall thickness of .188 inches if the nominal pipe size is five inches through ten inches.
    - (d) Have a minimum wall thickness of .375 inches if the nominal pipe size is twelve through twenty inches. Be standard weight, as set forth in ASTM specifications A53, A106, A589, API specification 5L, if the nominal pipe size is twenty-one inches or greater.

Table 1  
Steel well casing pipe weights and dimensions for ASTM A53, and A589

| Nominal pipe size (inches) | Minimum wall thickness (inches) | Outside diameter (inches) | Weight of plain end casing in lbs/ft |
|----------------------------|---------------------------------|---------------------------|--------------------------------------|
| 5.00                       | .188                            | 5.563                     | 10.79                                |
| 6.00                       | .188                            | 6.625                     | 12.92                                |
| 8.00                       | .188                            | 8.625                     | 16.94                                |
| 10.00                      | .188                            | 10.750                    | 21.21                                |
| 12.00                      | .375                            | 12.750                    | 49.56                                |
| 14.00                      | .375                            | 14.00                     | 54.57                                |
| 16.00                      | .375                            | 16.00                     | 62.58                                |
| 18.00                      | .375                            | 18.00                     | 70.59                                |
| 20.00                      | .375                            | 20.00                     | 78.60                                |

- (e) Be legibly marked on each length, by the manufacturer, with all of the following information:
- (i) The name of the manufacturer;
  - (ii) The kind of pipe (continuous welded, electric resistance welded or seamless);
  - (iii) The weight or schedule;
  - (iv) The nominal or outside diameter;
  - (v) The specification number; and
  - (vi) The heat or lot number.
- (f) Be structurally sound, watertight throughout its length, and shall have threaded and coupled, or welded joints;

- (i) Couplings shall have a design, taper, and type of thread that is consistent with the thread of the pipe. No more than three threads shall be exposed on fourteen thread pipe and no more than two threads shall be exposed on eight thread pipe.
  - (ii) Welded joints shall form a structurally sound and watertight joint and may include the use of butt-welds using a welding collar or guide, band rings, flared joints and welding collars. Steel pipe that is equal to or less than eight inches in diameter shall have a minimum of two weld passes. Steel pipe that is greater than eight inches in diameter shall have a minimum of three weld passes.
- (2) Thermoplastic pipe that is used as permanent well casing, liners, well screen risers, blanks, or tail pipes shall:
- (a) Be new pipe that is manufactured in compliance with the standards of ASTM specifications F480 and NSF standard fourteen;
  - (b) Be standard dimension ratio (SDR) twenty-one or heavier, except thermoplastic pipes that are larger than eight inches in diameter or installed at depths greater than two-hundred feet which shall be SDR seventeen or heavier. For purposes of this paragraph standard weight ratio or SDR means the ratio of average outside pipe diameter to minimum pipe wall thickness;
  - (c) Comply with dimensional standards for thermoplastic pipe as specified in ASTM specification F480 and the following table:

Table 2

Diameter and wall thickness of thermoplastic well casing

| Nominal pipe size (inches) | Outside diameter (inches) | Minimum wall thickness (inches) SDR21 | Minimum wall thickness (inches) SDR17 |
|----------------------------|---------------------------|---------------------------------------|---------------------------------------|
| 5                          | 5.563                     | .265                                  | .327                                  |
| 6                          | 6.625                     | .316                                  | .390                                  |
| 8                          | 8.625                     | .410                                  | .508                                  |
| 10                         | 10.750                    | .511                                  | .632                                  |

|    |        |      |      |
|----|--------|------|------|
| 12 | 12.750 | .606 | .750 |
| 14 | 14.00  | .667 | --   |
| 16 | 16.00  | .762 | --   |

- (d) Be legibly marked, by the manufacturer, with all of the following information:
- (i) The nominal pipe size;
  - (ii) The standard dimension ratio;
  - (iii) The type of plastic;
  - (iv) The words “well casing”;
  - (v) The impact classification (IC);
  - (vi) The specification number;
  - (vii) The manufacturer’s name or trademark;
  - (viii) The lot number and date of manufacture; and
  - (ix) A certification mark that verifies compliance with ANSI/NSF standard fourteen.
- (e) Be structurally sound, watertight throughout its length with casing joints or couplings that conform to the following:
- (i) Except as provided in paragraph (B)(2)(e)(ii) of this rule, all thermoplastic casing joints and couplings shall meet the standards of ASTM specification F480 and ANSI/NSF standard fourteen.
  - (ii) Spline lock joints shall be permitted for use in wells with casing constructed of thermoplastic, and need not meet the standards of ASTM specification F480. For purposes of this rule a spline lock joint is a non-metallic, watertight coupling designed for thermoplastic pipe which incorporates the use of a bell or coupling with machined grooves on the interior of the bell or

coupling, and is joined by inserting thermoplastic pipe with an elastomeric sealing gasket which seats into the machined grooves, and is locked in place by insertion of a high-strength flexible thermoplastic spline to provide full three hundred and sixty degree restraint with evenly distributed loading on the joint.

- (iii) All thermoplastic couplings shall be legibly marked with the nominal well casing pipe coupling size, the type of plastic, designation of compliance with ASTM F480 and ANSI/NSF standard fourteen, and the manufacturer's name or trademark.
  - (iv) Thermoplastic well casing joints that are solvent welded shall meet the standard of ASTM specification F480 and ANSI/NSF standard fourteen.
- (3) Precast concrete that is used as permanent well casing shall be structurally sound and watertight and meet the standards of ASTM C478 with precast concrete casing joints that meet the standards of ASTM specification C990.
- (C) Defective, visibly damaged, used or reject pipe shall not be used as casing or liner pipe for wells. Pipe withdrawn from a well or test hole during initial construction may be used as casing or liner pipe for another well provided the pipe meets the following requirements:
  - (1) The pipe has not become impregnated with any contaminant, including but not limited to natural gas and crude oil, during a previous use;
  - (2) The pipe meets the applicable requirements of paragraph (B) of this rule; and
  - (3) Has been visually inspected by the registered contractor for pinholes, cracks or other defects or damages.
- (D) Cement grout to be used for sealing the annular space in wells shall conform to the specifications of paragraph (I)(1) of rule 3701-28-07 of the Administrative Code and shall be mixed in accordance with the requirements of paragraph (J)(5)(b) of rule 3701-28-07 of the Administrative Code. Cement grout shall be allowed to set a minimum of twenty-four hours when standard type I and type II cement is used or when calcium chloride has been added to the cement grout. Cement grout shall be allowed to set a minimum of twelve hours when high early type III cement grout is used before drilling operations are resumed.
- (E) Bentonite grout to be used for sealing the annular space in wells shall conform to the

specifications of paragraph (I)(2) of rule 3701-28-07 of the Administrative Code.

- (F) Course grade and pelletized bentonite to be used for sealing the annular space in wells shall conform to the specifications of paragraph (I)(2) of rule 3701-28-07 of the Administrative Code and shall be used according to the requirements of paragraph(J)(5)(d) of rule 3701-28-07 of the Administrative Code.
- (G) Well screens used in unconsolidated or incompetent geologic formations shall meet the following criteria:
  - (1) Screens shall be constructed of steel or thermoplastic and shall meet ANSI/NSF standard sixty-one.
  - (2) Screens shall have uniform openings with at least eight per cent open area per foot of screen and an entrance velocity of 0.1 feet per second. Screen design shall facilitate proper development and maintenance of the well and minimize the entrance of fine materials into the well.
  - (3) Screens shall provide sufficient column and collapse strength to withstand installation and borehole pressures.
- (H) Filter packs and formation stabilizer materials installed in wells should consist of well-rounded particles that are:
  - (1) Ninety-five per cent siliceous in composition;
  - (2) Smooth, uniform and free of foreign matter; and
  - (3) Properly sized, washed and disinfected prior to installation in the well.
- (I) Packers and shale baskets installed in wells shall be constructed of materials that meet the requirements of ANSI/NSF standard sixty-one. Lead packers shall not be used in wells.

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Certified:

/S/            
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3701-28-12 Construction, surface design, maintenance, and modification of wells.

Wells used as private water systems shall be constructed to comply with the requirements of this rule.

- (A) Drive points or jetting methods shall only be used to construct a well when geologic conditions preclude the use of conventional drilling methods, such as cable tool, driven casing hammer, and air and mud rotary. For purposes of this rule drive point or jetting method means a small diameter well less than three inches in diameter that is installed by manually or mechanically driving the casing into the ground.
- (B) A well shall contain permanent casing that meets the requirements of paragraph (B) of rule 3701-28-111 of the Administrative Code.
  - (1) Except when drive points or jetting methods are used in accordance with paragraph (A) of this rule and as provided in this paragraph, the nominal pipe size of permanent casing shall be a minimum of five inches and sized to allow the well to produce water that is adequate for the intended use, and to allow for the installation and maintenance of the well and related pumping equipment. Where liner pipe must be used to repair or replace the permanent casing, used to maintain an open borehole in incompetent formations, or used to seal off contaminated or poor water quality formations, a nominal pipe size of less than five inches may be used.
  - (2) The top twenty-five feet of casing shall not be used as a suction line unless the well casing is protected by a standard weight or heavier outer casing.
  - (3) The casing shall be sufficiently straight and vertical to allow the normal installation and operation of the pump.
  - (4) All casing joints shall be watertight. Casing shall extend continuously to the top of the aquifer being used for water supply or to the top of the non-water bearing formations above an aquifer. Except as provided in rule 3701-28-121 of the Administrative Code, the casing shall not extend less than twenty-five feet below the natural ground surface.
  - (5) In addition to the requirements of paragraph (B)(4) of this rule, if nonpotable water is encountered:
    - (a) Above an aquifer containing potable water, the casing shall extend to the bottom of the aquifer containing the nonpotable water, or as deep as necessary to prevent the nonpotable water from entering the aquifer containing potable water;

- (b) Below an aquifer containing potable water, the lower portion of the well shall be filled with cement grout or bentonite grout, to a height sufficient to prevent entrance of nonpotable water into the aquifer containing potable water.
- (C) All annular spaces shall be completely filled, with grout from the bottom of the annular space or top of the filter pack or formation stabilizer upward to the ground surface and in accordance with the following requirements:
  - (1) Except as otherwise provided in rule 3701-28-121 of the Administrative Code the annular space in all wells shall be filled with grout.
  - (2) Except as otherwise provided in paragraphs (D),(E), (F) and (G) of this rule, and rule 3701-28-121 of the Administrative Code cement grout or bentonite grout shall be placed in the annular space of all wells by pressure grouting.
  - (3) Grout shall extend continuously at least twenty-five feet in depth.
  - (4) When pressure grouting is required, the grout shall be placed in the annular space in a continuous operation without interruption until the cement or bentonite grout of approximately the same density as the grout being placed into the borehole is coming out of the annular space.
  - (5) The annular space between a permanent casing and temporary casing shall be filled with grout during temporary casing removal.
  - (6) If the casing is not driven and the drilling method requires the drilling of an oversized borehole, the total annular space shall be a minimum of one inch per side for wells less than or equal to fourteen inches in diameter, and a minimum of two inches per side for wells greater than fourteen inches in diameter. For purposes of this rule, the annular space shall be measured between the side of the excavation and the coupling or outside diameter of the casing, whichever is less.
  - (7) The total volume of sealing materials used shall be within five per cent of the total volume of the annular space. The following table lists total hole volume based on well diameter and depth. If settling of the grout occurs, then additional grout shall be placed into the remaining void space.

## Volume of annular space between casing and borehole\*

| Nominal<br>Pipe size<br>(Inches) | Borehole size<br>(Inches) | Volume per foot of well depth |           |
|----------------------------------|---------------------------|-------------------------------|-----------|
|                                  |                           | (Cubic feet)                  | (Gallons) |
| 5 (5.563 od)                     | 8                         | 0.18                          | 1.38      |
| 5                                | 9                         | 0.28                          | 2.07      |
| 6 (6.625 od)                     | 9                         | 0.20                          | 1.51      |
| 6                                | 10                        | 0.31                          | 2.29      |
| 8 (8.625 od)                     | 11                        | 0.25                          | 1.90      |
| 8                                | 12                        | 0.38                          | 2.84      |
| 10 (10.75 od)                    | 13                        | 0.29                          | 2.18      |
| 10                               | 14                        | 0.44                          | 3.28      |
| 12 (12.75 od)                    | 16                        | 0.51                          | 3.81      |
| 14 (14.0 od)                     | 18                        | 0.70                          | 16.86     |
| 16 (16.0 od)                     | 20                        | 0.79                          | 5.87      |

\*This calculation does not include the volume occupied by couplings.

- (D) Cement grout may be placed into the annular space of a well using the conductor pipe gravity method where the annular space is greater than or equal to two inches per side, no greater than fifty feet in depth, and where there is a minimal amount of water in the borehole. For purposes of this rule, the “conductor pipe gravity” method means allowing cement to flow by gravity through a funnel or hopper connected to a conductor pipe. The conductor pipe shall be lowered to the bottom of the annular space to be grouted and the grout placed from the bottom up with the conductor pipe submerged at all times.
- (E) Coarse grade or pelletized bentonite may be poured into the annular space where the annular space is greater than or equal to two inches per side, no greater than fifty feet in depth, and where there is a minimal amount of water in the borehole.
- (F) Coarse grade bentonite may be poured into the annular space between a permanent casing and temporary casing during temporary casing removal.

- (G) A well that is constructed using a cable tool, driven casing hammer or any other method where the permanent casing is driven, and where temporary outer casing or an oversized borehole is not used, a collar flared joint or well bead shall extend beyond the outside diameter of the permanent casing and dry granular bentonite shall be poured around the permanent casing as it is being driven.
- (H) Filter packs or formation stabilizers used in wells completed in unconsolidated or incompetent formations shall be placed in accordance with the following specifications:
  - (1) Filter pack or formation stabilizer material shall extend a minimum of two feet above the screen for wells less than or equal to six inches in diameter, or a minimum of four feet above the screen for wells greater than six inches in diameter.
  - (2) The filter pack or formation stabilizer should be no less than three inches thick and no more than eight inches thick to facilitate proper well development.
- (I) Well screens that meet the specifications described in paragraph (F) of rule 3701-28-111 of the Administrative Code shall be installed in wells completed in unconsolidated or incompetent formations, unless geologic formation conditions prevent their use. Screens that are installed using telescoping methods shall be attached either directly to the bottom of the casing, or to a packer that meets the specification described in paragraph (H) of rule 3701-28-111 of the Administrative Code.
- (J) All wells shall be equipped with a pitless adapter or pitless unit that provides for the prevention of the entrance of surface water, dirt, animals, insects, or other foreign matter. The director shall approve all pitless adapters and pitless units and installation procedures for use in above and below ground installations if the director determines that the pitless adapter or pitless unit and installation procedures adequately prevent the entrance of surface water, dirt, animals, insects, or other foreign matter.
  - (1) A connection to a well casing that is made above ground shall be protected by a pitless unit installed at least twelve inches above the ground surface through one of the following methods:
    - (a) A threaded connection;
    - (b) a welded connection;
    - (c) A rubber expansion sealer;
    - (d) Bolted flanges with rubber gaskets;

- (e) A weather-tight vermin proof cap;
  - (f) Extension of the casing at least one inch into the base of a power pump mounted on and sealed to a concrete pedestal; or
  - (g) When the steel well casing pipe is not terminated at the desired depth for the installation of an approved pitless unit, the well casing pipe shall be cut off at the desired height, and the pitless unit may be welded or threaded and coupled to the top of the well casing pipe by one of the following methods:
    - (i) Cutting of the well casing pipe squarely, providing a bevel for the top of the well casing pipe and welding the beveled end of the unit to the beveled end of the well casing pipe.
    - (ii) Welding a pipe nipple having threads at one end and beveled on the other end to the cut off top beveled end of the well casing pipe and threading a full length standard recessed coupling watertight to the threaded end of the unit and to the nipple. The top of the well casing pipe and the bottom of the pipe nipple to be welded shall both have beveled ends. If the pitless unit has female threads, the unit may be threaded watertight to the threaded end of the pipe nipple.
    - (iii) Reaming out the threads of a full standard recessed coupling at least one-third the length of the coupling, and welding the coupling to the top of the cut off well casing pipe.
  - (h) The inside diameter of the pitless unit shall not be smaller than the inside diameter of the casing.
- (2) A connection to a well casing that is made below the ground or less than twelve inches above the ground surface shall be protected by a pitless adapter that meets the following requirements.
- (a) Approved pitless adapter units shall be connected by welding, bolting or clamping as required by the type of unit and the manufacturer. Any hole constructed into the side of the casing for access by the pitless adapter shall be of the size and dimension as required by the manufacturer, and shall be made using a hole saw or a cutting torch using a cutting guide.
  - (b) No part of a pitless adapter may extend into the inside diameter of a well

- casing so that setting or removal of the pump, pump piping or drop pipe, or the use of tools for well rehabilitation or chlorination is impeded for wells greater than or equal to a nominal pipe size of five inches. All parts of the pitless adapter within the interior of the casing shall be removable through the top of the well casing and shall provide complete clearance within the internal diameter of the well casing for wells equal to or less than four inches in diameter.
- (c) Where approved pitless adapters are installed by clamping on thermoplastic casing with deep pump installations and low static water levels, a backing plate, wide steel strap or casting shall be installed to protect the integrity of the thermoplastic casing at the point of the pitless adapter connection.
  - (d) Upon installation of the pitless adapter, the excavation surrounding the casing and pitless adapter shall be filled with cement or bentonite grout.
- (3) Pitless adapter or pitless unit connections to thermoplastic pipe shall meet the following requirements:
- (a) Steel well casing pipe extensions, pitless units or pitless adapters shall not be welded after they are attached to thermoplastic well casing. The thermoplastic coupling shall be threaded onto the pitless unit before it is solvent cemented to the top of the casing.
  - (b) Threaded connections shall only be used on pitless units or pitless adapters after attachment to the well casing pipe.
- (4) Except as provided in paragraph (J)(6) of this rule and paragraph (E) of rule 3701-28-02 of the Administrative Code the well casing height above finished grade shall be a minimum of twelve inches.
- (5) The top of the casing at its finished height shall be cut so that the surface will fit flush with the well cap and provide a tight seal. All well caps and seals shall fit securely to the top of the well casing to provide a weather tight seal to prevent the entrance of insects, be secured with screws or other appropriate connections, and vented to the atmosphere. Electrical conduit connections on well caps or seals shall be threaded and sealed at the bottom to prevent the entrance of insects and water.
- (6) Wells located in a one-hundred year flood plain shall have watertight caps with either the casing extending a minimum of three feet above the one-hundred year flood elevation or the vent, or shall be equipped with self-sealing type vents

that seal upon inundation by water.

- (K) A room housing pumping equipment shall:
- (1) Allow access for maintenance, alteration, removal and repair of the private water system components.
  - (2) Be constructed above the ground surface, except if the room is constructed as a basement, a basement offset, crawl space or buried vault that does not accumulate water.
- (L) Pump construction, installation, design and maintenance shall comply with the following:
- (1) A pump shall be constructed so that there are no unprotected openings into the interior of the pump or well casing.
  - (2) If a power driven pump is used it shall be attached to the casing or approved suction or discharge line by a watertight connection or shall have an approved base plate.
  - (3) Any plastic pump drop pipes used shall be in compliance with material requirements for pipe as required under rule 3701-28-16 of the Administrative Code.
  - (4) Any submersible pump motor lubricants and vertical turbine shaft lubricants used shall be United States drug administration (USDA) or food and drug administration (FDA) approved food contact grade formulations or ANSI/NSF standard sixty-one.
  - (5) Only potable water shall be used for priming pumps.
- (M) The installation of hand pumps shall comply with the following:
- (1) A hand pump, hand pump head, hand pump stand or similar devices shall be constructed in accordance with paragraph (L) of this rule and provide for venting as required under paragraph (P)(1) of this rule, and shall have a closed downward directed spout and a sealed pump rod packing assembly.
  - (2) A hand pump shall be attached to a steel well casing or standpipe by a sealed flange or other method approved by the director as adequately preventing the entrance of surface water, dirt, animals, insects, or other foreign matter. The

flange shall be not less than twelve inches above a concrete slab or the ground surface. Any annular space between a standpipe and well casing shall be sealed in accordance with paragraph (C) of this rule.

- (3) Where a well casing functions as a hand pump cylinder wall, the plunger shall be not less than twenty-five feet below the ground surface. A casing wall weep hole is not permitted.
- (N) Water suction lines shall be constructed to meet the following requirements:
- (1) The water suction line shall be constructed of copper, galvanized steel, plastic pipe or other material that meets NSF standard sixty-one.
  - (2) A water suction line that is outside the well casing shall be protected by one or more of the following methods:
    - (a) Fully exposing the line and by situating the line not less than twelve inches above the floor of a basement, basement offset, or pump room.
    - (b) Fully exposing the line above the ground surface.
    - (c) Situating the line within an outer pipe with the space between the line and the outer pipe filled with water from the system and maintained at system pressure.
    - (d) Use of polyethylene 3408 pressure rated potable water pipe.
- (O) Pressure tanks installed for private water systems shall meet the following requirements:
- (1) A pressure tank shall be installed in a basement, basement offset, pump room, crawl space, or buried vault on the property of the well owner if approved by the director pursuant to paragraph (O)(2) of this rule.
  - (2) Pressure tanks shall not be buried, unless the unit has been approved, in writing, by the director as adequately designed for such use with manufacturer specifications for its installation as a buried pressure tank and the department has determined that space for above ground installation is limited.
  - (3) Pressure tanks shall have a pressure relief valve.

- (4) Pressure tanks shall meet NSF standard sixty-one.
- (P) The installation of vents shall comply with the following requirements:
- (1) A casing vent shall be provided on all well caps and seals except for those used on deep well single pipe packer jet installations or on flowing wells where the flow rate is greater than the pumping rate of the permanent pump.
  - (2) A vent shall be self-draining, screened with a non-corroding mesh screen of fifteen to thirty mesh, pointed downward, and terminate not less than twelve inches above the ground surface or above the floor of a basement, basement offset, pump room, or at a point not less than three feet above the elevation of a one-hundred year flood plain.
  - (3) For casing with inside diameters equal to or less than six inches, the total vent surface area shall be no less than seventy-five hundredths of an inch in diameter. For casing with inside diameters greater than six inches. The total vent surface area shall be no less than one inch in diameter.
- (Q) The maintenance and modification of wells shall comply with the following:
- (1) Casings and tops of wells shall be protected against contamination at all times.
  - (2) If a casing deteriorates to such an extent that contamination may occur and the well cannot be repaired, new casing that meets the requirements of paragraph (B) of this rule shall be installed, or the well shall be sealed in accordance with rules 3701-28-07 and 3701-28-071 of the Administrative Code.
  - (3) If any part of the pump or any connection malfunctions or becomes defective in such a fashion that contamination may occur, the pump or connection shall be promptly repaired or replaced as necessary to prevent contamination.
  - (4) If casing is installed in a previously constructed well for any purpose, the casing shall meet the requirements of paragraph (B) of this rule.

Replaces: 3701-28-12

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Certified:

                  /S/                    
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3701-28-121 Well construction, special geologic conditions.

In addition to the requirements of rule 3701-28-12 of the Administrative Code, wells completed in special geologic conditions shall be constructed according to the following procedures:

- (A) Wells completed in unconsolidated and consolidated aquifers may have less than twenty-five feet of casing where geologic and hydro geologic conditions indicate potable water is not present at depths greater than twenty-five feet. Under no conditions shall casing extend to a depth of less than fifteen feet.
- (B) Where consolidated formations are encountered within twenty-five feet of the ground surface, an oversized borehole shall be drilled and the annular space shall be filled with cement grout or bentonite grout by pressure grouting.
- (C) Wells completed where multiple aquifers are present shall have the casing extend through aquifers that are not contributing to the water supply of the well. The annular space contiguous to aquifers that are not contributing to the water supply of the well shall be filled with cement grout or bentonite grout by pressure grouting.
- (D) Wells completed in confined aquifers shall have the casing extend through the confining layer to the top of the aquifer. The annular space contiguous to the confining formation shall be filled with cement grout or bentonite grout by pressure grouting. Filter packs and formation stabilizers shall not extend significantly into a confining formation or allow interconnection of two separate aquifers along the annular space.
- (E) Wells completed in aquifers with hydrostatic heads greater than the land surface elevation shall have casing and grout installed to protect the aquifer, prevent erosion of the overlying geologic materials, and confine the flow to within the casing and shall be constructed according to the following procedures, as applicable:
  - (1) If the anticipated flow at the ground surface is not excessive, after the borehole is drilled, and the casing set, the water in the casing may be pumped to lower the water level in the casing and the annular space. The annular space shall then be filled with cement grout by pressure grouting. However, the density of the cement grout may be greater than that required under paragraph (D) of rule 3701-28-111 of the Administrative Code to control flow in the annular space.
  - (2) If the anticipated flow at the ground surface is excessive, an upper enlarged borehole shall be drilled partially into the confining formation. The upper enlarged borehole shall be at least four inches in diameter larger than the nominal diameter of the outer well casing. The annular space between the upper enlarged borehole and outer well casing shall be filled with cement grout by pressure grouting. The outer casing may be left as permanent casing once the well is completed or may be removed.

- (a) If the confined aquifer is consolidated, a smaller diameter borehole shall be drilled through the upper enlarged borehole, the inner casing shall be firmly seated into the bedrock, and the remaining annular space shall be filled with cement grout by pressure grouting. However, the density of the cement grout may be greater than that required under paragraph (D) of rule 3701-28-111 of the Administrative Code to control flow in the annular space.
  - (b) If the confined aquifer is unconsolidated, a smaller diameter borehole shall be drilled through the upper enlarged borehole, with casing and a screen installed into the confined aquifer. The well shall be double cased, and the remaining annular space filled with cement grout by pressure grouting. However, the density of the cement grout may be greater than that required under paragraph (D) of rule 3701-28-111 of the Administrative Code to control flow in the annular space.
- (F) Wells completed in cavernous, highly fractured formations, or mine shafts shall be constructed according to the following, as applicable:
  - (1) Any cavernous, highly fractured formations or mine shafts that are not being used as a source of water shall have casing installed through the cavernous, highly fractured formations or mine shafts and comply with the following, as applicable:
    - (a) If cavernous, highly fractured formations or mine shafts are greater than twenty-five feet from the ground surface, then the formation or shaft shall be filled with cuttings, clean gravel or grout, or packers or shale baskets shall be installed at the top and bottom of the formation or shaft. The annular space shall then be filled with cement grout or bentonite grout by pressure grouting.
    - (b) If cavernous, highly fractured formations or mine shafts are less than twenty-five feet from the ground surface, casing shall be installed in an enlarged borehole and the annular space shall be filled with a cement grout containing additives that promote bridging of the cavernous, highly fractured formations or mine shafts by pressure grouting to a depth of at least five feet beyond the cavernous, fractured formation or mine shaft.
  - (4) If the cavernous, highly fractured formation or mine shaft is to be used as the source of water supply, then a packer or shale basket shall be installed at the top of the formation or shaft and the annular space shall be filled with cement grout or bentonite grout by pressure grouting.

(G) Wells encountering brine producing formations shall be constructed according to the following procedures:

- (1) Any brine producing formations that are encountered during drilling shall have casing installed through the brine producing formation and the annular space contiguous to the brine producing formation shall be filled with cement grout or bentonite grout by pressure grouting or the well shall be sealed to an elevation higher than the top of the brine producing formation. Grouts that are not adversely affected by the brine water shall be used for sealing the well or annular space.
- (2) If the brine producing formation cannot be successfully isolated from the water source, then the entire well shall be sealed in accordance with rules 3701-28-07 and 3701-28-071 of the Administrative Code.

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3701-28-122 Well development.

- (A) For purposes of this rule:
- (1) “Drawdown” means the extent to which the water level in and near a well is lowered when water is pumped or flows from the well.
  - (2) “Pump test” means to withdraw water from a well at a constant or stepped rate while measuring the drawdown in the well at specific time intervals for a specific period of time.
  - (3) “Stable yield” means the volume of water that can be consistently discharged from well over a period of time.
- (B) Wells shall be properly developed upon completion until turbidity in the well is minimized.
- (1) Mechanical development shall be performed so as not to cause damage to the components of the well.
  - (2) Chemical development procedures may be used in conjunction with mechanical procedures in accordance with the following requirements:
    - (a) Noncontinuous chemical treatment of a well, except chlorination, shall be performed by a registered contractor.
    - (b) Any chemicals used for well development or rehabilitation shall meet ANSI/NSF standard sixty-one and shall be used in a manner to prevent damage to the well or pump and prevent any hazard to humans or property. Any acid used shall be inhibited and neutralized upon removal from the well.
    - (c) Dispersing agents shall be used only when necessary to disaggregate clay particles to enhance removal. Chlorine shall be added to the mix water to prevent bacterial growth. Dispersing agents shall be immediately flushed from the well and aquifer to prevent bacterial growth in the aquifer.
- (C) Upon completion of development of the well, the static water level shall be measured and recorded, and then the well shall be pump tested to determine the stable yield in gallons per minute, or gallons per hour, and the water level drawdown. The registered contractor may use the contractor’s pump or the well owner’s pump, a bailer, air blowing or air lifting to determine the accurate yield of the well. The pump test should be conducted for a period of time sufficient to determine the stable yield. For flowing wells, the flow rate may be measured using an orifice plate with manometer or



3701-28-13 Construction and surface design of cisterns, hauled water storage tanks, and roof washers.

- (A) Cisterns and hauled water storage tanks shall be watertight with a smooth, clean interior surface. All concrete tanks shall be made of materials and constructed in accordance with ASTM specifications C 913. All plastic or fiberglass tank materials shall meet NSF standard sixty-one. All joints, connections, and other seams between component parts shall be sealed with nontoxic waterproof material that meets NSF standard sixty-one or equivalent to prevent the loss of stored water and the infiltration of surface or ground water.
- (B) Cisterns and hauled water storage tanks shall be easily accessible for cleaning. Partitions, baffles, or similar structural features shall be constructed of nonabsorbent, easily cleanable materials, free of spalls, cracks, or crevices which may entrap unwanted matter.
- (C) The capacity of cisterns and hauled water storage tanks shall be adequate to meet the intended needs of the household. No new cistern of less than two thousand five hundred gallons capacity per dwelling unit, shall be installed. No new hauled water storage tank of less than one thousand gallons shall be installed.
- (D) Inlets to cisterns and hauled water storage tanks shall be Of sufficient size and design to dissipate the pressure of the influent stream and minimize the stirring of any settled solids.
- (E) Cisterns and hauled water storage tanks shall be set level and at an adequate depth or location to prevent frost heave. The bottom of the excavation shall be continuous, relatively smooth, and free of rocks. The bottom of the excavation shall have a minimum of four inches of sand or similar granular material. Tanks shall not bear on rock ledges. Backfill shall be free of any large stones or debris, and shall be equally placed around the tank in uniform compacted layers of less than twenty-four inches. Earth cover shall be graded to prevent water from standing over the cistern or hauled water storage tank.
- (F) Manholes or risers shall be sealed to the top of the cistern or hauled water storage tank, have an opening of a minimum diameter of twenty-four inches and shall be constructed of the same or compatible material as the cistern or hauled water storage tank. The manhole opening shall have a watertight cover with edges projecting a minimum of eight inches above the level of the surrounding surface. The edges of the manhole or riser cover shall overlap the curb and project downward a minimum of two inches. The covers shall be secured to minimize the danger of contamination, accidents, and unwarranted entry.
- (G) Cistern and hauled water storage tank outlet drains and overflow pipes shall be a minimum of four inches in diameter and not be connected to any sewer, soil pipe,

- building drain, or other waste pipe. Outlet drains and overflow pipes shall be equipped with noncorroding animal guards with a maximum opening of forty-three thousandths of an inch. Such drains are to discharge at a point free from flooding through an atmospheric break to prevent backflow. For purposes of this rule atmospheric break means an unobstructed vertical separation in the open air between the lowest opening of any pipe or faucet supplying water to, or draining from a holding tank, plumbing fixture, or other device and the highest flood level of the receiving drain or area.
- (H) Cistern and hauled water storage tank vents and other openings shall be constructed and protected with noncorroding fly screen or guards with a maximum opening of forty-three-thousandths of an inch, so as to prevent the entrance of animals, insects, or other contaminating material. All vents shall be inverted. Cisterns and hauled water storage tanks with inlets and outlets to the open air need not be vented.
- (I) Fittings and couplings which extend through the walls or the cover of cisterns and hauled water storage tanks shall all be cast-in-place, by the manufacturer. Couplings shall be made of either cast brass or galvanized cast iron or flexible pipe to manhole connectors conforming to ASTM C-923, or shall be two-piece friction clamps or longitudinally ribbed plastic so as to prevent turning in place and the entry of contamination or loss of stored water.
- (J) A minimum of one above-ground roof washer or filtering device shall be provided on each cistern. The above-ground roof washer or filtering device shall be provided with an above-grade and easily removable debris trap with a minimum screen opening of one-quarter inch. The debris trap shall be installed in-line prior to the roof washer or filtering device and designed to catch or entrap the larger debris before it enters the filter or cistern tank. The top of the roof washer or filtering device shall extend above the ground a minimum of eight inches and have outlets of a minimum of four inches. All collected rain water shall first pass through the debris trap, then the roof washer or filtering device prior to entering the cistern. Several inches of one half inch to three quarters inch of washed gravel, or an equivalent filtering media or filtering device capable of removing larger particles may be used in each roof washer. There shall be at least one roof washer or filtering device at least fifteen inches in diameter and thirteen inches in height with at least a ten gallon capacity for every fifteen hundred square feet of roof area. All roof washers shall have a diversion valve or flap which shall be equipped to divert the first ten gallons of rainfall runoff per one thousand square feet, from the roof away from the cistern.
- (K) Cistern and hauled water storage tank inlet and fill pipes shall be of a minimum diameter of four inches and shall be protected against contamination at all times. The fill pipe shall be equipped with a secured and watertight cap or cover and extend above the ground a minimum of eight inches.

- (L) The water intake for the pump in the cistern and hauled water storage tank shall either be attached to a flotation device and be located a minimum of four inches below the surface of the water, or shall be otherwise designed to maintain the required depth settings in the water. Submersible pumps may be used as the water intake and need not be attached to a flotation device. However, at no time shall the water intake for the pump be located less than twelve inches from the bottom of the cistern or hauled water storage tank.
  
- (M) Water obtained from cisterns shall be continuously disinfected as prescribed in rule 3701-28-09 of the Administrative Code.

Effective date: January 1, 2000

R.C. 119.032 review date: 1/1/05; 9/1/99

Certified:

\_\_\_\_\_  
 /S/  
 Jodi Govern, Secretary  
 Public Health Council

9/17/99  
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3701-28-14 Construction and surface design of springs.

- (A) The location of the spring shall be at a point free from flooding and, in addition to the requirements of rule 3701-28-10 of the Administrative Code, shall comply with the following:
  - (1) The area surrounding the spring to a distance of fifty feet downslope and two hundred feet upslope or to the crest of the slope shall be under the control of the private water system owner through ownership of the land or an easement and shall not be used for any activity which may contaminate the spring.
  - (2) The spring outlet shall not be located in a one-hundred year flood plain.
- (B) A diversion ditch shall be located on the uphill side of the spring to divert surface water away from the spring construction. Discharge from the diversion ditch shall be a minimum of twenty-five feet and downslope from the spring.
- (C) The spring box shall be built with substantial and watertight walls of concrete, vitrified tile, or other suitable material extending to the aquifer.
- (D) The spring box shall be provided with a watertight, secured cover. Manholes, if provided, shall be a minimum of twenty-four inches in diameter and shall have a watertight curb with edges projecting a minimum of eight inches above the level of the surrounding surface. The edges of the manhole cover shall overlap the curb and extend downward a minimum of two inches. The spring box cover or manhole cover shall be provided with locks, bolts, or equivalent means to minimize the danger of contamination, accidents, and unwarranted entry.
- (E) A gravity drain or powered sump system shall be provided for the purpose of cleaning the spring box. The drain system shall be protected from freezing and be screened to prevent the entrance of insects, rodents and aquatic life.
- (F) The spring box shall be provided with a screened overflow pipe located slightly below the maximum water level elevation. The overflow pipe and any other openings shall be constructed and protected with noncorroding fly screen or guards with a maximum opening of one quarter of an inch, so as to prevent the entrance of animals, insects, or other contaminating material. When the pump, pressure tank or both are installed above the spring construction, an insulated housing shall be provided for frost protection.
- (G) The inlet pipe to the spring box shall be located above the drain outlet and shall be screened.
- (H) All joints, connections, and other seams between component parts of the spring



3701-28-15 Location and construction of ponds.

- (A) Ponds shall not be considered as a source of water for human consumption by the department, unless ground water sources are inadequate for the intended use or unacceptable due to the presence of naturally occurring or man-made contaminants that are not economically or technically feasible to treat. A pond shall not be an acceptable water supply source when a public water supply is readily accessible to the property.
- (B) The pond shall be located at the minimum distances from sources of contamination as specified in rule 3701-28-10 of the Administrative Code. In addition, the following criteria shall be met:
  - (1) The watershed shall have a permanent growth of vegetation and the watershed shall be under complete control of the pond owner;
  - (2) The watershed shall be free of barns, poultry yards, sewage tanks, privies, orchards, cultivated fields, and other sources of contamination;
  - (3) The watershed shall not be used for pasture;
  - (4) Livestock shall be fenced or otherwise prohibited from entering the pond and watershed area;
  - (5) The pond shall not be used for public recreational purposes such as swimming, fishing, or boating;
  - (6) The minimum distance from the nearest building shall be ten feet; and
  - (7) Diversion ditches or similar devices shall be used to direct water of unsuitable quality out of the watershed and away from the pond.

For purposes of this rule “watershed” means the area up gradient from the water supply that drains, channels, or otherwise directs surface water toward the water source.

- (C) Any person intending to install a pond to be used as a water source shall submit a plan to the department as required under paragraph (E) of rule 3701-28-03 of the Administrative Code. The pond and watershed shall conform to the following basic design criteria:

- (1) The watershed shall have an area not less than three acres per acre-foot of storage if there are no other sources of water for pond water recharge. The department may require a larger watershed if it has been determined that three acres per acre-foot of storage is inadequate for pond water recharge based on seasonal rainfall requirements of a specific area, and the watershed is the sole source of pond water recharge.
- (2) Off-stream ponds receiving water recharge directly from existing springs or wells constructed in compliance with this chapter shall have no minimum watershed size requirement if the annual flow is calculated to be adequate to keep the pond within ten percent of its capacity.
- (3) A pond shall not be recharged by pumping water from field drain tiles or drainage ditches. Ponds shall not be recharged from onsite wastewater system discharges, curtain drains, sump pumps or washing machines.
- (4) A pond may be recharged from roof water runoff. The roof area may be calculated as part of the total watershed area if it is to be included as a recharge source.
- (5) Sealing materials and liners designed to reduce water loss from pond leakage shall meet the following requirements:
  - (a) Meet all of the requirements of ANSI/NSF standard fifty-four for flexible membrane liners, or
  - (b) Be composed of bentonite or native clay materials sufficient to reduce pond permeability to less than  $10^{-8}$  centimeter per second and meet ANSI/NSF standard sixty.
- (6) At least twenty-five per cent of the pond area at the design normal water level shall have a minimum depth of eight feet;
- (7) Ponds shall have side slopes no steeper than 2:1;
- (8) The minimum top width of a dam shall be eight feet;
- (9) The side slopes of the dam for a pond shall be no steeper than 3:1 on the dry side, and 2:1 on the wet side; and

- (10) One or more spillways shall be provided so as to allow for the passage of normal waterflow and of excess storm runoff around the dam. The spillways shall pass water safely to the outlet channel below without damage to the dam, or to life, structures, or property. Where applicable, spillway construction shall comply with requirements of section 1521.06 of the Revised Code.
- (D) The size of the pond shall be adequate to meet the intended needs of the household, but shall contain no less than .6 acre feet of water or 195,510 gallons.
- (E) The intake for the private water system from the pond shall conform to one of the following design criteria:
  - (1) The intake for the water system shall be attached to a flotation device at the deepest end of the pond and shall be suspended not less than eighteen inches and not more than three feet below the water surface;
    - (a) A noncorroding permeable filter material or screen with openings for forty-three-thousandths of an inch or smaller shall be incorporated into the intake; and
    - (b) The intake for the water system shall be connected by not less than a one-and-one-quarter-inch diameter flexible pipe to the waterline and shall either pass through the bank at a depth adequate to prevent freezing, or pass through the dam and be protected by a galvanized steel pipe; or
  - (2) A submersible pump may be used with a cased pond intake constructed for the sole purpose of delivering water from the pond to the household. A cased pond intake shall not be deeper than the deepest portion of the pond and shall not be any further than five feet from the pond. A cased pond intake shall not be used when there is any risk of contaminating an aquifer from the inflow of pond water.
- (F) Antiseep collars shall be provided for durably and solidly installed intake and spillway inlets when such devices pass through the pond dam. For purposes of this rule antiseep collar means a projecting collar of concrete or other material built around the outside of a tunnel or conduit, under an embankment dam, to reduce the seepage potential along the outer surface of the conduit.

- (G) All pond water shall be continuously filtered by one of the following methods:
- (1) A slow sand filter which meets the requirements of this rule;
  - (2) A precoat filter which meets the requirements of this rule; or
  - (3) A filter approved by the director as providing for a logarithmic 3 reduction of giardia and a logarithmic 4 reduction of viruses and sufficient to handle the water needs of a household based on sixty gallons per person per day.
- (H) Slow sand filters and a pre-coat filters shall meet the following criteria:
- (1) The filter tank shall be watertight and durable with a smooth, clean interior surface;
  - (2) All joints, connections, and other seems between component parts shall be sealed with non-toxic waterproof material that meets NSF standard sixty-one to prevent the loss of stored water and the infiltration of surface water;
  - (3) The lower distribution system shall be non-clogging and resistant to corrosion, physical deformation and wear, provide adequate flow and distribution to uniformly collect filtered water during the filter cycle, and except for filters having dome or similar type under drains, have openings three-sixteenths inch (4.8 millimeter) or larger;
  - (4) All components shall be replaceable through a manhole in the filter tank.
- (I) In addition to the requirements of paragraph (H) of this rule, slow sand filters shall meet the following criteria:
- (1) Only washed sand and gravel shall be used. Filter sand shall be hard angular silicon material free of carbonates or other foreign material. Beach sand shall not be used. The effective sand size shall be between .30 and .45 millimeters. Sand uniformity coefficient shall not be greater than 2.5. Gravel used to support filter sand shall be rounded material, free of limestone and clay, and consist of at least three layers graded to prevent intermixing;

- (2) Sand shall be placed from the surface to a minimum depth of thirty inches. Three-eighths inch gravel shall be placed three inches thick below the sand. One-half inch gravel shall be placed three inches below the three-eighths inch gravel. One inch gravel shall be placed six inches thick below the one-half inch gravel. A fabric pre-filter may be used on the surface of the sand;
- (3) Maximum flow rate shall not exceed seventy-five gallons per day per square foot of the filter surface area;
- (4) The minimum filter size dimensions shall be based on water usage of one hundred-twenty gallons per bedroom per day from the following chart;

| Water needed<br>Gallons per<br>Day | Bedrooms | Filter surface area<br>(Square feet) | Square or<br>Rectangular<br>(Feet) | Round<br>dia.<br>(Feet) |
|------------------------------------|----------|--------------------------------------|------------------------------------|-------------------------|
| 360                                | 3        | 5.7                                  | 2 x 3                              | 3                       |
| 480                                | 4        | 7.1                                  | 2 x 4                              | 3                       |
| 600                                | 5        | 8.6                                  | 3 x 3                              | 4                       |

- (J) In addition to the requirements of paragraph (H) of this rule, pre-coat filters shall meet the following criteria;
  - (1) The pre-coat material shall be diatomaceous earth or processed perlite and be United States environmental protection agency graded material suitable for use with potable water;
  - (2) The pre-coat layer shall be one-eighth to one-fifth inches thick or equivalent to 0.2 pound per square foot;
  - (3) The designed filtration rate shall not exceed two gallons per minute per square foot of septum area; and
  - (4) The size of the filter shall be sufficient to meet the intended household usage per person per day.

- (K) Mechanical in-line cartridge filters shall not be used in lieu of the filter designs required under this rule. However, mechanical in-line cartridge filter systems tested against ANSI/NSF standard fifty-three, may be used in addition to the filter designs required under this rule.
- (L) A water storage tank used with ponds shall be adequate to meet the intended needs of the household, but it shall have a capacity of no less than two hundred gallons.
- (M) Valves shall be protected from frost damage and installed so that they are accessible from the surface of the ground by means of an open stack.
- (N) All water treatment components shall be protected from weather, freezing, and contamination, and also located in such a way so as to be easily inspected, cleaned, and serviced. With the exception of basement installation, all water treatment components of the system shall be stored above ground and housed in an enclosed area.
- (O) All ponds in use as a private water supply source before the effective date of this rule shall comply with rule 3701-28-09 of the Administrative Code and paragraph (G) of this rule when the pond is altered or repaired.
- (P) Water obtained from ponds used as a private water supply source shall be continuously disinfected as prescribed in rule 3701-28-09 of the Administrative Code. The owner shall maintain a written service agreement for the continuous disinfection of the system or test the water in the system in accordance with paragraph (E) of rule 3701-28-04 of the Administrative Code on an annual basis.

Replaces: 3701-28-15

Effective date: January 1, 2000

R.C. 119.032 review date: 1/1/05; 9/1/99

Certified:

                  /S/                    
Jodi Govern, Secretary  
Public Health Council

9/17/99  
Date

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Rule authorized by: 3701.34  
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Prior effective date: 1/1/81

3701-28-16 Piping.

- (A) All pipe utilized in the water piping system of a private water system outside a building shall be of materials as specified in table 606.4 of rule 4101:2-61-06 of the Administrative Code. This pipe shall also be protected from freezing.
- (B) All pipe used in a private water system shall be constructed with components that meet ANSI/NSF standard sixty-one or equivalent.

Replaces: 3701-28-16

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3701-28-17 Startup and operation of new, repaired and altered private water systems.

- (A) All new, repaired, or altered private water systems shall be disinfected with chlorine to neutralize contamination after construction, development, installation, alteration, or repair, prior to water being removed for human consumption.
- (1) The person performing the construction, development, installation, alteration, or repair shall disinfect the private water system according to this rule at the time of completion of the portion of work performed by that person.
  - (2) The owner of the private water system shall ensure that the entire private water system, including the plumbing and all related fixtures are disinfected in accordance with this rule, prior to placing that private water system into service.
- (B) Procedures for disinfection shall be as follows:
- (1) The gallons of water to be disinfected shall be determined by calculating the total capacity of the private water system including water stored in a well casing, cistern or spring box, pressure tanks, existing plumbing and attached fixtures, and all related storage, excluding water stored in a pond.
  - (2) When calcium hypochlorite chlorine is used for disinfection, the tablets or granules shall be completely dissolved in water prior to placement into the well. Sodium hypochlorite solutions shall be used within the manufacturer's posted expiration date. Sodium hypochlorite solutions with fragrance additives shall not be used for disinfection of private water systems. Sodium hypochlorite and calcium hypochlorite shall not be mixed with other chemicals for disinfection purposes and all manufacturer's directions must be followed. Calcium hypochlorite products should not be used to disinfect wells completed in limestone aquifers, or where the water in the well has high levels of dissolved calcium.
  - (3) The following procedures apply to cisterns, hauled water storage tanks and spring boxes:
    - (a) All loose debris, sediment, mineral encrustation and bacterial slime shall be removed from the cisterns, hauled water storage tank or spring box prior to disinfection.

- (b) A solution of one thousand milligrams per liter of chlorine shall be prepared in a storage container. The quantity of solution prepared shall be of sufficient volume to disinfect the entire cistern, hauled water storage tank, or spring box and all related storage, or pressure tanks, existing plumbing and attached fixtures.
  - (c) This solution shall be used to thoroughly rinse all sides of the cistern, hauled water storage tank and spring box. The solution shall then be circulated through the water supply system distribution lines.
- (4) The following procedures shall apply to a well:
- (a) All loose debris, sediment, mineral encrustation and bacterial slime shall be removed from the well prior to disinfection.
  - (b) A disinfectant solution shall be prepared as calculated from table two or three and poured into the well. For a new installation, an amount of disinfectant to make a two hundred and fifty parts per million chlorine solution shall be prepared. For an alteration, an amount of disinfectant to make a five hundred parts per million chlorine solution shall be prepared.
  - (c) The water in the well shall be agitated or surged to ensure even dispersal of the disinfectant throughout the entire water column.

| Table 1. Volume of water in well |                           |
|----------------------------------|---------------------------|
| Diameter of well (inches)        | Gallons per foot of water |
| 3                                | 0.37                      |
| 4                                | 0.65                      |
| 5                                | 1.0                       |
| 6                                | 1.5                       |
| 8                                | 2.6                       |

| Chlorine concentration (parts per million) | Gallons of 5.25% sodium hypochlorite - liquid bleach | Pounds of dry calcium hypochlorite | Minimum contact time |
|--|--|------------------------------------|----------------------|
| 250  | 0.5 gallons  | 0.38                               | 8 hours              |
| 500 ppm                                    | 1 gallons  | 0.75 pounds                        | 8 hours              |

| Diameter of well (feet) | Amount of 5.25% sodium hypochlorite per foot of water | Amount of 68% chlorine granules per foot of water |
|-------------------------|---|---|
| 3                       | 0.15 gallons (2.5 cups)                               | 2 ounces  |
| 4                       | 0.25 gallons (4 cups)                                 | 3 ounces  |
| 5                       | 0.4 gallons (6 cups)                                  | 4 ounces  |
| 6                       | 0.5 gallons (8 cups)                                  | 6 ounces  |
| 7                       | 0.75 gallons (12 cups)                                | 8 ounces  |
| 8                       | 1 gallon  | 10 ounces   |
| 10                      | 1.5 gallons   | 1 pound   |

- (d) A chlorinated water solution shall be used to wash down the sides of the well casing for a minimum of ten minutes. The chlorinated solution shall be dispersed throughout the entire water column in the well.
  - (e) Chlorinated water shall then be circulated through the distribution system and the plumbing within the dwelling or building.
- (5) Chlorinated water shall be maintained in the well, line, tanks or boxes and the distribution system for a minimum of eight hours of contact time or for a minimum of thirty minutes if a free chlorine residual of fifty milligrams per liter at a Ph of less than eight is measured.
- (6) All water in the plumbing, and the well, hauled water storage tank, spring box or

cistern shall then be discharged until the odor of chlorine disappears.

- (C) If a total coliform positive sample is obtained, the private water system shall be rechlorinated in accordance with this rule and resampled to include detection for escherichia coli in addition to total coliform. When more than two samples test positive for total coliform or escherichia coli are collected from a well, the well shall be superchlorinated. For the purposes of this rule, superchlorination is the introduction of a chlorinated solution of not less than one thousand parts per million of chlorine into the well by one of the following methods:
- (1) Installation of an inflatable packer above the aquifer and the injection of chlorinated water into the aquifer under pressures greater than atmospheric;
  - (2) The introduction of a volume of chlorinated water that is twice the total volume of water stored in the casing into the well to displace chlorinated water into the aquifer; or
  - (3) Other methods approved in writing by the director.
- (D) If total coliform or escherichia coli are found in samples from the well after superchlorination, the department shall notify the director and shall undertake an investigation of the private water system to determine the source of contamination and approve possible remediation measures, including continuous disinfection as described in rule 3701-28-09 of the Administrative Code.
- (E) All water samples shall be collected and processed in accordance with rule 3701-28-04 of the Administrative Code.

Replaces: 3701-28-17

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3701-28-18 Hauled water.

- (A) All water haulers shall comply with the requirements of this rule. All water received from transportation equipment shall be from an approved public water system and shall have a minimum of two-tenths milligram per liter residual at the time of delivery.
- (B) The outlet connections at filling points shall be constructed and protected so that no foreign material likely to cause contamination or pollution of the water can come in contact with the outlet when not in use, or with the water during the time of delivery.
- (C) All transportation equipment used in the distribution of water, including but not limited to tank trucks, tank cars, and tank wagons, shall be inspected for compliance with this rule and approved if in compliance with this rule annually, by the department having jurisdiction in the health district in which the applicant's principal place of business is located. The department may establish a fee for the inspection of each vehicle.
- (D) Any transportation equipment used in the distribution of water shall comply with the following:
  - (1) The vehicle and the container shall not have been previously used to transport a noxious, hazardous, or a toxic substance or liquid;
  - (2) All equipment used in this distribution of water shall be clean and sanitary and protected from contamination at all times;
  - (3) Each vehicle shall display the name and telephone number of the water hauler and a current approval sticker issued by the department;
  - (4) Tanks and other containers with which water comes in contact are to be made of stainless steel or other material that meets NSF standard sixty-one and so constructed that every portion of the interior can be easily cleaned and sanitized. Lead, cadmium, and other toxic metals are not to be used on surfaces which come in contact with the water;
  - (5) The interior, piping, valves, and permanent or flexible connections shall be so constructed and of materials which meet NSF standard sixty and can be easily cleaned and sanitized;
  - (6) The inlet or opening to every container shall be so constructed to prevent the entrance of insects, rodents or other foreign material that may cause contamination of water. With the exceptions of cleaning or filling the tank, the inlet openings shall be kept closed at all times;
  - (7) Outlet connections shall be so constructed and protected as to prevent contamination of potable water. Protection from contamination shall be

provided at times of delivery and nonuse; and

- (8) Flexible connector ends shall be protected and capped at all times except during filling or emptying of the transportation equipment.
  - (9) Any tank or other container that is used for the purpose of hauling water shall only be used to haul water and shall not be used to carry any other substances.
  - (10) A water hauler shall keep equipment to test the free residual of chlorine in the tank and shall test the tanks of water that are delivered. If less than 0.2 milligram per liter is detected then the hauler shall add sufficient chlorine to obtain the residual chlorine concentration required by paragraph (A) of this rule.
  - (11) A water hauler shall keep a record of all deliveries of water for a period of ninety days from the date of the last delivery.
- (E) The water contact surfaces and equipment shall be cleaned and disinfected:
- (1) Before it is put into use;
  - (2) When the system or any of its parts have been dismantled or replaced for purpose of repair, maintenance or alteration;
  - (3) Any time contamination is suspected; and
  - (4) At least weekly during periods of operation.
- (F) Each tank load of water shall be dosed with a sufficient amount of chlorine to produce a minimum chlorine residual of two tenths parts per million.
- (G) The department may order any water hauler to cease water deliveries or the use of any water transportation equipment for violation of this rule or if the department suspects contamination of the water hauling equipment or the hauled water.

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**Registration and bonding of water systems contractors.**

- (A) As a condition of doing business in this state, private water systems contractors shall annually register with the Ohio department of health and comply with the surety bonding requirements of section 3701.344 of the Revised Code and this rule.
- (B) Application for registration.
- (1) Application for annual registration as a private water systems contractor shall be made to the director on forms prescribed and provided by the director. The application shall be accompanied by:
    - (a) A one hundred forty-five dollar registration fee made payable only by check or money order to "Treasurer, State of Ohio"; and
    - (b) A registration bond, complying with paragraph (D) of this rule, executed by the applicant as principal, and a surety company authorized to do business in the state as surety, in the sum of ten thousand dollars. The surety bond shall run to the state as obligee and shall be for the benefit of any aggrieved party for damages incurred as a result of a violation of this chapter.
    - (c) The bond shall provide that the aggregate liability of the surety for any and all breaches of the conditions of the bond shall in no event exceed the penal sum of the bond.
  - (2) An applicant which is a partnership, corporation or other business association, shall designate one partner, officer, or other responsible full-time employee who shall be the company's representative to register on the company's behalf.
- (C) Registration issuance and renewal.
- (1) Upon receipt of a completed application for registration approved by the director, the director shall furnish the registrant with a valid and current registration card containing the name of the registrant, the registrant's representative, if applicable, the registration number, and the expiration date.
  - (2) In the case of those applicants subject to paragraph (B)(2) of this rule, the partnership, corporation, or other business association and not the representative designated in accordance with paragraph (B)(2) of this rule shall be the registrant. When the representative is no longer associated with the registrant, the registrant shall so inform the director in writing within thirty days and give the name of another representative in accordance with paragraph (B)(2) of this rule.
  - (3) The initial and renewal registration shall not be transferable and expires annually on the thirty-first of December, unless earlier revoked. A registration may be renewed for an ensuing year by making application to the director in accordance with paragraph (B) of this rule. If a renewal

application has been received on or prior to the thirty-first of December, such application shall extend the period of validity of the current registration until a new registration is received or the director denies a new registration under the provisions of division (B)(3) of section 3701.344 of the Revised Code, this chapter, and Chapter 119. of the Revised Code.

(D) Registration bonds.

- (1) Registration bonds shall be executed in the name of the applicant, as principal, on a bond agreement form provided by the director and shall include a certificate from the superintendent of insurance demonstrating that the surety company is authorized to operate a surety business in this state.
- (2) If the registration bond supporting the registration is canceled, the registrant shall immediately submit to the director a new registration bond, in accordance with the requirements of this rule. The surety company shall give thirty days written notice to the director prior to the effective date of cancellation.
- (3) As a condition precedent to making a claim on a registration bond:
  - (a) Any person who alleges to be an aggrieved party shall give written notification to the director and to the department having jurisdiction in the health district where the private water system is located. The written notification shall state the violation of Chapter 3701-28 of the Administrative Code upon which the person desires to base a claim. The director shall send a copy of the complaint to the water systems contractor and the surety company. For purposes of this rule aggrieved party means the property owner or the agent of the property owner who contracts for a private water system with a water systems contractor and whose system is not installed, altered, repaired or abandoned in substantial compliance with the provisions of this chapter;
  - (b) The director, with the assistance of the department shall investigate the validity of the allegation.
  - (c) If the director concludes that no rule violation exists, he shall so notify the alleged aggrieved party, the surety company and the registered contractor in writing. The director, if satisfied of the existence of a rule violation, shall notify in writing the aggrieved party, of the rule violation and issue a notice of violation to the water systems contractor and the surety company that sets forth the following:
    - (i) The nature of the violation;
    - (ii) The action required to correct the violation;
    - (iii) The date for completion of the corrective action; and
    - (iv) An opportunity for an informal hearing regarding the merits of the director's determination.

- (d) Within fifteen days of the issuance of a notice of violation under paragraph (D)(3)(c) of this rule the water systems contractor may request an informal hearing. The informal hearing shall be conducted before the director no later than thirty days after the director's receipt of the request. The director shall affirm, reverse, or modify the original findings and notify the aggrieved party, the surety and the water systems contractor of the decision within ten days after the hearing. The decision of the director to affirm, reverse, or modify the original findings is final and not subject to appeal.
- (e) If a water systems contractor fails to comply with the notice of violation issued pursuant to paragraph (D)(3)(c) of this rule the director shall notify the surety company, the aggrieved party and the water systems contractor and shall:
  - (i) Set forth the violation;
  - (ii) Inform the surety of its options in responding to the notice, as set forth in paragraph (D)(3)(f) of this rule.
- (f) Within thirty days from the date the surety company receives a notice under paragraph (D)(3)(e) of this rule the surety company shall notify the director that it will perform one of the following:
  - (i) Not correct the violation or violations resulting in the issuance of the order and shall make payment for the full amount of the bond to the aggrieved party;
  - (ii) Correct the violation or violations or pay the cost of correction within thirty days of receiving the notice and submit to the director a plan for performance of the work necessary to correct the violation or violations; or
  - (iii) Make payment to the aggrieved party in an amount equal to the purchase price of the private water system and any other activity necessary to bring the private water system into compliance with this chapter, including the sealing of a private water system, if necessary.
- (g) The rights of the surety company to correct the violation or violations resulting in a notice issued under paragraph (D)(3)(c) of this rule shall be terminated and the director shall order the entire amount of the bond forfeited if the surety company fails to:
  - (i) Notify the director within thirty days of receipt of the notice that it will or will not correct the violation or violations;
  - (ii) Submit a plan for completing the required work at the same time it notifies the director that it will perform or pay the cost of performing the required work; or

- (iii) Commence, continue, or complete the required work in a manner and in accordance with this rule and the provisions of this chapter.
  - (4) The notification required in paragraph (D)(3)(a) of this rule must be made within two years from the date the work on the private water system, or the component thereof, is completed. The rights of the aggrieved party to the bond shall be forfeited if the aggrieved party denies the water systems contractor, the surety company, or its agents access to the private water system to perform actions necessary to correct the violation or violations.
  - (5) The surety company shall give written notice to the director within thirty days of payment on a claim against a registration bond. The notice shall specify the name of the registered contractor, the name of the aggrieved party, the amount of the claim, and the date and manner in which the claim was paid.
- (E) Registration is not required of any person who performs labor or services under the direct supervision of a registered contractor, any private water system owner who performs work on the private water system serving his dwelling house, or any person who aids the owner with this work without compensation. However, persons exempt from registration under this paragraph shall comply with all applicable rules of this chapter. For purposes of this rule "direct supervision" means that a registered water system contractor instructs and controls the person claimed to be supervised and that the registered water system contractor is responsible for the actions of that person and is reasonably available if and when needed, even though such registered water systems contractor may not be physically present at the work site.
- (F) The director shall publish annually a list of names and addresses of all persons holding registrations under this chapter and upon written request shall provide a copy of the list to any person.
- (G) Every registrant shall maintain and submit to the department and/or the director such complete and accurate records as may be required for determining compliance with all applicable rules of this chapter.
- (H) Suspension, revocation, and denial of registration.
- (1) The director may suspend, revoke, or deny any registration of a private water systems contractor for violation of the requirements of this chapter.
  - (2) Grounds for suspension, revocation, or denial of a private water systems contractor's registration shall include, but not be limited to:
    - (a) A material misstatement or falsification of facts in the contractor's application for a registration or obtaining a registration through fraud or misrepresentation;
    - (b) A material misstatement or falsification of facts on a completion form or well log;
    - (c) A violation of the conditions of the contractor's registration;

- (d) A failure to submit completion forms and/or well logs in accordance with rule 3701-28-03 of the Administrative Code;
  - (e) A violation of any applicable rule of this chapter;
  - (f) Failure to maintain a surety bond as required under this rule;
  - (g) Conviction in any criminal proceeding or failure to comply with a judgement or order that is issued by the court in any civil proceeding in connection with a private water system;
  - (h) Aiding or abetting an unregistered person to evade the requirements of division (B)(3) of section 3701.344 of the Revised Code and this rule, allowing, one's registration to be used by an unregistered person, or acting as an agent, partner or associate of an unregistered person with the intent to evade the provisions of this chapter;
  - (i) A demonstrated incompetency to act in the business or businesses for which a registration is held; or
  - (j) Having more than one bond claim within a three year period where the director determined that there were violations of this chapter and that damages did occur.
- (3) The private water systems advisory council created by section 3701.346 of the Revised Code shall meet at the behest of the director to advise the director on the suspension, revocation, or denial of a private water systems contractor's registration.
- (4) Procedures for the revocation, suspension, or denial of a registration by the director shall be in accordance with Chapter 119. of the Revised Code. Pursuant to that chapter, the private water systems contractor is entitled to a hearing upon request made within thirty days of the mailing of notice of the action on the registration. The date set for the hearing shall be within fifteen days, but not earlier than seven days, after the private water systems contractor has requested a hearing, unless otherwise agreed to by both the agency and the contractor.

Effective: 11/15/2004

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Certification

11/04/2004  
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3701-28-21 Variance or waiver of certain provisions of this chapter.

- (A) Any applicant who believes that a variance of any rules 3701-28-01 to 3701-28-21 of the Administrative Code is necessary shall make application in writing to the department, specifically stating the proposed variance from the particular rule or rules and describing the system.
- (B) The department shall not grant any variance unless the applicant demonstrates that:
  - (1) There will be unusual and unnecessary hardship in complying with the rules;
  - (2) Contamination of the private water system or the water supply will not occur as a result of construction and operation of the system;
  - (3) The health of persons using water from the private water system will not be endangered thereby; and
  - (4) No other technically feasible and economically reasonable means of obtaining water from the proposed type of water source exists.
- (C) In the case of an emergency as determined by the department, the department may make written request of the director to waive the fees under paragraph (G) of rule 3701-28-04 of the Administrative Code. The director may grant such waiver of the fee if such waiver is warranted.
- (D) No variance or waiver shall be granted that will defeat the spirit and general intent of these rules, or otherwise be contrary to the public interest or adversely impact the public health.
- (E) The department shall maintain a list of all variances or waivers granted in a calendar year and shall provide to the director the name and address of the person granted a variance, reason for granting the variance or waiver, and a copy of the waiver or variance request for each variance or waiver granted or denied. This information shall be provided to the director by the first day of April of each calendar year.

