

2011 Revision  
Private Water Systems Rules  
Chapter 3701-28 Ohio  
Administrative Code

Rule 3701-28-10  
Well construction, alteration  
and maintenance

## 3701-28-10 (A)

- The property owner and the PWSC are responsible for minimizing the entrance of contaminants into the well.
- If construction is not complete and PWSC must leave, but equipment is left at site, he will securely cover the borehole and annular space to prevent entrance of contaminants and to eliminate safety hazards.

# 3701-28-10 (A), Cont

- If the drill rig is removed prior to the installation of casing and grout, the borehole shall be secured against collapse or be sealed.
- Open boreholes that are not cased, grouted and capped shall not be left open for more than 10 days unless there are extenuating circumstances and the local health department has been notified. The open borehole must be securely covered as previously stated.

## 3701-28-10 (B)

- Local health departments are to review the site where a drive point well is proposed to confirm that such a well is the only possible drilling method that can be used on that site.
- Drive point wells are those less than 3 inches in diameter, installed by driving the casing into the ground.
- Drive point well may not be constructed on an emergency basis.

# 3701-28-10 (C)

- Identifies use of secondary casing
- Casing must be centered in the borehole.  
This is in addition to the requirement that casing be placed straight and vertical.
- Primary casing installed into a consolidated formation is to be adequately seated in a competent geologic formation.

## 3701-28-10 (C), Cont.

- PWSC are to notify the local health dept within 10 days if they have used less than 25 feet of casing in a well.
- Under no circumstance shall less than 10 feet of casing be used in a well.

## 3701-28-10 (C), Cont. 2

- Wells with less than 25 feet of casing and not less than 15 feet of casing shall:
  - either have continuous disinfection per 3701-28-15 OAC;
  - OR may be installed so that the required isolation distances are doubled
  - and where two bacterial samples collected within a one year period, during opposite seasons are acceptable per 3701-28-04 OAC.

## 3701-28-10 (C), Cont. 3

- Wells with less than 15 feet of casing shall have continuous disinfection and cyst reduction per 3701-28-15 OAC.
- NO VARIANCE TO THIS RULE SHALL BE PERMITTED.

# 3701-28-10 (C), Cont. 4

- When consolidated formations are encountered within 25 feet of the surface an oversized borehole needs to be drilled, unless the consolidated formation is very soft, friable or weathered shale or sandstone.

## 3701-28-10 (D)

- Liner pipe may be installed inside and below primary or secondary casing and meet the material standards. In addition:
  - it must come to within 5 feet of the pitless adapter and must have a threaded connection at the top to allow for removal,
  - if slotted or perforated, may only be set in consolidated formations and shall not be used as a screen in unconsolidated formations.

# 3701-28-10 (E)

- All annular spaces are to be filled with grout from the bottom of the annular space or top of the gravel pack to the surface.
- Annular space must be uniform and borehole stability must be maintained.
- Grout is to surround each section of primary or secondary casing – exception of multiple screens

# 3701-28-10 (E)(5)

- If primary casing is placed in an oversized borehole the total annular space shall be:
  - a minimum of 1½ inches per side for wells less than 14 inches in diameter as measured from the outside of the casing, or a minimum of 1 inch per side as measured from the outside of the casing coupler.
  - a minimum of 2 inches per side for wells greater than 14 inches in diameter and a minimum of 1 inch per side as measured from the outside of the secondary casing.

# 3701-28-10 (E)(5), Cont.

- For wells larger than 20 inches in diameter:
  - the annular space shall be no greater than 6 inches per side or 12 inches total for wells less than or equal to 30 feet in depth
  - shall be no greater than 4 inches per side or 8 inches total for wells greater than 30 feet in depth.
- Annular space is the distance between the side of the borehole and the outside of the casing coupling. If there is no coupling, it is the outside of the casing.

## 3701-28-10 (E)(6)

- Except for the dry driven grout method, the total volume of sealing materials must not be less than 80% of the total volume of the annular space.

## 3701-28-10 (E)(7)

- A small diameter casing extension on large diameter fiberglass cased wells are only required to be grouted 6 inches above and 6 inches below the connection between the smaller and larger diameter casings.
- The annular space around the small diameter casing is to be filled with clean clay.

## 3701-28-10 (E)(8)

- Where the borehole of a well is consistently dry, consideration must be given as to which type of grout is appropriate.

# 3701-28-10 (F)

- **Pressure grouting requirements:**
  - Tremie or conductor pipe used for pressure grouting is to be of sufficient diameter, strength and pressure rating to grout to depth needed
  - may be left in place if the pipe is filled with grout and the depth being grouted is less than 100 feet.

## 3701-28-10 (F), Cont

- Except when grouting flowing wells, when pressure grouting deeper than 100 feet, the tremie pipe is to be raised with each batch of grout while keeping the end submerged a minimum of 10 feet below the surface of the grout in the annular space.

# 3701-28-10 (F)(3)

## **Shale Traps**

- A minimum of 2 shale traps shall be installed no more than 6 inches from the end of the casing when grouting up to 200 feet.
- An additional shale trap shall be added for each 100 foot, or part thereof, of increased grouting depth.

## 3701-28-10 (F)(3), Cont.

- Shale traps shall be placed so that the bottom of the upper shale trap is inside the lower shale trap.
- Shale traps may be filled with granular or coarse grade bentonite prior to being placed in the borehole.

## 3701-28-10 (F)(3), Cont.2

- If casing is set directly on the bottom or a ledge of consolidated formation, there is a 2 inch per side annular space and a minimum of 10 feet of coarse grade bentonite is placed from the bottom up, no shale trap is required.

# 3701-28-10 (F)(4)

## **Grout Additives:**

- Acid soluble cellulose fiber may be added to grout slurry to minimum fluid loss in the borehole.

# 3701-28-10 (H)

- **Requirements for dry pouring bentonite into the annular space.**
  - Coarse grade or pelletized grout shall be poured using approved pouring methods
  - the annular space must be equal to or greater than 2 inches per side as measured from the outside of the casing or coupling
  - Poured no greater than 200 feet in depth.

## 3701-28-10 (H), Cont.

- Granular grade bentonite may be dry poured, without screening, into a dry borehole where the annular space is equal to or greater than 2 inches per side as measured from the outside of the casing or coupling and to a depth is no more than 25 feet.
- Dry bentonite grout may never be poured in a borehole containing drilling fluids.

# 3701-28-10 (I)

## **Requirements for dry driven grout method:**

- Applies to cable tool, driven casing hammer or any other method where permanent steel casing is driven.
- A factory manufactured drive shoe is to be on the end of the casing being driven.
- A starter hole larger than the diameter of the casing must be constructed to a maximum of 5 feet deep. If the starter hole is deeper than 5 feet, a 2 inch annular space is required.
- Granular bentonite is to be mounded around the casing to be driven and kept dry.

# 3701-28-10 (J)

**Filter packs or formation stabilizers** to be placed in accordance with the following:

- Placed adjacent to well screen
- Extend a maximum of 2 feet above a screen in wells equal to or smaller than 6 inches in diameter and a maximum of 4 feet above wells larger than 6 inches in diameter.
- Shall not extend less than 10 feet from the natural ground surface.

# 3701-28-10 (J), Cont.

- For wells larger than 20 inches in diameter, filter pack/formation stabilizers shall not be greater than 6 inches per side for wells less than 30 feet deep and shall be no greater than 4 inches per side for wells greater than 30 feet deep.
- Filter packs/formation stabilizers are not to be placed inside casing or liner pipe.
- Except in flowing well conditions, all drilling fluids are to be flushed from the annular space before the filter pack/formation stabilizers are placed.

# 3701-28-10 (K)

## **Well Screens**

- Well screens are to be placed in wells completed in unconsolidated or incompetent formations.
- Screens are to be attached directly to the casing or else be telescoped in using a K packer.
- Shale traps may not be substituted for K packers.
- Well screens shall not be installed <10 feet from the natural ground surface.

# 3701-28-10 (L)(2)

## **Flowing wells construction:**

- Must prevent flow in the annular space
- If water flowing at the ground surface exceeds 5 gallons per minute, an enlarged borehole, at least 4 inches larger than the diameter of the casing, is to be drilled partially into the confining formation or to a depth of 25 feet and the annular space pressure grouted with cement.
- To be completed at the surface so water does not flow from under the cap.

# 3701-28-10 (L)(4)

- Flowing well discharge shall be controlled to reduce the loss of head and to conserve water by
  - extending the casing
  - installing a vermin proof cap, pitless adapter or discharge to an acceptable location
  - Installing a flowing well pitless adapter
- Other methods as approved by the department

# 3701-28-10 (L)(5)

- Flowing wells may discharge up to 10 gpm when the owner demonstrates he has a suitable discharge point on his property, that there is no possibility of cross connection and when:
  - Control is not practical due to high pressure
  - Control would result in the production of sand or turbidity.
  - The discharge will not adversely affect the surrounding area or impact surface drainage.
  - The discharge line will be protected by an air gap or backflow protection.

# 3701-28-10 (M)

## **Wells constructed in cavernous, highly fractured formations or mine shafts.**

- Additional method to seal off void:  
Primary casing shall be set to the top of the void and grouted in place. Secondary casing may be set inside the primary casing through the void and be grouted in place.

# 3701-28-10 (N)

## **Changes to construction standards for saline producing formations:**

- Wells in formations that produce saline water exceeding 3000 ppm shall be constructed according to the following:
  - All saline producing formations shall be cased through and the annular space sealed by pressure grouting with cement.
  - Only cement grouts not affected by saline water are to be used.

## 3701-28-10 (N), Cont.

- If the saline producing formation cannot be isolated from the water source, the well is to be abandoned by sealing per 3701-28-17 OAC, ...OR
- the system owner shall apply for a variance to use the water. In no case is a variance to be granted that would allow a well producing saline water to contaminate another aquifer or another private water system.

# 3701-28-10 (O)

## **Wells producing methane gas:**

- Wells that produce methane gas at concentrations greater than 10 mg/l (ppm) are to be vented to the atmosphere by:
  - Venting through a well cap with a screened vent, at least 1 inch in diameter, extending to a height where the methane will not present a hazard.
  - Use of a gas shroud.
  - Use of a vented tank equipped with spray device to disperse the water.

## 3701-28-10 (O), Cont.2

- Methane producing wells located in structures shall be vented to the outside through a minimum 3 inch vent pipe extending at least 10 feet from the foundation, at least 18 inches above the ground with a downturned and screened end.
- Other methods approved by the director.

# 3701-28-10 (P)

## **Pitless units and pitless adapters:**

- In addition to their being in compliance with these rules, pitless units and adapters are to be installed in accordance with the manufacturer's requirements.
  - Are to be installed below the frost line.
  - The excavation surrounding the casing and pitless adapter shall be backfilled with clean clay or native soils.

# 3701-28-10 (Q)

## **Well caps and seals:**

- All well caps and seals shall meet current water systems council pitless adapter standard and meet the following:
  - *New* - A well must have a cap on it to prevent entrance of contaminants at all times.
  - *New* - Except in the cases where venting is required in floodplain installations or methane gas control, there shall be no holes in a well cap.

# 3701-28-10 (Q), Cont.

- **Except for drive point wells, vents shall comply with:**
  - All caps are to be vented except for those used on single pipe jet pump installations.
  - All caps shall be self-draining and screened with non-corrosive mesh and terminate 12 inches above a floor or 3 feet above the 100 year flood plain elevation.
  - Vents shall have an total vent surface of  $\frac{3}{4}$  inch on wells where the casing is equal to or less than 6 inches in diameter and shall have a total vent surface equal to 1 inch on wells where the casing diameter is greater than 6 inches.

# 3701-28-10 (S)

## **Pump construction, installation and design:**

- Any fuel operated motor used to power a pump shall meet the isolation distance specified in 3701-28-07 OR shall be installed within a watertight secondary containment vessel.
- The pressure rating of plastic drop pipe shall be adequate to withstand the total pressure of the system.

# 3701-28-10 (S), Cont.

- Drop pipes and check valves shall not have holes installed in them for drainage.
- A check valve shall be installed no more than 20 feet from the top of submersible pumps.
- All electrical connections to be made in accordance with manufacturer's specifications.
- Pumps to be installed at a depth and configuration appropriate to the well construction as recommended by the manufacturer.

# 3701-28-10 (T)

## **Hand Pumps:**

- *New* - A hand pump shall not be installed by constructing a hole or opening in a well cap.
- Prior hand pump rule requirements still apply.

# 3701-28-10 (V)

## **Pressure Tanks – *New Requirements***

- For new construction, a pressure tank shall not be located in a crawl space unless the crawl space is reasonably accessible to a standing, average sized adult.
- If a pressure tank is not reasonably accessible, a sampling port shall be located within 3 feet of the entrance to the crawl space.

Note: This applies to existing systems under an alteration permit.

## 3701-28-10 (V), Cont.

- Except for jet pump installations, pressure tanks shall have a pressure relief valve installed.
- In-well pressure tanks shall be installed in accordance with the manufacturer's requirements.

# 3701-28-10 (W)

## **Maintenance and modification of wells:**

- In (3), “distribution system” has been added to the list of components whose malfunction will require prompt repair.
- Wells are to be disinfected after repair or maintenance is done on a well.