



Ohio Administrative Code

Rule 3701-28-15 Continuous disinfection, continuous filtration, cyst reduction filtration and point of entry water treatment.

Effective: January 1, 2020

(A) All private water systems using continuous disinfection and continuous filtration shall conform to the requirements of this rule.

(B) All water treatment components shall be protected from weather, freezing, and contamination, and located so as to be easily inspected, cleaned, and serviced. With the exception of basement or accessible crawlspace installation, all water treatment components of the system shall be stored above ground and housed in an enclosed area.

(C) All filter and disinfection systems shall be designed so as to meet the calculated peak demand flow requirements of a household, but be capable of providing no less than a ten gallon per minute flow.

(D) All disinfection tanks and components, filter tanks and other treatment components required in this rule shall have a legible label placed on the tank or component describing the specific function of the device. It shall be the responsibility of the installing private water system contractor to ensure that the tanks and components are properly labeled.

(E) The following private water systems shall be provided with continuous disinfection, as provided in this rule:

(1) Ponds;

(2) Springs;

(3) Cisterns;

(4) Wells constructed with less than fifteen feet of casing constructed in compliance with this chapter;



(5) Wells constructed with less than twenty-five feet, but no less than fifteen feet, of casing constructed in compliance with this chapter; and

(6) Wells with fifteen or more feet of casing that have been determined to be contaminated with bacteria that exceed the maximum contaminant level in paragraph (N) of rule 3701-28-04 of the Administrative Code shall be required to be provided with continuous disinfection if the construction of the well is determined to be in satisfactory compliance with this chapter and the aquifer is known or suspected of being contaminated with bacteria that cause the well water to exceed the maximum contaminant level in paragraph (N) of rule 3701-28-04 of the Administrative Code.

(F) Except private water systems utilizing ultraviolet light for continuous disinfection and pond filtration systems, which shall comply with the continuous filtration requirements of paragraph (J) of this rule, the following private water systems shall be provided with additional cyst reduction filtration that meets NSF 53-2016 or an equivalent standard as provided in this rule. For private water systems that utilize ultraviolet light for continuous disinfection an absolute five micron filter shall be provided for the following systems in accordance with paragraph (H) of this rule:

(1) Springs;

(2) Cisterns;

(3) Wells constructed with fifteen feet or less of casing in compliance with this chapter.

(G) A sampling faucet shall be installed after each disinfection and filtration step of a treatment train in accordance with paragraph (E)(2) of rule 3701-28-08 of the Administrative Code.

(H) Private water systems utilizing cyst reduction filtration shall meet the following requirements in addition to the requirements in paragraph (F) of this rule:

(1) The cyst reduction filters shall be installed to ensure a minimum flow rate that is adequate for the system owner's needs. Multiple cyst reduction filters used in order to ensure the minimum or greater flow rate shall be installed in parallel; and



(2) Each cyst reduction filter housing shall be clearly labeled with the size in absolute microns of the required cyst reduction replacement filter.

(I) All pond water systems shall have a point-of-entry granular activated carbon filter installed as the last step of the filtration portion of the treatment train.

(J) All pond water systems shall be continuously filtered by one of the following methods:

(1) A slow sand filter which meets the requirements of paragraph (R) of this rule;

(2) A pressurized rapid sand filter system that meets the requirements of paragraph (S) of this rule; or

(3) A pre-coat filter that meets the requirements of paragraph (T) of this rule.

(K) 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;

(3) Ultraviolet light disinfection system dosage shall be measured as microwatts per second per centimeter squared or equivalent millijoule. One millijoule equals one thousand microwatt seconds per centimeter squared; and

(4) Disinfection and filter systems shall be designed to meet the peak water use demands of the users or meet the maximum flow capability of the pump used.

(L) Disinfectants shall be applied prior to the water storage tank or retention tank to obtain the contact time required for the specific disinfectant used.



(1) Disinfectant solution reservoir tanks that use chlorine or iodine shall have a label applied by the contractor installing the system that states in bold one half inch lettering the warning "Failure to maintain the solution in the tank at concentrations sufficient to ensure continuous disinfection of the household water supply increases the possible health risk to the users."

(2) A disinfection system contact tank shall conform to the following:

(a) The contractor installing the system shall apply a label that identifies the component as the "retention tank for the disinfection system."

(b) For one-, two-, or three-family dwellings the disinfection system contact tank shall be a minimum of one hundred twenty gallons per household being served and be designed to reduce short-circuiting of the disinfection solution through the contact tank. A contact tank less than one hundred twenty gallons can be used if the tank design ensures adequate contact time and is approved by the department.

(c) In the case of buildings with private water systems serving up to twenty-four people or having more than three service connections, the system contact tank shall be of adequate size to ensure at least eight minutes of contact when used at peak demand and be designed to reduce short-circuiting of the disinfection solution through the contact tank.

(d) A contact tank is not required to be installed when chlorination or iodination is being used to maintain a chemical residual in the distribution lines immediately following continuous disinfection by ultraviolet light or ozone that are installed in accordance with this rule.

(M) 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 in milligrams per liter) for disinfection shall be four or greater; and

(3) The free chlorine residual in the water piping system shall be a minimum of 0.4 milligrams per



liter after eight minutes of contact.

(N) If an ultraviolet light (UV) system is used as the primary means of disinfection or is otherwise installed as an additional treatment device it shall meet all of the requirements of NSF 55-2017 for class A ultraviolet light treatment systems and shall be installed in accordance with the manufacturers requirements. Ultraviolet light systems that meet only NSF 55-2017 class B shall not be used for continuous disinfection or otherwise installed on a private water systems. An ultraviolet light system used as the primary means of disinfection shall also meet the following criteria:

(1) It shall be installed with an automatic shut-off device or warning device for instances where the ultraviolet light device is not functioning to insure proper disinfection of the household water supply;

(2) The influent water shall be pre-treated to meet all water quality parameters required by the manufacturer of the ultraviolet light unit or as required under NSF 55-2017 class A, including, but not limited to, hardness, iron, manganese, TDS, and turbidity in order to ensure optimal disinfection. The ultraviolet light unit shall be installed after any equipment used to soften the water or to remove iron or manganese or to improve clarity;

(3) An absolute filter size of no larger than five microns shall be installed in accordance with NSF 55-2017 class A prior to treatment of the water by the ultraviolet equipment;

(4) Where a private water system provides water to more than one dwelling or service connection, including all multi-family buildings, and ultraviolet light is used as the primary means of disinfection then either;

(a) Continuous disinfection shall be installed to maintain a chlorine residual of at least 0.2 milligrams per liter in the water distribution lines; or

(b) An NSF 55-2017 class A ultraviolet light device shall be installed in each dwelling after each service connection.

(5) If ultraviolet light is used for continuous disinfection of a private water system pond, additional oxidation using chlorine, iodine, or ozone shall be included as part of the disinfection and filtration



treatment train.

(O) 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 0.5 and one milligram per liter.

(P) If ozonation is the means of disinfection it shall be generated on site by corona arc discharge and 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) The water contact shall be achieved by the means of a combination of a venturi nozzle and cyclonic bubble diffuser;

(3) Ozone must have a minimum detectable residual of 0.1 milligram per unit after six minutes of contact;

(4) Ozone generators shall have air drawn through the system under a vacuum in order to prevent ozone gas leakage into the house;

(5) 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;

(6) All ozone generation chambers shall be constructed of stainless steel or of a material of equivalent resistance to destruction from ozone;



(7) Ozone generators shall have corona arc indicating lights.

(Q) All filter systems shall be installed so that a backflow prevention device or air gap protects the water system from the filter system backwashing discharge in accordance with rule 3701-28-08 of the Administrative Code.

(R) For the purpose of this rule "slow sand filtration" means a process of passing raw water through a porous granular medium by gravity, at a rate of less than seventy-five gallons per day per square foot of sand area, with substantial removal of particles by physical and biological mechanisms. Slow sand filters shall meet the following criteria:

(1) The filter tank shall be watertight and durable with a reasonably smooth, clean interior surface and shall be made of materials described in paragraph (A) of rule 3701-28-12 of the Administrative Code;

(2) All joints, connections, and other seams between component parts shall be sealed with non-toxic waterproof material that meets NSF 61-2016 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 of an inch (4.8 millimeter) or larger;

(4) All components shall be replaceable through a manhole in the filter tank;

(5) 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 two and one-half. 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;



(6) One inch gravel shall be placed six inches thick below the one-half inch gravel. One-half inch gravel shall be placed three inches thick below the three-eighths inch gravel. Three-eighths inch gravel shall be placed three inches thick below the sand. Sand shall be placed from the surface to a minimum depth of thirty inches. A fabric pre-filter may be used on the surface of the sand;

(7) Water shall be applied to the filter at rate of no more than 0.052 gallons per minute per square foot of filter area;

(8) 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 Gallons per day	Bedrooms	Filter surface area (square feet)	Square or rectangular (feet)	Round diameter (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

(9) Include a water storage tank with a capacity of no less than two hundred gallons or sixty gallons per bedroom per day, whichever is larger.

(S) For the purposes of this rule "rapid sand filter" means a filter system for treating water passing through a granular medium of approximately twelve to twenty micron filtration capability that includes additional components for filtration and/or coagulation of smaller material while maintaining pressure throughout the system and distribution line. A rapid sand filter alone shall not be used for cyst reduction. In addition to the requirements of paragraph (J) of this rule, pressurized rapid sand filter systems shall meet the following criteria:

(1) A pressurized rapid sand filter system shall include:

(a) Chemical coagulation meeting NSF 60-2016 followed by a retention tank specifically for coagulation, followed by the rapid sand filter, and if ultraviolet light is not being utilized for continuous disinfection, followed by a cyst reduction cartridge filter(s) meeting NSF 53-2016 or equivalent. Chemical coagulation shall be adjusted as pond water condition change;



(b) A pressurized rapid sand filter, followed by a nominal ten micron cartridge filter followed by an absolute five micron cartridge filter, and if ultraviolet light is not being utilized for continuous disinfection, followed by a cyst reduction cartridge filter(s) meeting NSF 53-2016 or equivalent for cyst reduction; or

(c) Alternative coagulation or filtration techniques as approved by the department.

(2) All cartridge filter housings shall be clearly labeled for the specific required replacement filter size in absolute and/or nominal microns.

(3) Any chemical used for coagulation shall be listed on NSF 60-2016.

(4) The rapid sand filter component shall contain bed depth of no less than twenty-four inches and a volume of no less than 1.5 cubic feet of sand or the equivalent filter material listed on NSF 61-2016. The effective sand size shall be between .30 and .45 millimeters. The sand uniformity coefficient shall not be greater than 2.5.

(a) Granular activated carbon or other treatment media that meets NSF 61-2016 may be used in the filter tank in addition to the required filtering media.

(b) The filter media tank shall be labeled describing all filter material enclosed, including type(s), size, and uniformity coefficient.

(5) Service flow rates of the rapid sand filter shall not exceed filter media manufacturer's specifications and shall provide adequate flow or storage capacity to meet the private water system demand.

(T) 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.

(U) 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 NSF 53-2016, may be used in addition to the filter designs required under this rule.