

Treatment Requirements by State

ALABAMA

ALASKA

ARIZONA

- Secondary treatment, filtration, nitrogen removal treatment, and disinfection. Filtration means a treatment process that removes particulate matter from the wastewater by passage through porous media, and disinfection means a treatment process that uses oxidants, UV, or other agents to kill or inactivate pathogenic organisms in wastewater.
- Chemical feed facilities must be provided, although they need not be used if the 24 h average turbidity criterion is achieved without chemical addition.
- Alternative treatment methods may be used provided the owner demonstrates through pilot plant testing, existing water quality data, or other means that the alternative method reliably produces a reclaimed water that meets the disinfection criteria and the total nitrogen criteria before discharge to a reclaimed water distribution system.
- After filtration and immediately before disinfection the mean 24h turbidity of filtered effluent must be ≤ 2 NTU and must not exceed 5 NTU at any time.

ARKANSAS

CALIFORNIA

- Tertiary treatment is required, including coagulation and filtration.
 - Coagulation refers to oxidized wastewater in which colloids and particulates have been destabilized and agglomerated by the addition of floc-forming chemicals.
 - Filtration refers to:
 - (a) passage through natural undisturbed soils or a bed of filter media
 - At a rate ≤ 5 gpm/ft² in gravity, upflow, or pressure filters; or ≤ 2 gpm/ft² in traveling bridge automatic backwash filters, and;
 - So that the average turbidity of the filtered water is ≤ 2 NTU over 24h; 5 NTU $\leq 5\%$ of time in 24 h; and 10 NTU at any time, OR
 - (b) use of microfiltration, ultrafiltration, nanofiltration, or reverse osmosis membranes so that the turbidity of the filtered water is < 0.2 NTU $> 5\%$ of the time in 24 h and < 0.5 NTU at any time.
- Coagulation can be omitted if (a) the filter effluent is below 2 NTU, and (b) continuous turbidity monitoring indicates that the influent to the filters does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU.
- Disinfection must be accomplished by:
 - (a) chlorination following filtration that provides a minimum CT (total chlorine residual concentration x modal contact time) of 450 mg-min/L, with the modal contact time ≥ 90 min, based on peak dry weather design flow, OR;
 - (b) a disinfection process following filtration that inactivates 99.999 percent of F-specific bacteriophage MS2 or polio virus in the influent wastewater.
- Regional boards may prescribe water reclamation requirements for a particular project after consultation and receipt of recommendations from the State Department of Health Services.
- Novel treatment methods are not excluded, but it must be demonstrated that they can assure an equal degree of treatment and reliability.

COLORADO

- Oxidation, filtration, and disinfection are required.

CONNECTICUT

DELAWARE

- Advanced level treatment with high-level disinfection is required. Treatment must include oxidation, clarification, coagulation, flocculation, filtration, and disinfection.
- Effluent should not be nitrified before application because nitrification could increase leaching of nitrate to the groundwater.
- Stipulations about how monitoring equipment is to be installed, used and maintained, as well as the method, frequency, and location of sample collection can be provided on a case-by-case basis by the regulatory agency, so that environmental and human health protection is optimized.
- Continuous on-line turbidity monitoring prior to disinfection is required. Continuous on-line monitoring of residual disinfection concentrations is required at the compliance monitoring point.

FLORIDA

- Secondary treatment with filtration and high-level disinfection is required. Secondary treatment is treatment designed so that the effluent meets certain water quality limits after disinfection. The designation of high level disinfection means that additional total suspended solids (TSS) control beyond secondary treatment levels is required, and the fecal coliform limits required are more stringent than those for secondary treatment.
 - TSS control should be provided by filtration; TSS in any sample before disinfection must be ≤ 5 mg/L.
- Chemical feed facilities for coagulant aids must be provided even if their use is not necessary to meet the TSS limits.
- Specific CT values are prescribed for different pre-chlorination effluent fecal coliform concentrations. Minimum allowable contact time at peak hourly flow is 15 min.
- Special evaluation and treatment stipulations are required when various classifications of ground water are used for injection of reclaimed water. A key groundwater characteristic of concern in this regard is TDS.
- If a treatment facility receives discharge from significant industrial users, a pretreatment program is required.
- Surface water, ground water, treated storm water, drinking water, and demineralization concentrate may be used to supplement the reclaimed water supply if certain stipulations are met that are specific to each supplemental water supply.
- A facility must have capacity of at least 0.1 mgd in order to provide water for reuse by slow rate land application in public areas, on residential properties, or on edible crops.
- Mixing must be rapid and uniform.

GEORGIA

- A biological oxidation process or the equivalent is required; multiple clarification units (or other method, such as membrane filtration) may be acceptable.
- Coagulation is required, although chemical feed systems may remain idle if, after start-up of the system, the 3 NTU level can be maintained without chemical addition.
- Filtration and continuous disinfection or equivalent (other process trains such as physical-chemical treatment followed by membrane filtration) are required after secondary treatment (as defined in 40 CFR 133.102): 30 mg/L BOD5, and 30 mg/L SS.
- Monitoring for detectable disinfection residual or recording of UV output and transmittance is required.

HAWAII

- Oxidation, filtration and disinfection are required, such that 99.999% of plaque-forming units of F-specific bacteriophage MS2 or polio virus in the water are inactivated and/or removed and the water meets the stipulated fecal coliform requirements (see below).
- Suggested treatment schemes include filtration with continuous chemical addition/coagulation.
- Chemical pretreatment facilities are required in all cases where granular media filtration is used; membrane filtration may be used.
- Chemical addition/coagulation can be accomplished with a rapid mix unit, or an in-line mixer; flocculation and aggregation may occur subsequently in the lower layers of a deep bed up-flow filter, or in the upper layers of a deep bed gravity filter. Coagulant types and doses, mixing and dispersion requirements, and residence times are stipulated.
- Theoretical chlorine contact time should be 120 minutes or more, and actual modal contact time should be 90 minutes or more, throughout which time the chlorine residual must be 5 mg/l or greater. (Chlorine contact time may also be set by demonstrating that it reliably achieves the virus reductions noted above.) Disinfection must limit fecal coliform bacteria to stipulated water quality limits. The chlorination facilities shall have adequate capacity to maintain a residual of 10 mg/l.
- When UV is used, final effluent must meet the applicable provisions of the UV Guidelines for Drinking Water and Water Reuse dated December 2000 or the latest version, published by the National Water Research Institute (NWRI) and the American Water Works Association Research Foundation (AWWARF).
- UV disinfection systems must be able to meet the required inactivation levels for the target microorganisms. Detailed guidelines for the UV disinfection system design are provided.
- Provisions are included for the demonstration of alternate treatment methods that can meet the cited water quality and reliability requirements.

IDAHO

- Water must be oxidized, coagulated, clarified, filtered (or treated by an equivalent process), and adequately disinfected.

ILLINOIS

- The minimum treatment required is a two-cell lagoon with tertiary sand filtration and disinfection, or a mechanical secondary treatment facility with disinfection.

INDIANA

- Secondary treatment is required, also any additional treatment necessary to produce effluent that meets the stated water quality limits.
- Treatment may be by activated sludge processes, trickling filters, rotating biological contactors, stabilization pond systems, or other approved secondary treatment process.
- Disinfection may be by chlorination, ozonation, chemical disinfectant, UV radiation, membrane processes, or another approved method.

IOWA

- The minimum required treatment is a primary lagoon-cell receiving ≤ 25 lb BOD₅/acre-day. Additional treatment may be required on case-by-case basis.
- Disinfection is required prior to spraying and after storage. A minimum of contact time of 15 min is required for disinfection.

KANSAS

KENTUCKY

LOUISIANA

MAINE

MARYLAND

MASSACHUSETTS

- Secondary treatment, filtration, and disinfection are required, sufficient to reach BOD and TSS ≤ 30 mg/L. Filtration means passage through natural undisturbed soils or other filter media such as sand and/or anthracite. Disinfection means the destruction, inactivation, or removal of pathogenic microorganisms by chemical, physical, or biological means. This may be accomplished by chlorination, ozonation, other chemical disinfectants, UV radiation, membrane processes, or other processes.
- If proven innovative/alternative technologies deliver comparable effluent quality to these traditional forms of treatment, they may be substituted.

MICHIGAN

- The treatment system must have the hydraulic capacity to treat organic and inorganic loadings so that the discharge meets the water quality standards.

MINNESOTA

MISSISSIPPI

MISSOURI

- Minimum treatment requirements are those equivalent to that obtained from a primary wastewater pond cell designed according to state regulations for wastewater treatment.
- Pond depth may be increased to include wastewater storage on top of the primary volume.

MONTANA

- Effluent must be oxidized to a level of treatment comparable to that from facilities producing secondary effluent.
- Coagulation is required, either by the addition of suitable floc-forming chemicals, or by an equally effective method.
- Effluent must be filtered through natural undisturbed soils or filter media such as sand or diatomaceous earth.
- Disinfection is required by chemical, physical or biological means to destroy pathogenic organisms.
- Wastewater treatment by a sequence of unit processes that will assure an equivalent degree of treatment and reliability may also be approved.

NEBRASKA

- Disinfection is required to meet the stated coliform limits.

NEVADA

- A minimum of secondary treatment with disinfection is required.
- Plans submitted for permitting must show the disinfection system, including system redundancy; also disinfection dosing, contact time, and other related factors.
- Plans must specify a filter system design, including system redundancy; also filter design calculations for sizing, pumps, and backwash cycle.
- A design plan must include provisions for backwash disposal.
- A design plan must include provisions for chemical storage and spill containment.

NEW HAMPSHIRE

NEW JERSEY

- Secondary treatment is required.
- Secondary treatment and filtration are required.
- Chemical addition may be necessary prior to filtration.
- Prior to disinfection, filtration must achieve TSS \leq 5 mg/L, with continuous monitoring for turbidity.
- Disinfection must achieve \leq 2.2 fecal coliforms per 100 mL of reuse water. Alternatives to chlorine for disinfection may be approved after submission of an operating protocol and statistically significant monitoring data that indicate compliance with this specification.

NEW MEXICO

- Reclaimed water shall be at all times adequately treated and disinfected, where adequate treatment refers to treatment such that at the point of diversion for irrigation the fecal coliform concentration meets the stated limits.
- (• Secondary treatment is required after primary treatment. Secondary treatment options include activated sludge, trickling filters, rotating biological contactors, and many stabilization pond systems.)
- (• Filtration is required.)
- (• Disinfection may be accomplished by chemical, physical or biological means, including chlorination, ozonation, other chemical disinfectants, UV radiation, membrane processes, or other processes.)

NEW YORK

NORTH CAROLINA

- A tertiary quality effluent (filtered or equivalent) is required.
- Aerated flow equalization facilities are required with a capacity based on either a representative diurnal hydrograph or at least 25% of the daily system design flow.

NORTH DAKOTA

- Secondary treatment is required.
- For waste stabilization lagoon systems, only water from secondary or tertiary lagoon cells may be used.
- If chlorination is available, maintenance of a 0.1 mg/L residual is preferred; the residual should be monitored daily at the point of use farthest from the treatment plant.
- Effluent leaving the irrigation site must conform to the Standards of Water Quality for North Dakota.

OHIO

- Wastewater should be stabilized, aerobic and disinfected.
- Suspended solids should be removed; supplementary screening may be necessary.
- Disinfection should occur prior to storage of water in holding ponds or tanks, or prior to direct application. Chlorination or UV can be used.

OKLAHOMA

- Multipurpose use areas must receive secondary treatment or equivalent.
- Disinfection is also required.

OREGON

- For public access sites, Level IV treatment (as described by the State) is required. Such treatment includes biological treatment to produce an oxidized wastewater and coagulation by the addition of chemicals or by an equally effective method.
- To meet stipulated turbidity limits, filtration of oxidized, coagulated, clarified wastewater is required, using natural undisturbed soils or filter media.
- Disinfection is required by chemical, physical, or biological means.
- Treatment processes that do not utilize coagulation may be approved if equivalent effluent quality can be demonstrated.

PENNSYLVANIA

- Secondary treatment is required to achieve a minimum of 85% removal of C-BOD5 and TSS.
- Pretreatment requirements are stipulated on a case-by-case basis.
- All wastes containing pathogens must be disinfected prior to application.
- Adjustments to these standards may be made on a case-by-case basis, or the adjustments may be made to minimum concentration requirements for effluent quality.

RHODE ISLAND

SOUTH CAROLINA

- Advanced wastewater treatment methods sufficient to achieve the stipulated effluent water quality limits are required.

SOUTH DAKOTA

- Secondary treatment is required, with disinfection sufficient to ensure the stipulated total coliform levels (from Water Quality section: total coliforms \leq 200 cfu/100 mL).

TENNESSEE

- Biological treatment is required with minimal nitrification of effluent.

TEXAS

UTAH

- A secondary treatment process is required, which may include activated sludge, trickling filters, rotating biological contactors, oxidation ditches, or stabilization ponds. After secondary treatment, monthly mean BOD and TSS of the effluent should be <25 mg/L.
- Filtration is required through filter media or approved membrane processes.
- Disinfection is required to destroy, inactivate, or remove pathogenic microorganisms by chemical, physical or biological means. Chlorination, ozonation, other chemical disinfectants, UV radiation, membrane processes or other approved processes are allowed.
- A turbidity standard (5 mg/L TSS or less) must be met before disinfection. If a turbidity standard cannot be met, but it can be demonstrated that there exists a consistent correlation between turbidity and the total suspended solids, then an alternate turbidity standard may be established. This will allow continuous turbidity monitoring for quality control while maintaining the intent of the turbidity standards to assure adequate disinfection.

VERMONT

Several systems have been installed with permit limits of 10 mg/L BOD and 10 mg/L TSS, with chlorination/dechlorination and monitoring required.

VIRGINIA

WASHINGTON

- Wastewater must, at a minimum, be oxidized, coagulated, filtered, and disinfected.
- Treatment methods other than those stipulated may be accepted if the applicant can demonstrate that they will assure an equal degree of treatment, public health protection, and treatment reliability. Pilot plant or other studies may be required to demonstrate that alternative methods of treatment can reliably produce reclaimed water that is essentially free of measurable levels of viable pathogens.

WEST VIRGINIA

WISCONSIN

WYOMING

- Advanced treatment and/or secondary treatment is required.
- A level of disinfection is required such that number of fecal coliform organisms is $\leq 2.2/100$ mL.