

Water quality guidelines for wastewater reuse are established by the Minnesota Pollution Control Agency and are designed to protect public health and exposure to pathogens and microorganisms that could cause illness. At a minimum, all reused municipal wastewater must be treated by a secondary treatment process or its equivalent.

Discharge permit limits and level of treatment requirements for municipal wastewater facilities are based on the specific reuse application and the potential for human exposure. These requirements establish a limit for total coliform bacteria, fecal coliform bacteria, and turbidity in the final treated water.




<p style="writing-mode: vertical-rl; transform: rotate(180deg);">high</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">↑</p>	<ul style="list-style-type: none"> <li>• Food crops where the recycled water contacts the edible portion of the crop, including root crops</li> <li>• Irrigation of residential landscape, parks, playgrounds, school yards, golf courses</li> <li>• Toilet flushing</li> <li>• Decorative fountains</li> <li>• Artificial snow making, structural fire fighting</li> <li>• Backfill consolidation around potable water pipe</li> <li>• Industrial process water that may come in contact with workers</li> <li>• Industrial or commercial cooling or air conditioning involving cooling towers, evaporative condensers, or spray that creates mist</li> </ul>	<p style="text-align: center;"><b>2.2</b> MPN/100 ml. Total Coliform</p> <p style="text-align: center;"><b>2</b> NTU daily average; <b>10</b> NTU daily max. turbidity</p>	<p style="text-align: center;"><b>Disinfected Tertiary</b></p> <hr/> <p style="text-align: center;"><b>Secondary + Filtration + Disinfection</b></p> <div style="border: 1px solid black; background-color: #0056b3; color: white; padding: 5px; text-align: center;"> <p><b>i</b></p> <p>NTU stands for Nephelometric Turbidity Unit. It is a standard measurement of turbidity in water or wastewater. MPN stands for maximum probable number.</p> </div>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Potential for human contact</p>	<ul style="list-style-type: none"> <li>• Cemeteries</li> <li>• Roadway landscaping</li> <li>• Ornamental nursery stock and sod farms with restricted access</li> <li>• Pasture for animals producing milk for human consumption</li> <li>• Nonstructural fire fighting</li> <li>• Backfill consolidation around nonpotable water pipe</li> <li>• Soil compaction, mixing concrete, dust control on roads and streets</li> <li>• Cleaning roads, sidewalks, and outdoor work areas</li> <li>• Industrial process water that will not come into contact with workers</li> <li>• Industrial boiler feed</li> <li>• Industrial or commercial cooling or air conditioning not involving cooling towers, evaporative condenser, or spray that creates mist</li> </ul>	<p style="text-align: center;"><b>23</b> MPN/100 ml. Total Coliform</p>	<p style="text-align: center;"><b>Disinfected Secondary 23</b></p> <hr/> <p style="text-align: center;"><b>Secondary + Disinfection</b></p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">low</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">↓</p>	<ul style="list-style-type: none"> <li>• Fodder, fiber, and seed crops</li> <li>• Food crops not for direct human consumption</li> <li>• Orchards and vineyards with no contact between edible portion</li> <li>• Non food bearing trees, such as Christmas trees, nursery stock and sod farms not irrigated less than 14 days before harvest</li> <li>• In Minnesota, this is commonly called “spray irrigation”</li> </ul>	<p style="text-align: center;"><b>200</b> MPN/100 ml. Fecal Coliform</p>	<p style="text-align: center;"><b>Disinfected Secondary 200</b></p> <hr/> <p style="text-align: center;"><b>Secondary + Disinfection</b></p> <p style="font-size: small;">(stabilization pond systems with 210 days of storage do not need a separate disinfection process)</p>

The values in this table are based on the State of California Regulations, which the Minnesota Pollution Control Agency (MPCA) has used as guidance for the permitting of wastewater reuse since 1992. Like Minnesota, many other states have used California regulations as a template for their own requirements.

# Key Definitions

**OXIDIZED WASTEWATER** is wastewater in which the organic matter has been stabilized, is nonputrescible (not liable to decay or decompose), and contains dissolved oxygen.

**DISINFECTED SECONDARY-200 EFFLUENT** is wastewater in which the concentration of fecal coliform bacteria in the disinfected effluent does not exceed 200 colonies per 100 milliliters.

 The State of California Department of Public Health has published a report titled, "Treatment Technology Report for Recycled Water," and lists specific brand name technologies which have been demonstrated to meet the specific treatment requirements.



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The highest level of treatment, "disinfected tertiary" also requires filtration.

**DISINFECTED SECONDARY-23 EFFLUENT** is wastewater that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a most probable number (MPN) of 23 per 100 milliliters.

**Detailed Definition:** The median concentration of total coliform bacteria in the disinfected effluent does not exceed an MPN of 23 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30 day period.

**DISINFECTED TERTIARY EFFLUENT** means a filtered and subsequently disinfected wastewater that meets specific criteria regarding the method and/or effectiveness of the disinfection process, and total coliform bacteria concentration.

**Detailed Definition:** Disinfected tertiary effluent means a filtered and subsequently disinfected wastewater that meets the following criteria:

(a) The filtered wastewater has been disinfected by either:

(1) A chlorine disinfection process following filtration that provides a CT (the product of total chlorine residual and modal contact time measured at the same point) value of not less than 450 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow; or

(2) A disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and/or remove 99.999 percent of the plaque forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration.

(b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

Definitions on this page are based on California Title 22 Code of Regulations and MPCA guidelines for municipal wastewater reuse.



## ADDITIONAL RESOURCES

For more information on the regulatory aspects of wastewater reuse in Minnesota, visit:

[www.pca.state.mn.us/sites/default/files/wq-wwr1-01.pdf](http://www.pca.state.mn.us/sites/default/files/wq-wwr1-01.pdf)

For information on an interagency effort to develop recommendations for water reuse policies in Minnesota, visit:

[www.health.state.mn.us/divs/eh/water/dwp\\_cwl/reuse/index.html](http://www.health.state.mn.us/divs/eh/water/dwp_cwl/reuse/index.html)