

## Drinking Water Testing Parameters for Public Water Supplies

The following table is a summary list of all water quality testing parameters that are required for Public Drinking Water Supplies and other parameters that the Massachusetts Department of Environmental Protection (MassDEP) Drinking Water Program (DWP) often requires. It includes parameters with Maximum Contaminant Limits (MCL), MassDEP Office of Research and Standards Guidelines (ORSG), Action Levels (AL), Secondary Chemical Standards (SMCL), and other recommended concentration limits. The table does not include all contaminants for which a MassDEP ORSG limit has been established and a more comprehensive list of those contaminants may be found in The MassDEP Office of Research and Standards (ORS) webpage *Drinking Water Standards and Guidelines*, available at <https://www.mass.gov/guides/drinking-water-standards-and-guidelines>. For a Public Water System, an exceedance of an ORSG requires further evaluation to determine whether additional action is required.

Public Drinking Water standards and monitoring requirements are specified in the MassDEP Drinking Water regulations, 310 CMR 22:00 and are available at <https://www.mass.gov/regulations/310-CMR-22-the-massachusetts-drinking-water-regulations>. Each Public Water System receives specific water testing monitoring requirements and sampling frequencies from the MassDEP Drinking Water Program in the applicable regional office.

A Public Water System is a system for the provision to the public of water for human consumption, through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year.

Note: Private drinking water supplies are not regulated by MassDEP but by the local board of health. Check with your local board of health for any water testing requirements that have been established for your municipality. MassDEP Drinking Water Program provides the document titled *Private Well Guidelines* for the benefit of private well owners, well drillers, and local boards of health.. These guidelines can be found online at <https://www.mass.gov/service-details/private-well-guidelines>. There are no state-wide private drinking water testing requirements in Massachusetts, only those established by the local boards of health. .

The recommended concentration limits in the following tables are subject to change based on new research and updated reviews. The MassDEP Office of Research and Standards (ORS) webpage *Drinking Water Standards and Guidelines* should be checked for updated concentration limits, and general decision-making. This webpage is located online at: <https://www.mass.gov/guides/drinking-water-standards-and-guidelines>. For information on the derivation of the recommended concentration limits, and general information on the health effects of drinking water contaminants click on the links provided for the individual contaminants at the above MassDEP webpage.

For additional information see the following:

- MassDEP Drinking Water regulations, available at: <https://www.mass.gov/regulations/310-CMR-22-the-massachusetts-drinking-water-regulations>
- MassDEP Office of Research and Standards (ORS) webpage *Drinking Water Standards and Guidelines*, available at <https://www.mass.gov/guides/drinking-water-standards-and-guidelines>
- Guidelines and Policies for Public Water Systems; **Appendix M**, Attachment A, available at: <https://www.mass.gov/doc/consumer-confidence-reporting-requirements>.
- Information from the U.S. Environmental Protection Agency (EPA), available at: <https://www.epa.gov/ground-water-and-drinking-water> and <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>
- Contact MassDEP Drinking Water Program in Boston at [program.director-dwp@mass.gov](mailto:program.director-dwp@mass.gov) or 617-292-5770

## Recommended Analytes, Concentration Limits, and Monitoring Frequency

Concentrations are in milligrams per liter (mg/l) or nanograms per liter (ng/l) or picocuries per liter (pCi/l); to convert milligrams per liter (mg/l) to micrograms per liter (ug/l) multiply concentration in mg/l by 1000. Where noted, the value in the "recommended concentration limit" column is not a concentration but a different unit of measurement

Parameter	Recommended Concentration Limit
Inorganic Compounds	
Antimony	0.006 mg/l
Arsenic	0.010 mg/l
Asbestos	7 million fibers/l
Barium	2 mg/l
Beryllium	0.004 mg/l
Cadmium	0.005 mg/l
Chloride	250 mg/l <sup>1</sup>
Copper (action level)	1.3 mg/l
Chromium (total)	0.1 mg/l
Cyanide (as free cyanide)	0.2 mg/l
Fluoride	4 mg/l
Hardness <sup>2</sup>	200 mg/l
Iron <sup>2</sup>	0.3 mg/l <sup>1</sup>
Lead (action level)	0.015 mg/l
Manganese <sup>3</sup>	0.3 mg/l
Mercury	0.002 mg/l
Nitrate (N)	10 mg/l
Nitrite (N)	1 mg/l
Total Nitrate & Nitrite (N)	10 mg/l
Perchlorate	0.0020 mg/l
pH	Range 6.5 to 8.5 <sup>1</sup>
Selenium	0.05 mg/l
Sodium <sup>4</sup>	20 mg/l <sup>5</sup>
Thallium	0.002 mg/l

### Table Continued on next three pages

<sup>1</sup> The limit listed is the Secondary Standard that has been adopted by MassDEP for PWS. It is not based on health considerations.

<sup>2</sup> The recommended concentration limits for hardness and iron are not based on health considerations, but rather on the effects that iron may have on taste or color of drinking water and the effects that hardness and iron may cause such as staining of plumbing fixtures and clothing (in cloths washer) and the potential clogging of plumbing fixtures, valves, and pipes due to a buildup of mineral deposits within the plumbing.

<sup>3</sup> EPA has set a lifetime Health Advisory value of 0.3 mg/l for Manganese to protect against concerns of potential neurological effects. This advisory is based on the health risks posed to children under the age of 1 and infants on formula by the ingestion of Manganese.

<sup>4</sup> Sodium guideline is based on an eight (8) ounce serving. This guideline was established to protect persons on sodium restricted diets. If the sodium concentration is above the guideline and a person using the water is on a sodium-restricted diet, that person's physician should be consulted as to whether the water should be consumed.

<sup>5</sup> **ORSG**: Office of Research and Standards Guideline.

Continued:

Parameter	Recommended Concentration Limit	Comments
Turbidity		
Turbidity <sup>6</sup>	1 NTU <sup>7</sup>	
Synthetic Organic Compounds (SOC) <sup>8</sup>		<p>To reduce cost it is best to perform a monitoring screen initially using analytical method 505 or 508. The recommended monitoring screen won't provide analytical results for all of the SOC listed in Appendix A. Monitoring for the remaining SOC should be considered if contaminants are detected in the monitoring screen. This approach is consistent with what MassDEP requires for SOC monitoring at public water supplies. Owners of wells in agricultural areas are encouraged to conduct more frequent testing.</p> <p>If you request laboratory analysis of all of the SOC listed in Appendix A, MassDEP encourages you to request that the laboratory include analytical results for other synthetic organic compounds that the laboratory may normally include with the analysis of the synthetic organic compounds listed in this table at no additional cost.</p>
Alachlor	0.002 mg/l	
Atrazine	0.003 mg/l	
Benzo(a)pyrene	0.0002 mg/l	
Carbofuran	0.04 mg/l	
Chlordane	0.002 mg/l	
Dalapon	0.2 mg/l	
Di(2-ethylhexyl)adipate	0.4 mg/l	
Di(2-ethylhexyl) phthalate	0.006 mg/l	
Dinoseb	0.007 mg/l	
Diquat	0.02 mg/l	
1,2-Dibromo-3-chloropropane (DBCP)	0.0002 mg/l	
2,4-D (2,4-Dichlorophenoxyacetic acid)	0.07 mg/l	
Endothall	0.1 mg/l	
Endrin	0.002 mg/l	
Ethylene Dibromide (EDB)	0.00002 mg/l	
Glyphosate	0.7 mg/l	
Heptachlor	0.0004 mg/l	
Heptachlor epoxide	0.0002 mg/l	
Hexachlorocyclopentadiene	0.05 mg/l	
Lindane	0.0002 mg/l	
Methoxychlor	0.04 mg/l	
Oxamyl(Vydate)	0.2 mg/l	
Polychlorinated biphenyls (PCBs)	0.0005 mg/l	
Pentachlorophenol	0.001 mg/l	
Picloram	0.5 mg/l	
Simazine	0.004 mg/l	
2,3,7,8-TCDD (Dioxin)	3x10 <sup>-8</sup> mg/l	
Toxaphene	0.003 mg/l	
2,4,5-TP (Silvex)	0.05 mg/l	

<sup>6</sup> See the table and associated footnotes provided by EPA at <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations> for a discussion of the concern for turbidity in drinking water and the recommended concentration limit.

<sup>7</sup> NTU = Nephelometric turbidity unit.

<sup>8</sup> The SOC monitoring requirements for public water supply wells typically only involve screening by analytical method 505 or 508. The screening analysis does not test for all SOC listed in this table.

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Parameter	Recommended Concentration Limit	Comments
<b>Bacteria</b>		Initial monitoring for <i>Cryptosporidium</i> and <i>Giardia lamblia</i> is only recommended if the source is surface water (e.g. spring) or a well located within 100 feet of a surface water body or is prone to flooding. It is recommended that additional monitoring occur after any flooding event in which the flood waters reach the well location, or as otherwise specified by the local Board of Health for private wells.
Total Coliform Bacteria	Positive sample	
Enterococci	Positive sample	
<i>Cryptosporidium</i>	Positive sample	
<i>Giardia lamblia</i>	Positive sample	
<b>Radionuclides</b>		Monitor for radionuclides initially in wells completed in granite formations or in areas known to have high radionuclide levels and determine future sampling frequency based upon the results. If the gross alpha result is greater than 15 pCi/l then uranium testing should be performed. If the gross alpha result is greater than 5 pCi/l then Radium-226 and Radium-228 testing should be performed.
Gross Alpha Activity	15 pCi/l	
Radon-222 <sup>5</sup>	10,000 pCi/l	
Radium –226 & 228	5 pCi/l	
Uranium	0.03 mg/l	
<b>Volatile Organic Compounds (VOC)</b>		MassDEP encourages you to request that the laboratory include analytical results for other volatile organic compounds that the laboratory may normally include with the analysis of the volatile organic compounds listed in this table at no additional cost.
Benzene	0.005 mg/l	
Carbon Tetrachloride	0.005 mg/l	
Dichloromethane (methylene chloride)	0.005 mg/l	
1,2-Dichlorobenzene (o-DCB)	0.6 mg/l	
1,4-Dichlorobenzene (p-DCB)	0.005 mg/l	
1,2-Dichloroethane	0.005 mg/l	
1,2-Dichloroethylene (cis)	0.07 mg/l	
1,2-Dichloroethylene (trans)	0.1 mg/l	
1,1-Dichloroethylene	0.007 mg/l	
1,2-Dichloropropane	0.005 mg/l	
Ethylbenzene	0.7 mg/l	
Methyl Tertiary Butyl Ether (MTBE)	0.07 mg/l <sup>7</sup>	
Monochlorobenzene (chlorobenzene)	0.1 mg/l	
Styrene	0.1 mg/l	
Tetrachloroethylene (PCE)	0.005 mg/l	
Toluene	1 mg/l	
Trichloroethylene (TCE)	0.005 mg/l	
1,1,1-Trichloroethane (1,1,1-TCA)	0.2 mg/l	
1,2,4-Trichlorobenzene	0.07 mg/l	
1,1,2-Trichloroethane	0.005 mg/l	
Vinyl Chloride (VC)	0.002 mg/l	
Xylenes (total)	10 mg/l	

<sup>5</sup> ORSG: Office of Research and Standards Guideline.

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Parameter	Recommended Concentration Limit	Comments
Per- and polyfluoroalkyl substances (PFAS)		MassDEP recommends you request that the laboratory include analytical results for other PFAS chemicals that the laboratory may normally include with the analysis of the PFAS chemicals listed in this table at no additional cost.
perfluorooctane sulfonic acid (PFOS)	20 ng/l	
perfluorooctanoic acid (PFOA)	20 ng/l	
perfluorohexane sulfonic acid (PFHxS)	20 ng/l	
perfluorononanoic acid (PFNA)	20 ng/l	
perfluoroheptanoic acid (PFHpA)	20 ng/l	
perfluorodecanoic acid (PFDA)	20 ng/l	
PFAS6 (total of all six of the above PFAS substances)	20 ng/l	
Secondary Contaminants <sup>9</sup>		Recommended Concentration Limits for Secondary Contaminants are not based on health considerations, but rather on aesthetic effects such as corrosion, mineral deposits, taste, color, odor, or staining that may be caused by water that exceeds the recommended limit.
Aluminum	0.05 to 0.2 mg/l	
Chloride <sup>10</sup>	250 mg/l <sup>10</sup>	
Color	15 color units	
Copper <sup>10</sup>	1 mg/l <sup>10</sup>	
Corrosivity	non-corrosive	
Fluoride <sup>10</sup>	2.0 mg/l <sup>10</sup>	
Foaming Agents	0.5 mg/l	
Iron <sup>10</sup>	0.3 mg/l <sup>10</sup>	
Manganese <sup>10</sup>	0.05 mg/l <sup>10</sup>	
Odor	3 Threshold Unit Number	
pH <sup>10</sup>	6.5 to 8.5 <sup>10</sup>	
Silver	0.10 mg/l	
Sulfate	250 mg/l	
Total Dissolved Solids	500 mg/l	
Zinc	5 mg/l	

<sup>9</sup> The recommended concentration limits listed for the secondary contaminants are not based on health considerations, but rather on the aesthetic effects such as taste, color, odor, or staining that may be caused by water that exceeds the recommended concentration limit.

<sup>10</sup> This water quality parameter is also listed in the Inorganic Compounds section on the first page of this table.

## **Recommended Use of Approved Methods and Certified Laboratories**

All water quality analyses should be conducted utilizing methods approved by the U. S. Environmental Protection Agency for analyzing drinking water (<https://www.epa.gov/dwanalyticalmethods>) and **not** methods used for analyzing wastewater.

All water quality analyses should be conducted by a laboratory that is certified by the Commonwealth of Massachusetts for the specific analysis required. The Commonwealth of Massachusetts has an ongoing laboratory certification program administered by the Wall Experiment Station. Through this program laboratories are certified to perform specific analyses. It is important to note, however, that a laboratory that is certified for one type of analysis may not be certified for another type of analysis. In addition, since the certification process is ongoing, a laboratory may, at any time, lose its certification for a particular analysis. Thus, prior to contracting a laboratory for a particular analysis, it should be verified that the laboratory has current certification by the state to perform such an analysis. A list of laboratories that are certified for specific analyses can be obtained at the following MassDEP web page: <https://www.mass.gov/how-to/find-a-certified-laboratory-for-water-testing>.