

**United States  
Environmental Protection Agency**

# **Preventive Maintenance for Small Public Water Systems Using Ground Water**

An Interactive PDF with Suggested Preventive Maintenance Tasks and Logs

**Introduction, System Information, Reference, and Contacts**



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## Instructions for Tools for Preventive Maintenance

This preventive maintenance PDF document, and the accompanying guidance notes and monthly logs, were developed with the assistance of the Southwest Environmental Finance Center to provide a schedule of routine operation and maintenance (O&M) tasks for small ground water systems.

The combined document set will help you:

1. Develop a preventive O&M program for your system, and log information developed using that system, including planning for daily, weekly and monthly tasks according to recommended schedules.
2. Develop basic security measures systems need to take to help prevent loss of service through terrorist acts, vandalism, or mischief. Please note that the list of security measures is not exhaustive, and each system should tailor its security measures to cover the individual risks that it may face.
3. Record additional comments and record and schedule any necessary repairs that require follow-up.

For additional information on a given task, please review the guidance note pages. Additionally, a contact list is provided herein if you need additional information or assistance.

How To Use These Documents:

1. Print this document, the guidebook, and the ongoing and monthly O&M files and store them in a 3-ring binder. You need only print the file for the month you are working on. Note, however, that this will require you to enter data and do all necessary calculations manually.

**OR**

2. Save this PDF (and the others in the set) on a laptop, tablet or other device and enter information electronically within the PDF documents (making sure to save the document frequently and keep backup copies). Fill out required interactive fields below (shown in light blue on your screen) and track your monthly O&M activities in the accompanying monthly files, by entering the appropriate data and marking the check boxes associated with specific tasks.
  - a. Note that the required logs for each month are in separate files. Many fields are programmed with the appropriate calculations to save you time. For example, the Daily Water Production Log will sum the daily production totals, and the chemical use logs will sum total volumes of chemicals used.
  - b. Be sure to save a backup copy of the file set so that you will have a fresh set of documents to work with next year.
  - c. Maintain back-up copies to prevent accidental data loss.

As an additional incentive to using the PDF files themselves to monitor and collect data on your O&M activities, we have included summary totals for certain data such as water production and chemical use on the logs. These will assist you in calculating many of the data points you will need to complete a standard AWWA Water Audit.

## System Information

Water System Name:	
PWSID#:	
Population Served:	
Owner Name:	
Owner Phone (day):	
Owner Phone (night):	
Owner Phone (cell):	
Water System Operator:	
Water System Operator Phone (day):	
Water System Operator Phone (night):	
Water System Operator Phone (cell):	
Water System Operator:	
Water System Operator Phone (day):	
Water System Operator Phone (night):	
Water System Operator Phone (cell):	
Other:	
Other:	
Other:	
Other:	
Other:	

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## Emergency Notification/Contact Information

Organization	Contact Name	Day Phone	Night Phone	Cell Phone
Safety Officer				
Supervisors				
Ambulance				
Fire Department				
Police Department				
Hospital				
Poison Control				
FBI Field Office				
Health Department				
Primary Agency				
Well Driller				
Chemical Supplier				
Local Emergency Planning Committee				
Designated Water System Spokesperson				
Local Government Official				
Local Hazmat Team				
Other Operators				
Neighboring Water System				
Neighboring Water System				
Television				
Radio				
Other:				
Other:				
Other:				
Other:				
Other:				

Contacts - EPA Regional, State and Primacy Agency

U.S. EPA Headquarters Office of Ground Water and Drinking Water	(202) 564-3750	<a href="https://www.epa.gov/ground-water-and-drinking-water">https://www.epa.gov/ground-water-and-drinking-water</a>
<b>U.S. EPA Regional, State, and Primacy Agency Phone Numbers and Websites</b>		
EPA Region 1	(617) 918-1111	<a href="https://www.epa.gov/aboutepa/epa-region-1-new-england">https://www.epa.gov/aboutepa/epa-region-1-new-england</a>
<b>Connecticut</b> Department of Public Health: Drinking Water Division	(860) 509-7333	<a href="http://www.ct.gov/dph/publicdrinkingwater">www.ct.gov/dph/publicdrinkingwater</a>
<b>Maine</b> Maine Department of Human Services: Division of Health Engineering	(207) 287-2070	<a href="http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/index.shtml">http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/index.shtml</a>
<b>Massachusetts</b> Department of Environmental Protection: Drinking Water Program	(617) 292-5500	<a href="http://www.mass.gov/eea/agencies/massdep/water/drinking/">http://www.mass.gov/eea/agencies/massdep/water/drinking/</a>
<b>New Hampshire</b> Department of Environmental Services: Drinking and Groundwater Bureau	(603) 271-3503	<a href="https://www.des.nh.gov/organization/divisions/water/dwgb/">https://www.des.nh.gov/organization/divisions/water/dwgb/</a>
<b>Rhode Island</b> Department of Health: Office of Drinking Water Quality	(401) 222-5960	<a href="http://www.health.ri.gov/programs/drinkingwaterquality">www.health.ri.gov/programs/drinkingwaterquality</a>
<b>Vermont</b> Department of Environmental Conservation: Drinking Water and Ground Water Protection Division	(802) 828-1635	<a href="http://dec.vermont.gov/water/drinking-water">http://dec.vermont.gov/water/drinking-water</a>

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Contacts - EPA Regional, State and Primacy Agency

EPA Region 2	212-637-3660	<a href="https://www.epa.gov/aboutepa/epa-region-2">https://www.epa.gov/aboutepa/epa-region-2</a>
<b>New Jersey</b> Department of Environmental Protection: Division of Water Supply and Geoscience	(609) 292-5550	<a href="http://www.nj.gov/dep/watersupply">www.nj.gov/dep/watersupply</a>
<b>New York</b> Department of Health: Bureau of Public Water Supply Protection	(518) 402-7650	<a href="https://www.health.ny.gov/environmental/water/drinking/">https://www.health.ny.gov/environmental/water/drinking/</a>
<b>Puerto Rico</b> Department of Health: Public Water Supply Supervision Program	(787) 977-5870	<a href="https://www.epa.gov/dwreginfo/public-water-system-supervision-pwss-grant-program">https://www.epa.gov/dwreginfo/public-water-system-supervision-pwss-grant-program</a>
<b>Virgin Islands</b> Department of Planning & Natural Resources: Division of Environmental Protection	(340) 774-3320	<a href="http://dpnr.vi.gov/environmental-protection/">http://dpnr.vi.gov/environmental-protection/</a>
EPA Region 3	(215) 814-5000	<a href="https://www.epa.gov/aboutepa/epa-region-3-mid-atlantic">https://www.epa.gov/aboutepa/epa-region-3-mid-atlantic</a>
<b>Delaware</b> Department of Public Health: Office of Drinking Water	(302) 741-8630	<a href="http://www.dhss.delaware.gov/dph/hsp/odw.html">http://www.dhss.delaware.gov/dph/hsp/odw.html</a>
<b>District of Columbia</b> Department of Energy & Environment; Water Quality Division	(202) 535-2600	<a href="https://doee.dc.gov/service/water-quality">https://doee.dc.gov/service/water-quality</a>
<b>Maryland</b> Department of the Environment: Water Supply Program	(410) 537-3589	<a href="http://mde.maryland.gov/programs/water/water_supply/Pages/index.aspx">http://mde.maryland.gov/programs/water/water_supply/Pages/index.aspx</a>
<b>Pennsylvania</b> Department of Environmental Protection: Bureau of Clean Water, Division of Program Support	(717) 787-5017	<a href="http://www.dep.pa.gov/Business/Water/CleanWater/Pages/default.aspx">http://www.dep.pa.gov/Business/Water/CleanWater/Pages/default.aspx</a>
<b>Virginia</b> Department of Health: Office of Drinking Water	(804) 864-7500	<a href="http://www.vdh.virginia.gov/drinking-water/">http://www.vdh.virginia.gov/drinking-water/</a>
<b>West Virginia</b> Bureau for Public Health: Environmental Engineering Division	(304) 356-4293	<a href="http://www.wvdhhr.org/oehs/eed/">www.wvdhhr.org/oehs/eed/</a>

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## Contacts - EPA Regional, State and Primacy Agency

EPA Region 4	(404) 562-9345	<a href="https://www.epa.gov/aboutepa/about-epa-region-4-southeast">https://www.epa.gov/aboutepa/about-epa-region-4-southeast</a>
<b>Alabama</b> Department of Environmental Management: Water Division	(334) 271-7823	<a href="http://www.adem.state.al.us/programs/water/default.cnt">http://www.adem.state.al.us/programs/water/default.cnt</a>
<b>Florida</b> Department of Environmental Protection: Source and Drinking Water Program	(850) 245-8336	<a href="http://www.dep.state.fl.us/water/drinkingwater/index.htm">www.dep.state.fl.us/water/drinkingwater/index.htm</a>
<b>Georgia</b> Department of Natural Resources: Watershed Protection Branch	(404) 463-8010	<a href="https://epd.georgia.gov/drinking-water">https://epd.georgia.gov/drinking-water</a>
<b>Kentucky</b> Department for Environmental Protection: Division of Water	(502) 564-3410	<a href="http://water.ky.gov/DrinkingWater/Pages/default.aspx">http://water.ky.gov/DrinkingWater/Pages/default.aspx</a>
<b>Mississippi</b> Department of Health: Bureau of Public Water Supply	(601) 576-7518	<a href="http://msdh.ms.gov/msdhsite/_static/30,0,76.html">http://msdh.ms.gov/msdhsite/_static/30,0,76.html</a>
<b>North Carolina</b> Department of Environment and Natural Resources: Public Water Supply Section	(919) 707-9100	<a href="http://deq.nc.gov/node/82906">http://deq.nc.gov/node/82906</a>
<b>South Carolina</b> Department of Health & Environmental Control: Bureau of Water	(803) 898-3432	<a href="http://www.scdhec.gov/HomeAndEnvironment/YourHomeEnvironmentalandSafetyConcerns/DrinkingWaterConcerns/">http://www.scdhec.gov/HomeAndEnvironment/YourHomeEnvironmentalandSafetyConcerns/DrinkingWaterConcerns/</a>
<b>Tennessee</b> Department of Environment & Conservation: Division of Water Resources	(888) 891-8332	<a href="http://www.tennessee.gov/environment/section/wr-water-resources">http://www.tennessee.gov/environment/section/wr-water-resources</a>



Contacts - EPA Regional, State and Primacy Agency

EPA Region 5	(312) 353-2000	<a href="https://www.epa.gov/aboutepa/epa-region-5">https://www.epa.gov/aboutepa/epa-region-5</a>
<b>Illinois</b> Environmental Protection Agency: Bureau of Water	(217) 782-3397	<a href="http://www.epa.illinois.gov/topics/water-quality/index">http://www.epa.illinois.gov/topics/water-quality/index</a>
<b>Indiana</b> Department of Environmental Management: Drinking Water Branch	(800) 451-6027	<a href="http://in.gov/idem/cleanwater/2381.htm">http://in.gov/idem/cleanwater/2381.htm</a>
<b>Michigan</b> Department of Environmental Quality: Drinking Water Program	(800) 662-9278	<a href="http://www.michigan.gov/deq/0,1607,7-135-3313_3675-,00.html">www.michigan.gov/deq/0,1607,7-135-3313_3675-,00.html</a>
<b>Minnesota</b> Department of Health: Drinking Water Protection Program	(612) 201-4700	<a href="http://www.health.state.mn.us/divs/eh/water/index.html">www.health.state.mn.us/divs/eh/water/index.html</a>
<b>Ohio</b> Environmental Protection Agency: Division of Drinking & Ground Waters	(614) 644-2752	<a href="http://www.epa.state.oh.us/ddagw/DrinkingandGroundWaters.aspx">http://www.epa.state.oh.us/ddagw/DrinkingandGroundWaters.aspx</a>
<b>Wisconsin</b> Department of Natural Resources: Bureau of Drinking Water and Ground Water	(888) 936-7463	<a href="http://dnr.wi.gov/topic/DrinkingWater/">http://dnr.wi.gov/topic/DrinkingWater/</a>

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## Contacts - EPA Regional, State and Primacy Agency

EPA Region 6	(800) 887-6063	<a href="https://www.epa.gov/aboutepa/epa-region-6-south-central">https://www.epa.gov/aboutepa/epa-region-6-south-central</a>
<b>Arkansas</b> Department of Health: Division of Engineering	(501) 661-2623	<a href="http://www.healthy.arkansas.gov/programsServices/environmentalHealth/Engineering/Pages/default.aspx">http://www.healthy.arkansas.gov/programsServices/environmentalHealth/Engineering/Pages/default.aspx</a>
<b>Louisiana</b> Office of Public Health: Safe Drinking Water Program	(225) 342-7499	<a href="http://new.dhh.louisiana.gov/index.cfm/page/963">http://new.dhh.louisiana.gov/index.cfm/page/963</a>
<b>New Mexico</b> Environment Department: Drinking Water Bureau	(877) 654-8720	<a href="http://www.nmenv.state.nm.us/dwb/dwbtop.html">www.nmenv.state.nm.us/dwb/dwbtop.html</a>
<b>Oklahoma</b> Department of Environmental Quality: Water Quality Division	(405) 702-8100	<a href="http://www.deq.state.ok.us/wqdnew/index.htm">www.deq.state.ok.us/wqdnew/index.htm</a>
<b>Texas</b> Commission on Environmental Quality, Office of Water	(512) 239-6696	<a href="https://www.tceq.texas.gov/agency/water_main.html">https://www.tceq.texas.gov/agency/water_main.html</a>
EPA Region 7	(913) 551-7003	<a href="https://www.epa.gov/aboutepa/epa-region-7-midwest">https://www.epa.gov/aboutepa/epa-region-7-midwest</a>
<b>Iowa</b> Department of Natural Resources: Water Supply Operations Section	(515) 725-0282	<a href="http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Drinking-Water-Compliance">http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Drinking-Water-Compliance</a>
<b>Kansas</b> Department of Health & Environment: Bureau of Public Water Supply Section	(785) 296-5514	<a href="http://www.kdheks.gov/pws/">http://www.kdheks.gov/pws/</a>
<b>Missouri</b> Department of Natural Resources: Public Drinking Water Branch	(573) 751-1300	<a href="http://dnr.mo.gov/env/wpp/dw-index.html">http://dnr.mo.gov/env/wpp/dw-index.html</a>
<b>Nebraska</b> Health & Human Services System: Public Water Supply Program	(402) 471-3121	<a href="http://dhhs.ne.gov/publichealth/pages/enh_pwsindex.aspx">http://dhhs.ne.gov/publichealth/pages/enh_pwsindex.aspx</a>

Contacts - EPA Regional, State and Primacy Agency

EPA Region 8	(303) 312-6312	<a href="https://www.epa.gov/aboutepa/epa-region-8-mountains-and-plains">https://www.epa.gov/aboutepa/epa-region-8-mountains-and-plains</a>
<b>Colorado</b> Department of Public Health & Environment: Drinking Water Program	(303) 692-3500	<a href="https://www.colorado.gov/pacific/cdphe/drinking-water">https://www.colorado.gov/pacific/cdphe/drinking-water</a>
<b>Montana</b> Department of Environmental Quality: Public Water Supply Bureau	(406) 444-4400	<a href="http://deq.mt.gov/Water/PWSUB/pws">http://deq.mt.gov/Water/PWSUB/pws</a>
<b>North Dakota</b> Department of Health: Drinking Water Program	(701) 328-5211	<a href="https://www.ndhealth.gov/MF/dw.html">https://www.ndhealth.gov/MF/dw.html</a>
<b>South Dakota</b> Department of Environment & Natural Resources: Drinking Water Program	(605) 773-3754	<a href="https://denr.sd.gov/des/dw/dwhome.aspx">https://denr.sd.gov/des/dw/dwhome.aspx</a>
<b>Utah</b> Department of Environmental Quality: Division of Drinking Water	(801) 536-4200	<a href="https://deq.utah.gov/Divisions/ddw/index.htm">https://deq.utah.gov/Divisions/ddw/index.htm</a>
<b>Wyoming</b> EPA Region 8: Wyoming Drinking Water Program	(303) 312-6312	<a href="https://www.epa.gov/region8-waterops">https://www.epa.gov/region8-waterops</a>
EPA Region 9	(415) 947-8000	<a href="https://www.epa.gov/aboutepa/epa-region-9-pacific-southwest">https://www.epa.gov/aboutepa/epa-region-9-pacific-southwest</a>
<b>American Samoa</b> American Samoa Environmental Protection Agency	(684) 633-2304	<a href="http://epa.as.gov/water-program">http://epa.as.gov/water-program</a>
<b>Arizona</b> Department of Environmental Quality: Water Quality Division	(602) 771-2300	<a href="http://www.adeq.state.az.us/environ/water/dw/index.html">www.adeq.state.az.us/environ/water/dw/index.html</a>
<b>California</b> Department of Health Services: Division of Drinking Water Programs	(916) 449-5577	<a href="http://www.waterboards.ca.gov/drinking_water/programs/">http://www.waterboards.ca.gov/drinking_water/programs/</a>
<b>Guam</b> Guam Environmental Protection Agency	(671) 300-4751	<a href="http://epa.guam.gov/programs/safe-drinking-water/">http://epa.guam.gov/programs/safe-drinking-water/</a>
<b>Hawaii</b> Department of Health: Safe Drinking Water Branch	(808) 586-4258	<a href="http://health.hawaii.gov/sdwb/">http://health.hawaii.gov/sdwb/</a>
<b>Nevada</b> Division of Environmental Protection: Bureau of Safe Drinking Water	(775) 687-9520	<a href="http://www.ndep.nv.gov/bsdwb/">http://www.ndep.nv.gov/bsdwb/</a>

Contacts - EPA Regional, State and Primacy Agency

EPA Region 10	(206) 553-1200	<a href="https://www.epa.gov/aboutepa/epa-region-10-pacific-north-west">https://www.epa.gov/aboutepa/epa-region-10-pacific-north-west</a>
<b>Alaska</b> Department of Environmental Conservation: Division of Water	(907) 465-5177	<a href="http://dec.alaska.gov/water/">http://dec.alaska.gov/water/</a>
<b>Idaho</b> Department of Environmental Quality: Water Quality	(208) 373-0502	<a href="http://www.deq.idaho.gov/water-quality/">http://www.deq.idaho.gov/water-quality/</a>
<b>Oregon</b> Department of Human Services: Drinking Water	(971) 673-0405	<a href="https://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Pages/index.aspx">https://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Pages/index.aspx</a>
<b>Washington</b> Department of Health: Division of Drinking Water	(800)525-0127	<a href="http://www.doh.wa.gov/CommunityandEnvironment/Drinking-Water">http://www.doh.wa.gov/CommunityandEnvironment/Drinking-Water</a>
Additional Contacts		
National Rural Water Association	(580) 252-0629	<a href="http://www.nrwa.org/">http://www.nrwa.org/</a>
State Rural Water Associations		For associations listed by State, see: <a href="https://nrwa.org/state-associations/">https://nrwa.org/state-associations/</a>
Rural Community Assistance Program	(203) 408-1273 (888) 321-7227	<a href="http://www.rcap.org">http://www.rcap.org</a>
Rural Utilities Service	(202) 690-2670	<a href="https://www.rd.usda.gov/about-rd/agencies/rural-utilities-service">https://www.rd.usda.gov/about-rd/agencies/rural-utilities-service</a>
Safe Drinking Water Hotline	1-800-426-4791	email: <a href="mailto:hotline-sdwa@epa.gov">hotline-sdwa@epa.gov</a>
EPA National (24-hour)	1-800-424-8802	

## Contacts - Technical Assistance Centers

Technical Assistance Centers		
<b>Illinois</b> Midwest Technology Assistance Center MTAC	(217) 333-9321	<a href="http://mtac.sws.uiuc.edu">http://mtac.sws.uiuc.edu</a>
<b>Kentucky</b> Center for Water Resource Studies	(270) 745-2761	<a href="https://www.wku.edu/cwrs/">https://www.wku.edu/cwrs/</a>
<b>Mississippi</b> Mississippi Water Resources Research Institute	(662) 325-2630	<a href="http://www.wrri.msstate.edu">http://www.wrri.msstate.edu</a>
<b>Missouri</b> Missouri Water Resources Research Center	(573) 882-7564	<a href="http://engineering.missouri.edu/water/">http://engineering.missouri.edu/water/</a>
<b>Montana</b> Montana Water Center	(406) 994-6690	<a href="http://www.montanawatercenter.org/">http://www.montanawatercenter.org/</a>
<b>New Hampshire</b> New England Water Treatment Technology Assistance Center	(603) 862-1106	<a href="http://www.unh.edu/erg/wttac/">http://www.unh.edu/erg/wttac/</a>
<b>Pennsylvania</b> Technology Assistance Center for Small Public Water Systems	(717) 787-9633	<a href="http://www.dep.pa.gov/PUBLICPARTICIPATION/ADVISORY-COMMITTEES/WATERADVISORY/TAC/Pages/default.aspx">http://www.dep.pa.gov/PUBLICPARTICIPATION/ADVISORY-COMMITTEES/WATERADVISORY/TAC/Pages/default.aspx</a>
<b>West Virginia</b> National Drinking Water Clearinghouse	(800) 624-8301	<a href="http://www.nesc.wvu.edu/drinkingwater.cfm">http://www.nesc.wvu.edu/drinkingwater.cfm</a>

## Contacts - Environmental Finance Centers

Environmental Finance Center Network		<a href="http://efcnetwork.org/">http://efcnetwork.org/</a>
<b>Maine</b> New England Environmental Finance Center at the University of Southern Maine	<a href="mailto:efc@maine.edu">efc@maine.edu</a>	<a href="http://efc.muskie.usm.maine.edu/">http://efc.muskie.usm.maine.edu/</a>
<b>New York</b> Syracuse University Environmental Finance Center	(315) 443-3759	<a href="http://efc.syr.edu/">http://efc.syr.edu/</a>
<b>Maryland</b> The Environmental Finance Center, University of Maryland	(301) 405-6383	<a href="http://www.efc.umd.edu/">http://www.efc.umd.edu/</a>
<b>North Carolina</b> UNC Environmental Finance Center	(919) 843-3528	<a href="https://efc.sog.unc.edu/">https://efc.sog.unc.edu/</a>
<b>Kentucky</b> Center For Environmental Policy and Management	(800) 334-8635 <a href="mailto:cepmeffc@louisville.edu">cepmeffc@louisville.edu</a>	<a href="http://louisville.edu/cepmeffc">http://louisville.edu/cepmeffc</a>
<b>Michigan</b> Great Lakes Environmental Infrastructure Center	(906) 487 2102	<a href="http://gleic.org/">http://gleic.org/</a>
<b>New Mexico</b> Southwest Environmental Finance Center	(505) 277-0644	<a href="http://southwestefc.unm.edu">http://southwestefc.unm.edu</a>
<b>Kansas</b> Environmental Finance Center, at Wichita State University's Hugo Wall School of Public Affairs	(316) 978-6629	<a href="http://www.wichita.edu/thisis/home/?u=efc">http://www.wichita.edu/thisis/home/?u=efc</a>
<b>California</b> Environmental Finance Center West at Earth Island Institute	(510) 878-9968	<a href="http://www.efcwest.net/">http://www.efcwest.net/</a>
<b>California</b> Environmental Finance Center at Sacramento State	(916) 278-6011	<a href="http://www.efc.csus.edu/">http://www.efc.csus.edu/</a>

## Commonly Used Conversion Factors

Formulas	Calculator Input	Calculator Output
1 foot (ft) = 12 inches (in)	ft	in
1 pint (pt) = 16 fluid ounces (fl oz)	pt	fl oz
1 pound (lb) = 16 ounces (oz)	lb	oz
1 quart (qt) = 2 pints = 32 oz	qt	fl oz
1 gallon (gal) = 3.785 liters (L)	gal	L
1 L = .264 gal	L	gal
1 square foot (sq. ft.) = 144 square inches (sq. in.)	sq. ft.	sq. in.
1 cubic foot (cu. ft.) = 7.48 gallons (gal)	cu. ft.	gal
1 acre foot (ac. ft.) = 43,560 cu. ft. = 325, 829 gal	ac. ft.	gal
1 gallon per min (gpm) = 1440 gallons per day (gpd)	gpm	gpd
1 cubic foot per second (cfs) = 646,272 gpd = 448.8 gpm	cfs	gpm
1 million gallons per day (MGD) = 1.55 cfs = 694.4 gpm	MGD	gpm
1 part per million (ppm) = 1 milligram per liter (mg/L) = 8.34 lbs per million gallons (lb/MG)	ppm	lb/MG
1.0 pounds per square inch (psi) = 2.31 feet of head	psi	ft. hd.
1.0 feet of head = 0.443 psi	ft. hd.	psi
1 horsepower (hp) = 550 foot-pounds per second	hp	ft.lb./s

## Commonly Used Formulas

Formulas
Area = Length x Width
Chemical Dosage: pounds per day (lbs./day) = MGD x ppm x 8.34 lbs/gal
Circular Area = $\text{Pi} \times r^2$ (where Pi = 3.14, and r = radius) OR Circular Area = $0.785 \times D^2$ (where D = diameter)
Volume (rectangular) = Length x Width x Height
Circular Volume = Circular Area x Height
Circumference = $2 \times \text{Pi} \times r$ (where Pi = 3.14 and r = radius) OR $\text{Pi} \times D$ (where D = diameter)
CT = Chlorine Concentration (mg/L) x time (in minutes)
Detention Time = tank volume (gal) / Flow (gpm or gpd)
Perimeter of Rectangle = $(2 \times \text{Length}) + (2 \times \text{Width})$
Perimeter of other shapes = add lengths of all sides
Flow rate (Q, ft <sup>3</sup> /sec) = Velocity (ft/sec) x Area(ft <sup>2</sup> )
Force = Pressure (psi) x Area (in <sup>2</sup> )
Pounds per gallon (fluid not water) = Specific gravity x 8.34
Specific capacity = flow (gpm) / draw-down (ft)
Water horsepower = $Q$ (flow in gpm) x $H$ (feet of head) / 3960