

Common Calculations Used in Fish Pond and Lake Management

Drugs and pesticides are applied to ponds and tanks for many reasons, including these:

- to control fish diseases
- to control aquatic weeds
- to selectively eliminate specific kinds of undesirable fish
- to correct water quality problems

For several good reasons, it is absolutely necessary that the amount of material to use for a particular problem be accurately calculated. If you overtreat, there is a high probability that some, if not all, of the fish will be killed. If you undertreat, you won't get the desired effect and, in the case of a disease, all fish may die before you can re-treat the pond or tank. In either case, a miscalculation can be expensive.

You must know the correct volume of water to be treated before attempting to calculate the amount of material to use. To obtain the volume of a pond, determine the surface acreage and the average depth of the pond. Then multiply the surface acres by the average depth to get the volume of the pond in acre-feet.

To determine the volume of a tank, raceway, or holding vat, measure its width and length and the depth of water to be present at the time of treatment. Multiply these three measurements together to calculate the volume. The measurements can be in inches, feet, yards, centimeters, or meters. In other words, the unit of measurement used is

not important. However, measuring in feet is usually most convenient.

After determining the correct volume of water to be treated, use this formula to calculate the correct amount of material to use.

$$\text{Amount of material needed} = \frac{\text{Volume} \times \text{conversion factor} \times \text{ppm desired}}{\% \text{ active ingredient}}$$

Volume = volume of water to be treated. Can be any volumetric units of measurement—cubic feet, liters, gallons, acre-feet

Conversion factor = the weight of material that must be added to one unit volume of water to give one part per million (ppm). See Table 1 for conversion factors.

ppm desired = the treatment rate desired in parts per million (ppm)

% active ingredient = the percent ingredient of the material to be used. Most materials used in treating fish diseases or aquatic weeds are 100 percent active or are considered to be 100 percent active for treatment purposes.

For assistance in calculating treatment levels to be used, contact your county Extension agent or specialists in the Mississippi State University Department of Wildlife and Fisheries.

Table 1. Weight of chemical that must be added to one unit volume of water to give one part per million (ppm) (conversion factors)

2.72 pounds per acre-foot	=	1 ppm
1,233 grams per acre-foot	=	1 ppm
0.0283 grams per cubic foot	=	1 ppm
0.0000624 pounds per cubic foot	=	1 ppm
0.0038 grams per gallon	=	1 ppm
0.0584 grains per gallon	=	1 ppm
1 milligram per liter	=	1 ppm
0.001 gram per liter	=	1 ppm
8.34 pounds per million gallons of water	=	1 ppm

Temperature conversions

Centigrade to Fahrenheit = $(^{\circ}\text{C} \times 9/5) + 32^{\circ}$
 Fahrenheit to Centigrade = $(^{\circ}\text{F} - 32^{\circ}) \times 5/9$

Table 2. Conversions for units of volume

To	cm ³	liter	m ³	in ³	ft ³	fl oz	fl pt	fl qt	gal
From									
cm ³	1	0.001	1 x 10 ⁻⁶	0.0610	3.53 x 10 ⁻⁵	0.0338	0.00211	0.00106	2.64 x 10 ⁻⁴
liter	1000	1	0.001	60.98	0.0353	33.81	2.113	1.057	0.2642
m ³	1 x 10 ⁶	1000	1	6.1 X 10 ⁴	35.31	3.38 x 10 ⁴	2113	1057	264.2
in ³	16.39	0.0164	1.64 x 10 ⁻⁵	1	5.79 X 10 ⁻⁴	0.5541	0.0346	0.0173	0.0043
ft ³	2.83 x 10 ⁴	28.32	0.0283	1728	1	957.5	59.84	29.92	7.481
fl oz	29.57	0.0296	2.96 x 10 ⁻⁵	1.805	0.00104	1	0.0625	0.0313	0.0078
fl pt	473.2	0.4732	4.73 x 10 ⁻⁴	28.88	0.0167	16	1	0.5000	0.1250
fl qt	946.4	0.9463	9.46 x 10 ⁻⁴	57.75	0.0334	32	2	1	0.2500
gal	3785	3.785	0.0038	231.0	0.1337	128	8	4	1

Table 3. Conversions for units of length

To	cm	m	in	ft	yd
From					
cm	1	0.01	0.3937	0.0328	0.0109
m	100	1	39.37	3.281	1.0936
in	2.540	0.0254	1	0.0833	0.00278
ft	30.48	0.3000	48	12	10.3333
yd	91.44	0.9144	36	3	1

Table 4. Conversions for units of weight

To	gm	kg	gr	oz	lb
From					
gm	1	0.001	15.43	0.0353	0.0022
kg	1000	1	1.54 X 10 ⁴	35.27	2.205
gr	0.0648	6.48 x 10 ⁻⁵	1	0.0023	1.43 x 10 ⁻⁴
oz	28.35	0.0284	437.5	1	0.0625
lb	453.6	0.4536	7000	16	1

Table 5. Miscellaneous conversion factors

1 acre-foot	=	43,560 cubic feet
1 acre-foot	=	325,850 gallons
1 acre-foot of water	=	2,718,144 pounds
1 cubic foot of water	=	62.4 pounds
1 gallon of water	=	8.34 pounds
1 gallon of water	=	3,785 grams
1 liter of water	=	1,000 grams
1 fluid ounce	=	29.57 grams
1 fluid ounce	=	1.043 ounces

Abbreviations

cm = centimeter	gr = grain
cm ³ = cubic centimeter	in = inch
fl oz = fluid ounce	in ³ = cubic inch
fl pt = fluid pint	kg = kilogram
fl qt = fluid quart	lb = pound
ft = foot	m = meter
ft ³ = cubic foot	m ³ = cubic meter
gal = gallon	oz = ounce
gm = gram	yd = yard



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