

USEFUL TABLES AND CALCULATIONS

Weights and Measures

Liquid

1 milliliter (ml)	= 1 cubic centimeter (cc)
1 teaspoon (tsp)	= 5 milliliter (ml)
3 teaspoons (tsp)	= 1 tablespoon (Tbsp)
1 tablespoon (Tbsp)	= 15 milliliter (ml)
2 tablespoons (Tbsp)	= 1 ounces (oz)
16 tablespoons (Tbsp)	= 1 cup (c.)
1 cup (c.)	= 8 ounces (oz)
2 cups (c.)	= 1 pint (pt)
1 pint (pt)	= 16 ounces (oz)
2 pints (pt)	= 1 quart (qt)
8 pints (pt)	= 1 gallon (gal)
1 gallon (gal)	= 128 ounces (oz)
1 gallon (gal)	= 3785 milliliters (ml)

Weight

1 ounce (oz)	= 28.4 grams (gm)
16 ounces (oz)	= 1 pound (lb)
1 pound (lb)	= 454 grams (gm)
1 kilogram (kg)	= 2.2 pounds (lbs)

Length and Area

1 mile (mi)	= 5,280 feet (ft)
1 mile (mi)	= 320 rods
1 rod	= 16.5 feet (ft)
1 mile (mi)	= 1.6 kilometers (K)
1 acre (A)	= 43,560 square feet (sq ft)
1 square rod (sq rod)	= 272.3 square feet (sq ft)
1 acre (A)	= 160 square rods (sq rod)

Pints of Commercial Material Needed Per Acre

for given amounts of active ingredient (ai)

lb ai/gal of commercial material	Recommended rate in pounds of active ingredient per acre (lbs of ai/A)					
	0.25	0.5	0.75	1.0	1.5	2.0
	Pints of commercial material per acre					
1.00	2	4	6	8	12	16
2.00	1	2	3	4	6	8
2.64	0.75	1.5	2.25	3	4.5	6
3.00	0.7	1.33	2	2.7	4	5.33
3.34	0.6	1.2	1.8	2.4	3.6	4.8
4.00	0.5	1	1.5	2	3	4
5.00	0.4	0.8	1.2	1.6	2.4	3.2
6.00	0.33	0.7	1	1.33	2	2.7
6.70	0.3	0.6	0.9	1.2	1.8	2.4
7.00	0.29	0.57	0.87	1.14	1.7	2.3
8.00	0.25	0.5	0.75	1.0	1.5	2.0

Amount of Chemical Needed

for 1 sq rod and 1,000 sq ft
Applied at the rate of 1 lb of ai/A

Liquid		
lb ai/gal	milliliters (ml)	
	per sq rod	per 1,000 sq ft
0.67	35	130
1.00	24	87
1.50	16	58
2.00	12	43
2.50	10	35
3.00	8	29
3.34	7	26
4.00	6	22
6.00	4	14
7.00	3.5	12
Dry		
percent (%) ai	grams (g)	
	per sq rod	per 1,000 sq ft
100	2.8	10
90	3.1	12
80	3.5	13
75	3.8	14
70	4.0	15
65	4.4	16
60	4.7	17
50	5.6	21
40	7.0	26
30	9.4	35
20	14.1	52
10	28.3	104
5	56.6	208
4	71.0	261
3	94.6	347
2	142.0	521
1	284.0	1,042

How to Determine the Amount of Herbicide Needed

If rate is recommended for
Liquid commercial product:

Rate of product/acre x acres treated = total volume

Example: 1.5 pt/A x 20 A = 30 pt product

30 pt ÷ 8 pt/gal = 3.75 gal product

If rate is recommended as
Active ingredient (ai) for liquid product:

Rate of ai/A ÷ lb ai/gal product = gal product/A

Gal product/A x A treated = total gallons product

Example: 0.5 lb ai ÷ 4 lb ai/gal = 0.125 gal/A

0.125 gal/A x 20 A = 2.5 gal product

If rate is recommended for
A dry commercial product:

Rate of product/A x A treated = total weight

Example: 15 lb/A x 50 A = 750 lb product

If rate is recommended as
Active ingredient (ai) for a dry product

Rate of ai/A ÷ lb ai/lb product = lb product/A
lb product/A x acres = total weight

Example: 2 lb ai/A ÷ 0.8 lb ai/lb product = 2.5 lb product/A

2.5 lb/A x 30 A = 75 lb product

Method for Applying Correct Amount of Spray Solution per Acre

To determine the spray volume of a hydraulic sprayer, use the following short-cut calibration formulas.			
1. Determine application speed in miles per hour (mph)	mph = (feet traveled ÷ time in seconds) x 0.6818		
2. Determine nozzle output in gallons/minute (gal/min)	gal/min = ounces collected ÷ (2.13 x seconds)		
3. Determine sprayer output in gallons/acre (gal/A)	gal/A = [(5,940 x gal/min per nozzle) ÷ (nozzle spacing in inches x mph)]		
Teaspoon Volume Equivalents			
To prepare one gallon of spray solution (using standard kitchen measuring spoons, level measure)			
Chemical	Rate per Acre	Volume water per Acre	Tablespoons of chemical for 1 gallon of spray solution
2,4 D amine *	3 pint (1.5 lb)	50 gallons	2.0
2,4 D amine *	1 pint (0.5 lb)	10 gallons	3.2
2,4 D low-volatile ester *	3 pint (1.5 lb)	50 gallons	2.0
2,4 D low-volatile ester *	1 pint (0.5 lb)	10 gallons	3.2
glyphosate	2 quart (1.5 lb)	50 gallons	2.6
naptalam	2 gallons (4.0 lb)	50 gallons	10.2
* Based on 2,4 D formulation with a 4 lb acid equivalent (ae)/gal			