Pesticides Calculations for Homeowners

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Pesticides for Homeowners

- Rates are given in tsp or tbsp per gal for dry products and oz per gal for liquid products. Rates can also be given per area.
- Examples:
  - Sevin - 2.25 lb/1000 sq.ft.
  - Weed B Gone - 1 oz / gal / 400 sq.ft.
- Ready-to-Use products are becoming more common because of their ease of use.

Commercial Pesticides

- Rates on commercial packages are given in lbs / 100 gal of water.
- Rates are also given in the amount of pesticide to use per acre in a given amount of water.

- Examples:
  - Sevin 4F: 1-2 qt / A
  - Roundup WeatherMax: 11-32 oz / A

Commercial Pesticides

- **Difficulty arises when you read:**

  "Use 1 lb per 100 gal of water"

  but you need only 1 gal.

- **The next chart helps when converting to smaller spray volume mixes.**

Formulation	100 gal	5 gal	3 gal	1 gal
Wettable Powder	5 lbs	15 tbsp	9 tbsp	3 tbsp
	4 lbs	13 tbsp	8 tbsp	8 tsp
	3 lbs	10 tbsp	6 tbsp	2 tbsp
	2 lbs	8 tbsp	4 tbsp	4 tsp
	1 lb	3 tbsp	6 tsp	2 tsp
	1/2 lb	5 tsp	1 tsp	1 tsp
Emulsifiable Concentrate	5 gal	1 qt	1 1/4 pt	13 tbsp
	4 gal	1 1/2 pt	1 pt	10 tbsp
	3 gal	1 1/4 pt	3/4 pt	1/4 pt
	2 gal	3/4 pt	1/2 pt	5 tbsp
	1 gal	1/2 pt	8 tbsp	3 tbsp
	1 qt	3 tbsp	2 tbsp	2 tsp
	1 pt	5 tsp	1 tsp	1 tsp

For dry formulations, it is difficult to measure tsp or tbsp required for 1 gal of water when the rate is 1 pound per 100 gal

US Standards

Dry Formulations Measurement Equivalents

1 lb = 16 oz

Sample Calculations for Determining Pesticide Concentration

1 lb of fungicide per 100 gal of water

= 16 oz per 100 gal

= 1.6 oz per 10 gal

= 0.16 oz per 1 gal

Metric Standards

Dry Formulations Measurement Equivalents

1 lb = 16 oz = 454 g

1 oz = 28.4 g

Sample Calculations for Determining Pesticide Concentration

1 lb of fungicide per 100 gal of water

= 454 g per 100 gal

= 4.5 g per 1 gal

For liquid formulations, it is possible to calculate down to tbsp and tsp.

US Standards
Liquid Formulations Measurement Equivalents

1 gal = 4 qt = 8 pt = 16 cups = 128 fl.oz.

1 qt = 2 pt = 4 cups = 32 fl.oz.

1 fl.oz. = 2 tbsp

1 cup = 8 fl.oz. = 16 tbsp = 48 tsp

1 tbsp = 3 tsp

Sample Calculations for Determining Pesticide Concentration

1 qt of pesticide per 100 gal of water

= 32 fl.oz. per 100 gal

= 0.32 fl.oz. per 1 gal

= 1.92 or 2 tsp per 1 gal

Metric Standards

Liquid Formulations Measurement Equivalents

1 gal = 4 qt = 8 pt = 16 cups = 128 fl.oz. = 3785 ml

1 qt = 946 ml

1 pt = 473 ml

1 cup = 237 ml

1 fl.oz. = 29.6 ml

1 tbsp = 14.8 ml

1 tsp = 4.9 ml

Sample Calculations for Determining Pesticide Concentration

1 qt of pesticide per 100 gal of water

= 946 ml per 100 gal

= 9.5 ml per 1 gal

Why are Calculations Important?

Using just the right amount of pesticide and fertilizer:

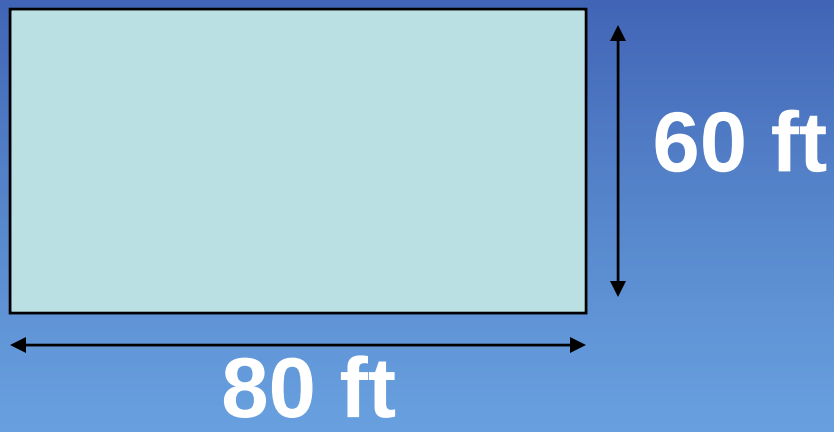
- **minimizes the potential for personal, property, or environmental damage and**
- **maximizes consumer's return on the dollar.**

How Do I Calculate the Area to Be Treated?

- Rates for lawn care products are stated per 1000 square feet or per acre.
- Rates for flowers, shrubs, and vegetables are often given per 100 square feet.
- To determine how much pesticide or fertilizer is needed for a job, first calculate the size of the area to be treated.

Square or Rectangle

Area = Length x Width

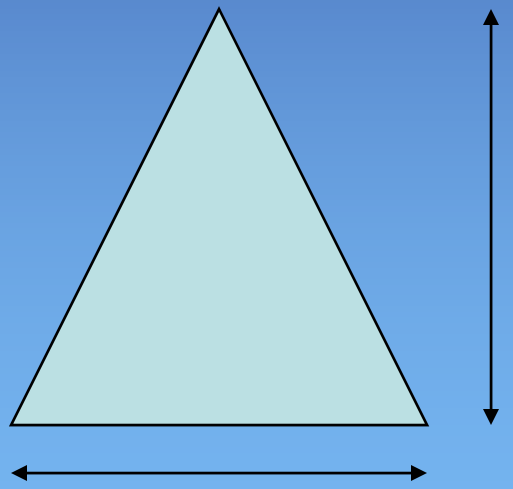


Area = 80 x 60 = 4800 sq.ft.

Triangle

Area = Base x Height / 2

A triangular area with 20 ft base and 40 ft height = 20 ft x 40 ft / 2 = 400 sq.ft.



Circle

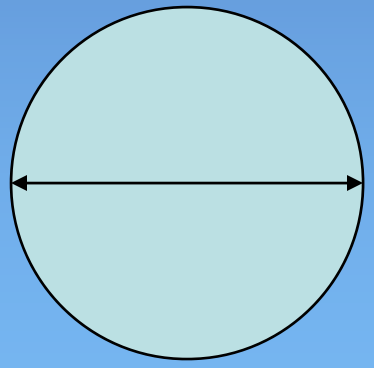
$$\text{Area} = 3.14 \times r^2$$

A circular flower bed measuring 40 ft in diameter would have a radius of 20 ft, so:

$$\text{Area} = 3.14 \times 20^2 = 3.14 \times (20\ \text{ft} \times 20\ \text{ft})$$

$$\text{Area} = 1{,}256\ \text{ft}^2$$

40 ft



Irregular Shapes

Irregular shapes (flower beds, vegetable garden) can be divided into smaller, recognizable geometric areas (square, rectangle, circle, triangle).

Once the area to be sprayed is calculated, next you have to convert the commercial rate to your applicable rate.

Sample Calculations - 1

- You need to spread a crabgrass herbicide over 2400 sq.ft.
- You purchase a 25 lb bag of the herbicide.
- The label states that the contents of the bag will cover 5,000 sq.ft.
- How much of the bag will be needed?
- 2400 sq.ft. / 5000 sq.ft. per bag = 0.48 bag
- 0.48 bag x 25 lb per bag = 12 lb needed.

Sample Calculations - 2

- You need to apply an insecticide over 4800 sq.ft. The label says to apply 1 gal of water and 4 tsp for each 200 sq.ft.
- How much water and insecticide are needed?
- Water needed:

  4800 sq.ft. / 200 sq.ft. per gal = 24 gal

- Insecticide needed:

24 gal x 4 tsp = 96 tsp or 2 cups of insecticide

Sample Calculations - 3

- A label prescribes 2 lb/A.
- How much is needed for a 4800 sq.ft. ?

(Remember that 1 A = 43,560 sq.ft.)

- 4800 sq.ft. / 43,560 sq.ft. per A = 0.11 A
- 0.11 acre x 2 lb = 0.22 lb of product or 3.5 oz product / 4800 sq.ft.

Pesticide Options for Homeowners

1. Ready-to-use Pesticides
2. Trigger pump sprayers
3. Aerosol cans
4. Dust Applicators
5. Impregnated wax bars – wipers
6. Bait stations
7. Granule Spreaders
8. Hose-End Sprayers
9. Hand-Operated Sprayer

1. Ready-to-Use Pesticides

A good choice if you:

- **have a pest that is likely to occur infrequently or that involves only a small area of the home or garden**
- **are not familiar with the use or handling of concentrated pesticides**
- **are unsure of how to calculate and mix the concentrated pesticide for the proper application rate**
- **do not have the right type of application equipment, or do not have a safe storage area for concentrated pesticides.**

2. Hand-Operated Sprayers

The label on most pesticide concentrates for use in the home garden gives the application rate in the form of a dilution ratio with clear and simple instructions.

For example:

Mix 1 fl.oz. per gal of water.

Spray to cover foliage thoroughly.

This is an ideal situation, no other instructions needed.

2. Hand-Operated Sprayers

Some labels give the application rate as an amount per unit area:

For Example: Apply 250 ml / 100 sq.ft.

To determine how much pesticide to put in the sprayer to cover a given area, you first needs to know how much area the sprayer will cover.

This is called sprayer calibration.

2. Hand-Operated Sprayers: Calibration

The easiest way to calibrate a small, hand-operated sprayer is to do the following:

- **fill the tank with a known volume of plain water**
- **walking at a set pace, spray water to uniformly cover a predetermined area**

2. Hand-Operated Sprayers: Calibration

If the area covered was 120 sq.ft., then the amount of pesticide needed to put in the sprayer is:

250 ml per 100 sq.ft. (required)

X ml per 120 sq.ft. (calibration)

X ml = 250 ml x 120 / 100

X ml = 300 ml

2. Hand-Operated Sprayers: Calibration

- If you are close to the desired output (250 ml / 100 ft^2), you can slow down or speed up your pace.
- If you can't get close by adjusting your pace, next best choice is changing the nozzle. For example, by switching from 8002 to 8001, you are automatically cutting the output in half.
- Speed and nozzle are your 2 easiest choices for adjusting your sprayer calibration.

How much pesticide to buy ?

- **Calculate the total amount of pesticide or fertilizer needed for a given application season or year.**

- **Multiply the amount needed for one application times the estimated number of applications required.**

Is it wise to buy bulk for best price?

Not an easy question !

- Choose the quantity of product based on anticipated need, not just the best value.
- Excess pesticides in storage may lose their effectiveness over time, and eventually require disposal.
- Plan ahead and purchase only in quantities that can be used efficiently within the same year.

Cost Comparison

Wal-Mart - Roundup 1.92% RTU

- $10.94 / 1 gal

Roundup WeatherMax 5.5 lb a.i./ gal

- **$63.38 / gal, minimum 2.5 gal purchase =** total purchase = $158.
- **A 2% solution (5 oz / gal water) costs** $1.25 / gal
- **Can make 125 mixes with 2.5 gal**

I would still buy RTU product for backyard for reasons listed earlier.

Cost Comparison

Wal-Mart – Sevin 0.126% -RTU

- $14.43 / gal

Sevin

- **$30.53 / gal, minimum 2.5 gal purchase =** total purchase ~ $75.
- **A 0.126% solution (1.61 oz / gal water) costs** $0.38 / gal

- **If you have a pesticide applicator certification, you may choose to purchase pesticide packaged for commercial growers.**
- **This may be more convenient and economical.**
- **However, the pesticide may not be available in small packages but in 1 lb, 2.5 gal, or larger sizes.**

Miscellaneous Information

Mixing Instructions

For a 50 gal tank.

- **Fill half the tank with water.**
- **Add the spreader/sticker/adjuvant (if needed)**
- **Add the pesticide.**
- **Add water up to the 50 gal mark.**

Safety Equipment and Clothing

Read the label before mixing or applying pesticides.

Minimum Requirements:

1. **Long sleeve shirt.**
2. **Long pants**
3. **Chemical-resistant gloves: never cotton or leather.**
4. **Shoes and socks, not sneakers or sandals.**

Safety Equipment and Clothing

Clothing and equipment differ for different pesticides

For Example:

1. **Sandea: 1+2+4, i.e. gloves not necessary.**
2. **Roundup: 1+2+3+4**
3. **Strategy: 1+2+3+4 + coverall + protective eyewear.**

For Leaks or Spills

- **Have one or two bags of absorbent materials (cat litter) and large plastic bags readied on the truck or nearby where the handling tasks are being performed.**
- **In case of leaks or spills follow the basic safety principles and the three C's of spill management (Control, Contain, Clean up).**
- **If you don't know or forget what to do, call for help and wait until it arrives.**
- **Don't assume that if you ignore it, it will go away.**

Safety Precautions

- Don’t eat, drink, or chew tobacco during application.
- Wash hands thoroughly before eating, drinking, chewing gum or tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Wash thoroughly and put on clean clothes.
- Wash the outside of gloves before removing.
- When done, wash thoroughly and change into clean clothes.