



## Three Options for Mixing and Loading Spray Tanks

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### Introduction

Preparing a pesticide solution is sometimes confusing or intimidating. The instructions for preparing the mixture in the spray tank are not always straight forward and the language is not always standardized. However, the mixture must be prepared correctly for effective application, compliance, and safety. Making the effort to properly mix chemicals can save money and headaches in the long run. This fact sheet provides simple guidelines for correctly and safely mixing and loading spray solutions.

### Safety Considerations

Although pesticides can be highly effective, there can also be risk involved when using them. This risk is highest during mixing when direct contact to concentrated product is most likely (MacFarlane et al., 2013). When mixing in large tanks, like the 300-gallon tank on a spray truck pictured in Figure 1, start the sprayer engine to agitate the solution during mixing. This will help achieve an even mix while avoiding settling which can cause uneven application.

Of utmost importance is following the product label while handling and mixing pesticides (Figure 2). Nearly 97% of accidental human pesticide exposure comes through skin contact (Fishel, 2000). The exposure risk can be minimized by using the required personal protective equipment (PPE) for the chemicals being mixed (Yarpuz-Bozdogan, 2018). Always mix with adequate ventilation to prevent respiratory exposure to chemicals. Triple rinse any container that is used to measure chemical products. When a bottle or jug is empty, dispose of it according to the product label. Typically, this includes rinsing and cutting a hole in the bottom to prevent re-use.



**Figure 1.** *Spray Truck for Mixing and Applying Pesticides Over Large Areas*

Following are three options for safely mixing and loading spray tanks.

### Option 1: Mixing for a Full Tank

1. Finding the number of acres treated per tank can be calculated by dividing the tank capacity by the application rate.

**Example:** 30-gallon tank divided by 15 gallons/acre (application rate) = 2 acres

2. To calculate the amount of chemical product you should add per tank, multiply the number of acres treated per tank by the amount of chemical product listed on the label in units of product per acre.

**Example:** 2 acres x 2 quarts/acre = 4 quarts of product added to the tank

3. Add the calculated amount of product and water needed to fill the tank.

**Example:** 4 quarts (1 gallon) of product and 29 gallons of water for 30 gallons

### Option 2: Mixing by the Gallon

1. Calculate the amount of product per gallon by dividing the labeled product rate per acre (ounces, quarts, or pounds per acre) by the application rate (gallon per acre).

**Example:** 32 ounces (1 quart)/30 = 1.07 ounces of product per gallon

2. Multiply product per gallon by gallons of solution to be used.

**Example:** 1.07 ounces x 2.5 gallons = 2.7 ounces

### Option 3: Mix for a Percent (%) of Product

1. Write down the desired solution percentage found on the label as a decimal.

**Example:** 2.0% = 0.02 in decimal form

2. Multiply 128 ounces by the desired solution decimal number.

**Example:** 128 ounces x 0.02 = 2.6 ounces per gallon mix

3. Multiply ounces by desired gallons to be used in the tank.

**Example:** 2.6 ounces x 25 gallon = 65 ounces product per 25-gallon tank load



**Figure 2.** Carefully Measure All Products in Approved Containers

## Conclusion

Whether preparing a large tank or a small tank, the same guidelines and safety considerations apply to mixing pesticides. When it is time to mix, first determine the tank size and rate of the product or products being mixed. Once you obtain those two numbers, any of the three options presented above will work to achieve the correct ratio of chemical to water. Although this fact sheet provides guidelines for tank-mixing calculations, anyone mixing pesticides should always read and follow the label.

## References

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