

## **Determine Water and Pesticide to Mix**

***You are going to apply a herbicide to a 20-acre field, using a ground sprayer that has been calibrated to apply 20 gallons per acre. How much water and how much product should you mix to apply if the herbicide rate is 44 fluid ounces per acre, and the spray volume must be at least 15 gallons per acre?***

First, think about your sprayer output. The pesticide label says you must have a spray volume of at least 15 gallons per acre. Your sprayer has been calibrated to spray 20 gallons per acre, so it is appropriate for this application.

$$\frac{20 \text{ gallons pesticide solution}}{1 \text{ acre}} \times 20 \text{ acres} = 400 \text{ gallons pesticide solution}$$

$$\frac{44 \text{ fluid ounces pesticide}}{1 \text{ acre}} \times \frac{20 \text{ acres}}{1} \times \frac{1 \text{ gallon}}{128 \text{ fluid ounces}} = 6.875 \text{ gallons of pesticide}$$

400 gallons of pesticide solution – 6.875 gallons of pesticide = 393.125 gallons of water.

### **Practice**

- 1. You are going to apply a herbicide to a 50-acre field, using a ground sprayer that has been calibrated to apply 20 gallons per acre. How much water and how much product should you mix to apply if the herbicide rate is 24 fluid ounces per acre, and the spray volume must be at least 15 gallons per acre?***
  
- 2. You are going to spot treat 2,600 sq. feet using a back-pack sprayer that has an output of 57 ounces per 1,000 sq. ft. How much water and how much product should you mix if the pesticide rate is 2 fluid ounces per 1,000 sq. ft.?***
  
- 3. You will apply 2 gallons of product per acre to a 100-acre field. How many gallons of product and how many gallons of water will you need when your sprayer applies 34 gallons per acre?***

## Answers

1. **You are going to apply a herbicide to a 50-acre field, using a ground sprayer that has been calibrated to apply 20 gallons per acre. How much water and how much product should you mix to apply if the herbicide rate is 24 fluid ounces per acre, and the spray volume must be at least 15 gallons per acre?**

$$\frac{24 \text{ fl oz}}{1 \text{ acre}} \times 50 \text{ acres} \times \frac{1 \text{ gal}}{128 \text{ fl oz}} = 9.375 \text{ gallons of pesticide}$$

Spray volume must be at least 15 gpa, and the sprayer is calibrated to apply 20 gallons per acre, which is appropriate.

$$50 \text{ acres} \times \frac{20 \text{ gallons}}{1 \text{ acre}} = 1,000 \text{ gallons of spray}$$

1,000 gallons of pesticide solution – 9.375 gal. pesticide = 990.625 gal. water

2. **You are going to spot treat 2,600 sq. feet using a back-pack sprayer that has an output of 57 ounces per 1,000 sq. ft. How much water and how much product should you mix if the pesticide rate is 2 fluid ounces per 1,000 sq. ft.?**

To determine the total spray mixture needed, set up the following ratio and cross multiply:

$$\frac{57 \text{ fluid ounces}}{1,000 \text{ sq. ft.}} = \frac{N \text{ fluid ounces}}{2,600 \text{ sq. ft.}}$$

$$(57 \times 2,600) = (N \times 1,000)$$

$$N = 148.2 \text{ fl. oz. (round off to 148).}$$

To determine the amount of herbicide needed, set up the following ratio and cross multiply:

$$\frac{2 \text{ fl oz herbicide}}{1,000 \text{ sq. ft.}} = \frac{N \text{ fluid ounces}}{2,600 \text{ sq. ft.}}$$

$$N = 5.2 \text{ fl. oz. of herbicide}$$

To treat the target area, add a little more than 5 oz. of herbicide to 143 oz. of water (148 – 5). Because there are 128 ounces in 1 gallon, this will mean adding 5 ounces of herbicide to 1.1 gal. of water (143/128 = 1.1 gallons of water).

- 3. You will apply 2 gallons of product per acre to a 100-acre field. How many gallons of product and how many gallons of water will you need when your sprayer applies 34 gallons per acre?**

$$\frac{34 \text{ gal of spray solution}}{1 \text{ acre}} \times 100 \text{ acres} = 3,400 \text{ gallons of spray solution}$$

$$\frac{2 \text{ gal of pesticide}}{1 \text{ acre}} \times 100 \text{ acres} = 200 \text{ gallons of pesticide}$$

$$3,400 \text{ gallons of spray solution} - 200 \text{ gallons of pesticide} = 3,200 \text{ gallons of water}$$