

# CALCULATIONS FOR TURFGRASS FERTILIZATION

This information was adapted from *Turfgrass Fertilization: A Basic Guide for Professional Turfgrass Managers*, prepared by Dr. Peter Landschoot for Penn State's College of Agricultural Sciences.

**P**roper fertilization practices require that precise amounts of nutrients be delivered. Small mistakes in area measurements or fertilizer rate calculations can mean poor results or serious turf injury.

To calculate the area of irregularly shaped areas, divide the area into common shapes, calculate the areas of those shapes, then add the areas together.

A fundamental problem in turfgrass fertilization involves determining how much fertilizer is needed to supply a specified amount of nitrogen (or any other nutrient) per 1,000 sq. ft. Use the following examples to learn how to solve this type of problem.

Example: You have a 50-lb. bag of 26-5-10 fertilizer that you want to apply to a lawn at a rate of 1.0 lb. nitrogen per 1,000 sq. ft. How much of the 26-5-10 fertilizer will you need to apply per 1,000 sq. ft?

The quickest way to solve this problem is to ignore the weight of the fertilizer bag and simply divide the amount of nitrogen desired (1.0 lb. nitrogen per 1,000 sq. ft.) by the percentage of nitrogen in the bag (26%). When using percentages in calculations, convert the number to its decimal form (e.g., 26% = 0.26, 5% = 0.05).

One pound nitrogen per 1,000 sq. ft. divided by 0.26 equals 3.8 lbs. of a 26-5-10 fertilizer is needed to supply 1.0 lb. nitrogen per 1,000 sq. ft.

Here's another example. To find out how much phosphate and potash you are applying to the turf when you apply 3.8 pounds of the 26-5-10 fertilizer per 1,000 sq. ft., multiply the amount of fertilizer you are applying by the percentage of phosphate in the bag (5%). Do the same for potash (10%). Remember to convert the percentages of phosphate and potash to their decimal forms (3.8 lb. fertilizer per 1,000 sq. ft.) x 0.05 phosphate = 0.19 lb. phosphate per 1,000 sq. ft.; 3.8 lb. fertilizer per 1,000 sq. ft.) X 0.10 potash = 0.38 lb. potash per 1,000 sq. ft.

Another common problem involves determining the area that a bag of fertilizer can cover and how many bags are needed to cover large sites. For example, how much area can be covered with a 50-lb. bag of 26-5-10 at the rate of 1.0 lbs. nitrogen per 1,000 sq. ft.? Now that you know 3.8 lbs. of 26-5-10 fertilizer will cover 1,000 sq. ft., determine how many times 3.8 lbs. goes into 50 lbs. 50 lbs. divided by 3.8 lbs. = 13.2.

Now, multiply 13.2 by 1,000 sq. ft.: 13.2 X 1,000 = 13,200 sq. ft. Thus, a 50-lb. bag of 26-5-10 covers 13,200 sq. ft. at a rate of 1.0 lb. nitrogen per 1,000 sq. ft.

How many 50-lb. bags of 26-5-10 will you need to fertilize a 30,000 sq. ft. area at 1.0 lb. nitrogen per 1,000 sq. ft.? If a 50-lb. bag of 26-5-10 fertilizer covers 13,200 sq. ft. at 1.0 lb. nitrogen per 1,000 sq. ft., determine how many times 13,200 goes into 30,000: 30,000 divided 13,200 = 2.3 bags of 26-5-10 will cover 30,000 sq. ft.

Occasionally fertilizer recommendations given as lb. nitrogen per 1,000 sq. ft. must be converted to lb. fertilizer per acre. If you must determine how many pounds of a 16-8-8 fertilizer should be applied per acre if the recommendation call for 0.75 lb. nitrogen per 1,000 sq. ft.

First, find out how much fertilizer will be needed per 1,000 sq. ft. (see previous example). (0.75 lb. nitrogen per 1,000 sq. ft.) divided by 0.16 = 4.7 lb. fertilizer per 1,000 sq. ft.

Then, since there are 43,560 sq. ft. in an acre, multiply the amount of fertilizer needed per 1,000 sq. ft. by 43,560, then divide by 1000. (4.7 lbs. fertilizer X 43,560) divided by 1,000 = 205 lbs. of a 16-8-8 fertilizer per acre. **ST**

## Determining the area of a site to fertilize

### Square:



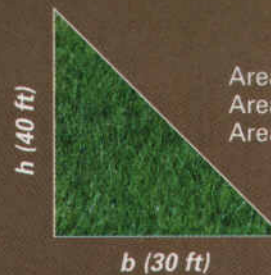
Area = a x b  
Area = 100 ft x 100 ft  
Area = 10,000 sq. ft

### Rectangle:



Area = l (length) x w (width)  
Area = 200 ft x 100 ft  
Area = 20,000 sq. ft

### Triangle:



Area = 0.5 x b (base) x h (height)  
Area = 0.5 x 30 ft x 40 ft  
Area = 600 sq. ft

### Circle:



Area = (always 3.14) x r<sup>2</sup>  
Area = 3.14 x 5<sup>2</sup>  
Area = 3.14 x 25 ft  
Area = 78.5 sq. ft

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