

## CALCULATIONS FOR SOIL

### TO CONVERT ONE FERTILIZER TO ANOTHER OF A SIMILAR RATIO

You need to know how much actual nutrient you're putting on.

Example:

You have a recommendation to use 5 lb. 20-10-10 per 1000 sq ft.  
How much 16-8-8 should you use to put on the same amount of nutrients?

16-8-8 is the same 2-1-1 ratio as 20-10-10

First, Base your calculations on only 1 nutrient.

Calculate how much nutrient is in the recommended amount of fertilizer.

20-10-10 is 20% nitrogen.

.20 x 5 lb. = 1 lb. of nitrogen in 5 lb. 20-10-10

**The General Rule:**

Percent of nutrient times the total weight of fertilizer equals the pounds of nutrient.

Second, divide the pounds of nutrient to be applied, by the percent of nutrient in the fertilizer.

$\frac{1 \text{ lb. N}}{.16 \text{ N}} = 6.25 \text{ lb. 16-8-8 to apply 1 lb. N}$

.16 N

**The General Rule:**

To determine the number of pounds of fertilizer to apply, divide the pounds of nutrient to be applied by the percent of nutrient in the fertilizer.

This works for any nutrient, any fertilizer.

### TO CONVERT RATE PER 1000 SQ FT TO RATE PER ACRE & VICE VERSA

There are 43,560 square feet in an acre.

Round up to 44,000 for easier calculation.

Example:

In the example above, we used 6.25 lb. 16-8-8 to apply 1 lb N/1000 sq. ft.

How much should be applied to get the same rate on an acre?

$6.25 \text{ lb./1000 sq. ft.} \times 44 \text{ sets of 1000 sq. ft.} = 275 \text{ lb./acre 16-8-8}$

**The General Rule:**

To convert pounds/1000 square feet to pounds/acre, multiply the lbs./1000 by 44.

To convert pounds/acre to pounds/1000 sq. ft., divide the pounds/acre by 44.

## LIQUID FERTILIZER

Amount of fertilizer in a liquid is expressed on a volume basis.  
 Analysis is expressed on a percentage by weight basis.  
 Determine the weight of a given volume of the fertilizer.  
 Then calculate the weight of N, P and K in that volume.

### Example:

How much 20-40-10 liquid fertilizer would you apply to obtain a fertilization rate of 2 lb. of N/1000 sq ft? How much would you apply on 2,000 square feet?

Step 1 Base the calculation on only one nutrient.  
 Multiply the weight of the gallon times the percentage of nutrient.  
 1 gal. of 20-40-10 weighs 11.5 lbs.

Step 2 Multiply the total weight by the percentage of nutrient  
 11.5 lbs. x .20 = 2.3 lb. N/gal of 20-40-10

### Final Calculation:

$$\frac{\text{nutrient rate in lb/1000 sq ft}}{\text{weight of nutrient/gal. of fertilizer}} \quad \times \quad \frac{\text{area to be fertilized in sq ft}}{1000}$$

$$\frac{2 \text{ lb N/1000 sq ft}}{2.3 \text{ lb N/gal}} \quad \times \quad \frac{2000}{1000} = .87 \text{ per 1000 sq ft} \times 2 \text{ thousands} \\ = 1.7 \text{ gallons on 2,000 square feet}$$

### The General Rules:

Base the calculation on the weight of one nutrient.  
 Multiply the weight of a gallon by the percentage of nutrient to get the pounds of nutrient in a gallon.  
 Divide the rate desired by the weight of nutrient/gallon of fertilizer  
 Multiply the result by the area to be fertilized (in square feet) divided by 1000.

| <u>Organic Matter Coverage in Cubic Yards</u>    |      |      |      |      |      |
|--|------|------|------|------|------|
| Percent Organic Matter Mixed into Top 8" of Soil |      |      |      |      |      |
| Area in square feet                              | 10%  | 15%  | 20%  | 25%  | 30%  |
| 300  | 0.6  | 0.8  | 1.1  | 1.4  | 1.7  |
| 500  | 0.9  | 1.4  | 1.9  | 2.3  | 2.8  |
| 1,000  | 1.9  | 2.8  | 3.7  | 4.6  | 5.6  |
| 3,000  | 5.6  | 8.3  | 11.1 | 13.9 | 16.7 |
| 5,000  | 9.3  | 13.9 | 18.5 | 23.1 | 27.8 |
| 10,000   | 18.5 | 27.8 | 37.0 | 46.3 | 55.6 |

To a depth of 1 inch, 3 cubic feet will cover 36 square feet.

There are 27 cubic feet in a cubic yard.

Therefore, 1 cubic yard covers  $9 \times 36$  sq. ft. = 324 square feet to a depth of 1 inch.

1,000 sq ft is approximately 3 times 324 sq ft.

Therefore, it takes 3 cu yd of organic matter to cover 1,000 sq ft to a depth of 1 inch.

The table above shows 2.8 cu yd spread over 1,000 sq ft = 15% organic matter.

Call it 3 cu yd/1000 sq ft = 15% OM.

Therefore, 1 " of organic matter worked into the top 8" of soil = 15% organic matter.

There are about 44,000 sq ft in an acre.

Therefore,  $3 \times 44 = 132$  cu yd/acre to give 15% organic matter.

If you get over 50% organic matter, the soil dries excessively quickly.

## THE PROBLEMS TO SOLVE

1. Your soil test recommendation is 2 lb 0-0-50 and 2 lb 46-0-0 per 1000. What amount of 8-2-10 should be applied per 1000 sq ft to approximate the rec?

### **The General Rule:**

Base the calculation on the weight of one nutrient.

Percent of fertilizer times the total weight of fertilizer equals the pounds of nutrient.

### **The Other General Rule:**

To determine the number of pounds of fertilizer to apply, divide the pounds of nutrient to be applied by the percent of nutrient in the fertilizer.

This works for any nutrient, any fertilizer.

2. In Problem 1, how much would be applied per acre?

### **The General Rule:**

To convert pounds/1000 square feet to pounds/acre, multiply the lbs./1000 by 44.

To convert pounds/acre to pounds/1000 sq. ft., divide the pounds/acre by 44.

3. How much liquid 20-40-10 would you use per 1000 square feet to apply 3 lb of potassium per 1000 sq ft?

### **The General Rules:**

Base the calculation on the weight of one nutrient.

Multiply the weight of a gallon by the percentage of nutrient to get the pounds of nutrient in a gallon.

Divide the rate desired by the weight of nutrient/gallon of fertilizer

Multiply the result by the area to be fertilized (in square feet) divided by 1000.

4. How much organic matter would you apply to add 20% organic matter to an acre of soil?

### **HINT**

Read the amount per 1000 sq. ft. from the chart.

Remember that there are about 44,000 square feet in an acre.