



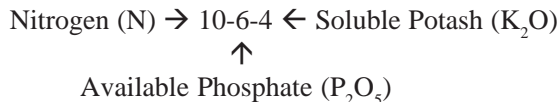
Understanding Fertilizer Labels: Grades and Ratios of Nitrogen, Phosphorous, and Potassium

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Fertilizers vary considerably in the amounts and the kinds of nutrients they carry. Selecting the proper fertilizer for your particular crop and soil needs requires an understanding of the fertilizer label.

Fertilizers contain one or more of the three primary plant nutrients: nitrogen, phosphorous, and potassium. A fertilizer containing only one nutrient is referred to as a "single-nutrient" fertilizer. "Mixed" fertilizers contain two or all three of the primary nutrients. Mixed fertilizers are made by combining two or more fertilizer materials. There is considerable variation in the proportion of the different nutrients contained in mixed fertilizers.

Every container (bag, bucket, etc.) of fertilizer on the market must have, by law, a label giving the guaranteed nutrient content of the fertilizer. The information required on the label and the way in which the information is given are specified by the fertilizer law. The information on the label is the guaranteed amount of the primary nutrients given in a series of three numbers, such as 10-6-4, and is referred to as the "fertilizer grade." A fertilizer grade gives the minimum guaranteed primary nutrient content as percentage of total nitrogen (N), percentage of available phosphate (P₂O₅), and percentage of water-soluble potash (K₂O). The fertilizer grade always specifies the nutrient content in this order:



The first number indicates the pounds of nitrogen (N) contained in each 100 pounds of fertilizer. The

middle figure refers to the amount of phosphate (P₂O₅), and the last figure shows the pounds of potash (K₂O) in each 100 pounds of a particular fertilizer. By referring to these numbers printed on the bag, you can tell the amount of each nutrient in the fertilizer. This labeling is the same nationwide.

"Fertilizer ratio" is a term frequently used in reference to mixed fertilizers. It means the ratio of two or more nutrients to another. For example, a 10-10-10 fertilizer has a 1-1-1 ratio, and a 5-10-15 grade has a 1-2-3 ratio. The ratio is important for fitting a particular fertilizer to soil test recommendations.

Mixed Fertilizers for Particular Needs

Different ratios of mixed fertilizer make it possible to select one that is the best match for your particular crop and soil needs. Once you know the nutrient requirements of the crop and have determined the fertility level of the soil by soil test, a fertilizer ratio can be selected. If, for example, the soil test recommendation for Lawn A calls for about equal amounts of each of the three primary nutrients, then you would select a 1-1-1 ratio fertilizer to supply the nutrients in equal amounts. If the recommendation for Lawn B is for 1 pound of nitrogen (N), 3 pounds of phosphate (P₂O₅), and 2 pounds of potash (K₂O) to be applied per 1000 square feet, then you would select a 1-3-2 ratio mixed fertilizer. To supply the nutrients in the desired proportion, Lawn A could use a 10-10-10 fertilizer grade and Lawn B a 5-15-10 fertilizer.

Ratios of mixed fertilizer are often available in



several grades. The 1-1-1 ratio may be available in at least five grades, namely: 8-8-8, 10-10-10, 12-12-12, 15-15-15, and 20-20-20. When using different grades within a given ratio, you can apply exactly the same amounts of nutrients by varying the application rate.

If the suggested fertilizer grade is not available, you may substitute another grade. Try to use a grade as close to the recommended grade as possible. Some fertilizer grades are more readily available from dealers that supply fertilizer to farmers.

Single-Nutrient Fertilizers for Particular Needs

Each of the primary plant nutrients can be supplied separately using single-nutrient fertilizer materials, and give just as good a crop response as when applied in mixed fertilizers. When only one plant nutrient is needed, a single-nutrient fertilizer should be purchased that contains only that particular nutrient. When more than one nutrient is needed, single-nutrient fertilizers can be used, but they must be applied by going over the land more than once.

Buying Fertilizer

To obtain the maximum return on the money you invest in fertilizer, purchase only the plant nutrients that are recommended by soil test.

The cost of applying the required nutrients to the soil should be the basis for buying a particular fertilizer. Usually the fertilizer that costs the least per bag or ton is the most expensive when calculated on the basis of its plant nutrient content. Wise selection and use of fertilizers contributes to a more sustainable agriculture.

Fertilizer Rate Calculations

Example 1:

It has been recommended that 0.5 pounds of nitrogen per 1000 square feet be applied to a lawn. You could use a single-nutrient fertilizer, such as ammonium nitrate, which contains 33.5% N. How many pounds of this fertilizer will you need to apply?

Solution:

Divide the pounds of nutrient needed by the percentage of the nitrogen source and multiply the result by 100.

$$\frac{0.5 \text{ (pounds of N recommended)}}{33.5 \text{ (\% of N in ammonium nitrate)}} \times 100$$

= 1.5 pounds of ammonium nitrate per 1000 square feet

Example 2:

The soil test report recommends that 3 pounds of K_2O per 1000 square feet be applied. You could use a single-nutrient fertilizer such as potassium chloride, which contains 60% K_2O . How many pounds of this fertilizer will you need to apply?

Solution:

Divide the pounds of nutrient needed by the percentage of the K_2O in the potash fertilizer and multiply by 100.

$$\frac{3 \text{ (pounds of } K_2O \text{ recommended)}}{60 \text{ (\% } K_2O \text{ in potassium chloride)}} \times 100$$

= 5 pounds of potassium chloride per 1000 square feet

Example 3:

The soil test report recommends 1 pound of N, 2 pounds of P_2O_5 and 1 pound of K_2O per 1000 square feet be applied. You are able to purchase a mixed fertilizer with a 1-2-1 ratio, such as a 15-30-15. How many pounds of this fertilizer will you need to apply?

Solution:

Divide the pounds of nutrient needed by the percentage of the nutrient in the fertilizer and multiply the result by 100.

$$\frac{1 \text{ (pounds of N recommended)}}{15 \text{ (\% N in 15-30-15)}} \times 100$$

= 6.6 pounds of 15-30-15 per 1000 square feet

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