

Understanding a Turfgrass Fertilizer Label

Proper fertilization is critical to the healthy and vigorous growth of a lawn. While general fertility guidelines can aid in maintaining high quality turfgrass, even the best recommendations are of little value if one cannot accurately apply the fertilizer recommended. In order to intelligently purchase and apply turfgrass fertilizers, one must be able to read and understand a fertilizer label.

Many different types of fertilizer are available for use on turfgrass. **Complete** fertilizers contain nitrogen (N), phosphorous (P) and potassium (K) and are widely used for turfgrass fertilization. For certain situations, **incomplete** fertilizers containing some combination of N, P and K, but not all three elements, may be the best choice. Every fertilizer material, whether complete or incomplete, must carry a label stating the guaranteed analysis of the material. The exact label information may vary from state to state, as no uniform countrywide regulations exist; the manufacturer is, however, usually required to include the following label information:

1. Name, brand, or trade mark.
2. Guaranteed chemical analysis.
3. Potential acidity (CaCO₃ equivalent)
4. Manufacturer's name and address.
5. Net weight of fertilizer in the container.

The **GUARANTEED ANALYSIS** (or fertilizer GRADE) is a listing of nutrients contained in the bag, by weight. The first number of the analysis lists % N, the second number represents % P₂O₅ (phosphate), and the third number % K₂O (potash).

Occasionally, a fourth number may appear prominently on the label. In turf fertilizers, this fourth number usually represents either iron (Fe) or sulfur (S), two supplemental nutrients that may be of value under special conditions.

The **RATIO** of a fertilizer is an important characteristic to understand. The ratio of a fertilizer is the relationship between the N - P₂O₅ -and K₂O content of a fertilizer. A fertilizer with a 3-1-2 ratio contains twice as much N as K₂O and three times more N than P₂O₅.

The ratio does not usually reflect N, P and K content. Only N is expressed on an actual elemental basis. P and K are expressed on an oxide basis; that is, they are contained in the phosphate and potash compounds. Phosphate contains 44% P and potash contains 83% K. Thus, a 18-6-12 grade fertilizer contains 18% N, 6% P₂O₅ and 12% K₂O. A 50 lb. bag of 18-6-12 contains 9 lbs N, 3 lbs P₂O₅ and 6 lbs K₂O. It also contains only 1.3 lbs of actual P and 5 lbs of actual K. Fertilizer grades of 45-15-30, 36-12-24 and 9-3-6 also

have a 3-1-2 ratio. Pound for pound, a 36-12-24 fertilizer contains twice the nutrients of a 18-6-12 fertilizer. Thus, to supply equal amounts of nutrients, one could use 1/2 as much 36-12-24 as 18-6-12 to obtain a similar response.

If possible, a soil test should be performed to determine the ratio and amount of phosphate and potash which should be applied. If P and K levels are adequate, (more than 10 ppm P, more than 100 ppm K), an incomplete fertilizer containing only N would be a good choice. If a soil test is not immediately available, a fertilizer ratio of about 3-1-2 to 5-1-2 is normally recommended for turfgrass. It is not necessary that the ratio be exactly 3-1-2 or 5-1-2 if it is close to that ratio. For late summer and early fall fertilization, a fertilizer with a balanced ratio of N and K (that is, one part nitrogen for every one part potassium) is recommended to minimize potential winter injury.

In addition to listing % N, P₂O₅ and K₂O by weight, the label of a turf fertilizer further describes how much of the total N is **water insoluble nitrogen** (WIN). WIN is nitrogen which is slowly released for use by the turf over a long period of time (several weeks, months or years) as opposed to quickly available **water soluble nitrogen** (WSN). For lawn maintenance, a fertilizer containing both WSN and WIN is desirable. WSN is quickly available to the turf and thus provides improved color and growth very soon after application. However, it is more likely to cause foliar burn at rates exceeding 2 lbs. of N/1000 sq. ft. or during periods of hot, dry weather. At normal rates of 1 lb. of N/1000 sq. ft., the response from WSN will last approximately 4-6 weeks depending upon climatic conditions. If a longer period of response (and thus fewer applications) is desired, a fertilizer containing some of the N as WIN should be considered.

WIN is slowly released by one of several mechanisms and, therefore, is less likely to cause foliar burn; it provides a longer lasting response than quickly available WSN. It is also more expensive per pound of N applied, especially if the WIN is derived from natural organic sources such as sewage sludge, plant extracts, proteins, etc.

Calculating How Much Fertilizer to Apply

In order to determine how much fertilizer to apply to an area, one must know: square footage of turf to be treated, recommended application rate and the analysis of the fertilizer.

Example:

Green-Way fertilizer (18-6-12) has been chosen to provide 1 lb. of total N per 1000 sq. ft. of area. The turf area is 7,000 sq. ft. How much Green-Way fertilizer is needed to fertilize the area?

- (Area to be fertilized) x (recommended rate of N) = Total lbs. of N needed
- (7,000 sq. ft.) x (1 lb. N per 1000 sq ft) = 7 lbs. N needed for the job
- (lbs. nutrient needed) / (percent nutrient in analysis)= lbs. of actual fertilizer needed

- $(7 \text{ lbs. N needed}) / (.18\text{N/lb. of fertilizer}) = 38.9 \text{ lbs. of fertilizer needed for the job}$

Therefore, about 39 lbs. of 18-6-12 are needed to supply 1 lb. of N per 1000 sq. ft. to a 7000 sq. ft. lawn. This same calculation can be used to determine how much of ANY fertilizer to purchase to apply ANY nutrient if you know: sq. ft. to be treated, fertilizer analysis and recommended rate of the nutrient to be applied.

CaCO₃ Equivalent

Most fertilizers, especially complete fertilizers, tend to cause an acidic reaction in soils. The acidification is often a result of the oxidation of the ammonium (NH₄⁺) which provides the fertilizer's N. Phosphorous and potash fertilizers commonly have little effect on pH unless they also contain nitrogen. The CaCO₃ equivalent is a measure of the acidifying potential of a fertilizer. It expresses how much CaCO₃ (calcium carbonate; limestone) would have to be applied to the turf area to counteract the acidifying effects after one ton (2000 lbs.) of the fertilizer had been applied to the area.

Example: Green-Way fertilizer is applied at a rate of 5 lbs./1000 sq. ft. to a lawn. How much CaCO₃ (limestone) would have to be applied to counteract the effect of 5 lbs. fertilizer r/1 000 sq. ft. applied to a 40,000 sq. ft. area?

- $(5 \text{ Lbs. of fertilizer}) / (1000 \text{ sq. ft}) \times (40,000 \text{ sq.ft.}) = 200 \text{ lbs of fertilizer applied}$
- $(200 \text{ lbs. of fertilizer applied}) \times (250 \text{ lbs CaCO}_3) / (2000 \text{ lbs.fertilizer indicated on label}) = 25 \text{ lbs. CaCO}_3$

Thus, 25 lbs. of limestone would be needed per 40,000 sq. ft. to neutralize the acidifying nature of 200 lbs. of applied fertilizer. The acidifying nature of a fertilizer is rarely of critical concern, but in the absence of a soil test, it is a way of partially estimating lime requirements over a long period of time.

Adapted from the University of Massachusetts Cooperative Extension, 2001

Pesticides are poisonous! Read and follow all safety precautions on labels. Handle carefully and store in original containers out of reach of children, pets or livestock. Dispose of empty containers immediately, in a safe manner and place. Pesticides should never be stored with foods or in areas where people eat.

When trade names are used for identification, no product endorsement is implied, nor is discrimination intended against similar materials. Be sure that the pesticide you intend to use is registered for the state of use.

The user of this information assumes all risk for personal injury or property damage.