Understanding fertilizer formulas

Q: *How do they get 23 lbs. N, 7 lbs. P and 7 lbs. K in these liquid fertilizers when the bucket itself only weighs 18 lbs. total? Is there some kind of equivalency working here? Or are the lbs. of NPK per 1000 sq. ft.?*

A: The numbers 23-7-7 refer to the percent by weight of N, P, and K in that particular formulation. If there are 18 lbs. of that fertilizer in the bucket, then the bucket actually contains 4.14 lb. of N, 1.26 lb. of P, and 1.26 lb. of K.

How far the contents of that bucket go depends on the application rate desired. If the desired application rate applies 1 lb. of N per 1000 sq.ft., then the bucket has enough total fertilizer to cover 4,140 sq.ft. But if the desired application rate is 1/8 lb. of N per msf, the bucket will cover 33,120 sq.ft.

To determine how many buckets of fertilizer are needed, determine how much actual N is in the bucket/container by multiplying the first number in the fertilizer formula (in this case 23) times .01 to convert to a decimal and then by the weight of the container in lbs. (or 18 lbs. in this bucket). The formula looks like this: 23 X .01 X 18 = 4.14 lb. of N. If the area to be treated is 20.8 msf and the application rate is 1 lb. of N per 1000 sq.ft., then the total number of buckets needed to treat 20.8 msf is five buckets.

You can do the same calculation for any element in a fertilizer formula, but you are limited in the amount of the lesser concentrated nutrients that you can apply, since in this example N is three times as concentrated as both P and K. If you want to apply one lb. of P per msf, you would be forced to apply almost 3.3 lbs of N to make sure that the total P equaled 1 lb. per msf. Under most circumstances 3.3 lb. of N is too high and will either cause excessive vertical growth or burn the turf because of the excess N.

To apply high P or K this 23-7-7 formula is not a good choice. This has been recognised by manufacturers and there are a number of high P and K fertilizers available. For applying a high P application so called starter fertilizers typically have P as the highest concentrated nutrient usually in 15-25-10 NPK ratios. And high K fertilizers are typically formulated as 15-0-30 or 15-0-15 formulations. Both of these formulas allow for high P or K fertilization without providing an excess amount of N.