FERTILIZERS & CALCULATIONS

Commonly used dry fertilizers

N-P-K	Common names
11-52-00	Eleven fifty two
0-45-0	Triple super phosphate
16-20-0	Sixteen twenty
34-0-0	Ammonium nitrate
46- 0-0	urea

* N=nitrogen; P= phosphorus in the form of P_2O_5, K= potassium
** values represent % material (e.g., 11-52-0 is 11% N, 52% P and 0% K)

To determine the amount of dry material required per acre, divide the amount of nutrient needed by the % nutrient content in the fertilizer and multiply by 100. For example you need 80 lb (units) of nitrogen per acre as dry ammounium nitrate (34-0-0): (80÷ 34) x 100 = 235.3 lb material per acre.

Commonly used liquid fertilizers

N-P-K	Common name	Wt/gal	Actual N/gal (lb)	Actual P2O5/gal (lb)
32-0-0	Urea ammonium nitrate (UAN32)	11.1	3.55	---
20-0-0	Ammonium nitrate (AN20)	10.6	2.12	---
20-0-0	Aqua ammonia (AN20)	7.6	1.52	---
17-0-0	Calcium ammonium nitrate (Can 17)	12.6	2.14	---
82-0-0	Anhydrous ammonia; “gas”	5.15	4.22	---
0-52-0	Phosphoric acid; “phos acid”	14.2	---	7.38
10-34-0	Ten thirty-four	11.7	1.17	3.98

*anhydrous ammonia is a liquid when stored under pressure; upon release to the atmosphere it is converted to gas by the decrease in pressure.

To determine the amount of liquid material required per acre, multiply the weight per gallon by the % nitrogen (or phosphorus content) to determine the pounds of actual nutrients per gallon. For example, you need to apply 80 lb of actual nitrogen per acre and you are going to use AN 20. AN 20 is 20-0-0 and weighs 10.6 lb per gallon.
Therefore, 10.6 x 0.20 = 2.12 actual nitrogen per gallon (products weight may vary slightly with temperature).
Therefore, in order to get 80 lb actual nitrogen per acre using a material that is 2.12 actual N per gal; 80÷2.12 = 37.7 gal of AN 20 required to provide 80 lb actual N per acre.

FERTILIZER CALCULATIONS (continued)

To calculate the flow rate of liquid fertilizer added to irrigation water, divide the total gallons required by the length of time needed for the irrigation to find the gallons per hour to apply. Use the formulas below to calculate the flow rate needed.

To fill up a 12 oz. Container (standard soda pop can size):

$$\text{Time (seconds)} = \left(\frac{337.5}{\text{flow rate (gal/hr)}} \right)$$

or to fill up any size container:

$$\text{Time (seconds)} = \left(\frac{\text{Container volume (oz)}}{\text{Flow rate (gal/hr)}} \right) \times 28.125$$

For example, you're going to irrigate 35 acres for 24 hr and you need 10 gal of product per acre:

10gal/acre x 35 acres = 350 gal needed to irrigate 35 acres.

350 ÷ 24 hr = 14.6 gal/hr

Therefore, to calculate the number of seconds to fill a 12 oz container, use the first formula:

$$\left(\frac{337.5}{14.6 \text{ gal/hr}} \right) = 23.1 \text{ seconds}$$

or for 8 oz container, (or any other size container), use the second formula.

$$\left(\frac{8 \text{ oz}}{14.6 \text{ gal/hr}} \right) \times 28.125 = 16.1 \text{ seconds}$$