UNIVERSITY OF MISSOURI
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Components of Your Soil Test Report

University of Missouri Extension does NOT endorse any one product. Always check with supplier and/or the label.

General Terms:

Buildup Period – MU standard is 8 years. Soil test report recommendations contain: seasonal crop need to reach yield goal (Removal Rate) + critical phosphorus and potassium soil levels (Buildup) which vary for forage and row crop.

6-inch acre furrow slice – The default soil test recommendations are based on a 6" core sample depth. Therefore, it is important to be consistent in sampling depth in order to obtain best results.

Parts Per Million (PPM) - The 6" acre furrow slice represents 2 million pounds of soil per acre. Some labs will convert lab analysis levels of phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), zinc (Zn), sulfur (S), boron (B) from PPM to pounds (lbs) per acre while some do not.

PPM Conversions:

6" sample: PPM x 2 = lbs/A lbs/ton = PPM x 0.002 12" sample: PPM x 4 = lbs/A

pH – This is a measurement of active hydrogen (H) ions in the soil. The level of H in the soil determines its acidity when below 7.0 (neutral) or alkalinity when above 7.0. The letter p indicates that hydrogen is a log scale of 10. Soil movement on the pH scale of 1.0 unit is 10 times more/less acidic. Ex: pH 4.0 is 100 times more acidic than pH 6.0. MU labs measure a salt pH while some commercial labs will measure a water pH. These measurements are both of hydrogen however the water pH will be 0.5 units higher. So a pH water of 6.0 would measure pH 5.5 in salt.
Refer to MU Guide 9102: http://extension.missouri.edu/p/G9102

Buffer pH – index value used to determine nuetralizable acidity (N.A.) Calculation: N.A. = 7.0 – buffer pH

Effective Nuetralizing Material (ENM) – standard measurement of limestone to reduce acidity. All ag lime in MO is analyzed for purity and fineness of grind which determines ENM. Check with your limestone dealer for the guaranteed analysis ENM per ton of their lime. Refer to MU Guide 9102: http://extension.missouri.edu/p/G9102

Organic Matter (OM) – Percentage of humus in a 6" acre furrow slice. It takes 10 lbs of organic material to make one of pound organic matter. Mineralization of each 1% OM will provide approximately 20 lbs N, 5 lbs P2O5, 2 lbs Sulfur per year.

Nitrogen (N): Plant available nitrogen is in the form of nitrate (NO3). The other measurable form of nitrogen that readily coverts to nitrate is ammonium (NH4). N is needed for complete plant growth (root and shoot). Nitrogen recommendations are based on crop need and are given in actual (available) units. Nitrogen fertilizer sources contain a percentage of actual N per pound of fertilizer material.

Common N sources:

Urea	46% N	Urea-Ammonium Nitrate (UAN) solution (11 lb./gal)	28% or 32% N
Ammonium sulfate	21% N	Anhydrous ammonia	82%
Ammonium nitrate	34% N	Diammonium phosphate (DAP)	18%
ESN (polymer coated urea)	44% N (slow release product, avoid late timings)		

**Urea (uncoated) containing products are subject to volatilization, research indicates the use of urease inhibitors containing NBPT will reduce the risk of loss.*

Phosphorus (P): Plant available phosphorus is in the form of phosphate (P2O5). P is needed for root development and energy (ATP). Bray I and Mehlich III soil analysis gives the plant available phosphorus on a soil test. Phosphate recommendations based on soil test levels + crop need (buildup + removal). Phosphorus fertilizer sources contain a percentage of P2O5 per pound of material. Conversion Equation: P = P2O5 X 0.44. Target soil level: 45 lb/A.

Common P sources:

Diammonium phosphate (DAP) 46% P2O5; Triple Super Phosphate 46% P2O5 (Other sources available)

Potassium (K): Plant available potassium is in the form of (K2O). K is needed for plant health. K2O recommendations based on soil test levels + crop need (buildup + removal). Potassium fertilizer sources contain a percentage of K2O per pound of material. Conversion Equation: K = K2O X 0.83. Target soil level: Row Crops: 220 + (5 x CEC)
Forage: 160 + (5 x CEC).

Common K sources:
Potash 60% K2O (Other sources available)

Sulfur (S): Plant available sulfur is in the form of sulfate (SO4). S is needed for N use in plants. Sulfur recommendations based on Organic Matter (O.M.) and CEC of soil.

Common S sources:
Ammonium sulfate 24% Calcium sulfate (gypsum) 15% Ammonium thiosulfate solution 26%
Elemental sulfur 90% (Elemental sulfur must be applied in time to convert to sulfate before crop need)

Micro Nutrients:
Zinc (Zn) low: <0.5 ppm; med.: 0.5-1.0 ppm; high: >1.0 ppm
Boron (B) low: <0.25 ppm; med. 0.25-0.5 ppm; high: >0.5 ppm

Mixed Fertilizers: Your major nutrients are generally abbreviated on a fertilizer package as N-P-K, which is a percent per pound of product in bag. Many fertilizers come with a source of 2 or 3 of the major nutrients N, P, K and some come with micronutrients. When your soil test recommendations are given based on your yield goal and soil levels of P and K, fertilizer dealers can blend the amounts of N, P, K + micros to deliver a complete fertilizer per acre.

Removal rates of common crops.

Crop	P Removal (lbs P2O5/unit)	K Removal (lbs K2O/unit)	P Removed Per Crop (lbs)	K Removed Per Crop (lbs)
Corn (150 bu)	**0.45**	**0.30**	**68**	**45**
Corn Silage (20 ton)	**3.6**	**9**	**72**	**180**
Soybeans (60 bu)	**0.84**	**1.44**	**50**	**86**
Wheat (70bu)	**0.60**	**0.30**	**42**	**21**
Alfalfa Hay (5 ton)	**10**	**45**	**50**	**225**
Cool Season Hay (3 ton)	**9**	**34**	**27**	**102**
Cool / Clover (3 ton)	**8**	**38**	**24**	**114**
Bermudagrass (4 ton)	**9**	**34**	**36**	**136**
Native Warm Season Grasses (3.5 ton)	**2**	**15**	**7**	**53**

Math Example:
If a soil test recommendation for 3 ton/A of fescue hay comes back: 120 lb N : 90 lbs P2O5 : 75 lbs K2O
Your fertilizer sources needed to meet this recommendation can vary based on nitrogen source. Recommendations will be rounded to nearest whole number:
First: determine P2O5 need:
90 lbs P2O5 / 0.46 = **195 lbs of DAP (18-46-0)**;
195 lbs DAP x 0.18 = 35 lbs N
Second: determine N need and subtract N credit from DAP (if this is the source)
120 lb N – 35 lbs N = 85 lbs N from N fertilizer source (ammonium nitrate for this example)
85 lbs N / 0.34 = **250 lbs Ammonium Nitrate (34-0-0)**
Third: determine K2O needed from Potash (0-0-60) source:
75 lbs K2O / 0.6 = **125 lbs of Potash (0-0-60)**

Some fertilizer calculators online can quickly calculate total amount of fertilizer needed for your field.
Texas A&M: http://soiltesting.tamu.edu/calc2/AgNcalc.htm
University of Georgia: http://aesl.ces.uga.edu/soil/fertcalc/