

# FERTILIZER RECOMMENDATION TABLE

ST-2 (Revised 7/03)

The recommendations in Columns 1 through 9 of this table are to be used only if you are growing a crop different from that given on your report form. The soil test recommendations cannot be as specific as those on your report form.

**To use this table follow these steps:**

1. Note the column number printed on your soil test report following the crop name or choose the column that best represents your soil nutrient levels.
2. Find that column from those listed across the top of this table.
3. Next look under the Crop column (left side of table). Select the crop for which you want the recommendation.
4. Follow this line horizontally across the sheet until you come to the proper column selected in step 2. Your fertilizer recommendation is in this block.
5. The total amount of required plant nutrients is given. Application instructions, such as those for using a starter fertilizer, or fall versus spring

applications, are also noted. Adjustments for different expected yields from those in the table are given below.

6. Nitrogen recommendations for small grains depend on previous manure applications. See note at bottom.

7. Recommendations in column 5 are the amounts required to just offset crop removal and maintain the soil test level.

**Yield goal adjustments**

**CORN GRAIN-** for each 25 bu/A change in yield, at low to optimum soil test levels, increase or decrease the recommendation by 30-10-7; at high soil test levels, adjust only the nitrogen by 1.1 lb/bu change in yield.

**CORN SILAGE-**for each 4T/A change in yield, at low to optimum soil test levels, increase or decrease the recommendation by 30-15-30; at high soil test levels, adjust only the nitrogen by 30 lb for each 4T/A change in yield.

ALFALFA-for each ton of hay, increase or decrease the recommendation by 15 lb P<sub>2</sub>O<sub>5</sub> and 4.60 lb K<sub>2</sub>O/T.

**Manure**

These recommendations do not take into consideration plant nutrients in applied manure. To determine how to adjust the recommendations for fertilizer nutrients in manure, see the "Manure Management" section of the Penn State Agronomy Guide.

Mehlich 3 soil test levels used to calculate the recommendations in this table are as follows:

Test Level	P <sub>2</sub> O <sub>5</sub> (lb/A)	K <sub>2</sub> O (lb/A)
Low	70	100
Optimum	140	210
High	300	400

Crop (expected yield)	Column 1 Low P, Low K	Column 2 Low P, Opt K	Column 3 Low P, Hi K	Column 4 Opt P, Low K	Column 5 Opt P, Opt K	Column 6 Opt P, Hi K	Column 7 Hi P, Low K	Column 8 Hi P, Opt K	Column 9 Hi P, Hi K
Corn Grain (125 bu/A)	130-120-150	130-120-40	130-120-0	130-50-150	130-50-40	130-50-0	130-0-150	130-0-40	130-0-0
Corn Silage (21 T/A) or sorghum- sudangrass (25 ton/A)	150-150-260	150-150-150	150-150-0	150-80-260	150-80-150	150-80-0	150-0-260	150-0-150	150-0-0
	<b>Starter Fertilizer:</b> Use 100 to 300 lb/A of a starter fertilizer with a high P <sub>2</sub> O <sub>5</sub> ratio (e.g., 1-2-1, 1-3-1, 1-4-2, 1-5-0). On soils with high nutrient levels or for late planting on soils with optimum or higher nutrient levels a starter fertilizer may not be necessary. <b>Legume N:</b> Following a legume, the N recommendation should be reduced from 40 to 110 lb. N/A depending on the legume species and stand. <b>Nitrogen Management:</b> 50% to 90% of the nitrogen should be applied when the corn is 10 to 20 inches tall. When double cropping corn with rye an additional 50 to 90 lb/A of nitrogen can be applied to the rye. For sorghum-sudangrass the fertilizer should be applied before seeding.								
Alfalfa (5 T/A)	0-145-360	0-145-250	0-145-60	0-75-360	0-75-250	0-75-60	0-0-360	0-0-250	0-0-60
	<b>Starter Fertilizer:</b> For establishment under adverse conditions, banding 100 to 300 lb/A of a starter fertilizer with a high P <sub>2</sub> O <sub>5</sub> ratio (e.g., 1-2-1, 1-3-1, 1-4-2) may be beneficial. For no-till, use no starter nitrogen.								
Clover, trefoil, crownvetch (3.5 T/A)	0-125-250	0-125-140	0-125-0	0-55-250	0-55-140	0-55-0	0-0-250	0-0-140	0-0-0
	<b>Starter Fertilizer:</b> For establishment under adverse conditions, banding 100 to 300 lb/A of a starter fertilizer with a high P <sub>2</sub> O <sub>5</sub> ratio (e.g., 1-2-1, 1-3-1, 1-4-2) may be beneficial. For no-till, use no starter nitrogen.								
Grasses: orchardgrass, bromegrass, reed canarygrass, timothy (4 T/A)	160-130-290	160-130-180	160-130-0	160-60-290	160-60-180	160-60-0	160-0-290	160-0-180	160-0-0
	<b>Starter Fertilizer:</b> For establishment under adverse conditions, banding 100 to 300 lb/A of a starter fertilizer with a high P <sub>2</sub> O <sub>5</sub> ratio (e.g., 1-2-1, 1-3-1, 1-4-2) at planting may be beneficial. <b>Nitrogen Management:</b> Apply 30 lb of nitrogen in late summer of the establishment year. For established stands, split the nitrogen into three applications before each cutting: spring, early summer (with P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O), and early fall. The amount applied at each application time should be based on the expected yield for the next cutting. Approximately 40 lb N per ton of expected yield at each cutting should be applied.								
Soybeans (40 bu/A)	0-120-205	0-120-95	0-120-0	0-50-205	0-50-95	0-50-0	0-0-205	0-0-95	0-0-0
	<b>Starter Fertilizer:</b> Do not use a starter fertilizer with soybeans. When double cropping add the P and K to the barley.								
Wheat* (60 bu/A)	*-130-220	*-130-110	*-130-0	*-60-220	*-60-110	*-60-0	*-0-220	*-0-110	*-0-0
Rye* (40 bu/A)									
	<b>Starter Fertilizer:</b> 100 to 300 lb/A of a starter fertilizer with a high P <sub>2</sub> O <sub>5</sub> ratio (e.g., 1-2-1, 1-3-1, 1-4-2) can be applied at planting time. Do not apply more than 15 lb of nitrogen or 30 lb of nitrogen + potash through the drill.								
Barley* (75 bu/A)	*-115-200	*-115-90	*-115-0	*-45-200	*-45-90	*-45-0	*-0-200	*-0-90	*-0-0
	<b>Starter Fertilizer:</b> 100 to 300 lb/A of a starter fertilizer with a high P <sub>2</sub> O <sub>5</sub> ratio (e.g., 1-2-1, 1-3-1, 1-4-2) can be applied at planting time. Do not apply more than 15lb of nitrogen or 30 lb of nitrogen + potash through the drill.								
Oats, grain sorghum* (80 bu/A)	*-140-205	*-140-95	*-140-0	**-.70-205	*-70-95	*-70-0	*-0-205	*-0-95	*-0-0
	<b>Starter Fertilizer:</b> Apply 100 to 300 lb/A of a starter fertilizer with a high P <sub>2</sub> O <sub>5</sub> ratio (e.g., 1-2-1, 1-3-1, 1-4-2). Do not apply more than 20 lb nitrogen or 45 lb of nitrogen + potash through the drill.								

\*NOTE: Spring nitrogen recommendations for small grains. Use the lower rate when following a crop that has received a high rate of nitrogen.

Manure applied:	Every 1-2 yrs.	Every 3-4 yrs.	None in recent yrs.	
<b>Crop</b>	<b>Nitrogen recommendation (lb A)</b>			
Wheat	0-30	30-60	60-90	For wheat and barley, if plants didn't tiller well in fall, apply the N by mid-March
Barley	0	0-30	30-40	otherwise, apply anytime up to growth stage 5.
Oats, spring barley, grain sorghum	0-30	30-60	60-90	For oats, spring barley, and grain sorghum, apply prior to planting.

For more information see the current Penn State Agronomy Guide or contact our local Penn State Cooperative Extension Office.

# LIMING MATERIAL CONVERSION TABLE FOR FIELD CROPS

The limestone recommendation on your soil test report is based on the use of a liming material equivalent in neutralizing power to 100% calcium carbonate limestone. The recommendations are in pounds of calcium carbonate equivalent (CCE) per acre. The use of any liming material that is not equivalent in neutralizing power to pure calcium carbonate limestone (100% CCE) must be adjusted so that you actually apply enough liming material to neutralize the acidity in your soil. All agricultural liming materials sold in Pennsylvania are required by law to be labeled with their calcium carbonate equivalent (CCE). Using the CCE of your liming material, the amount required to supply the recommended amount of neutralizing power (CCE) for your soil may be calculated as shown below or read directly from the table.

It is also very important that a liming material be ground fine enough to be effective. Pennsylvania aglime regulations classify agricultural liming materials into the following three groups based on fineness:

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|--|--|
| 1. Fine-sized<br>95% through a 20-mesh screen<br>60% through a 60-mesh screen<br>50% through a 100-mesh screen | 2. Medium-sized<br>90% through a 20-mesh screen<br>50% through a 60-mesh screen<br>30% through a 100-mesh screen |
|--|--|

3. Coarse-sized  
All liming materials that fail to meet one of the above minimums for fineness.

A material meeting the standard for a fine-sized liming material is considered adequate for meeting soil test recommendations in most situations. It is assumed that fine-sized liming materials will react rapidly enough to effect a change in soil pH in the year of application and will typically remain effective for about three years. The medium- and coarse-sized materials will be slower to react and thus less effective in changing soil pH in the year of application and will take longer to completely react. The actual fineness must be printed on the liming material label.

## Calculation of Actual Lime Requirement:

$$\text{Actual Liming Material Required} = \frac{\text{Soil Test Limestone Recommendation}}{\text{CCE of liming material to be used}} \times 100$$

### Example:

#### Soil Test Recommendation:

Limestone – Apply 4,000 lbs. of calcium carbonate equivalent per acre.

#### Liming Material Label:

Calcium Carbonate Equivalent (CCE) = 80%

#### Actual Liming Material Required:

$$\frac{4000}{80} \times 100 = 5,000 \text{ lbs. liming material per acre.}$$

The calculations and table for adjusting your recommendations for the CCE of your liming material assume that the material meets the minimum fineness standards for fine-sized limestone. In selecting a liming material, there is generally little advantage in using material much finer than the minimum standards for fine-sized material. In emergency situations where a very rapid change in soil pH is required, paying extra for a finer material may be warranted. However, planning ahead by using a less expensive material and allowing it time to react will generally give better and more economical results.

### Directions for using the conversion table:

Find your test limestone recommendation in the left hand column and then read across the table on that line until you come to the column headed by the % CCE nearest to that of your liming material. The number at that point is the pounds of liming material required to meet the limestone recommendation on your soil test.

Because there is generally little advantage to applying more than 8,000 pounds of CCE per acre in any one application to agricultural land, this table is divided into three sections suggesting how the total liming material required can be split for most efficient use. Separate the applications by 6 months time or at least by tillage operations. (See the right hand column).

Pounds per acre of Calcium Carbonate Equivalent Recommendation on your soil test	Percent Calcium Carbonate Equivalent (%CCE) of Your Liming Material									Divide Total into the Following Number Applications
	70	75	80	85	90	95	100	105		
1000	1400	1300	1200	1200	1100	1100	1000	1000		
2000	2900	2700	2500	2400	2200	2100	2000	1900		
3000	4300	4000	3700	3500	3300	3200	3000	2900		
4000	5700	5300	5000	4700	4400	4200	4000	3800		
5000	7100	6700	6200	5900	5600	5300	5000	4800	1	
6000	8600	8000	7500	7100	6700	6300	6000	5700		
7000	10000	9300	8700	8200	7800	7400	7000	6700		
8000	11400	10700	10000	9400	8900	8400	8000	7600		
9000	12900	12000	11200	10600	10000	9500	9000	8600		
10000	14300	13300	12500	11800	11100	10500	10000	9500		
11000	15700	14700	13700	12900	12200	11600	11000	10500		
12000	17100	16000	15000	14100	13300	12600	12000	11400		
13000	18600	17300	16200	15300	14400	13200	13000	12400	2	
14000	20000	18700	17500	16500	15600	14700	14000	13300		
15000	21400	20000	18700	17600	16700	15800	15000	14300		
16000	22900	21300	20000	18800	17800	16800	16000	15200		
17000	24300	22700	21200	20000	18900	17900	17000	16200		
18000	25700	24000	22500	21200	20000	18900	18000	17100	3	
19000	27100	25300	23700	22400	21100	20000	19000	18100		
20000	28600	26700	25000	23500	22200	21100	20000	19000		

To convert to 1000 sq. ft. rate, divide the recommended value in the table by 43.5.

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