

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENT 1007
TESTING OF AGRICULTURAL LIMING MATERIAL**

April 19, 2002

- 1007.01 Types**
- 1007.02 Apparatus**
- 1007.03 Reagents**
- 1007.04 Physical Analysis**
- 1007.05 Chemical Analysis**
- 1007.06 Rate of Application**

- 1007.01** Types.
- 1. Limestone
 - 2. Slag (Air and water cooled)
 - 3. Hydrated Lime

- 1007.02** Apparatus.
- 1. Oven (forced air).
 - 2. Rotap shaker.
 - 3. 1:1 sand splitter.
 - 4. Sieves.
 - 5. Analytical balance.

- 1007.03** Reagents.
- 1. 0.10N NaOH
 - 2. 0.10N Hcl
 - 3. 0.80N Hcl
 - 4. Bromocresol Green
 - 5. Phenolphthalein

1007.04 Physical Analysis.

- (a) If sample is not dry, allow to air dry overnight and continue.
- (b) Using a sand splitter, mix sample in one pass then split it down to obtain a 100 to 150 gram sample.
- (c) Dry at 105°C for 1 hour in the oven.
- (d) Quantitatively transfer to 200 mm nominal diameter U.S. standard sieves stacked 2.36 mm, 850 mm, 250 mm, 150 mm and pan, respectively. (Extra sieves will be needed to take up slack in shaker.)
- (e) Shake sieve stack for 15 minutes in Rotap. After shaking, note if agglomerates are present. If noted, break by using hard bristle brush and shake again.

- (f) After shaking, carefully remove and record mass on each sieve fraction.
- (g) Retain material passing the 250 mm sieve for Chemical Analysis in 1007.05.
- (h) Report in the following manner:

Sieve Size	Retained (Grams)	Percent Retained	Total Percent
2.36 mm	_____	_____	_____
850 mm	_____	_____	_____
250 mm	_____	_____	_____
150 mm	_____	_____	_____
Pan	_____	_____	_____

1007.05 Chemical Analysis.

- (a) Limestone. Accurately weigh 0.250 grams of sample passing the 250 mm sieve into 250-milliliter breaker or flask. Add 10 milliliters of 0.8 HCL, 100 milliliters of distilled water and boil very gently (low hot plate) for 10 minutes, cool to room temperature, add 10 drops of phenolphthalein and titrate with 0.1 N NaOH to a pink end point. Report as in (d).
- (b) Blast Furnace Slag. Accurately weigh 0.250 grams of sample passing the 250 mm sieve into 250 milliliter breaker of flask. Add 10 milliliters of 0.8 N HCL, 100 milliliters of distilled water. Boil gently with continuous stirring for 10 minutes. Cool to room temperature, add 1 milliliter of 30% H₂O₂, 5 drops of bromocresol green and titrate with 0.1 N NaOH to a slight blue end point. Report as in (d).
- (c) Hydrated Lime. Accurately weigh 0.250 grams of sample into 250-milliliter beaker or flask. Add 10 milliliters of 0.8 N, then 20 milliliters of 0.1 N HCL respectively. Swirl and boil gently (low hot plate) for 5 minutes. Cook to room temperature, dilute to the 100 milliliter mark with distilled water, add 10 drops of phenolphthalein and titrate with 0.1 N NaOH to pink end point. Report as in (e).
- (d) Limestone and slag: Report as:

$$[(\text{NHCL} \times \text{VHCL}) \times 10 - (\text{NNAOH} \times \text{VNAOH}) \times 10] \times 2.0018 = \% \text{ TNP}$$
 Report as: % TNP
- (e) Hydrated Lime:

$$[(0.80 \times \text{VHCL} + 0.10 \times \text{VHCL} - \text{NNAOH} \times \text{VNAOH}) \times 10] \times 2.0018 = \% \text{ TNP}$$
 Report as: % TNP

1007.06 Rate of application. Utilizing the sieve analysis and the total neutralizing power, the rate of application is determined by using the "Ohio Table of Equivalent Amount of Liming Materials and Conversion Factors" from The Agronomy Guide Bull. 472 The Cooperative Extension Service Of The Ohio State University.