

Leaflet T (revised).

TESTING LIME
FOR
LIME-SULPHUR
SOLUTION

New York Agricultural Experiment Station
Geneva, N. Y.

1914

**Why test
purity of
lime ?**

In making lime-sulphur solution an excess of either lime or sulphur should be avoided. An excess of sulphur increases the amount of sediment. The excess sulphur remains undissolved and is therefore lost. An excess of lime causes the solution to crystallize easily and a large excess increases the sediment also.

In order to be successful in making concentrated lime-sulphur solution it is quite necessary that the amount of lime, sulphur and water called for in the Geneva Station formula be strictly adhered to and all lime should be tested before it is used, since impurities lessen the actual lime in any weighed quantity.

The new Geneva Station formula is given in Bulletin 329.

**Principle of
test.**

The test is based on the fact that when one part, by weight, of pure lime (calcium oxide, CaO) and two and one-fourth parts of sulphur are boiled with water for one hour, the lime and sulphur go into solution and only a slight amount of sediment is formed. If the lime contains impurities (oxides of magnesium, iron, aluminum, etc., and carbonates of magnesium, calcium, etc.), these do not go into the solution but remain as sediment, together with any undissolved sulphur not acted upon because of an insufficient amount of lime, caused by the impurities in the lime used.

The apparatus required consists
Apparatus. of (1) a granite-iron-ware deep vessel holding $1\frac{1}{2}$ to 2 quarts, in which to boil the mixture; (2) a spoon of the same material; (3) a stick for stirring and measuring, on which is cut a notch at the point where the surface of the water stands when one quart of water is placed in the dish and the stick placed vertically in the water, one end resting upon the bottom of the dish; (4) a glass cylinder about $2\frac{1}{2}$ inches in diameter and 15 inches high graduated to hold 1 quart; (5) a hydrometer, either a specific gravity spindle or a Beaumè hydrometer.

Details of method. The method of carrying out the test is as follows: Weigh carefully 2 ounces of the lime to be tested, place it in the boiling vessel and slake with water, adding the water gradually and being careful not to smother the lime with too much water. Stir with the spoon until the lime is thoroughly slaked and a thick, uniform paste or milk of lime is formed. Then add water enough to fill to the notch on the stick, after which place over a fire and boil. Weigh $4\frac{1}{2}$ ounces of fine, high-grade flowers of sulphur and when the milk of lime begins to boil add the sulphur gradually, stirring in vigorously with the spoon. Allow the mixture to boil gently for one hour, stirring most of the time to break up any lumps of sulphur, using the spoon or stick or both according to convenience and effectiveness. During the boiling, measure the height of the mixture about once every ten minutes by means of the notched stick and if the level of the liquid has dropped below the notch, add enough hot water to bring the level back to the notch. When the mixture has boiled one hour, let it cool to atmospheric temperature and then, after stirring it up thoroughly with the spoon, pour quickly into the glass cylinder, being careful to get in all the sediment.

Do not pour the hot solution into the cylinder for it will surely break.

Add enough water to bring the mixture up to the quart mark. Pour back into the dish and stir with the spoon in order to thoroughly mix in the water. Now return again to the cylinder and allow to stand quietly until all the sediment has settled to the bottom of the cylinder.

Now introduce the hydrometer and after obtaining the reading, find the percentage purity of the lime, and the number of pounds to use for the Geneva Station formula, by means of the table.

Specific gravity	Degree Beaume	Percentage purity	Pounds of lime for Geneva formula
1.142	18.0	100	36
1.135	17.1	95	38
1.128	16.3	90	40
1.121	15.5	85	42
1.114	14.3	80	45
1.107	13.9	75	48
1.099	12.9	70	51
1.092	12.1	65	55
1.085	11.2	60	60
1.079	10.5	55	66
1.071	9.4	50	72

Care of the hydrometer. The hydrometer should not be left floating in the solution after the reading is obtained. It should be removed at once and thoroughly washed clean with water. If any of the solution is allowed to dry on the spindle it gives incorrect readings.