

Palintest®

Soil pH/Lime Requirement Kit

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To ensure maximum accuracy, this kit should only be used in conjunction with Palintest products.

All Palintest instruments and reagents are manufactured in, and distributed from the UK.

THE PALINTEST SOILTETER SYSTEM

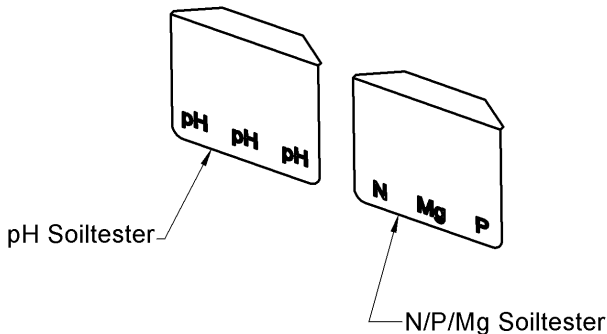
Soil testing plays a vital role in modern agricultural and horticultural management. Regular assessment of major nutrient levels in the soil is essential to make fertiliser recommendations and to ensure optimum growing conditions.

The Palintest system of soil testing is unique. Simple to use test equipment, and reagents in stable tablet form, mean that reliable results can be obtained by all users - with or without formal training in soil analysis.

This is why the Palintest system is used by farmers, growers and specialists throughout the world - you can rely on years of Palintest experience for your soil testing needs.

The Palintest Soiltester system offers a rapid reliable means of soil analysis. The system uses Palintest Soiltester blocks - simple to use colour comparison blocks.

The Palintest Soiltester blocks are integrated with the Palintest range of soil extraction and reagent tablets. They offer therefore a simple colorimetric method of analysis for a range of important soil tests.



SOIL ANALYSIS APPLICATIONS

Soil analysis is a complex subject. The wide variation in soil types and crops under cultivation has promoted many different methods of soil analysis. Often the results obtained must be related to the method of analysis used.

Whilst precise laboratory analysis undoubtedly has a vital role, simple methods of field testing can be immensely useful in soil management. In particular results can be obtained quickly and economically. Field tests can be conducted in order to make fertiliser recommendations, to check if further tests are needed or to determine if samples should be collected for specialist analysis.

Palintest soil tests are equally suited for use in the field and in the laboratory. Palintest soil test kits are an important part of any agricultural or horticultural management programme.

CORRELATION OF RESULTS

Chemical elements are often strongly bonded or complexed within the soil structure. Soil analysis measures the nutrients or trace elements which are 'exchangeable' or 'extractable' under the conditions of the test. The amounts will depend on the nature of the extraction method and the time of contact. Thus whilst a general relationship exists between different methods of soil analysis, precise correlation can sometimes be difficult.

In developing Palintest methods regard has been paid to standard laboratory methods of soil testing (Ref - 1, 2). Correlations have been established for the pH, Lime Requirement, Nitrate (N), Phosphate (P), Potassium (K) and Magnesium (Mg) methods (Ref - 3). These tests should give similar results to United Kingdom ADAS methods for normal agricultural soils. However, in view of the wide variation in soil types it is not possible to guarantee that precisely similar results will be obtained in all cases.

Test results should always be considered in relation to the fertiliser programme applied and the conditions of cultivation. In the event of unexpected test results being obtained, such as very high or very low values, then it is recommended that samples are submitted for laboratory analysis.

FERTILISER RECOMMENDATIONS

Fertiliser recommendations are outside the scope of these soil test instructions. It is suggested that users refer to standard fertiliser recommendations such as those published by ADAS (Ref - 4) in the United Kingdom and by government agencies in other countries.

REFERENCES

- 1 The Analysis of Agricultural Materials; Agricultural Development and Advisory Service; Ministry of Agriculture, Fisheries and Food; Reference Book RB 427.
- 2 Methods of Soil Analysis; American Society of Agronomy, 1965, 5th printing 1979.
- 3 Comparison of Palintest Soil Test Methods with Standard Laboratory Procedures, Colin Marks and Valerie Argent, Palintest Ltd.
- 4 Fertiliser Recommendations; Agricultural Development and Advisory Service; Ministry of Agriculture, Fisheries and Food; Reference Book 209.

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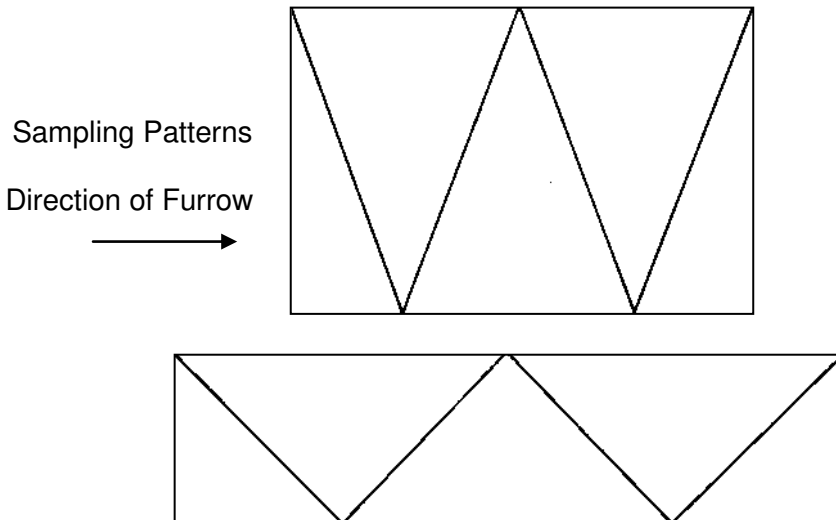
SOIL SAMPLING

A soil sample should be collected from each plot or area to be examined. Separate samples should be collected from each area, which differs in soil type, previous cropping history or type of soil management.

Preferably, samples of soil should be taken using a soil sampling auger which enables 'cores' of soil to be taken from below the surface. Alternatively, a piece of narrow rigid tubing may be used. Between 10 and 25 individual cores should be taken from each area to make up the soil sample for analysis. It is customary when sampling large areas of agricultural land to take cores along the shape of an imaginary W covering the area being sampled. Cores should not be taken close to hedgerows, under trees or adjacent to buildings.

To provide the sample for analysis, the individual cores should be thoroughly mixed in a bucket. Stones and foreign materials should be removed by hand. The soil can be passed through a 2 mm sieve or similar if this is available. The sample can then be transferred to a polythene sample bag (PT 301).

For field analysis, the tests may be conducted directly on the moist sample. Where analysis is to be carried out at a later time, it is preferable to dry the sample by spreading it out on a tray or plastic sheet and allowing it to stand in air.



TEST INSTRUCTIONS

Soil pH

Soil pH is a measure of the hydrogen ion activity and is important in determining the availability of plant nutrients. Agricultural soils generally lie within the pH range of 4 - 8.

Neutral soils have a pH value close to 7.0. Soils are considered alkaline if the pH is above 7, and acidic if the pH is below 7. Soils below pH 5 are strongly acidic and will only support acid loving plants.

Lime Requirement

The 'Lime Requirement' of a soil is a measure of the quantity of liming material required to raise the pH of the soil to a specified value. The specified pH value is 6.5 for mineral soil, 6.2 for organic soil and 5.8 for peaty soil. It is not necessary to test soils where the existing pH is higher than these values since in such cases the lime requirement will be zero.

In the Palintest Lime Requirement test, the soil is shaken with a pH buffer and the extent to which the soil modifies the buffer pH is used to determine the lime requirement. The test is carried out as an extension of the Soil pH test. The value given is the amount of calcium carbonate required to raise a 20 cm depth of soil to the pH value specified for the particular soil type.

Reagents and Equipment

Palintest Soil pH Tablets	ST-2200
Palintest Lime Buffer Tablets	ST-2210
Palintest pH Soiltester	PT 320
Soil Scoop 2 ml	PT 302

Test Procedure

Soil pH

Use the tubes on either side of the Soiltester. Two soil samples may be tested at the same time :-

- 1 Take a level 2 ml scoop of soil and place in the Soiltester tube. Fill to the 10 ml mark with deionised water.
- 2 Add one Soil pH tablet then shake the Soiltester gently for one minute.
- 3 Allow the soil to settle then compare the solution against the Soiltester colour standards under daylight conditions. The reading obtained represents the soil pH value.

Note

With certain soils the suspension may be slow to settle and the colours may appear weak. In such cases the test should be repeated using two Soil pH tablets.

Lime Requirement

This test may be carried out as a continuation of the Soil pH test. In this case go directly to step 3 of the instructions below :-

- 1 Take a level 2 ml scoop of soil and place in the Soiltester tube. Fill the tube to the 10 ml mark with deionised water.
- 2 Add one Soil pH tablet and shake the Soiltester gently for one minute.
- 3 Add one Lime Buffer tablet and shake the Soiltester gently for two minutes.
- 4 Allow the soil to settle then compare the solution colour against the Soiltester colour standards under daylight conditions. Note the modified pH reading of the buffer.
- 5 Refer to the Lime Requirement table appropriate to the type of soil under test. The tables show the lime requirement expressed in terms of calcium carbonate (CaCO_3). Quantities are given in various units commonly used in agriculture.

Mineral Soils

Mineral soils contain less than 10% organic material :-

Soiltester Reading (Modified pH)	Lime Requirement (CaCO₃)			
	tonne/ha	gram/m²	cwt/acre	oz/sq yard
4.0	30	3000	240	90
4.5	25	2500	200	75
5.0	20	2000	160	60
5.5	15	1500	120	45
6.0	10	1000	80	30
6.5	4	400	30	12
7.0	0	0	0	0
7.5	0	0	0	0
8.0	0	0	0	0

Organic Soils

Organic soils contain 10 - 25% organic material :-

Soiltester Reading (Modified pH)	Lime Requirement (CaCO₃)			
	tonne/ha	gram/m²	cwt/acre	oz/sq yard
4.0	32	3200	225	95
4.5	26	2600	210	78
5.0	21	2100	165	61
5.5	15	1500	120	45
6.0	10	1000	75	28
6.5	4	400	30	12
7.0	0	0	0	0
7.5	0	0	0	0
8.0	0	0	0	0

Peaty Soils

Peaty Soils contain greater than 25% organic material :-

Soiltester Reading (Modified pH)	Lime Requirement (CaCO ₃)			
	tonne/ha	gram/m ²	cwt/acre	oz/sq yard
4.0	34	3400	270	100
4.5	28	2800	225	85
5.0	22	2200	180	65
5.5	17	1700	135	50
6.0	11	1100	85	32
6.5	5	500	40	15
7.0	0	0	0	0
7.5	0	0	0	0
8.0	0	0	0	0

The lime requirement values given in the foregoing tables should be regarded as maximum values. Over-liming should be avoided as this may give rise to trace element deficiencies.

Liming Materials

The results of the Palintest Lime Requirement test are given in terms of calcium carbonate (ground limestone or chalk). In practice a variety of liming materials are used and regard must be paid to the neutralising value of these materials in order to determine the amounts required from the results given as calcium carbonate.

GENERAL INSTRUCTIONS

Care and Maintenance

Palintest kits are designed to give long service and require very little maintenance. The main requirement is to keep the components in a clean condition. Spillages of test solutions should be wiped up immediately with a damp cloth. In addition to routine cleaning, the sample containers should be washed periodically in warm soapy water.

Deionised Water

Deionised water is required for sample dilution and for the general rinsing of test tubes, etc. The Palintest De-Ion Pack (PT 500/B) has been specially developed to provide deionised water for use with test kits both in the field and in the laboratory.

The Palintest De-Ion Pack produces approximately 2½ litres of deionised water in 2 - 5 minutes from mains water or from clean natural water sources. Instructions for using the De-Ion Pack are given on the product.
