

Application Notes: Reflectometry – Phosphate Potassium in Soil Samples

Reflectometric determination using phosphomolybdenum blue method

Reagents

Catalog No. 116978 **Reflectoquant® Phosphate Test**
 Catalog No. 117246 **Reflectometer RQflex® 20**
 Catalog No. 102103 **Calcium lactate (for soil tests)**
 Catalog No. 100319 **Hydrochloric acid 32 % Folded filter**

This application note pertains to RQflex® 20 and all discontinued instruments (RQflex® 10, RQflex® plus)



Sample preparation

Preparation of DL solution for extraction:

Stock solution:

Add 800 ml boiling water to 120 g Calcium lactate and stir until the lactate is completely dissolved. Add 40 ml 10 M hydrochloric acid to the warm solution and fill up to 1 l by adding distilled water after the solution has cooled down to room temperature.

DL solution for use: (prepare the solution daily!)

Dilute 50 ml stock solution to 1 l using distilled water.

The pH of the solution for use must be 3.6.

Weigh approx. 5 g (exactly weighed) of dry, sieved (using the fraction < 2 mm) soil into a beaker and add 250 ml DL solution for use. Shake for 90 minutes and filter through a folded filter.

Analysis

Rinse the test vessel with the pretreated sample solution and fill to the 5-ml mark. Add 10 drops of reagent PO4-1 and swirl. Press START button and simultaneously immerse both reaction zones of the test strip in the sample solution (15 - 35 °C) for approx. 2 seconds. Allow excess liquid to run off via the long edge of the strip on to an absorbent paper towel. Wait 90 seconds and then measure the strip in the reflectometer. The value [mg/l] will be stored automatically. (Please refer to the RQflex® operating instructions and the package insert of the Reflectoquant® Phosphate Test.)

Calculation

$$\text{Phosphate content [mg/100g]} = \frac{\text{Measured value [mg/l]} \times \text{Vol. extract. sol [ml]}}{\text{Weight of sample [g]} \times 10}$$

Results - comparison with photometric and official LUFA method

Sample	Reflectoquant® [mg/100g P ₂ O ₅]	Photometry [mg/100g P ₂ O ₅]	LUFA [mg/100g P ₂ O ₅]
1	26.1	28.5	27.2
2	13.1	13.1	13.2
3	20.5	21.6	20.4
4	11.2	12.8	13.3
5	14.9	16.8	16.4
6	11.2	13.1	13.1
7	13.1	13.3	12.8
8	11.2	11.2	11.4
9	18.7	19.7	19.3
10	26.1	27.8	26.1
11	22.4	23.8	23.1
12	28.0	28.5	25.8
13	33.6	32.7	28.9
14	7.5	7.6	8.2
15	14.9	15.3	14.6
16	22.4	20.4	21.1
17	26.1	28.3	28.5
18	48.6	47.5	46.7
19	41.1	38.4	37.0
20	43.0	42.1	40.4

Product #	Description
1.02103	Calcium lactate for soil tests
1.00319	Hydrochloric acid 32% for analysis EMSURE® for analysis EMSURE®
1.16978	Phosphate Test Method: reflectometric with test strips and reagent 5 - 120 mg/l PO ₄ ³⁻ Reflectoquant®
1.17246	Reflectometer