Transport Roads & Maritime Services

NSW GOVERNMENT

Test method T1030

Determination of total actual acidity of acid sulphate soils

NOVEMBER 2012

Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added	D.Dash	June 2001
Ed 2/ Rev 0	All	Reformatted RMS template	J Friedrich	November 2012

Note that Roads and Maritime Services is hereafter referred to as 'RMS'.

The most recent revision to Test method T1030 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T1030

Determination of total actual acidity of acid sulphate soils

1. Scope

This test method sets out the procedure for determining the Total Actual Acidity of acid sulphate soil arising from the presence of pyrite in soil. It is derived from the procedure given in Technical Report No 53 (1993), CSIRO, Centre for Environmental Mechanics.

2. Apparatus

(a) Balance of 200 g capacity, accurate and readable to 0.0001 g.

(b) Thermostatically controlled oven capable of maintaining a temperature of 75 - 80°C.

(c) Centrifuge, capable of reaching 3000 RPM and appropriate capacity centrifuge tubes to fit.

(d) End over end shaker

(e) Laboratory glassware such as beakers, volumetric flasks, pipettes etc.

(f) pH meter

(g) Auto titrator (optional)

(h) Burette, capacity 50 mL

(i) AS sieves, 2.36 mm and 0.600 mm

(j) Metal mixing and quartering trayor riffle box

(k) Magnetic stirrer and bar.

3. Reagents

(a) Potassium chloride solution 1M; weigh 18.64 g AR grade potassium chloride and make up to volume with deionized water in a 250 mL volumetric flask.

(b) Standard sodium hydroxide solution 0.5 M; weigh 10.0 g AR grade sodium hydroxide and make up to volume with deionized water in a 500 mL volumetric flask. Standarize against standard hydrochloric acid solution using bromophenol blue indicator

(c) Standard buffers of pH4 and pH7.

4. Sample Preparation

(a) Dry the sample at 75-80°C in the oven.

(b) Sieve the material to pass 2.36 mm sieve breaking up aggregations but avoiding breaking up discrete particles.

(c) By riffling or quartering, obtain, from the material passing the 2.35 mm sieve about 50 g of material, avoiding the loss of fines.

(d) Crush or grind this portion to pass 0.600 μm sieve and mix well.

5. Procedure

(a) Weigh accurately, about 5 g of soil (W) passing 0.600 mm sieve into a suitable centrifuge tube.

(b) Add 25 mL of 1M potassium chloride, stopper the tube and shake in the end-over-end shaker for 30 min.

(c) Centrifuge the tube and sample at 3000 RPM for 2 minutes and pour the supernatant liquid into a 250 mL beaker.

(d) Make up to approximately 100 mL with deionized water.

(e) Standardize the pH meter with pH4 and pH7 buffers following the manufacturers recommended procedure.

(f) Place the beaker and contents on the magnetic stirrer, immerse the stirrer bar and set to a slow stirring motion.

(g) Insert the pH electrode into the liquid in the beaker and position the burette filled with standard 0.5M sodium hydroxide solution over the beaker.

(h) Titrate with standard 0.5M sodium hydroxide solution only adding the next increment when the pH becomes steady: Titrate to pH = 5.5.

Alternatively set up the auto-titrator according to the manufacturers instructions and titrate to the pre-set value of pH =5.5.

(i) Note the volume of standard sodium hydroxide used for the titration.

6. Calculations

(a) Calculate the Total Actual Acidity (TAA) of the soil sample as follows:

$$TAA = \frac{V \times M}{W} \text{ (mole/kg}$$

Where

V = volume of standard sodium hydroxide solution, mL
M = molarity of standard sodium hydroxide solution
W = mass of soil sample, grams.

7. Reporting

Report the Total Actual Acidity of the soil in mole/kg to the nearest 0.01 mole/kg.