T 289

DETERMINING pH OF SOILS FOR USE IN CORROSION TESTING FOP FOR AASHTO T 289

T 289

DETERMINING pH OF SOILS FOR USE IN CORROSION TESTING FOP FOR AASHTO T 289

DETERMINING pH OF SOILS FOR USE IN CORROSION TESTING FOP FOR AASHTO T 289

02 ## Scope

This method of test covers the procedure for determining the pH values of soil samples in the laboratory.

The purpose of the test is to supplement resistivity determinations made according to AASHTO T 288, helping to identify soil conditions that may accentuate the corrosion of embedded metal items.

03 ## Sampling

Obtain a representative sample of sufficient size according to appropriate sampling requirements for soils. Reduce to an appropriate test sample size according to AASHTO T 248.

The original sample size must be sufficient to yield at least 100 grams of dry material passing the No. 10 sieve.

04 ## Apparatus

05
- **Sieves:** A series of sieves of the following sizes: 1/4 inch, No. 4, No. 10, and a pan
- **Balance:** Of sufficient capacity and accurate to 0.1% of sample mass
- **Drying Apparatus:** Any suitable device capable of drying samples at a temperature not exceeding 140° F.

06
- **Pulverizing Apparatus:** Either mortar and rubber-covered pestle or any device suitable for breaking up the aggregations of soil particles without reducing the size of the individual grains of soil.
- **Sample Splitter:** A suitable riffle sampler or sample splitter for proportional splitting of the sample and capable of obtaining representative portions of the sample without appreciable loss of the fines. The width of the container used to feed the riffle sample splitter should be equal to the total width of the riffle chutes. Proportional splitting or quartering of the sample on canvas cloth is also permitted.

07
- **Distilled Water**
- **Beaker:** Wide-mouth glass 50 mL beaker.
- **Teaspoon or Small Scoop**

- **Thermometer:** Reading 77 ±50° F, to the nearest 0.2° F.
- **pH Meter:** Meter suitable for laboratory or field analysis, with either 1 or 2 electrodes.
- **PH Standard Buffer Solutions:** Standards to be used are pH of 4.0, 7.0 and 10.0.
- **Glass Stirring Rod**

Sample Preparation

08 The sample as received from the field shall be dried in air or a drying apparatus not exceeding 140° F. The sample shall then be reduced to an appropriate size by splitting or quartering. The aggregations of soil particles shall then be broken up in the pulverizing apparatus.

The portion of the dried sample selected for testing shall be separated into fractions by one of the following methods:

Method A – Alternate method Using No.10 Sieve

09 The dried sample shall be separated into two fractions using the No. 10 sieve. The fraction retained on the sieve shall be ground with a
10 pulverizing apparatus until the aggregations of soil particles are broken into separate grains. After pulverizing, that material shall be separated into two fractions over the No. 10 sieve.

The sample used for testing shall consist of all the material passing the No. 10 sieve after the separation procedure described above.

Method B – Alternate method Using No. 4 and No. 10 Sieves

11 The dried sample shall first be separated into two fractions using the No. 4 sieve. The fraction retained on this sieve shall be ground with a pulverizing apparatus until the aggregations of soil particles are broken into separate grains and again separated on the No. 4 sieve. The fraction passing the No. 4 sieve shall be mixed thoroughly and, by use of the splitter or by splitting and quartering, a representative portion adequate for testing shall be obtained. This split-off portion shall then be separated on the No. 10 sieve, and prepared according to Method A.

12 **Method C – Alternate method Using 1/4 inch and No. 10 Sieves**

The dried sample shall first be separated into two fractions using the 1/4 in. sieve. The fraction retained on this sieve shall be ground with a pulverizing apparatus until the aggregations of soil particles are broken into separate grains and again separated on the 1/4 in. sieve. The fraction passing the 1/4 in. sieve shall be mixed thoroughly and, by use of the splitter or by splitting and quartering, a representative portion adequate for testing shall be obtained. This split-off portion shall then be separated on the No. 10 sieve, and prepared according to Method A.

Procedure

13 1. From the prepared soil, remove a representative portion of approximately 100 grams according to AASHTO T 248.
2. Place 30.0 ±0.1 g of soil into the glass beaker.
3. Add to the soil sample 30.0 ±0.1 g of distilled water. Stir to obtain a soil slurry then cover material with a watch glass.
4. Allow the sample to stand for a minimum of one hour while stirring the sample every 10 to 15 minutes.

14 5. Measure the temperature of the sample and adjust the temperature controller of the pH meter to that of the sample.
6. Standardize the pH meter according to manufacturers instructions.
7. Stir the sample well with a glass rod immediately before immersing the electrodes into the sample.

15 8. Place the electrodes into the soil slurry and gently turn the beaker or container to make a
16 good contact between the solution and the electrodes.
9. Allow the meter to stabilize for a minimum of 30 seconds before reading.
10. Read and record the pH value of soil to the nearest 0.1.
11. Rinse off the electrodes well with distilled water, and dab lightly (do not wipe!) with soft tissues to remove any film from the electrodes.

17

Report

- Report on standard agency forms.
- Report pH to nearest 0.1.

18

Tips!

- Periodically check for damage to electrodes.
- Electrode tips should be kept moist during storage. Follow manufacturer's instructions

REVIEW QUESTIONS

1. Why is this test performed?

2. How much material is required for this test?

3. Describe the soil pH determination.

4. What must be done after each pH determination?

5. To what degree of accuracy is pH reported?

PERFORMANCE EXAM CHECKLIST

DETERMINING pH OF SOIL FOR USE IN CORROSION TESTING FOP FOR AASHTO T 289

Participant Name:_____ Exam Date:_____

Sampling

1. Sample obtained by method approved by agency for sampling of soils? _____
2. Sample reduced to appropriate size according to AASHTO T 248? _____
3. Sample large enough to yield at least 100 grams of dry soil finer than No. 10 sieve after processing? _____

Sample Preparation

1. Sample air-dried, or oven-dried at a temperature not exceeding 140° F? _____
2. Specimen separated by appropriate method (A, B, or C)? _____

Procedure

1. Representative portion of approximately 100 grams obtained by T 248? _____
2. A representative portion weighing 30.0 ±0.1g obtained? _____
3. Sample combined with 30.0 ±0.1g of distilled water in a glass beaker and mixed to obtain a slurry? _____
4. Beaker covered with watch glass and allowed to stand for a minimum of one hour, stirring every 10 to 15 minutes? _____
5. Temperature taken and pH meter adjusted? _____
6. pH meter standardized per manufacturers instructions? _____
7. Sample stirred before placing electrodes into slurry? _____
8. Beaker turned after placing electrodes into slurry? _____
9. Meter allowed to stabilize at least 30 seconds before recording readings? _____
10. Results recorded to the nearest 0.1? _____
11. Electrode rinsed in distilled water and lightly dabbed with tissue to remove any film? _____

Comments: First attempt: (Pass/Fail) ___ Second attempt: (Pass/Fail) ___

_____
_____
_____
_____
_____
_____
_____
_____

Signature of Examiner_____.