HDOT TM 5-00

Standard Test Method for Wet Preparation of Disturbed Soil Samples

1. Scope

1.1 This test method is intended for the wet preparation of soil samples as received from the field, for subsequent testing for the liquid limit, plasticity index, sand equivalent, gradation, and/or moisture-density relations of soils.

1.2 This method is to be used on soils with natural moisture content higher than 40 percent or on sensitive soils such as volcanic ash which will have significant irreversible change in properties if dried before testing.

1.3 This method shall be used as directed by the Engineer or if allowed in the Special Provisions for the project in which the soil will be used.

2. Referenced Documents

2.1 AASHTO Standards:

- M92 Wire Cloth Sieves for Testing Purposes
- T11 Materials Finer Than 75*μm* (No. 200) Sieve in Mineral Aggregates by Washing
- T27 Sieve Analysis of Fine and Coarse Aggregates
- T89 Determining the Liquid Limit of Soils
- T90 Determining the Plastic Limit and Plasticity Index of Soils
- T99 The Moisture-Density Relations of Soils Using 2.5 kg (5.5 pounds) Rammer and a 305 mm (12 inches) Drop
- T176 Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test
- T180 Moisture-Density Relations of Soils Using a 4.54 kg (10 pounds) Rammer and a 457 mm (18 inches) Drop
- T265 Laboratory Determination of Moisture Content of Soils

3. Apparatus

3.1 Balance — The balance shall be precision to 0.1 gram.

3.2 Sieves — The 4.75 *mm* (No. 4), 2.00 *mm* (No. 10), 425 *μm* (No. 40) and 75 *μm* (No. 200) sieves shall conform with the requirements of AASHTO M 92.

3.3 Sample Splitter

4. Sampling

4.1 Samples shalls be obtained in the field at least 300 mm (12 in) below the existing surface, or as directed by the Engineer, to insure that the moisture content of the sample is representative of the natural moisture content of the material at the site.

4.2 Samples shall immediately be stored and shipped in air-tight containers and properly sealed to maintain its natural moisture content. DO NOT DRY THE SAMPLE OR ALLOW THE SAMPLE TO DRY.

4.3 Sampled material shall be immediately transported to the laboratory through the most appropriate means.

5. Preparation of Sample

5.1 The sample as received from the field shall be thoroughly mixed and aggregations shall be thoroughly broken up in such a way to avoid reducing the natural size of individual particles.

5.2 The sample shall not be dried. The natural moisture content shall be reported as the "as received" moisture content on all test reports requiring this method of preparation.

5.3 Samples shall be obtained by the method of quartering or by use of a sample splitter.

5.4 Portions of samples that will not be tested immediately shall be stored in air tight container to retain the field moisture content.

6. Preparation of Liquid Limit and Plasticity Index Tests

6.1 A sample weighing approximately 1,000 grams (2.2 pounds) shall be prepared in accordance with Paragraph 5 - Preparation of Sample.

6.2 Place the 425 *μm* (No. 40) sieve in a pan.

6.3 Place a portion of the sample on the sieve.

6.4 Add water with a syringe while agitating the sample with the fingers. Continue rubbing and washing until all the minus 425*μm* (No. 40) material has passed through the No. 40 sieve.

6.5 Repeat this procedure until all the sample has been washed or rubbed through the No. 40 sieve.

6.6 Set the container holding the wash water and fine material aside without disturbing for several hours until all soil particles have settled to the bottom of the container and the water is clear.

6.7 Siphon or pour off as much of the water as possible. Be careful not to lose any of the soil particles.

6.8 Air dry the sample until it is wet without any free water.

6.9 Mix the wet sample thoroughly and test.

6.10 Test the sample in accordance with AASHTO T 89 -Determining the Liquid Limit of Soils, with the exception that the test will be run from the wet to dry state. This is accomplished by air-drying the sample in increments and performing the shock determinations at different moisture contents as the soil slowly dries out.

6.11 Using a portion of the sample in the liquid limit test, test the soil for the plasticity index in accordance with AASHTO T 90 - Determining the Plastic Limit and Plasticity Index of Soils.

7. Preparation for Sand Equivalent Test

7.1 A sample weighing approximately 1,000 grams (2.2 pounds) shall be prepared in accordance with Paragraph 5 - Preparation of Sample.

7.2 Sieve the sample over the 4.75*mm* (No. 4) sieve. Rub the sample through the sieve with fingers if necessary.

7.3 Without drying the sample, test the sample in accordance with AASHTO T 176 - Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.

8. Preparation for Gradation Test

8.1 Two samples shall be prepared in accordance with Paragraph 5. Preparation of Sample. The gradation sample shall weigh in its natural condition, not less than the amount indicated in Table 1. A moisture sample shall weigh at least 30% of the gradation sample.

Table 1 Guide for Gradation Test Sample Size

Nominal Maximum Sieve Size	Approximate Minimum Weight of Sample, kg
4.5 *mm* (No. 4)	1.0
12.5 *mm* (½")	2.0
19.0 *mm* (¾")	3.0
25.0 *mm* (1")	4.0
37.5 *mm* or over (≥ 1½)	5.0

8.2 Weigh the gradation sample in its wet condition and place in a container. Add sufficient water to the sample to cover it.

8.3 Prepare a nest of two sieves with a 75*μm* (No. 200) sieve on the bottom and a 2.00 mm (No. 10) sieve on the top.

8.4 Transfer the sample to the nested sieves and wash with running water. When the sample is larger than can be handled at one time on the nested sieves, wash a portion of the sample and transfer it to a container in which it is to be dried. Tapping of the sieve has been found to expedite the washing procedure.

8.5 Dry the washed material retained on the nested sieves to a constant weight at a temperature not to exceed 110°C (230°F).

8.6 Test the sample in accordance with AASHTO Designation: T 27 - Sieve Analysis of Fine and Coarse Aggregates.

Note 1: The dry weight to be used in the computation for the gradation shall be computed using the initial wet weight and the moisture content of the sample.

9. Preparation for Laboratory Compaction Test

9.1 Sample shall be prepared in accordance with Paragraph 5 - Preparation of Sample.

9.2 The material will be tested in accordance with AASHTO T 99 - Moisture-Density Relations of Soils Using a 2.5 kg (5.5 pounds) Rammer and a 305 mm (12 inches) Drop or AASHTO T180 - Moisture-Density Relations of Soils Using a 4.54 kg (10 pounds) Rammer

and an 457 mm (18 inches) Drop, whichever is applicable, except that the test will be run from the wet to dry state starting from the natural moisture content. This is accomplished by air-drying the soil in increments and performing a density determination at the different moisture contents as the sample slowly dries out. For wet or damp samples, air drying in increments may be accomplished by use of a drying apparatus which is maintained at a temperature not exceeding 60 °C (140 °F).

9.3 Prepare as many points as required.

9.4 If the test takes more than a day to run, the sample shall be placed in an air-tight container so as not to lose moisture.