1301 PREPARATION OF SOIL SAMPLES FOR TESTING

AASHTO Designation T 87 (Mn/DOT Modified)

1301.1 SCOPE

This method describes the dry preparation of soil samples (as received from the field) for mechanical analysis, determination of the soil characteristics, the moisture-density relationship test, and other tests as may be desired.

1301.2 APPARATUS

A. Balance - Shall conform to the requirements of AASHTO Designation M 231 (Classes G2 & G20), Readability and sensitivity 0.1 grams, accuracy 0.1 grams or 0.1%. Balances shall be appropriate for the specific use.

B. Drying Apparatus - Any suitable device that can dry samples at a temperature not exceeding 60 °C (140 °F).

C. Sieves - A series of sieves of the following sizes: 50, 25.0, 19.0, 9.5, 4.75, 2.00mm & 425μm (2", 1", 3/4", 3/8", #4, #10 & #40). The sieves shall conform to the requirements of AASHTO M 92.

D. Pulverizing Apparatus - A mortar and rubber-covered pestle; a mechanical device consisting of a power-driven, rubber-covered muller and a mortar or revolving drum with rubber-covered rollers or any other suitable device. The device shall be suitable for breaking up soil particle aggregations without reducing the size of the individual grains or rocks.

E. Sample Splitter - A suitable sample splitter for proportional splitting of the sample and capable of obtaining representative portions of the sample without appreciable loss of fines. Quartering the sample is also permitted. **See Section 1002.**

1301.3 SAMPLE SIZE

A. Approximately, 1000 to 1500 grams for mechanical analysis, determination of the soil constants and material for re-checks.

B. 1) Approximately, 5.5 - 7.5kg (12 - 16 pounds) for the moisture-density relationship test for granular materials.

OR

2) Approximately 11.5 - 13.5kg (25 - 30 pounds), split into five samples each weighing approximately 2.25kg (5 pounds) for fine-grained cohesive soils.

C. Approximately 9 - 11.5kg (20 - 25 lbs.) for the stabilometer test.

NOTE 1: When all the above tests (A-C) are requested for design purposes, it is necessary to submit 22.5 - 27kg (50 - 60 lbs.) of material.

1301.4 INITIAL PREPARATION of TEST SAMPLES

A. The soil samples as received from the field, shall be dried thoroughly in air or in an oven at a temperature not exceeding 60 °C (140 °F).

B. The sample is now pulverized using an acceptable pulverizing apparatus so that all the aggregations of soil particles pass through a 4.75mm (#4) sieve.

C. Split the +4.75mm (#4) and the -4.75mm (#4) portions of the material and set aside 1/2 of each for the R-value (stabilometer) test if required.

D. Run a sieve analysis on the +4.75mm (#4) material and record the weights retained on the 50, 25.0, 19.0, 9.5 & 4.75mm (2", 1", 3/4", 3/8" & #4) sieves.

E. Weigh and record the weight of the -4.75mm (#4) material. At this point proceed with the preparation of the proctor test specimen if necessary. If not, proceed with the preparation of the hydrometer analysis test specimen.

1301.5 PROCTOR TEST SAMPLE PREPARATION

A. Remove and discard the +50mm (2") material obtained in 4D.

B. Weigh the material passing the 50mm (2") sieve and retained on the 19.0mm (3/4") sieve. Replace this material with an equal weight of aggregate that passes the 19.0mm (3/4") sieve and is retained on the 4.75mm (#4) sieve. This material may come from extra material from the original sample or may be material from another sample with similar characteristics.

C. Blend the material by passing both the +4.75mm and -4.75mm (+#4 and -#4) portions (as obtained in 5B and 4E above) through a 50mm (2") sample splitter at least four times.

D. At this time, split the sample down to a size (subsample) which will provide 1000 - 1500 grams of -4.75mm (#4) material for a hydrometer analysis, if necessary.

E. Proceed with the method described in Section 1305, for granular material or the optional method for fine grained cohesive soils.

1301.6 MECHANICAL ANALYSIS and PHYSICAL TESTS SAMPLE PREPARATION

A. Sieve the subsample obtained in 5D over a 4.75mm (#4) sieve and discard the +4.75mm (#4) material.

B. Pulverize the passing 4.75mm (#4) material, with an approved pulverizing apparatus and sieve over a 2.00mm (#10) sieve. Continue the pulverizing and sieving operation until no appreciable amount of material passes the 2.00mm (#10) sieve. Weigh and record the weights of both the +2.00mm (#10) and -2.00mm (#10) material.

C. Split the -2.00mm (#10) portion and set aside 1/2 of the sample for the hydrometer test. **See Section 1302.**

D. Pulverize the remaining 1/2 sample and sieve over a 425μm (#40) sieve. Continue the pulverizing and sieving operation until no appreciable amount of material passes the 425μm (#40) sieve. The +425μm (#40) portion is discarded and the -425μm (#40) portion is set aside for the liquid limit and plastic limit determinations. **See Sections 1303 & 1304.**

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