
Standard Method of Test for

One-Point Method for Determining Maximum Dry Density and Optimum Moisture

AASHTO Designation: T 272-18 (2022)

Technically Revised: 2018

Reviewed but Not Updated: 2022

Editorially Revised: 2021

**Technical Subcommittee: 1b, Geotechnical Exploration,
Instrumentation, Stabilization, and Field Testing**



**American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. This method is for the rapid determination of the maximum dry density and optimum moisture content of a soil sample using a one-point determination and an individual moisture/density curve or a family of curves.
- 1.2. The following applies to all specified limits in this standard: For the purposes of determining conformance with these specifications, an observed value or a calculated value shall be rounded off “to the nearest unit” in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of [ASTM E29](#).
- 1.3. The values stated in SI units are to be regarded as the standard.
- 1.4. *The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of [R 18](#) are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with [R 18](#) alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of [R 18](#) or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
 - [R 18](#), Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
 - [R 75](#), Developing a Family of Curves
 - [T 99](#), Moisture–Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop
 - [T 180](#), Moisture–Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop
 - [T 217](#), Determination of Moisture in Soils by Means of a Calcium Carbide Gas Pressure Moisture Tester
 - [T 255](#), Total Evaporable Moisture Content of Aggregate by Drying
 - [T 265](#), Laboratory Determination of Moisture Content of Soils

- 2.2. *ASTM Standard:*
- [E29](#), Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

3. SIGNIFICANCE AND USE

- 3.1. The method described herein corresponds to the methods in either [T 99](#) or [T 180](#) and must be chosen accordingly; for example, when moisture–density relationships as determined by Method C of [T 99](#) are used to form the family of curves, then Method C described in [T 99](#) must be used for the one-point determination.
- 3.2. A family of curves is a group of typical soil moisture–density relationships determined using [T 99](#) or [T 180](#), which reveal certain similarities and trends characteristic of the soil type and source. Soils sampled from one source will have many different moisture–density curves, but if a group of these curves are plotted together, certain relationships usually become apparent. In general, it will be found that higher unit mass soils assume steeper slopes with maximum dry densities at lower optimum moisture contents, while the lower unit mass soils assume flatter, more gently sloped curves with higher optimum moisture contents.

4. METHOD SELECTION

- 4.1. See [T 99](#) or [T 180](#).
- 4.2. One-point determinations are made by compacting soil using [T 99](#) or [T 180](#) and one of the procedural methods described therein:
- *Method A*—A 101.6-mm (4-in.) mold; soil material passing a 4.75-mm (No. 4) sieve.
 - *Method B*—A 152.4-mm (6-in.) mold; soil material passing a 4.75-mm (No. 4) sieve.
 - *Method C*—A 101.6-mm (4-in.) mold; soil material passing a 19.0-mm ($3/4$ in.) sieve.
 - *Method D*—A 152.4-mm (6-in.) mold; soil material passing a 19.0-mm ($3/4$ in.) sieve.
- 4.3. The method used to compact the sample shall be the same method and procedure used to develop the moisture/density curve or family of curves used for the reference curve(s).

5. APPARATUS

- 5.1. See [T 99](#) or [T 180](#) for the selected method.

6. SAMPLE

- 6.1. Refer to [T 99](#) or [T 180](#).
- 6.1.1. Follow the initial drying step in Sample section of [T 99](#) or [T 180](#).
- 6.1.2. Sieve sample over the appropriate sieve.

7. PROCEDURE

- 7.1. The representative sample needs to be between 80 to 100 percent of the optimum moisture. Adjust the moisture content, if necessary. The maximum density determination will be more accurate the closer the moisture content is to the optimum moisture content.