
Standard Practice for Developing Soil Moisture–Density Relations

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



**American Association of State Highway and Transportation Officials
555 12th Street NW, Suite 1000
Washington, D.C. 20004**

1.

SCOPE

- 1.1.
- This standard practice provides a process for developing a soil moisture–density relations using multiple individual moisture–density relations (curves) developed according to T 99 or T 180.
- 1.2.
- The values stated in SI units are to be regarded as the standard.

2.

REFERENCED DOCUMENTS

- 2.1.
- AASHTO Standards:
- 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

3.

TERMINOLOGY

- 3.1.
- Definitions:
- 3.1.1.
- soil moisture–density relations—a group of soil moisture–density relations (commonly known as a family of curves) determined using T 99 or T 180, which reveal certain similarities and trends characteristic of the soil type and source.
- 3.1.2.
- spine—smooth line extending through the point of maximum density–optimum moisture content of a group of moisture–density curves.

4.

SIGNIFICANCE AND USE

- 4.1.
- All curves used in a group must be developed using a single Method: A, B, C, or D of T 99 or T 180.
- 4.2.
- Curves are plotted on a graph; the soil moisture–density relations is developed by drawing a smooth line through the maximum density/optimum moisture points. At least three curves are required to establish this relationship.
- 4.3.
- Generally, 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 (Figure 1).