



Designation: D 4718 – 87 (Reapproved 2001)

## Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles<sup>1</sup>

This standard is issued under the fixed designation D 4718; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This practice presents a procedure for calculating the unit weights and water contents of soils containing oversize particles when the data are known for the soil fraction with the oversize particles removed.

1.2 The practice also can be used to calculate the unit weights and water contents of soil fractions when the data are known for the total soil sample containing oversize particles.

1.3 This practice is based on tests performed on soils and soil-rock mixtures in which the portion considered oversize is that fraction of the material retained on the No. 4 sieve. Based on these tests, this practice is applicable to soils and soil-rock mixtures in which up to 40 % of the material is retained on the No. 4 sieve. The practice also is considered valid when the oversize fraction is that portion retained on some other sieve, such as the  $\frac{3}{4}$ -in. sieve, but the limiting percentage of oversize particles for which the correction is valid may be lower. However, the practice is considered valid for materials having up to 30 % oversize particles when the oversize fraction is that portion retained on the  $\frac{3}{4}$ -in. sieve.

1.4 The factor controlling the maximum permissible percentage of oversize particles is whether interference between the oversize particles affects the unit weight of the finer fraction. For some gradations, this interference may begin to occur at lower percentages of oversize particles, so the limiting percentage must be lower for these materials to avoid inaccuracies in the computed correction. The person or agency using this practice shall determine whether a lower percentage is to be used.

1.5 This practice may be applied to soils with any percentage of oversize particles subject to the limitations given in 1.3 and 1.4. However, the correction may not be of practical significance for soils with only small percentages of oversize particles. The person or agency specifying this practice shall specify a minimum percentage of oversize particles below

which the practice need not be applied. If a minimum percentage is not specified, 5 % shall be used.

1.6 This practice may not be applicable to soil-rock mixtures which degrade under field compaction.

1.7 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- C 127 Test Method for Specific Gravity and Absorption of Coarse Aggregate<sup>2</sup>
- D 698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort<sup>3</sup>
- D 1556 Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method<sup>3</sup>
- D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>))
- D 2167 Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method<sup>3</sup>
- D 2216 Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass<sup>3</sup>
- D 2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)<sup>3</sup>
- D 3017 Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)<sup>3</sup>
- D 4253 Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table<sup>3</sup>

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.03 on Texture, Plasticity, and Density Characteristics of Soils.

Current edition approved July 31, 1987. Published September 1987.

<sup>2</sup> Annual Book of ASTM Standards, Vol 04.02.

<sup>3</sup> Annual Book of ASTM Standards, Vol 04.08.