



Designation: D6913/D6913M – 17

Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis¹

This standard is issued under the fixed designation D6913/D6913M; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

Although this test method has been used for many years, there are vast testing variations due to soil types and conditions. The test is more complicated and complex than would be expected. Multiple procedures are being presented along with new terminology. Although these procedures are not new, they will now be defined and explained. Some examples of these new terms are composite sieving, designated separating sieve and subspecimen. This test method outlines the majority of conditions and procedures but does not cover every conceivable variation or contingency. The table of contents in the Scope section is added to enable the user to easily find a specific topic or requirement. Only sections/subsections with titles are presented. Therefore, numbered subsections will not be continuous in some cases, as indicated in the Scope section.

1. Scope

1.1 Soils consist of particles with various shapes and sizes. This test method is used to separate particles into size ranges and to determine quantitatively the mass of particles in each range. These data are combined to determine the particle-size distribution (gradation). This test method uses a square opening sieve criterion in determining the gradation of soil between the 3-in. (75-mm) and No. 200 (75- μ m) sieves.

1.2 The terms, soils and material, are used interchangeably throughout the standard.

1.3 In cases where the gradation of particles larger than 3 in. (75 mm) sieve is needed, Test Method **D5519** may be used.

1.4 In cases where the gradation of particles smaller than No. 200 (75- μ m) sieve is needed, Test Method **D7928** may be used.

1.5 Typically, if the maximum particle size is equal to or less than 4.75 mm (No. 4 sieve), then single-set sieving is applicable. Furthermore, if the maximum particle size is greater than 4.75 mm (No. 4 sieve) and equal to or less than 9.5 mm ($\frac{3}{8}$ -in sieve), then either single-set sieving or composite sieving is applicable. Finally, if the maximum particle size is equal to or greater than 19.0 mm ($\frac{3}{4}$ -in sieve), composite sieving is applicable. For special conditions see **10.3**.

¹ This test method 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.

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1.6 Two test methods are provided in this standard. The methods differ in the significant digits recorded and the size of the specimen (mass) required. The method to be used may be specified by the requesting authority; otherwise Method A shall be performed.

1.6.1 *Method A*—The percentage (by mass) passing each sieve size is recorded to the nearest 1 %. This method must be used when performing composite sieving. For cases of disputes, Method A is the referee method.

1.6.2 *Method B*—The percentage (by mass) passing each sieve size is recorded to the nearest 0.1 %. This method is only applicable for single sieve-set sieving and when the maximum particle size is equal to or less than the No. 4 (4.75-mm) sieve.

1.7 This test method does not cover, in any detail, procurement of the sample. It is assumed that the sample is obtained using appropriate methods and is representative.

1.8 *Sample Processing*—Three procedures (moist, air dry, and oven dry) are provided to process the sample to obtain a specimen. The procedure selected will depend on the type of sample, the maximum particle-size in the sample, the range of particle sizes, the initial conditions of the material, the plasticity of the material, the efficiency, and the need for other testing on the sample. The procedure may be specified by the requesting authority; otherwise the guidance given in Section **10** shall be followed.

1.9 This test method typically requires two or three days to complete, depending on the type and size of the sample and soil type.