Designation: D1241 – 15

Standard Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses[1]

This standard is issued under the fixed designation D1241; 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.

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

1. Scope*

1.1 This specification covers the quality and grading of the following materials for use in the construction of subbase, base, and surface courses: sand-clay mixtures; gravel; stone or slag screenings; sand; crusher-run coarse aggregate consisting of gravel, crushed stone, or slag combined with soil mortar; or any combination of these materials. The requirements are intended to cover materials having normal specific gravity, absorption, and gradation characteristics. Where other materials are to be used, appropriate limits suitable to their use must be specified.

1.2 *Units*—The values stated in SI units are to be regarded as standard. The sieve designations are identified using the "standard" system in accordance with Specification E11, such as 25-mm and 75-µm, followed by the "alternative" system of 1-in. and No. 200, respectively. Use of the "alternative" system shall not be regarded as nonconformance with this standard.

1.3 The following precautionary caveat pertains only to the Test Methods portion, Section 9, of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C117 Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

C131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates

D75 Practice for Sampling Aggregates

D421 Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D4318 Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

D4700 Guide for Soil Sampling from the Vadose Zone

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

3. Terminology

3.1 *Definitions*—See Terminology D653 for general definitions.

4. Types

4.1 The following types of mixtures are specified:

4.1.1 *Type I*—Mixtures shall consist of stone, gravel, or slag with natural or crushed sand and fine mineral particles passing a 75-µm (No. 200) sieve and shall conform to the requirements of Table 1 for Gradation A, B, C, or D.

4.1.2 *Type II*—Mixtures shall consist of natural or crushed sand with fine mineral particles passing a 75-µm (No. 200) sieve, with or without stone, gravel, or slag, and shall conform to the requirements of Table 1 for Gradation E or F.

5. General Requirements

5.1 *Coarse Aggregate*—Coarse aggregate, retained on a 4.75 mm (No. 4) sieve, for use in Type I and Type II mixtures, shall consist of hard, durable, and sound particles or fragments of stone, gravel, or slag. Coarse aggregate shall have abrasion loss, determined by Test Method C131, of not more than 50 percent.

[1] This specification is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.08 on Special and Construction Control Tests.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

***A Summary of Changes section appears at the end of this standard**

TABLE 1 Gradation Requirements for Soil-Aggregate Materials

Sieve Size	Mass Percent Passing Square Mesh Sieves					
	Type I				Type II	
	Gradation A	Gradation B	Gradation C	Gradation D	Gradation E	Gradation F
50-mm (2-in.)	100	100	...	...	...	...
25.0-mm (1-in.)	...	75 to 95	100	100	100	100
9.5-mm (⅜-in.)	30 to 65	40 to 75	50 to 85	60 to 100	...	...
4.75-mm (No. 4)	25 to 55	30 to 60	35 to 65	50 to 85	55 to 100	70 to 100
2.00-mm (No. 10)	15 to 40	20 to 45	25 to 50	40 to 70	40 to 100	55 to 100
425-µm (No. 40)	8 to 20	15 to 30	15 to 30	25 to 45	20 to 50	30 to 70
75-µm (No. 200)	2 to 8	5 to 15	5 to 15	8 to 15	6 to 15	8 to 15

NOTE 1—A higher or lower abrasion loss may be specified by the engineer, depending upon the materials available for the work.

5.2 *Fine Aggregate*—Fine aggregate, passing a 4.75 mm (No. 4) sieve, for use in Type I and Type II mixtures, shall consist of natural or crushed sand and fine mineral particles passing the 75-µm (No. 200) sieve. The fraction passing the 75-µm (No. 200) sieve shall not be greater than two thirds of the fraction passing the 425-µm (No. 40) sieve as determined by Test Methods C117 and C136. The fraction passing the 425-µm (No. 40) sieve shall have a liquid limit not greater than 25 and a plasticity index not greater than 6 as determined by Test Method D4318.

5.3 The composite material of Types I and II shall be free of organic matter and clay lumps and shall conform to the grading requirements of Table 1.

6. Subbase Materials

6.1 Materials for subbase shall conform to the requirements of Section 5 and Table 1 for Type I, Gradation A, B, C, or D, or for Type II, Gradation E or F. The type and grading desired shall be specified.

NOTE 2—Where local experience (performance history, material properties, etc.) has shown that, in order to prevent damage by frost action, it is necessary to have lower percentages of the subbase materials passing the 75-µm (No. 200) sieve than are required by Table 1, the engineer may specify lower percentages. The engineer may also specify tighter gradation requirements when local experience suggests it to be appropriate.

7. Base-Course Materials

7.1 Materials for base course shall conform to the requirements of Section 5 and Table 1 for Type I, Gradation A, B, C, or D, or for Type II, Gradation E or F. The type and grading desired shall be specified.

NOTE 3—Where local experience (performance history, material properties, etc.) has shown that, in order to prevent damage by frost action, it is necessary to have lower percentages of the base-course materials passing the 75-µm (No. 200) sieve than are required by Table 1, the engineer may specify lower percentages. The engineer may also specify tighter gradation requirements when local experience suggests it to be appropriate.

8. Surface-Course Materials

8.1 Soil-aggregate materials for surface course shall conform to the requirements of Section 5 and Table 1 for Type I, Gradation C or D; or for Type II Gradation E or F. The type and grading shall be specified.

NOTE 4—When materials are being used for surface courses, the Engineer may give consideration to the permeability characteristics of the materials used (that is, material type, grading, etc.).

9. Test Methods

9.1 Sample the material and determine the properties enumerated in this specification in accordance with the following ASTM standards:

9.1.1 *Sampling*—Practice D75.

9.1.2 *Sieve Analysis*—Test Method C117 and Test Method C136.

9.1.3 *Abrasion Loss*—Test Method C131.

9.1.4 *Soil Sampling from the Vadose Zone*—Guide D4700.

9.1.5 *Preparing Soil Samples*—Method D421.

9.1.6 *Liquid Limit, Plastic Limit, and Plasticity Index* —Test Method D4318.

NOTE 5—The quality of the result produced by this standard is dependent upon the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice D3740 does not in itself assure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluation some of those factors.

10. Keywords

10.1 coarse aggregate; crushed stone; fine aggregate; gradation; granular materials; gravels; soil–aggregate subbase, base, and surface courses

SUMMARY OF CHANGES

In accordance with Committee D18 policy, this section identifies the location of changes to this standard since the last edition (2007) that may impact the use of this standard.

(1) Inserted Section 1.3, Units, for added clarification between "standard" and "alternative" sieve designations. The sieve designations have been updated throughout this specification.
(2) The references to ASTM D420 have been deleted from the Specification, as it was withdrawn in 2011.
(3) Inserted references to ASTM D4700 Standard Guide for Soil Sampling from the Vadose Zone.
(4) Inserted references to ASTM E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves.
(5) Revised Section 3.1, Definitions, to reflect the D18 approved verbiage.
(6) Revised Table 1 to reflect the use of "standard" and "alternative" sieve designations. Table formatting was changed for ease of use.
(7) Revised Note 5 to reflect the D18 approved verbiage.