Designation: D 1241 – 07

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

This standard is issued under the fixed designation D 1241; 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 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 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]

C 117 Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

C 131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates

D 75 Practice for Sampling Aggregates

D 420 Guide to Site Characterization for Engineering Design and Construction Purposes

D 421 Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants

D 653 Terminology Relating to Soil, Rock, and Contained Fluids

D 3740 Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D 4318 Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

3. Terminology

3.1 For definitions of terms in this standard, refer to Terminology D 653.

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 No. 200 (75-µm) 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 No. 200 (75-µm) 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 No. 4 (4.75 mm) 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 C 131, of not more than 50.

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 No. 4 (4.75 mm) sieve, for use in Type I and Type II mixtures, shall consist of natural or crushed sand and fine mineral particles passing the No. 200 (75-µm) sieve. The fraction passing the No. 200 (75-µm) sieve shall not be greater than two thirds of the fraction passing the No. 40 (425-µm) sieve as determined by

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

Test Methods C 117 and C 136. The fraction passing the No. 40 (425-μm) sieve shall have a liquid limit not greater than 25 and a plasticity index not greater than 6 as determined by Test Method D 4318.

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 1for 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 No. 200 (75-μm) 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 No. 200 (75-μm) 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 D 75.

9.1.2 *Sieve Analysis*—Test Method C 117 and Test Method C 136.

9.1.3 *Abrasion Loss*—Test Method C 131.

9.1.4 *Surveying and Sampling Soils for Highway Subgrades*—Guide D 420.

9.1.5 *Preparing Soil Samples*—Method D 421.

9.1.6 *Liquid Limit, Plastic Limit, and Plasticity Index*—Test Method D 4318.

NOTE 5—The precision of these test methods is dependent on the competence of the personnel performing them and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D 3740 are generally considered capable of competent and objective testing. Users of these test methods are cautioned that compliance with Practice D 3740 does not in itself assure reliable testing. Reliable testing depends on many factors; Practice D 3740 provides a means of evaluating 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

Committee D18 has identified the location of selected changes to this standard since the last issue (D 1241 – 00) that may impact the use of this standard (approved July 1, 2007).

(*1*) Editorial changes were made to conform to Form and Style for ASTM Standards.
(*2*) Revised Section 4 pertaining to Type I and II gradings.
(*3*) Changed "No. 10 (2.00 mm)" to "No. 4 (4.75 mm)" in Sections 5.1 and 5.2.
(*4*) Revised Note 4.