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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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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.

ε[1] NOTE—Editorial changes were made throughout in March 1994.

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 only materials having normal or average 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 10, 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:*

C 117 Test Method for Material Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing[2]

C 131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine[2]

D 75 Practice for Sampling Aggregates[3]

D 98 Specification for Calcium Chloride[3]

D 420 Guide for Investigating and Sampling Soil and Rock for Engineering Purposes[4]

D 421 Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants[4]

D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils[4]

3. Types

3.1 The following types of mixtures are specified:

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

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

4. General Requirements

4.1 *Coarse Aggregate*—Coarse aggregate retained on a No. 10 (2.00-mm) sieve, for use in Type I and Type II mixtures, shall consist of hard, durable particles or fragments of stone, gravel, sand, or slag; materials that break up when alternately frozen and thawed or wetted and dried shall not be used. Coarse aggregate shall have a percentage of wear, by the Los Angeles test, of not more than 50.

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

4.2 *Fine Aggregate*—Fine aggregate passing a No. 10 (2.00-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 sieve shall not be greater than two thirds of the fraction passing the No. 40 (425-µm) sieve. The fraction passing the No. 40 sieve shall have a liquid limit not greater than 25 and a plasticity index not greater than 6.

4.3 The composite soil-aggregate material of Types I and II shall be free of vegetable matter and lumps or balls of clay and shall conform to the grading requirements of Table 1.

5. Subbase Materials

5.1 Soil-aggregate materials for subbase shall conform to the requirements of Section 4 for Type I, Gradation A, B, C, or D, or for Type II, Gradation E or F. The type and grading

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[2] *Annual Book of ASTM Standards*, Vol 04.02.

[3] *Annual Book of ASTM Standards*, Vol 04.03.

[4] *Annual Book of ASTM Standards*, Vol 04.08.

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

desired shall be specified.

NOTE 2—Where local experience 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 should specify such lower percentages.

6. Base-Course Materials

6.1 Soil-aggregate materials for base course shall conform to the requirements of Section 4 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 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 should specify such lower percentages.

7. Surface-Course Materials

7.1 Soil-aggregate materials for surface course shall conform to the requirements of Section 4 for Type I, Gradation C or D; or for Type II Gradation E or F. The type and grading shall be specified.

NOTE 4—Where it is planned that the soil - aggregate surface course is to be maintained for several years without bituminous surface treatment or other superimposed impervious surfacing, the engineer should specify a minimum of 8 % passing the No. 200 (75-µm) sieve instead of the minimum percentages shown in Table 1 for Gradation C, D, or E, and should specify a maximum liquid limit of 35 and plasticity index range from 4 to 9, instead of the limits given in 4.2.

8. Moisture Content

8.1 All materials shall contain moisture sufficient to ensure that the design density requirements will be obtained when the materials are compacted.

9. Admixture

9.1 Calcium chloride used for the control of moisture shall conform to all the requirements of Specification D 98.

10. Test Methods

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

10.1.1 *Sampling*—Practice D 75.[2]

10.1.2 *Sieve Analysis*—Test Method C 117, and Method C 136.[3]

10.1.3 *Percentage of Wear*—Test Method C 131.[3]

10.1.4 *Surveying and Sampling Soils for Highway Subgrades*—Practice D 420.[4]

10.1.5 *Preparing Soil Samples*—Method D 421.[4]

10.1.6 *Liquid Limit, Plastic Limit, and Plasticity Index*—Test Method D 4318.[4]

11. Keywords

11.1 acceptance tests; backfilling; base courses; coarse aggregates; cohesionless soils; construction control; crushed stones; design standards; earth materials; field control; fills; flexible pavements; gradation; granular materials; gravels; materials testing; quality control; railroads; roadbase; rolled fills; screenings; soil classifications; subbase; subgrade; specifications.