



Standard Test Method for Aggregate Durability Index¹

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1. Scope

1.1 This test method covers the determination of a durability index of an aggregate. The calculated durability index is a value indicating the relative resistance of an aggregate to production of detrimental clay-like fines when subjected to the prescribed mechanical methods of degradation.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates²

D 75 Practice for Sampling Aggregates³

D 2419 Test Method for Sand Equivalent Value of Soils and Fine Aggregate³

D 4753 Guide for Evaluating, Selecting, and Specifying Balances and Scales for Use in Soil, Rock, and Construction Materials Testing⁴

E 11 Specification for Wire Cloth and Sieves for Testing Purposes⁵

3. Summary of Test Method

3.1 This test method was developed to permit prequalification of aggregates proposed for use in the construction of transportation facilities. Basically, the test establishes an aggregate's resistance to generating fines when agitated in the

presence of water. Separate and different test procedures are used to evaluate the coarse and the fine portions of a material.

3.2 A sample of coarse aggregate is prepared to a specific grading and then washed in a mechanical washing vessel for a 2-min agitation time. After discarding the minus 4.75-mm (No. 4) material, dry the washed test sample.

3.3 The coarse aggregate test sample is then agitated in the mechanical washing vessel for a period of 10 min. A representative portion of the resulting wash water and minus 75- μ m (No. 200) size fines is collected and mixed with a stock calcium chloride solution and placed in a plastic cylinder. After a 20-min sedimentation time, the level of the sediment column is read. The height of the sediment value is then used to calculate the durability index of the coarse aggregate (D_c).

3.4 The fine aggregate sample is prepared by washing a specific quantity of the material in the mechanical washing vessel for a 2-min agitation period. All minus 75- μ m (No. 200) size material is washed from the sample through a 75- μ m (No. 200) sieve and discarded. The plus 75- μ m (No. 200) fraction is dried.

3.5 The fine aggregate test sample is tested by the Standard Sand Equivalent Test Method (Test Method D 2419) except for modifications to the test sample preparation and duration of the shaking time. The mechanical shaker method is required. A shaking time of 10 min instead of 45 s is used.

3.6 This test method includes procedures for testing aggregates exhibiting a wide range in specific gravity, including lightweight and porous coarse aggregates, and also procedures for testing small maximum size aggregate which is too fine to test as a coarse aggregate and too coarse to consider as a fine aggregate, such as a pea gravel or a very coarse sand.

3.7 The durability index for coarse aggregate (D_c) or for fine aggregate (D_f) is calculated, as applicable, by appropriate equations presented in the method. The durability index of a well-graded aggregate containing both coarse and fine fractions is defined as the lowest of the two values, D_c or D_f , obtained by the test. This value is recommended to be the controlling value for specification purposes.

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.51 on Aggregate Tests.

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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.

⁵ Annual Book of ASTM Standards, Vol 14.02.