



Standard Practice for Sampling Aggregates¹

This standard is issued under the fixed designation D 75/D 75M; 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 practice covers sampling of coarse and fine aggregates for the following purposes:

- 1.1.1 Preliminary investigation of the potential source of supply,
- 1.1.2 Control of the product at the source of supply,
- 1.1.3 Control of the operations at the site of use, and
- 1.1.4 Acceptance or rejection of the materials.

~~NOTE 1—Sampling plans and acceptance and control tests vary with the type of construction in which the material is used. Attention is directed to Practices E105 and D3665.~~

~~1.2 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. 1—Sampling plans and acceptance and control tests vary with the type of construction in which the material is used.~~

1.2 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

~~1.4 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.~~

~~NOTE 2—The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of Practice D 3666 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice D 3666 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of Practice D 3666 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.~~

2. Referenced Documents

2.1 *ASTM Standards:*²

- C 125 Terminology Relating to Concrete and Concrete Aggregates
- C 702 Practice for Reducing Field Samples of Aggregate to Testing Size
- D 8 Terminology Relating to Materials for Roads and Pavements
- D 2234/D 2234M Test Method Practice for Collection of a Gross Sample of Coal
- D 3665 Practice for Random Sampling of Construction Materials³ Practice for Random Sampling of Construction Materials
- D 3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
- E 105 Practice for Probability Sampling of Materials

¹ This practice is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.30 on Methods of Sampling.

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² Annual Book of ASTM Standards, Vol 04.02.

³ 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.

E 122 [Practice for Calculating Sample Size to Estimate, With a Specified Tolerable Error, Precision, the Average Quality for a Characteristic of a Lot or Process](#)

E 141 [Practice for Acceptance of Evidence Based on the Results of Probability Sampling](#)

3. Terminology

3.1 Definitions:

3.1.1 *maximum size of aggregate, n—in specifications for, or descriptions of aggregate*—the smallest sieve opening through which the entire amount of aggregate is required to pass. **C 125, D 8**

3.1.2 *maximum aggregate size, (Superpave) n—in specifications for, or descriptions of aggregate*—one size larger than the nominal maximum aggregate size.

3.1.3 *nominal maximum aggregate size (of aggregate), n—in specifications for, or descriptions of aggregate*—the smallest sieve opening through which the entire amount of the aggregate is permitted to pass. **C 125, D 8**

3.1.4 *nominal maximum aggregate size (Superpave), n—in specifications for, or descriptions of aggregate*—one size larger than the first sieve that retains more than 10 % aggregate. **C 125, D 8**

3.1.4.1 *Discussion*—These definitions in 3.1.2 and 3.1.4 apply to hot mix asphalt (HMA) mixtures designed using the Superpave system only, and differ from the definitions published in D 8

3.1.4.2 *Discussion*—Specifications on aggregates usually stipulate a sieve opening through which all of the aggregate may, but not need to, pass so that a stated maximum portion of the aggregate may be retained on that sieve. A sieve opening so designed is the *nominal maximum size*.

3.1.4.2 *Discussion*—Specifications on aggregates usually stipulate a sieve opening through which all of the aggregate may, but not need to, pass so that a stated maximum portion of the aggregate may be retained on that sieve. A sieve opening so designed is the *nominal maximum size*.

4. Significance and Use

4.1 Sampling is equally as important as the testing, and the sampler shall use every precaution to obtain samples that will show the nature and condition of the materials which they represent.

4.2 Samples for preliminary investigation tests are obtained by the party responsible for development of the potential source (Note 2>Note 3). Samples of materials for control of the production at the source or control of the work at the site of use are obtained by the manufacturer, contractor, or other parties responsible for accomplishing the work. Samples for tests to be used in acceptance or rejection decisions by the purchaser are obtained by the purchaser or his authorized representative.

NOTE 2—The 3—The preliminary investigation and sampling of potential aggregate sources and types occupies a very important place in determining the availability and suitability of the largest single constituent entering into the construction. It influences the type of construction from the standpoint of economics and governs the necessary material control to ensure durability of the resulting structure, from the aggregate standpoint. This investigation should be done only by a responsible trained and experienced person. For more comprehensive guidance, see the Appendix.

5. Securing Samples

5.1 *General*—Where practicable, samples to be tested for quality shall be obtained from the finished product. Samples from the finished product to be tested for abrasion loss shall not be subject to further crushing or manual reduction in particle size in preparation for the abrasion test unless the size of the finished product is such that it requires further reduction for testing purposes.

5.2 *Inspection*—The material shall be inspected to determine discernible variations. The seller shall provide suitable equipment needed for proper inspection and sampling.

5.3 Procedure:

5.3.1 *Sampling from a Flowing Aggregate Stream (Bins or Belt Discharge)*—Select units to be sampled by a random method, such as Practice D 3665, from the production. Obtain at least three approximately equal increments, selected at random from the unit being sampled, and combine to form a field sample whose mass equals or exceeds the minimum recommended in 5.4.2. Take each increment from the entire cross section of the material as it is being discharged. It is usually necessary to have a special device constructed for use at each particular plant. This device consists of a pan of sufficient size to intercept the entire cross section of the discharge stream and hold the required quantity of material without overflowing. A set of rails may be necessary to support the pan as it is passed under the discharge stream. Insofar as is possible, keep bins continuously full or nearly full to reduce segregation.

NOTE 3—Sampling the initial discharge or the final few tons from a bin or conveyor belt increases the chances of obtaining segregated material and should be avoided.

5.3.2 *Sampling from the Conveyor Belt*—Select units to be sampled by a random method, such as Practice D 3665, from the production. Obtain at least three approximately equal increments, selected at random, from the unit being sampled and combine to form a field sample whose mass equals or exceeds the minimum recommended in 5.4.2. Stop the conveyor belt while the sample increments are being obtained. Insert two templates, the shape of which conforms to the shape of the belt in the aggregate stream on the belt, and space them such that the material contained between them will yield an increment of the required weight. Carefully scoop all material between the templates into a suitable container and collect the fines on the belt with a brush and dust pan and add to the container.

5.3.3 *Sampling from Stockpiles or Transportation Units*—Avoid sampling coarse aggregate or mixed coarse and fine aggregate from stockpiles or transportation units whenever possible, particularly when the sampling is done for the purpose of determining

aggregate properties that may be dependent upon the grading of the sample. If circumstances make it necessary to obtain samples from a stockpile of coarse aggregate or a stockpile of combined coarse and fine aggregate, design a sampling plan for the specific case under consideration. This approach will allow the sampling agency to use a sampling plan that will give a confidence in results obtained therefrom that is agreed upon by all parties concerned to be acceptable for the particular situation. The sampling plan shall define the number of samples necessary to represent lots and sublots of specific sizes. General principles for sampling from stockpiles are applicable to sampling from trucks, rail cars, barges, or other transportation units. For general guidance in sampling from stockpiles, see the Appendix.

5.3.4 *Sampling from Roadway (Bases and Subbases)*—Sample units selected by a random method, such as Practice D 3665, from the construction. Obtain at least three approximately equal increments, selected at random from the unit being sampled, and combine to form a field sample whose mass equals or exceeds the minimum recommended in 5.4.2. Take all increments from the roadway for the full depth of the material, taking care to exclude any underlying material. Clearly mark the specific areas from which each increment is to be removed: a metal template placed over the area is a definite aid in securing approximately equal increment weights.

5.4 *Number and Masses of Field Samples:*

5.4.1 The number of field samples (obtained by one of the methods described in 5.3) required depends on the criticality of, and variation in, the properties to be measured. Designate each unit from which a field sample is to be obtained prior to sampling. The number of field samples from the production should be sufficient to give the desired confidence in test results.

NOTE 45—Guidance for determining the number of samples required to obtain the desired level of confidence in test results may be found in Test Method D 2234/D 2234M, Practice E 105, Practice E 122, and Practice E 141.

5.4.2 The field sample masses cited are tentative. The masses must be predicated on the type and number of tests to which the material is to be subjected and sufficient material obtained to provide for the proper execution of these tests. Standard acceptance and control tests are covered by ASTM standards and specify the portion of the field sample required for each specific test. Generally speaking, the amounts specified in Table 1 will provide adequate material for routine grading and quality analysis. Extract test portions from the field sample according to Practice C 702 or as required by other applicable test methods.

6. Shipping Samples

6.1 Transport aggregates in bags or other containers so constructed as to preclude loss or contamination of any part of the sample, or damage to the contents from mishandling during shipment.

6.2 Shipping containers for aggregate samples shall have suitable individual identification attached and enclosed so that field reporting, laboratory logging, and test reporting may be facilitated.

TABLE 1 Size of Samples

Aggregate Size ^A	Field Sample Mass, min, kg ^B [lbs]	Field Sample Volume, min, L [Gal]
Fine Aggregate		
2.36 mm	10 [22]	8 [2]
2.36 mm [No. 8]	10 [22]	8 [2]
4.75 mm	10 [22]	8 [2]
4.75 mm [No. 4]	10 [22]	8 [2]
Coarse Aggregate		
9.5 mm	10 [22]	8 [2]
9.5 mm [3/8 in.]	10 [22]	8 [2]
12.5 mm	15 [35]	12 [3]
12.5 mm [1/2 in.]	15 [35]	12 [3]
19.0 mm	25 [55]	20 [5]
19.0 mm [3/4 in.]	25 [55]	20 [5]
25.0 mm	50 [110]	40 [10]
25.0 mm [1 in.]	50 [110]	40 [10]
37.5 mm	75 [165]	60 [15]
37.5 mm [1 1/2 in.]	75 [165]	60 [15]
50 mm	100 [220]	80 [21]
50 mm [2 in.]	100 [220]	80 [21]
63 mm	125 [275]	100 [26]
63 mm [2 1/2 in.]	125 [275]	100 [26]
75 mm	150 [330]	120 [32]
75 mm [3 in.]	150 [330]	120 [32]
90 mm	175 [385]	140 [37]
90 mm [3 1/2 in.]	175 [385]	140 [37]

^A For processed aggregates, use the nominal maximum size as indicated by the appropriate specification or description. If the specification or description does not indicate a nominal maximum size (for example, a sieve size indicating 90-100% passing), use the maximum size (that sieve indicating 100% passing).

^B For combined coarse and fine aggregates (for example, base or subbase aggregate), the minimum weight shall be coarse aggregate minimum mass plus 10 kg.