



Designation: D3665 – 12 (Reapproved 2017)

## Standard Practice for Random Sampling of Construction Materials<sup>1</sup>

This standard is issued under the fixed designation D3665; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This practice covers the determination of random locations (or timing) at which samples of construction materials can be taken. For the exact physical procedures for securing the sample, such as a description of the sampling tool, the number of increments needed for a sample, or the size of the sample, reference should be made to the appropriate standard method. The selection procedures in Section 6 utilize the table of four-digit numbers given in Table 1.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.3 This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

### 2. Referenced Documents

2.1 ASTM Standards:<sup>2</sup>

- C172 Practice for Sampling Freshly Mixed Concrete
- C183 Practice for Sampling and the Amount of Testing of Hydraulic Cement
- D75 Practice for Sampling Aggregates
- D140 Practice for Sampling Bituminous Materials
- D345 Test Method for Sampling and Testing Calcium Chloride for Roads and Structural Applications
- D979 Practice for Sampling Bituminous Paving Mixtures
- D5361 Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing
- E105 Practice for Probability Sampling of Materials

<sup>1</sup> 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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<sup>2</sup> 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.

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

E141 Practice for Acceptance of Evidence Based on the Results of Probability Sampling

### 3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *representative sample, n*—(1) a random sample; or (2) an unbiased sample.

3.1.1.1 *random sample, n*—a sample obtained from a lot of material in such a manner that all parts of the lot have a known probability of being included in the sample.

3.1.1.1.1 *Discussion*—An example of random sample is the case where specifications limit roadway sampling to within one foot of the edge, therefore the probability of inclusion of samples within one foot of the edge is zero.

3.1.1.2 *unbiased sample, n*—a sample obtained from a lot of material in such a manner that all parts of the lot have an equal probability of being included in the sample.

### 4. Significance and Use

4.1 This practice is useful for determining the location or time, or both, to take a sample in order to minimize any unintentional bias on the part of the person taking the sample.

NOTE 1—The effectiveness of this practice in achieving random samples is limited only by the conscientiousness of the user in following the stipulated procedures.

4.2 The selection procedures and examples in this standard provide a practical approach for ensuring that construction material samples are obtained in a random manner. Additional details concerning the number of sample increments, the number of samples, the quantities of material in each, and the procedures for extracting sample increments or samples from the construction lot or process are contained in Practices C172, C183, D75, D140, D979, D5361, and Test Method D345.

4.3 This standard contains examples citing road and paving materials. The concepts outlined herein are applicable to the random sampling of any construction material and can easily be adapted thereto.

4.4 Additional sampling guidance is provided in Practice E105 concerning probability sampling, Practice E122 concerning choosing sample sizes to estimate the average quality of a



lot or process (see Note 2), and in Practice E141 for acceptance of evidence based on results of probability sampling.

NOTE 2—The guidance contained in Practice E122 is not available in other documents referenced in this section.

4.5 The best and most practical method for ensuring that samples of construction materials include the full range of a construction process is by incorporating a stratified random

sampling procedure into the sampling process. To implement a stratified random sampling procedure, divide the lot to be sampled into the desired number of equal sublots and randomly sample each subplot in accordance with this standard.

NOTE 3—If the sublots are of unequal size, it will likely be necessary to weigh the samples in order to maintain a fair and defensible sampling process.

TABLE 1 Table of Random Numbers

Table with 20 rows and 20 columns of random numbers. The header includes 'Row' and 'Column' labels. The table contains numerical values for each cell, ranging from 0.0356 to 0.9390.







