



Designation: E1109 – 19

# Standard Test Method for Determining the Bulk Density of Solid Waste Fractions<sup>1</sup>

This standard is issued under the fixed designation E1109; 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 test method may be used to determine the bulk density of various fractions from the resource recovery processing of municipal solid waste. It is intended as a means of characterizing such fractions and for providing data useful to designers of solid waste processing plants.

1.2 The values stated in SI units are to be regarded as 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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>

[C702/C702M Practice for Reducing Samples of Aggregate to Testing Size](#)

[D75/D75M Practice for Sampling Aggregates](#)

[D2216 Test Methods for Laboratory Determination of Water \(Moisture\) Content of Soil and Rock by Mass](#)

[D5681 Terminology for Waste and Waste Management](#)

[E689 Reference Radiographs for Ductile Iron Castings](#)

[E1107 Test Method for Measuring the Throughput of Resource-Recovery Unit Operations](#)

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.03 on Treatment, Recovery and Reuse.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

## 3. Terminology

3.1 *Definitions*—For definitions of terms common to waste and waste management used in this test method, refer to Terminology [D5681](#).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *bulk density*—the mass per unit volume of particulate matter or material.

## 4. Summary of Test Method

4.1 A sample of a solid waste stream is tamped in a cubical container of known volume and then weighed. Bulk density is calculated from the weight of the contents and volume of the container.

## 5. Significance and Use

5.1 This test method describes a physical property of solid waste in processing facilities, a property that characterizes the solid waste streams and hence the operation of resource recovery separators and processors.

5.2 The bulk density is an important property for the design of materials handling equipment, separators, and processors.

5.3 In this test method, bulk density is not considered an absolute material property as is the density of individual particles of a material. The measured bulk density here depends on the size of the container, the moisture content of the “as tested” material, and how the material is loaded into the container. For example, the bulk density of material placed loosely in a container will be less than that of material tamped into a container. Also, some materials placed loosely in a container will settle with time due to its own weight; thus, its bulk density will increase. As written, the “as tested” waste sample may or may not be dried prior to testing, so that calculated bulk density includes the moisture associated with the “as tested” material.

## 6. Apparatus

6.1 *Balance*—A balance or scale accurate to within 0.1 % of the test load at any point within the range of use. The range of use shall be considered to extend from the weight of the measure empty to the weight of the measure plus its contents.