



Designation: E1638 – 22

Standard Terminology Relating to Sieves, Sieving Methods, and Screening Media¹

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INTRODUCTION

Particle size analysis through the use of standard test sieves, and particle separation through the use of screening media, are commonly adopted methods of achieving desired process specifications related to particles. To ensure a better understanding of sizing and separation systems and processes and to ensure appropriate comparison of data, terminology common to the processes must be documented and defined.

For Subcommittee E29.01 on Sieves, Sieving Methods, and Screening Media, this is an ongoing process of developing new related terms. Every effort has been made to ensure accuracy, precision, and clarity for the terms included. Suggestions and comments for additions, corrections, and revisions are welcomed.

1. Scope

1.1 This terminology includes all those terms used in all of the standards under the jurisdiction of Subcommittee E29.01. Terms are defined that are related to the manufacture of standard test sieves and screening media, as well as terms related to the methods, analysis, procedures, and equipment for sizing and separating particles.

1.2 Committee E29 on Particle and Spray Characterization feels that it is essential to include terms and definitions explicit to the scope, regardless of whether the terms appear in existing ASTM standards. Terms that are in common usage and appear in common-language dictionaries are generally not included.

1.3 *Units*—The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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*:²

- E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves
- E161 Specification for Electroformed Material and Test Sieves
- E323 Specification for Perforated-Plate Sieves for Testing Purposes
- E454 Specification for Industrial Perforated Plate and Screens (Square Opening Series)
- E674 Specification for Industrial Perforated Plate and Screens (Round Opening Series)
- E2016 Specification for Industrial Woven Wire Cloth
- E2427 Test Method for Acceptance by Performance Testing for Test Sieves
- E2589 Terminology Relating to Nonsieving Methods of Powder Characterization
- E2814 Specification for Industrial Woven Wire Filter Cloth
- E3278 Test Method for Bubble Point Pressure of Woven Wire Filter Cloth
- E3315 Specification for Certification of Metallic Materials

3. Terminology

3.1 *Definitions*:

absolute filtration rating, n —largest pore size found in the test specimen. **E3278**

¹ This terminology is under the jurisdiction of ASTM Committee E29 on Particle and Spray Characterization and is the direct responsibility of Subcommittee E29.01 on Sieves, Sieving Methods, and Screening Media.

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² 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.

agglomerate, *n*—two or more particles adhering together. **E1638**

aperture, *n*—the opening in a screening or sieving medium. **E11, E2016**

aperture size, *n*—the dimension defining an opening in a screening or sieving medium. **E11, E2016**

as reported, *v*—information based on a prior processing certification. **E3315**

DISCUSSION—Applicable to chemistry, mechanical, or other properties or processes.

as tested, *v*—information based on actual testing of the current processed material. **E3315**

DISCUSSION—Parameters to be tested must be specified.

backing cloth, *n*—a wire mesh support layer used directly under the sieve cloth with openings coarser than the sieve designation. **E11**

bar, *n*—the metal between perforations. **E454, E674**

blank, *n*—an unperforated area located other than along the perimeter of a plate. **E454, E674**

bolting grade wire cloth, *n*—wire cloth meeting a group of specifications that are typical for higher sifting capacities and which can speed the bolting action of vibratory screening machines, manufactured based on using a limited number of wire diameters for a large group of mesh designations. **E2016**

DISCUSSION—“Bolting Grade” designations are often misused; and should not be specified without a wire diameter, as the designations have become non-standard.

break-out, *v*—a term applied to the action that occurs ahead of the punch in its going through the plate. **E454, E674**

DISCUSSION—The fracturing of the material results in a tapered hole with the small dimensions on the punch side.

bubble point test, *n*—a capillary flow test method that measures the pressure required to force an air bubble through a filter cloth sample wetted under a test liquid of known surface tension. **E2814**

DISCUSSION—The pressure is inversely proportional to the pore size, should be standardized, and the pressure observed at the first bubble point location is considered the absolute rating. The test result pressure can be converted to a pore size or micron retention by applying a pore size calculation factor (see Test Method **E3278**).

bulk density, *n*—the mass per unit volume of a material, including voids inherent in the material as tested. **E1638**

calibration test sieve, *n*—a test sieve manufactured using sieve cloth which has been inspected after being mounted in the sieve frame, and that meets the requirements in accordance with Specification **E11**, Table 1, in part based on the standard deviation of the number of sample openings in the test sieve (Column 11) not exceeding the maximum allowable for a confidence level of 99.73 % (Column 12). **E11**

DISCUSSION—Calibration sieves have had at least twice as many openings measured as Inspection sieves.

candidate test sieve, *n*—the test sieve to be performance tested. **E2427**

centers, *n*—the dimensional sum of one perforation and one bar, or the dimensional distance from the center of one perforation to the center of an adjacent perforation. **E454, E674**

certificate of compliance, *n*—an attestation document in accordance with 5.1.1. **E3315**

DISCUSSION—Informally also known as *certificate of conformance* or *C of C*.

DISCUSSION—While generally these terms are considered synonymous and used interchangeably, there is also argument that compliance is a more binding term when used in reference to an external specification (for example, wire in accordance with Specification A478), while conformance may be used in reference to an internal specification (for example, quality system in accordance with AS9100).

cloth thickness, *n*—overall thickness of the filter cloth, nominally estimated by adding the warp wire diameter plus two times the shute wire diameter. **E2814**

country of melt origin, *n*—the country where the original raw material was melted/smelted. **E3315**

DISCUSSION—Just the term country of origin is a vague clause subject to interpretation without qualification; see Defense Federal Acquisition Regulation Supplement (DFARS), Supplementary Requirements section.

compliance test sieve, *n*—a test sieve manufactured using sieve cloth which has been inspected prior to being mounted in the sieve frame, and that meets the requirements in accordance with Specification **E11**, Table 1, in part based on the standard deviation of the required number of sample openings per 100 square feet of sieve cloth (Column 7) not exceeding the maximum allowable for a confidence level of 66 % (Column 8). **E11**

crimp, *n*—the corrugation in the warp or shute wire, or both.

DISCUSSION—The crimp in the wires is formed either during the weaving process, or with a crimping machine prior to weaving. If formed during the weaving process, the tension existing between the warp and the shute wires fundamentally determines the respective amount of depth of crimp, which locks the wires in place and in part establishes the firmness of the sieve cloth. **E11, E2016**

DISCUSSION—The crimp in the wires is formed during the weaving process, and the tension existing between the warp and shute wires fundamentally determines the respective amount or depth of crimp, which in part establishes the firmness of the filter cloth. In standard filter cloth, the warp wire is tensioned such that it only crimps minimally if at all, and the shute wire crimps predominately around the warp wire. In reverse filter cloth, the warp wire is held under reduced tension as it does crimp around the shute wire, but the shute wire remains predominately straight. **E2814**

cumulative retained distribution graph, *n*—a graph obtained by plotting the total (cumulative) percentage by the mass retained on each of a set of sieves versus the corresponding aperture sizes. **E1638**

DISCUSSION—Also known as *cumulative oversize distribution graph*.

cumulative passing distribution graph, *n*—a graph obtained by plotting the total (cumulative) percentage by the mass