



Designation: **E1638—12** **E1638—13**

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

This standard is issued under the fixed designation E1638; 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.

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.

2. Referenced Documents

2.1 *ASTM Standards*:²

[E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves](#)

[E161 Specification for Precision Electroformed Sieves](#)

[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 Sieves](#)

[E2589 Terminology Relating to Nonsieving Methods of Powder Characterization](#)

[E2814 Guide for Industrial Woven Wire Filter Cloth](#)

3. Terminology

3.1 *Definitions*:

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

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

E11

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

E11

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.

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*—capillary flow bubble point methods are based on the fact that the pressure required to force an air bubble through filter cloth wetted under a test liquid of known surface tension is inversely proportional to the pore size. **E2814**

DISCUSSION—

The pressure observed at the first bubble location is considered the absolute micron retention rating.

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**

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**

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**

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. **E11, E2016**

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. With the exception of reverse 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. **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 passing each of a set of sieves versus the corresponding aperture sizes. **E1638**

DISCUSSION—

Also known as *cumulative undersize distribution graph*.

die side, *n*—the surface of the plate that was against the die during the punching operation. **E454, E674**

double crimp wire cloth, *n*—wire cloth woven with approximately equal corrugations in both the warp and shute wires to lock the wires in position. **E11, E2016**

electroformed material, *n*—electrodeposited grid material consisting of precision openings used as the base material for electroformed sieves. **E161**

electroformed sieves, *n*—see **test sieves** (electroformed). **E161**

endpoint, *n*—point at which no more material falls through the sieve concluding the sieving, taking into account sample degradation. **E2427**

filter cake (surface cake), *n*—material that is retained on the filter cloth during processing. **E2814**

DISCUSSION—

The filter cake forms and builds up as particulate is retained, until the increased flow resistance of the filter cake requires it be removed from the filter cloth, typically by backflushing. The deposition of material forming the filter cake can aid in filtration by providing depth filtration, which results in a lower micron retention.

finished end pattern, *n*—the condition that occurs with some specifications of staggered pattern perforations as a result of tool design where the pattern is completed on both ends of the plate. **E454, E674**

firmness, *n*—a subjective term referring to the planar rigidity of wire cloth (as a roll good, not mounted in a frame). **E11, E2016**

DISCUSSION—

Firmness is established by the tensile strength of the material, the relationship of the mesh to wire diameters, the type of weave, and amount of crimp in the wires. The absence of firmness in wire cloth is termed **sleaziness**.

flat top wire cloth, *n*—wire cloth with deep crimps, as in lock crimp, except that all crimps are on the under side of the cloth, leaving the top surface all in one plane. **E2016**

DISCUSSION—

Sometimes designated *smooth top*.

gage (also gauge), *n*—a number designating a specific thickness of metal sheet tabulated in a standardized series, each of which represents a decimal fraction of an inch. **E454**

glass bead test, *n*—method for determining the filtration rating of filter cloth using a set of presorted precisely sized spherical glass beads, passing them through the filter cloth, and examining the beads passed or captured. **E2814**

DISCUSSION—

The largest bead passed is considered the absolute micron retention rating.

inspection 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 required number of sample openings in the test sieve (Column 9) not exceeding the maximum allowable for a confidence level of 99 % (Column 10). **E11**

intermediate crimp wire cloth, *n*—precrimped wire cloth with extra crimps or corrugations between the points of intersection. **E2016**