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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.

2. Referenced Documents

2.1 *ASTM Standards*:²

ASTM STP 447B Manual on Testing Sieving Methods
E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

2.2 *ISO Standard*:³

ISO 2395 Test Sieves and Test Sieving—Vocabulary.

3. Significance and Use

3.1 This terminology contains terms used in the description and procedure of analysis of the size of particulate materials through sieve analysis with standard testing sieves and is applicable to the work of many ASTM technical committees. For a composite listing of published ASTM standards using standard testing sieves, refer to **ASTM STP 447B**.

3.2 While some of the terms appearing in this terminology may also be used in the description, procedure, and end products of production screening (either on a batch-fed or continuous basis), it is the intent of this terminology to present the definitions and usage of terms strictly in the context of sieve analysis using standard testing sieves.

4. Terminology

4.1 *Definitions*:

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

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

bar, *n*—the metal between perforations.

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

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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

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

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

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

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.

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 of 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).

cumulative oversize 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.

cumulative undersize 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.

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

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.

margin or border, *n*—an unperforated area located along the perimeter of a plate.

matched test sieve, *n*—a test sieve that reproduces the performance results of a calibration sieve within defined limits for a designated material.

median particle size, *n*—the particle size at which half the distribution (by mass, volume, number, etc.) is larger than and half smaller than the stated size.

mesh, *n*—the number of wires or openings per linear inch or 25.4 millimetres, counted from the center of any wire to a point exactly one inch or 25.4 millimetres distant, including the fractional distance between either thereof.

near size particle, *n*—a particle of a size approximately equal to the aperture size of the sieve that may block an opening.

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particle size distribution, *n*—in sieve analysis, the percentages, by mass or number, of all fractions into which various sizes of particles are classified.

percent retained, *n*—mass fraction percentage of material that is left upon or retained by the sieve after the test has been performed.

plain weave, *n*—sieve cloth in which the warp wires and shute wires pass over one and under one in both directions.

rectangular (off-count) mesh, *n*—Either precrimp or double crimp wire cloth having a different number of wires in the warp and shute, producing rectangular openings; the diameter of the warp and shute wires may be the same or different.

representative sample, *n*—a sample taken from a quantity of material that exhibits the characteristics of the original material from which it was taken.

selvage, *n*—the edge or border of wire cloth finished off so as to prevent unraveling; examples of finished edges include looped selvage, folded selvage, cut and tucked, welded, plastic bonded, and bent-back picket, as opposed to a raw or cut edge.

shute wires, *n*—the wires running the short way of, or across the cloth as woven (also referred to as the shoot, fill, or weft wires).

sieve, *n*—a plate, sheet, or woven wire cloth, or other device, with regularly spaced apertures of uniform size, mounted in a suitable frame or holder, for use in separating material according to size. The terms sieve and screen can be used interchangeably.

sieve analysis, *n*—the act of obtaining a particle size distribution using test sieves.

sieve cloth, *n*—woven wire cloth conforming to Specification E11.

sieve shaker, *n*—the mechanical device or method used to shake the sieves.

slaziness, *n*—wire cloth that does not exhibit firmness.

smooth side or punch side, *n*—the surface of the plate that was the uppermost during the punching operation and through which the punch entered the plate.

test sieve (wire cloth), *n*—a sieve manufactured by mounting sieve cloth in a frame, designed for use in particle sieve analysis by sieving.

unfinished end pattern, *n*—the condition that occurs with some specifications of staggered pattern perforations as a result of tool design.

DISCUSSION—One end of the plate the pattern will appear to be incomplete due to unperforated holes in the even numbered rows. While on the other end of the same plate, the pattern will appear to be incomplete due to unperforated holes in the odd numbered rows.

warp wires, *n*—the wires running the long way of the cloth as woven.

5. Keywords

5.1 particle measurement; particle size; particles; particulate; screen; screening; sieve; sieve analysis; standard testing sieve