

ANSI/ASAE S319.4 FEB2008 (R2017)

Method of Determining and Expressing Fineness of Feed Materials by Sieving



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ANSI/ASAE S319.4 FEB2008 (R2012)

Approved February 2008; reaffirmed December 2017 as an American National Standard

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Proposed initially by a subcommittee of the American Feed Manufacturers Association; approved by the ASAE Electric Power and Processing Division Technical Committee; adopted by ASAE December 1968; reconfirmed December 1973, December 1978, December 1983; revised March 1985; revised by the ASAE Food and Grain Processing and Storage Committee; approved by the Food and Process Engineering Institute Standards Committee December 1989; revised editorially November 1990; reaffirmed December 1994, December 1995; revised October 1996; approved as an American National Standard July 1997; reaffirmed December 2001, February 2003; reaffirmed by ANSI February 2003; Editorially revised March 2003; reaffirmed by ASABE February 2008; revised February 2008; revision approved by ANSI February 2008; reaffirmed by ASABE December 2012; reaffirmed by ANSI February 2013; reaffirmed by ASABE and ANSI December 2017.

Keywords: Feed, Particle size, Sieving

1 Purpose and scope

1.1 The purpose of this Standard is to define a test procedure to determine the fineness of feed ingredients and to define a method of expressing the particle size of the material. Surface area and number of particles per unit mass can be calculated from the determined particle size.

1.2 This Standard should be used to determine the fineness of feed ingredients where the reduction process yields particles which are primarily spherical or cubical the approximate ratio of major to minor axes is approximately 1.0. It is not adequate to define the particle size of materials such as steamed and rolled grains, which are a flaked product, or products such as chopped hay and fibrous biomass where a substantial fraction consists of elongated particles.

1.3 This Standard is compatible with ISO 565, ISO 2395, ISO 2591-1, ISO 3310-1, and ISO 9276-1.

2 Normative references

The following standards contain provisions which, through references in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Standards organizations maintain registers of currently valid standards.

2.1 ASTM E11-95 Specification for Wire-Cloth Sieves for Testing Purposes

2.2 ASTM D1921-89 Test Methods for Particle Size (Sieve Analysis) of Plastic Materials

2.3 ASTM D4749-87 Test Method for Performing the Sieve Analysis of Coal and Designating Coal Size

2.4 ASTM D4570-86 Test Methods for Rubber Chemicals — Determination of Particle Size of Sulfur by Sieving (Dry)

- 2.5** ISO 565:1990 Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet—Nominal sizes of openings
- 2.6** ISO 2395:1990 Test sieves and test sieving — Vocabulary
- 2.7** ISO 2591-1:1988 Test sieving — Part 1: Methods using test sieves of woven wire cloth and perforated metal plate
- 2.8** ISO 3310-1:1990 Test sieves — Technical requirements and testing Part 1: Test sieves of metal wire cloth
- 2.9** ISO 9276-1:1990 Representation of results of particle size analysis Part 1: Graphical representation

3 Definitions

The following is a list of the definitions for the terms related to this Standard. Refer to ISO 2395 for more general terminology of test sieving.

- 3.1 aperture size:** Dimension defining an opening.
- 3.2 blinding:** Obstruction of the apertures of a sieving medium by particles of material being sieved.
- 3.3 charge:** A test sample, or part of a test sample, placed on a test sieve or a nest of test sieves.
- 3.4 cumulative oversize distribution curve:** A curve obtained by plotting the total percentages by mass retained on each of a set of sieves of descending aperture size against the corresponding aperture sizes.
- 3.5 cumulative undersize distribution curve:** A curve obtained by plotting the total percentages by mass passing through each of a set of sieves of descending aperture size against the corresponding aperture sizes.
- 3.6 dispersion agent:** Non-toxic chemicals that help break up agglomerates.
- 3.7 end-point:** The point in time after which further sieving fails to pass an amount sufficient to change the result significantly.
- 3.8 frame:** A rigid framework that supports the sieving medium and limits the spread of the material being sieved.
- 3.9 log-normal standard deviation:** The standard deviation of the logarithm of particle diameters in a log-normal size distribution curve (refer to equation 2).
- 3.10 median size:** Particle diameter at 50% probability of a size distribution curve. Equivalent to geometric mean diameter (see equation 1).
- 3.11 nest of test sieves:** A set of test sieves assembled together with a lid (cover) and a receiver (pan).
- 3.12 oversize:** That portion of the charge that has not passed through the apertures of a stated sieve.
- 3.13 sample:** A representative part taken from a quantity of material.
- 3.14 sieving:** The process of separating a mixture of particles according to their size by means of one or more sieves.
- 3.15 size distribution curve:** A graphical representation of the results of a size analysis.
- 3.16 test sieve:** A sieve, intended for the particle size analysis of the material to be sieved, that conforms to a test sieve standard specification.
- 3.17 undersize:** That portion of the charge that has passed through the apertures of a stated sieve.
- 3.18 woven wire cloth:** A sieving medium of wires that cross each other to form the apertures.