



Designation: E 389 – 93 (Reapproved 1998)

Standard Test Method for Particle Size or Screen Analysis at No. 4 (4.75-mm) Sieve and Coarser for Metal-Bearing Ores and Related Materials¹

This standard is issued under the fixed designation E 389; 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.

1. Scope

1.1 This test method covers the determination of the size distribution by screen analysis of metal-bearing ores and related materials at No. 4 (4.75-mm) sieve and coarser.

1.2 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

E 11 Specification for Wire-Cloth Sieves for Testing Purposes²

E 276 Test Method for Particle Size or Screen Analysis at No. 4 (4.75-mm) Sieve and Finer for Metal-Bearing Ores and Related Materials³

E 882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory³

3. Terminology

3.1 Definitions:

3.1.1 *particle size*—in screen testing, the smallest sieve aperture through which the particle has passed and the size of the following aperture through which the particle fails to pass.

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

4. Summary of Test Method

4.1 The sample is passed through a bank of standard sieves by agitation. The screening technique described in this procedure may be used on any solid particles that can be dried so that sieve blinding does not occur.

¹ This test method is under the jurisdiction of ASTM Committee E-1 on Analytical Chemistry for Metals, Ores, and Related Materials and is the direct responsibility of Subcommittee E01.02 on Ores, Concentrates, and Related Metallurgical Materials.

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² *Annual Book of ASTM Standards*, Vol 14.02.

³ *Annual Book of ASTM Standards*, Vol 03.05.

5. Significance and Use

5.1 This test method is intended to be used for compliance with compositional specifications for particle size distribution. It is assumed that all who use this procedure will be trained analysts capable of performing common laboratory practices skillfully and safely. It is expected that work will be performed in a properly equipped laboratory and that proper waste disposal procedures will be followed. Follow appropriate quality control practices such as those described in Guide E 882.

6. Apparatus and Materials

6.1 *U.S. Standard Sieves*, conforming to the requirements of Specification E 11.

6.2 *Sieve Shaker*, mechanical or manual.

6.3 *Drying Oven*, of approximate size and capable of maintaining a uniform temperature at $110 \pm 5^\circ\text{C}$.

6.4 *Sample Splitter or Riffle*, with openings not less than three times the size of the largest particle.

6.5 *Scales and Weights*, of adequate accuracy.

6.6 *Pans*, for holding samples.

6.7 *Brushes*, for cleaning sieves and pans.

7. Sample Preparation

7.1 If necessary, reduce the sample by means of a sample splitter or riffle, or by coning and quartering, or by the alternate-shovel method. Dry at $110 \pm 5^\circ\text{C}$ to constant weight.

NOTE 1—The size of the sample is very important in sieve analysis because the number of particles on a sieve surface affects the probability of any one particle passing through the sieve at a given time. The more particles there are on a sieve, the greater probability that any one particle is hindered from getting into a position to pass through the opening. Avoid overloading the sieves.

7.2 Screen the test sample from 7.1 on a No. 4 (4.75-mm) sieve. Weigh the material passing the sieve and, if desired, screen in accordance with Test Method E 276.

8. Procedure

8.1 Clean the sieves and apparatus by brushing.

8.2 Nest the selected sieves and fit a pan to the bottom sieve. Place the material which was retained on the No. 4 (4.75-mm) sieve from 7.2 in the top sieve. Cover and clamp in the mechanical shaker and shake for the length of time as specified in 8.3.