INTERNATIONAL

~~Designation:E161–00(Reapproved 2010)~~ Designation: E161 – 12

Standard Specification for Precision Electroformed Sieves[1]

This standard is issued under the fixed designation E161; 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 specification covers the requirements for design and construction of electroformed sieves. These sieves are used to perform particle-size distribution analysis and in preparing narrowly designated particle-size fractions. They may also be used as reference standards when suitably calibrated. A method of calibrating these sieves is included in Annex A1.

NOTE 1—Complete instructions and procedures on the use and calibration of testing sieves are contained in ASTM Manual 32.[2] This publication also contains a list of all published ASTM Standards on sieve analysis procedures for specific materials or industries.

1.2 The sieve analysis results from two testing sieves of the same sieve designation may not be the same because of the variances in sieve opening permitted by this specification. To minimize the differences in sieve analysis results, the use of testing sieves matched on a performance basis is suggested.

NOTE 2—For other types of sieves, see Specifications E11 and E323.

1.3 The values stated in SI units shall be considered standard for the dimensions of the electroformed mesh openings and the size of the wires in the electroformed mesh. The values stated in inch-pound units shall be considered standard with regard to the sieve frames.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of 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:*[3]

C430 Test Method for Fineness of Hydraulic Cement by the 45-m (No. 325) Sieve

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E323 ~~Specification for Perforated-Plate Sieves for Testing Purposes~~ Specification for Perforated-Plate Sieves for Testing Purposes

E1638 Terminology Relating to Sieves, Sieving Methods, and Screening Media

2.2 *ISO Standard:*[4]

ISO 565 Test sieves—Metal Wire Cloth, Perforated Plate and Electroformed Sheet-Nominal Aperture Sizes

3. Terminology

3.1 *Definitions*—For definitions of related terms, refer to Terminology E1638.

3.2 *Definitions of Terms Specific to This Standard:*

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

3.2.2 *electroformed sieves, n*—see *test sieve (electroformed).*

3.2.3 *non-standard frames (electroformed), n*—sieve frames other than as specified in accordance with Table 2 of Specification E161 that may be circular, square, rectangular, or non-metal.

3.2.3.1 *Discussion*—The frame may have the electroformed sheet permanently attached, or it may be designed so the electroformed sheet is replaceable.

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

Current edition approved ~~May~~April 1, ~~2010.~~2012. Published ~~July 2010.~~May 2012. Originally approved in 1960. Last previous edition approved in ~~2004~~2010 as E161 – 00 (20~~10~~04). DOI: ~~10.1520/E0161-00R10.~~10.1520/E0161-12.

[2] ASTM Manual 32, Manual on Test Sieving Methods, available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

[3] 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.

[4] Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland, http://www.iso.ch.

TABLE 1 Nominal Dimensions, Permissible Variations and Limits for Precision Electroformed Sieves

Nominal Opening Size, µm[A]	Tolerance on Sieve Openings, ±µm	Limits, Openings per Linear cm[B]		Limits, Openings per Linear in.	
		Min	Max	Min	Max
500	2.0	15.35	16.14	39	41
425	2.0	17.32	18.11	44	46
355	2.0	19.29	20.87	49	53
300	2.0	22.83	24.41	58	62
250	2.0	25.20	26.77	64	68
212	2.0	31.89	33.46	81	85
180	2.0	35.04	36.61	89	93
150	2.0	41.34	46.06	105	117
125	2.0	46.06	51.18	117	130
106	2.0	47.24	59.06	120	150
90	2.0	55.12	78.74	140	200
75	2.0	59.06	78.74	150	200
63	2.0	66.93	98.43	170	250
53	2.0	78.74	110.24	200	280
45	2.0	90.55	118.11	230	300
38	2.0	98.43	137.80	250	350
32	2.0	110.24	157.48	280	400
25	2.0	118.11[C]	196.85[C]	300[C]	500[C]
20	2.0	157.48[C]	295.28[C]	400[C]	750[C]
15	2.0	157.48[C]	295.28[C]	400[C]	750[C]
10	2.0	196.85[C]	393.70[C]	500[C]	1000[C]
5	2.0	196.85[C]	590.55[C]	500[C]	1500[C]

[A] These nominal size openings are from the preferred number series R40/3 and R10. (Openings on apertures 32 µm and less are series R10.) These standard designations correspond to the values for test sieve apertures recommended by the International Standards Organization, Geneva, Switzerland, in ISO 565. Other opening sizes are not precluded.

[B] These limits permit at least two adjacent sieves to be formed with the same number of openings per cm. The percent open area must in no case be so great that the width of metal between openings is less than 13 µm.

[C] Because of their greater durability in routine testing, sieves made close to the minimum limit are normally supplied. Sieves made close to the maximum limit may be obtained only on special order but are preferable from the standpoint of logical progression and better test completion time.

TABLE 2 Dimensions of Standard Circular Frames

Current Nominal Diameter, in.	Proposed Revision Mean Diameter		Comments Typical Frame[A] Nominal Height[B]
	Inside at Top[C]	Outside on Skirt	
3	3.000 in. + 0.030/–0.000 (76.20 mm + 0.76/–0.00)	3.000 in. + 0.000/–0.030 (76.20 mm + 0.00/–0.76)	1 in. (25.4 mm)
8	8.000 in. + 0.030/–0.000 (203.20 mm + 0.76/–0.00)	8.000 in. + 0.000/–0.030 (203.20 mm + 0.00/–0.76)	2 in. (50.8 mm) FH[D] 1 in. (25.4 mm) HH[E]
12	12.00 in. + 0.030/–0.000 (304.80 mm + 0.76/–0.00)	12.00 in. + 0.000/–0.030 (304.80 mm + 0.00/–0.76)	2 in. (50.8 mm) FH

[A] Other frame heights are not precluded.
[B] Distance from the top of the frame to the sieve cloth surface.
[C] Measured 0.2 in. (5 mm) below the top of the frame.
[D] FH = Full height.
[E] HH = Half height.

3.2.4 *support grid*, *n*—conductive metal grid mounted to the sieve sheet.

3.2.5 *test sieve (electroformed)*, *n*—a sieve manufactured by mounting electroformed material consisting of high precision openings in a frame, designed for use in particle size analysis by sieving.

4. Ordering Information

~~3~~4.1 Orders for items under this specification include the following information as necessary:

~~3~~4.1.1 Name of material (Electroformed Sieve),

~~3~~4.1.2 ASTM designation and year of issue (Specification E161 – XX),

~~3~~4.1.3 Quantity of each item, and

~~3~~4.1.4 Standard sieve designation (Table 1, Column 1).

~~3.1.5For~~4.1.5 For testing sieves in standard circular frames:

~~3~~4.1.5.1 Nominal sieve frame diameter, and

~~3~~4.1.5.2 Nominal sieve frame height.