~~Designation:E11–04~~ Designation: E 11 – 09

Standard Specification for ~~Wire Cloth and Sieves for Testing Purposes~~Woven Wire Test Sieve Cloth and Test Sieves[1]

This standard is issued under the fixed designation E 11; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

~~1.1This specification covers the requirements for design and construction of testing sieves using a medium of woven wire cloth mounted in a frame for use in testing for the classification of materials according to designated particle size (See Note 1 and Note 2), and wire cloth, meeting the specifications of Table 1, to be designated test grade wire cloth. All subsequent references to wire cloth shall mean test grade wire cloth. Methods for checking testing sieves and wire cloth for conformance to this specification are included in the annex.~~

~~NOTE1—Complete instructions and procedures on the use and calibration of testing sieves are contained in *Manual 32*~~

1.1 This document specifies the technical requirements for; the woven wire test sieve cloth (sieve cloth) used in test sieves, the construction of test sieves, standard and non-standard test sieve frame sizes, and test procedures used to inspect sieve cloth and the test sieves. This Specification applies to test sieves manufactured with sieve cloth having a nominal aperture size ranging from 125 millimeters (mm) down to 20 micrometers (μm).

1.2 Additional reference information can be found in Specifications E 161, E 323, E 2016, and in Test Methods C 430 and E 2427. ~~Note that 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. *Manual 32*[2] also contains a list of all published ASTM standards on sieve analysis procedures for specific materials or industries. This list may be referenced to obtain statements of precision and bias for sieve analysis of specific materials.~~

~~NOTE2—For other types of sieves, see Specification E323 and Specification E161.~~

~~1.2The values stated in SI units shall be considered standard for the dimensions of the wire cloth openings and the diameter of the wires used in the wire cloth. The values stated in inch-pound units shall be considered standard with regard to the sieve frames.~~

~~1.3The following precautionary statement refers only to the test method portion, Annex A1, of this specification: *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.*~~

1.3 The values stated in SI units shall be considered standard for the dimensions of the sieve cloth openings and the wire diameters used in the sieve cloth. The values stated in inch-pound units shall be considered standard with regard to the sieve frames, pans, and covers.

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:*[2]

C 430 Test Method for Fineness of Hydraulic Cement by the 45-μm (No. 325) Sieve

E 161 Specification for Precision Electroformed Sieves

E 323 Specification for Perforated-Plate Sieves for Testing Purposes

---

[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 on Sieves, Sieving Methods, and Screening Media.

Current edition approved May 1, ~~2004.~~2009. Published ~~May 2004.~~June 2009. Originally approved in 1925. Last previous edition approved in ~~2001~~2004 as E 11 – ~~01~~4.

~~[2] Manual on Testing Sieving Methods, *ASTM Manual 32*, ISBN 0-8-31-2495-3. Available from ASTM Headquarters.~~

[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.

E437~~Specifications for Industrial Wire Cloth and Screens (Square Opening Series)~~ 1638 Terminology Relating to Sieves, Sieving Methods and Screening Media
E 2016 Specification for Industrial Woven Wire Cloth
E 2427 Test Method for Acceptance by Performance Testing of U.S. Standard Test Sieves

2.2 *Federal Standard:*
Fed. Std. No. 123 Marking for Shipment (Civil Agencies)[3]
2.3 *Military Standard: ~~MIL-STD-129 Marking for Shipment and Storage~~*[4]
MIL-STD-129 Marking for Shipment and Storage[3]
2.4 *ISO Standard:*
ISO 3310-1 Test Sieves—Technical Requirements and Testing – Part 1: Test Sieves of Metal Wire Cloth[4]

3. ~~Ordering Information~~

~~3.1Orders for items under this specification include the following information as necessary:~~
~~3.1.1Name of material (U.S.A. Standard Testing Sieves or U.S.A. Standard sieve cloth),~~
~~3.1.2ASTM designation and year of issue (ASTM E11–01),~~
~~3.1.3Quantity of each item,~~
~~3.1.4Standard sieve designation (see~~ Terminology
3.1 *Definitions:*
3.1.1 *aperture*—the dimension defining an opening in a screening surface.
3.1.2 *crimp*—the corrugation in the warp and shute wire, or both. 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 shute wires fundamentally determines the respective amount or depth of crimp, which locks the wires in place, and in part establishes the firmness of the sieve cloth.
3.1.3 *firmness*—a subjective term referring to the planar rigidity of sieve cloth (as a roll good, not mounted in a test sieve frame), 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 sieve cloth is termed *sleaziness* .
3.1.4 *matched test sieve*—a test sieve that reproduces the performance results of another test sieve within user defined limits for a designated material (for information only and may not be in compliance with this Specification).
3.1.5 *mesh*—the number of wires or openings per linear inch (25.4 mm) counted from the center of any wire to a point exactly 1 in. (25.4 mm) distant, including the fractional distance between either thereof.
3.1.6 *plain weave*—sieve cloth in which the warp wires and shute wires pass over one and under one in both directions.
3.1.7 *shute wires*—the wires running the short way of, or across the cloth as woven (also referred to as the shoot, fill, or weft wires).
3.1.8 *sieve*—an apparatus for the purpose of sieving, consisting of a separating media mounted in a frame.
3.1.9 *sieve cloth*—woven wire cloth conforming to this specification.
3.1.10 *test sieve (wire cloth)*—a sieve manufactured by mounting sieve cloth in a frame, designed for use in particle size analysis by sieving.
3.1.11 *compliance test sieve*—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 Table 1~~, Column 1),~~
~~3.1.5Alternative sieve designation if needed (see~~ 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).
3.1.12 *inspection test sieve*—a test sieve manufactured using sieve cloth which has been inspected after being mounted in the sieve frame; and that meets the requirements of Table 1 ~~, Column 2),~~
~~3.1.6For testing sieves in standard circular frames:~~
~~3.1.6.1Nominal sieve frame diameter (see 5.2 and 5.3),~~
~~3.1.6.2Nominal sieve frame height (see~~ 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).
3.1.13 *calibration test sieve*—a test sieve manufactured using sieve cloth which has been inspected after being mounted in the sieve frame; and that meets the requirements of Table 1 in part based on the standard deviation of the required number of sample openings in the test sieve (column 11) not exceeding the maximum allowable for a confidence level of 99.73% (column 12).
3.1.14 *twill weave*—sieve cloth in which the warp wires and shute wires pass over two and under two wires in both directions.
3.1.15 *warp wires*—the wires running the long way of the cloth as woven.

[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.~~
[3] Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.mil.
~~[4] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.~~
[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

TABLE 1 Nominal Dimensions, and Permissible Variations for W Sireve Cloth of St and Compliard Tnce, Inst Sipeves (U.S.A.) Sction and Calibrd Sation Terst Sieves

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	[redacted]2)
Sieve Designation		Nominal Sieve Opening, (in.A)	Permissible Variation ±Y of AveVariage Opentiong from thr Ave StandardageVarion SiOpeve Designationg	Open+X Maxing Dimensum Exceeded By Noat Miore Than 5 % o f theor Openings	Resulting Maximum Individual Opening	Compliance Sieves		Inspection Sieves		Calibration [redacted]eves	
Standard	Alternative					Sample Openings per 100 ft[C2]	AlMaximum Standard Deviation	Sample Openings per Sieve	Maximum Standard Deviation	Sample Openings per Sieve	Ma[redacted]imum St[redacted]dard De[redacted]iation
(1)	(2)	(3)	(4)	(5)	(6)	(7)					
millimeter		inches	millimeter	millimeter	millimeter						
125 mm	5 in.	5	±3.70 mm	130.0 mm	130.9 mm	20	–	all	–	all	–
125	5 in.	5	3.66	4.51	129.51	20	–	all	–	all	–
106 mm	4.24 in.	4.24	±3.20 mm	110.2 mm	111.1 mm	20	–	all	–	all	–
106	4.24 in.	4.24	3.12	3.99	109.99	20	–	all	–	all	–
100 mm[D]	4 in.[D]	4	±3.00 mm	104.0 mm	104.8 mm	20	–	all	–	all	–
100	4 in.	4	2.94	3.82	103.82	20	–	all	–	all	–
90 mm	3½ in.	3.5	±2.70 mm	93.6 mm	94.4 mm	20	–	all	–	all	–
90	3½ in.	3.5	2.65	3.53	93.53	20	–	all	–	all	–
75 mm	3 in.	3	±2.20 mm	78.1 mm	78.7 mm	20	–	all	–	all	–
75	3 in.	3	2.22	3.09	78.09	20	–	all	–	all	–
63 mm	2½ in.	2.5	±1.90 mm	65.6 mm	66.2 mm	20	–	all	–	all	–
63	2½ in.	2.5	1.87	2.71	65.71	20	–	all	–	all	–
53 mm	2.12 in.	2.12	±1.60 mm	55.2 mm	55.7 mm	20	–	all	.	all	–
53	2.12 in.	2.12	1.58	2.39	55.39	20	–	all	.	all	–
50 mm[D]	2 in.[D]	2	±1.50 mm	52.1 mm	52.6 mm	20	–	all	–	all	–
50	2 in.	2	1.49	2.29	52.29	20	–	all	–	all	–
45 mm	1¾ in.	1.75	±1.40 mm	46.9 mm	47.4 mm	20	.	all	–	all	–
45	1¾ in.	1.75	1.35	2.12	47.12	20	.	all	–	all	–
37.5 mm	1½ in.	1.5	±1.10 mm	39.1 mm	39.5 mm	20	1.374	all	–	all	–
37.5	1½ in.	1.5	1.13	1.85	39.35	20	1.374	all	–	all	–
31.5 mm	1¼ in.	1.25	±1.00 mm	32.9 mm	33.2 mm	420	1.0066	all	–	all	–
31.5	1¼ in.	1.25	0.95	1.63	33.13	20	1.066	all	–	all	–
26.5 mm	1.06 in.	1.06	±.800 mm	27.7 mm	28.0 mm	20	0.869	15	0.584	all	–
26.5	1.06 in.	1.06	0.802	1.44	27.94	20	0.869	15	0.584	all	–
25.0 mm[D]	1.00 in.[D]	1	±.800 mm	26.1 mm	26.4 mm	20	0.823	15	0.553	all	–
25	1.00 in.	1	0.758	1.38	26.38	20	0.823	15	0.553	all	–
22.4 mm	⅞ in.	0.875	±.700 mm	23.4 mm	23.7 mm	150	0.734	15	0.493	all	–
22.4	⅞ in.	0.875	0.681	1.27	23.67	150	0.734	15	0.493	all	–
19.0 mm	¾ in.	0.750	±.600 mm	19.9 mm	20.1 mm	150	0.622	15	0.418	30	0[redacted]446
19	¾ in.	0.750	0.579	1.13	20.13	150	0.622	15	0.418	30	0[redacted]446
16.0 mm	⅝ in.	0.625	±.500 mm	16.7 mm	17.0 mm	150	0.527	15	0.354	30	0[redacted]378
16	⅝ in.	0.625	0.490	0.99	16.99	150	0.527	15	0.354	30	0[redacted]378
13.2 mm	0.530 in.	0.530	±.410 mm	13.83 mm	14.05 mm	150	0 441	15	0.296	30	0[redacted]316
13.2	0.530 in.	0.530	0.406	0.86	14.06	150	0 441	15	0.296	30	0[redacted]316
12.5 mm[D]	½ in.[D]	0.500	±.390 mm	13.10 mm	13.31 mm	2150	0.421	15	0.283	30	0[redacted]302
12.5	½ in.	0.500	0.385	0.83	13.33	150	0.421	15	0.283	30	0[redacted]302
11.2 mm	7⁄16 in.	0.438	±.350 mm	11.75 mm	11.94 mm	150	0.382	15	0.56	30	0[redacted]274
11.2	7⁄16 in.	0.438	0.346	0.77	11.97	150	0.382	15	0.256	30	0[redacted]274
9.5 mm	⅜ in.	0.375	±.300 mm	9.97 mm	10.16 mm	150	0.330	15	0.222	30	0[redacted]237
9.5	⅜ in.	0.375	0.295	0.68	10.18	150	0.330	15	0.222	30	0[redacted]237
8.0 mm	5⁄16 in.	0.312	±.250 mm	8.41 mm	8.58 mm	150	0.284	15	0.191	30	0[redacted]204
8	5⁄16 in.	0.312	0.249	0.60	8.60	150	0.284	15	0.191	30	0[redacted]204
6.7 mm	0.265 in.	0.265	±.210 mm	7.05 mm	7.20 mm	150	0.8245	15	0.164	30	0[redacted]175
6.7	0.265 in.	0.265	0.210	0.53	7.23	150	0.245	15	0.164	30	0[redacted]175
6.3 mm[D]	¼ in.[D]	0.250	±.200 mm	6.64 mm	6.78 mm	150	0.8233	15	0.157	30	0[redacted]167
6.3	¼ in.	0.250	0.197	0.51	6.81	150	0.233	15	0.157	30	0[redacted]167
5.6 mm	No. 3½ [E]	0.223	±.180 mm	5.90 mm	6.04 mm	150	0.6211	15	0.142	30	0[redacted]151
5.6	No. 3½	0.223	0.176	0.47	6.07	150	0.211	15	0.142	30	0[redacted]151
4.75 mm	No. 4	0.187	±.150 mm	5.02 mm	5.14 mm	150	0.6182	15	0.123	30	0[redacted]131
4.75	No. 4	0.187	0.150	0.41	5.16	150	0.182	15	0.123	30	0[redacted]131
4.00 mm	No. 5	0.157	±.130 mm	4.23 mm	4.35 mm	150	0.4161	15	0.108	30	0[redacted]115
4	No. 5	0.157	0.127	0.37	4.37	150	0.161	15	0.108	30	0[redacted]115
3.35 mm	No. 6	0.132	±.110 mm	3.55 mm	3.66 mm	200	0.138	20	0.097	40	0[redacted]103
3.35	No. 6	0.132	0.107	0.32	3.67	200	0.138	20	0.097	40	0[redacted]103
2.80 mm	No. 7	0.110	±.095 mm	2.975 mm	3.070 mm	200	0.121	20	0.085	40	0[redacted]090
2.8	No. 7	0.110	0.090	0.29	3.09	200	0.121	20	0.085	40	0[redacted]090
2.36 mm	No. 8	0.0937	±.080 mm	2.515 mm	2.600 mm	200	0.104	20	0.073	40	0[redacted]077
2.36	No. 8	0.0937	0.076	0.25	2.61	200	0.104	20	0.073	40	0[redacted]077
2.00 mm	No. 10	0.0787	±.070 mm	2.135 mm	2.215 mm	0	.94	25	0068	50	0[redacted]072
2	No. 10	0.0787	0.065	0.23	2.23	250	0.094	25	0.068	50	0[redacted]072
1.7 mm	No. 12	0.0661	±.060 mm	1.820 mm	1.890 mm	0	.81	25	0059	50	0[redacted]062
1.7	No. 12	0.0661	0.056	0.20	1.90	250	0.081	25	0.059	50	0[redacted]062
1.4 mm	No. 14	0.0555	±.050 mm	1.505 mm	1.565 mm	00	0.71	0	0.055	80	0[redacted]057
1.4	No. 14	0.0555	0.046	0.18	1.58	400	0.071	40	0.055	80	0[redacted]057
1.18 mm	No. 16	0.0469	±.045 mm	1.270 mm	1.330 mm	00	0.63	0	0.049	80	0[redacted]051
1.18	No. 16	0.0469	0.040	0.16	1.34	400	0.063	40	0.049	80	0[redacted]051
1.00 mm	No. 18	0.0394	±.040 mm	1.080 mm	1.135 mm	00	0.55	40	0.042	80	0[redacted]044
1	No. 18	0.0394	0.034	0.14	1.14	400	0.055	40	0.042	80	0[redacted]044
850 µmF		inches	micrometer	micrometer	micrometer						
micrometer		inches	micrometer	micrometer	micrometer						
850	No. 20	0.0331	±35 µm	925 µm	970 µm	00	48.76	40	37.73	80	3[redacted].36

3.2 Additional terms can be found in Terminology E 1638.

4. Ordering Information

4.1 Orders for items under this specification should include the following information as required:
4.1.1 Description of item(s) (Test Sieve or Sieve Cloth),
4.1.2 ASTM E 11 designation and year of issue,
4.1.3 Quantity of each item, and
4.1.4 Sieve designation (Table 1, Standard Column 1, Alternate Column 2).
4.2 Test sieves in standard circular frame:
4.2.1 Nominal sieve frame diameter (see Table 2~~),~~
~~3.1.7For sieve cloth not in frames or in nonstandard frames:~~
~~3.1.7.1Lateral dimensions of sieve cloth,~~
~~3.1.7.2Description of nonstandard frame,~~
~~3.1.8For U.S. Government purchases, if supplementary requirements apply,~~
~~3.1.9Compatible sieve pans and covers, and~~
~~3.1.10Special requirements (specific type of metal for sieve cloth and frames, matched sieves, for example).~~

~~4.~~), and

4.2.2 Nominal sieve frame height (see Table 2).
4.3 For sieve cloth not in frames or in *nonstandard* frames:
4.3.1 Sieve cloth designation, and
4.3.2 Description of nonstandard frame.
4.4 For U.S. Government purchases, if supplementary requirements apply:
4.4.1 Compatible sieve pans and covers, and
4.4.2 Special requirements (specific type of metal for sieve cloth and frames, test sieve designation and or matched sieves for example).

5. Sieve Cloth Requirements

~~4.1Wire cloth used in U.S.A. standard testing sieves meeting the specifications shown in~~
5.1 The sieve cloth used in test sieves shall meet the requirements of Table 1 ~~shall be designated "test grade". Test grade sieve cloth shall be woven from stainless steel, brass, bronze, or other suitable wire with a plain weave, except that cloth with openings of 63 µm (No. 230) and finer may be woven with a twill weave. For definitions of "plain" and "twill" weave, refer to Specification E437. The wire shall not be coated or plated.~~
~~4.2The openings of the sieve cloth of successive sieves progress from a base of 1 mmintheratioofapproximately 4 $\sqrt{2}$:1.~~
~~4.3All measurements of openings and wire diameters shall be made along the midpoints of the opening as shown in~~ and shall be designated Specification E 11 Sieve Cloth. The number of inspected apertures shall be in accordance with Table 1 (Column 7). Sieve cloth conforming to this specification shall be woven from stainless steel, brass, or bronze. Sieve cloth with openings greater than or equal to 75 micrometers shall be woven using a plain weave. For sieve cloth with openings equal to or less than 63 micrometers the sieve cloth may be supplied using a twill weave. The sieve cloth shall not be coated or plated.
5.2 All measurements of openings and wire diameters shall be made along the midpoints of the openings as shown in Fig. 1.

TABLE 2 Dimensions of Standard Frames

Nominal Diameter, in.	Mean Diameter, in. (mm)		–Typical Frame[A]	
	~~in.~~	Inside at Top[B]	Outside on Skirt	Nominal Height~~C~~, in. (mm)
~~3~~	~~3.000 + 0.030/–0.000~~	~~3.000 + 0.000/–0.030~~	~~1¼ (32) FH[D]~~	
3	3.000 + 0.030/–0.000	3.000 + 0.000/–0.030	1¼ (32) FH[C]	
	(76 + 0.76/ –0.00)	(76 + 0.00/ –0.76)	⅝ (16) HH	
6	6.000 + 0.030/–0.000	6.000 + 0.000/–0.030	1¾ (45) FH	
	(152 + 0.76/ –0.00)	(152 + 0.00/ –0.76)	1 (25) HH	
8	8.000 + 0.030/–0.000	8.000 + 0.000/–0.030)	2 (50) FH	
	(203 + 0.76/ –0.00	(203 + 0.00/ –0.76)	1 (25) HH	
10	10.000 + 0.030/–0.000	10.000 + 0.000/–0.030	3 (76) FH	
	(254 + 0.76/ –0.00)	(254 + 0.00/ –0.76)	1½ (38) HH	
12	12.000 + 0.030/–0.000	12.000 + 0.000/–0.030	3¼ (83) FH	
	~~(305 + 0.76/ –0.00)~~	~~(305 + 0.00/ –0.76)~~	~~2 (50) IH~~	
	(305 + 0.76/ –0.00)	(305 + 0.00/ –0.76)	1⅜ (50) IH	
			1⅝ (41) HH	

[A] ~~Othe~~Fr~~-~~frame heights meaasure~~-~~nd from top of frame to top of sieve cl~~uded~~oth.
[B] Measured 0.2 in. (5 mm) below the top of the frame.
[C] ~~Distance from the top of the frame to the sieve cloth surface.~~
[D] FH = full height; HH = half height; IH = intermediate height.

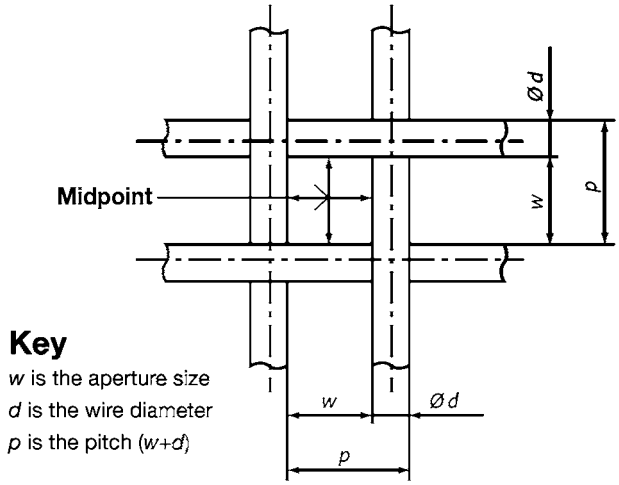

FIG. 1 Aperture Size

~~4.4Sieve cloth shall conform to the dimensional requirements of~~

5.3 There shall be no punctures or obvious defects in the sieve cloth.

5.4 Test sieves can be supplied based on different levels of confidence as Compliance Sieves, Inspection Sieves, and Calibration Sieves. Calibration sieves have had at least twice as many openings measured as Inspection sieves.

5.5 Each test sieve must be examined and found to be free of manufacturing defects.

6. Technical Requirements

6.1 *Opening Sizes, Tolerances, and Standard Deviation*:

6.1.1 Four tolerances shall be applied: the variation for average opening (*Y*), the maximum variation (*X*), the maximum standard deviation and the wire diameter. The opening tolerances apply to the opening sizes, measured on the midpoint of the opening (see Fig. 1), and applied separately in both the warp and shute directions.

6.1.2 The average opening size shall not exceed the sieve designation by more than $\pm Y$ (Table 1~~. The average opening (distance between parallel wires measured at the center of the opening), in the *x* (horizontal) and *y* (vertical) directions measured separately, shall conform to the values in Column 1, within the permissible variation in average opening size shown in Column 4. Not more than 5% of the openings shall exceed the value shown in Column 5. The maximum individual opening size shall not exceed the value shown in Column 6.~~

~~4.4.1The average diameter of the *x* (horizontal) and *y* (vertical) wires, measured separately, shall conform to the diameter in Column 7 within the tolerances in Footnote A of~~ , Column 4):

$$Y = \frac{w^{0.98}}{27} + 1.6 \tag{1}$$

where *Y* and *w* are expressed in micrometers.

6.1.3 The maximum opening size measured shall not exceed the nominal opening size *w* (Table 1.

~~4.5Wires shall be crimped in such a manner that they will be rigid when in use.~~

~~4.6There shall be no punctures or obvious defects in the cloth.~~

~~5.Test Sieve Frames~~

~~5.1~~, *Column 1), by more than X* (Table 1, Column 5):

$$X = \frac{2(w^{0.75})}{3} + 4w^{0.25} \tag{2}$$

where *X* and *w* are expressed in micrometers.

6.1.4 The intermediate value *Z* shall be stated as follows:

$$Z = (X + Y) / 2 \tag{3}$$

6.1.5 The maximum standard deviation is calculated based on the Gaussian normal distribution curve, where the area under the curve to the maximum value *X* minus the area under the curve to the intermediate value *Z*, is equal to this critical area between (*w* + *Z*) and (*w* + *X*) not exceeding more than 5 % of the openings (see Appendix X2). The resulting tolerances for sigma are given in Table 1 for Compliance sieve cloth (Column 8).

6.1.5.1 In order to increase the probability or acceptance confidence level from 66 % at one-sigma to *X*σ, specifically 99 % (2.58σ) and 99.73 % (3σ) for Inspection and Calibration sieves respectively, these maximum standard deviation values are

determined by dividing sigma by a correction or K-factor. These K-factors are determined based on approximation to a Chi-square distribution for the sample variance as follows:

$$K = 1 + X\sigma / \sqrt{2(n-1)} \quad (4)$$

6.1.5.2 The applicable resulting K-factors (see Appendix X3) are then applied and the maximum standard deviation tolerances are determined as follows:

$$\sigma_x = \text{sigma} / K \quad (5)$$

6.1.5.3 The resulting tolerances are given in Table 1 for Inspection Sieves (Column 10) and for Calibration Sieves (Column 12).

6.1.6 The actual standard deviation of the openings in the warp and weft directions, when taken separately, shall not exceed the values shown in Table 1 for each type. If the number of sample openings is less than 15, the maximum standard deviation is not evaluated.

6.1.6.1 The population standard deviation σ is obtained by measuring all of the full openings *N* found in the test sieve and is calculated from the following equation:

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(w_i - \overline{w})^2} \quad (6)$$

6.1.6.2 The sample standard deviation *s* is calculated from the measurement of the number of apertures, *n* as listed in Table 1 (Column 8 for sieve cloth, Column 10 for Inspection Sieves, and Column 12 for Calibration Sieve), using the following equation:

$$s = \sqrt{\frac{1}{n-1}\sum_{r=1}^{n}(w_i - \overline{w})^2} \quad (7)$$

6.2 *Wire Diameters*:

6.2.1 The nominal wire diameters given in Table 1, Column 13 are typical.

6.2.2 The wires in a test sieve or sieve cloth shall fall between the range of choice (d min and d max) given in Table 1, Column 14 and 15, respectively. It is recognized that mechanical deformation of the wire occurs during weaving, and therefore the diameter measured after weaving may be different than the *nominal* wire diameter.

6.2.3 The wires shall be crimped in such a manner that the cloth exhibits firmness, as agreed between the user and the supplier, as applied to roll goods.

6.3 *Test Sieve Frames*:

6.3.1 *General Requirements*—Frames for wire cloth sieves shall be constructed in such a manner as to be rigid. The wire cloth shall be mounted on the frame without distortion, looseness, or waviness. To prevent the material being sieved from catching in the joint between the wire cloth and the frame, the joint shall be filled smoothly or constructed so that the material will not be trapped.

5.2—*Frames for test sieves shall be constructed in such a manner to be rigid. The sieve cloth shall be mounted on a frame without distortion, looseness, or waviness. The method used to attach the sieve cloth to the frame shall be done so the material being sieved will not become caught in the joint between the sieve cloth and the frame.*

6.3.2 *Standard Frames*—Sieve frames shall be circular with nominal diameters of 3, 6, 8, 10, or 12 in. (76, 152, 203, 254, or 305 mm) as may be specified. The dimensions shall conform to the requirements in —Sieve frames shall be circular. Typical frame sizes are 3 in., 6 in., 8 in., 10 in., and 12 in. diameter (or 76, 152, 203, 254, or 305 mm). Tolerances for dimensions of test sieve frames are given in Table 2. Frames shall be made from noncorrosive material such as brass or stainless steel and be of seamless construction.

5.2.1The bottom of the frame shall be constructed so as to provide an easy sliding fit with any sieve frame of the same nominal diameter conforming to the specified dimensions.

5.2.2The joint or fillet at the connection of the sieve cloth to the frame will provide a minimum clear sieving surface with a diameter equal to the nominal diameter less 0.5 in. (13 mm).

NOTE3—Attention is called to Test Method C430, which contains requirements for 2 in. (51 mm) diameter sieves used in the mineral industry, especially the cement group.

5.3*. Other frame sizes may be used. Frames shall be made of a noncorrosive material such as brass or stainless steel. The bottom of the frame shall be constructed so as to provide an easy sliding or nesting fit with any sieve frame of the same nominal diameter conforming to the specified dimensions.*

6.3.3 The joint or fillet at the point where the sieve cloth and frame meet will provide a minimum clear sieving surface with a diameter equal to the nominal diameter, less 0.5 in. (13 mm).

6.3.4 *Nonstandard Frames*—Other sieve frames may be either square, rectangular, or circular. The frame may have the sieve cloth permanently installed, or may be designed to permit replacement. The provisions of 5.1 —Other sieve frames may be square, rectangular, circular, or non-metal. The frame may have the sieve cloth permanently attached, or it may be designed so the sieve cloth is replaceable. The provisions of section 6.3.1 apply. Note4—While there are no requirements for nesting of nonstandard sieve frames, care should be applied in use to prevent loss of material during analysis.

5.4*Pans and Covers*—Pans and covers for use with sieves shall be made so as to nest with the sieves. Pans with extended rims