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DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
WASHINGTON, D. C.

Letter
Circular
LC 74
(Revised Edition)

(April 15, 1924)

STANDARD SPECIFICATIONS FOR SIEVES
"STANDARD SIEVE SERIES"

1. Although it has been recognized for many years that a series of standard sieves should be based upon a definite and logical succession of sieve openings, it was not until 1916 that definite steps were taken to establish and publish specifications for a complete series of testing sieves. After studying the problem and consulting both manufacturers and users, a conference was held at the Bureau of Standards on April 20, 1916 at which a tentative standard scale for all testing sieves was adopted. Since then certain revisions have been made to increase the usefulness and availability of this sieve series, and these revised specifications are the basis of certification of all sieves submitted to the Bureau of Standards for test.

2. Although this sieve scale was, in its conception, essentially metric, since the sieve having an opening of 1 mm was the basic one for calculating the series of nominal openings, the relation of consecutive sieves in the series being one to the fourth root of two, it may also be considered as essentially in the customary units by those who so prefer. The series has been made large enough, it is hoped, to meet the needs of all industries. Some industries may have occasion to use all the sieves in a certain section of the series and none of the others, while in other industries it may be desirable to use only certain sieves selected from the whole range of the series. In making such selections it is recommended that this be done on some systematic plan, as for example, the selection of every other sieve or of every fourth one in the series. In the former case the ratios of each opening to the next smaller one would be as $\sqrt[4]{2}$:1, in the latter case 2:1.

3. Because of the wide range of openings in sieves now manufactured which is possible with a given number of meshes per unit length by the use of wires of different diameters, and the consequent confusion and uncertainty which arises in designating sieves by the number of meshes per unit length, it is recommended that all reference to mesh be avoided in the designation of the sieves, but that for convenience each sieve be given an abstract number which will indicate the approximate position of the sieve in the series. The proper designation of a sieve is the size of the opening, supplemented by the wire diameter, but it is well recognized that few users of sieves will be able to carry the sizes of the various openings in mind without reference to a

printed table. All that the users of sieves desire to know in general is that the sieves are "standard", that is, that they conform to established specifications, and therefore the only designation required is a simple one which will suggest the degree of fineness or coarseness of the material passing or retained upon any given sieve. Such a designation is an abstract number which is approximately the number of meshes per linear inch. The advantage of such a designation is readily apparent. Thus the sieve, which has a 0.105 mm opening, is given the number 140, which may be regarded simply as a fixed arbitrary number indicating that the sieve has approximately 140 meshes per inch. The fact that a sieve of nominal opening and wire diameter has actually 141.9 meshes per inch or 55.9 meshes per centimeter is of no importance; the number 140 merely indicates to those who are familiar with the old sieves what order of separation this sieve would give in testing any graded material. It is urgently recommended that all users of sieves in the future designate these standard sieves by these arbitrary numbers approximately the mesh per inch, and that the manufacturers mark and list the sieves in this manner, together with the size of the openings and the wire diameters in both millimeters and inches.

4. The Bureau of Standards tests sieves of this series to determine whether they conform to specifications given below. This test will consist of the examination of the openings of both the warp and shoot of the cloth to ascertain whether they come within the tolerance allowed, of measurements of the diameter of wires in each direction to determine the average diameter and a measurement of any large openings to ascertain whether they exceed the limits of these specifications, and of an examination of the sieve to discover any imperfections of the sieve which may seriously affect the sieving value. Sieves which pass the specifications will be stamped with the seal of the Bureau of Standards.

5. The tolerances on wire diameter and average opening have been made sufficiently liberal to make this sieve series one which can be obtained. The idea has also been kept well in mind that these specifications are for standard testing sieves and not for market grade sieve cloth. It is possible that at a later date it may be feasible to reduce these tolerances somewhat. It is believed that sieves whose wire diameters agree with the nominal values within 15% will give better service than sieves whose wire diameters are farther from the nominal values.

6. For the present a certificate will be furnished for each sieve that passes the requirements. For sieves which fail to meet the specifications, reports will be rendered showing wherein they do not conform to the standard. The sieving value of a full-height No. 200 sieve is included in the certificate or report.

7. Each sieve submitted for test should bear a permanent and legible identification number preferably a manufacturer's serial number. An extra charge of 10 cents will be made by the Bureau for identifying during the test such sieves as do not already bear an identifying number.

8. Attention is called to the fact that sieves which have been tested by the Bureau of Standards and found to be in accordance with the specifications for U. S. Standard Sieves bear the seal of the Bureau. The "B. S. No ___" is in itself only an indication that the sieve has been tested at the Bureau of Standards and a certificate or report issued, but does not signify whether or not it conforms to the specifications.

SCHEDULE OF FEES

Schedule 9. Standard Sieves and Sieve Cloth

| | | | |
|---|-----|---|--------|
| 9 | (a) | Test and certification or report on any testing sieve - - - - - | \$2.00 |
| 9 | (b) | Extra charge for placing a preliminary identification number on sieves not otherwise identified - - - - - | .10 |
| 9 | (c) | Test and report on a piece of sieve cloth, per square foot - - - - - | 3.00 |

Tests for the Federal government and for State governments are conducted without charge.

STANDARD SPECIFICATIONS FOR SIEVES

1. Wire cloth for standard sieves shall be woven (not twilled, except that the cloth of No. 230, No. 270, and the No. 325 sieve, may be twilled until further notice) from brass, bronze, or other suitable wire and mounted on the frames without distortion. To prevent the material being sieved from catching in the joint between the cloth and the frame, the joint shall be smoothly filled with solder, or so made that the material will not catch. The sieve frames should be circular, about 20 cm (8 inches) in diameter and about 5 cm (2 inches) or 2.5 cm (1 inch) between the top of the frame and the cloth.

2. The average opening between the adjacent warp and the adjacent shoot wires, taken separately, shall be that given in column 2 of the attached table, within the "Tolerance in average opening" given in column 6. The average diameter of the warp and of the shoot wires, taken separately, of the cloth of any given sieve shall be that given in column 4 of the attached table within the "Tolerance in wire diameter" given in column 7. The maximum opening between adjacent parallel wires shall not exceed the nominal width of opening for that sieve by more than the "Tolerance in maximum opening" given in column 8 of the attached table.

3. The Bureau of Standards reserves the right to reject sieves for obvious imperfections in the sieve cloth or its mounting, as for example, punctured, loose, or wavy cloth, imperfections in soldering, etc., also for an excessive number of large openings.

4. Full-height number 200 sieves will be given a sieving test with a standard sample of cement and the sieving correction thus obtained will be incorporated in the certificate or report unless it is indicated in the request for the test of the sieves that they are not intended for cement testing and that the sieving test is not required.

U. S. STANDARD SIEVE SERIES

TABLE OF FUNDAMENTAL DATA

STANDARD SPECIFICATIONS FOR SIEVES

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|-----------|-----------------------------------|------------------------------|--|------------------------------|---|--|---|
| Sieve No. | Sieve Opening Milli- meters | Sieve Open- ing Inches | Wire Diam- eter Milli- meters | Wire Diam- eter Inches | Toler- ance in av- erage open- ing | Toler- ance in Wire Diam- eter | Toler- ance in max- imum open- ing |
| 4 | 4.76 | .187 | 1.27 | .050 | ± 3% | -15 to +30% | 10% |
| 5 | 4.00 | .157 | 1.12 | .044 | ± 3% | -15 to +30% | 10% |
| 6 | 3.36 | .132 | 1.03 | .040 | ± 3% | -15 to +30% | 10% |
| 7 | 2.83 | .111 | .92 | .035 | ± 3% | -15 to +30% | 10% |
| 8 | 2.38 | .0937 | .84 | .0331 | ± 3% | -15 to +30% | 10% |
| 10 | 2.00 | .0787 | .76 | .0299 | ± 3% | -15 to +30% | 10% |
| 12 | 1.68 | .0661 | .69 | .0272 | ± 3% | -15 to +30% | 10% |
| 14 | 1.41 | .0555 | .61 | .0240 | ± 3% | -15 to +30% | 10% |
| 16 | 1.19 | .0469 | .54 | .0215 | ± 3% | -15 to +30% | 10% |
| 18 | 1.00 | .0394 | .48 | .0189 | ± 3% | -15 to +30% | 10% |
| 20 | .84 | .0331 | .42 | .0165 | ± 5% | -15 to +30% | 25% |
| 25 | .71 | .0280 | .37 | .0146 | ± 5% | -15 to +30% | 25% |
| 30 | .59 | .0232 | .33 | .0130 | ± 5% | -15 to +30% | 25% |
| 35 | .50 | .0197 | .29 | .0114 | ± 5% | -15 to +30% | 25% |
| 40 | .42 | .0165 | .25 | .0098 | ± 5% | -15 to +30% | 25% |
| 45 | .35 | .0138 | .22 | .0087 | ± 5% | -15 to +30% | 25% |
| 50 | .297 | .0117 | .188 | .0074 | ± 6% | -15 to +35% | 40% |
| 60 | .250 | .0098 | .162 | .0064 | ± 6% | -15 to +35% | 40% |
| 70 | .210 | .0083 | .140 | .0055 | ± 6% | -15 to +35% | 40% |
| 80 | .177 | .0070 | .119 | .0047 | ± 6% | -15 to +35% | 40% |
| 100 | .149 | .0059 | .102 | .0040 | ± 6% | -15 to +35% | 40% |
| 120 | .125 | .0049 | .086 | .0034 | ± 6% | -15 to +35% | 40% |
| 140 | .105 | .0041 | .074 | .0029 | ± 8% | -15 to +35% | 60% |
| 170 | .088 | .0035 | .063 | .0025 | ± 8% | -15 to +35% | 60% |
| 200 | .074 | .0029 | .053 | .0021 | ± 8% | -15 to +35% | 60% |
| 230 | .062 | .0024 | .046 | .0018 | ± 8% | -15 to +35% | 90% |
| 270 | .053 | .0021 | .041 | .0016 | ± 8% | -15 to +35% | 90% |
| 325 | .044 | .0017 | .036 | .0014 | ± 8% | -15 to +35% | 90% |

Bureau of Standards
 Washington, D. C.
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