387

PROGRESS REPORT OF COMMITTEE ON MECHANICAL ANALYSIS OF SANDS*

HE Committee on Mechanical Analysis of Sand has up to this time delayed the preparation of a report principally because of the fact that it is thought to be one of the principal duties of this committee to submit a proposed standard method of conducting such analyses and because during the past two years, especially, the United States Bureau of Standards at Washington, D.C., has been active in securing co-operation and joint action of parties interested in the selection and adoption of standard screens. It is recognized that standard screens are required not only for the mechanical analyses of sands but also in many other industries, yet it is believed that it is to the best interests of all having to do with such sand analyses that the one standard be used for all. There are obvious advantages in having the one standard screen scale available for all purposes and there is no apparent advantage in having a separate or distinct set of standard screens for testing sand.

Early action of the Bureau of Standards in the matter of standardizing sieves resulted in the adoption of certain specifications standardizing 200 and 100-mesh sieves used primarily for testing cement. Subsequently, early in 1917, responding to the demands of industry, the Bureau of Standards called a conference at Washington including representatives of practically all national engineering and technical organizations and others interested in the adoption of standard sieves. The conference, after considering various screen scales, adopted a standard screen scale, and recommended that it be adopted generally by scientific, technical and engineering societies and committees as part of their specifications for materials and methods of tests; also that it be used by private firms who have need of standard sieves. The committee recommends the adoption of the standard screen scale for sieves used in the mechanical analysis of sands.

The screen scale is essentially metric. The sieve having an opening of 1.0 mm. is the basic one and the sieves above and below this in the series are related to it by using in general the square root of 2, or 1.4142, or the fourth root of 2, or 1.1892, as the ratio of the width of one opening to the next smaller opening. The first ratio, that is, 1.4142, is used for openings between 1.0 mm. and 8.0 mm., while the second ratio is used for openings below 1.0 mm. to give more sieves as required in that part of the scale.

Because of the possible wide range of openings in sieves now manufactured with a given number of meshes of wire per unit length, due to the use of wires of different diameters, and because of the consequent confusion and uncertainty which arise in designating sieves by the number of meshes per unit length, the sieves of this series are designated by the width of the opening in millimeters, as, for example, a 1.41 mm. sieve, or a 0.36 mm. sieve. The committee recommends that this method of designating sieves be adopted instead of the customary method of designating the number of meshes per inch.

To meet the need for sieves of this series at the present time the committee has included a temporary provision in the specifications for the acceptance of sieves of slightly different mesh and wire diameter than that called for in the screen scale, provided the resultant opening is the same as the nominal opening within a small range. This will make possible the use of a number of sieves now on the market in which the ratios of wire

*Abstracted from Report of Committee appointed by American Water Works Association. diameter to opening are only slightly different from those of the screen scale.

Specifications for Standard Sieves.

Sieves shall be of brass constructed in diameters of 20 cm. (7.87 inches) or 15 cm. (5.91 inches). These are the outside diameters of the bottom of the sieves or the inside diameters of the top of the sieves.

Wire cloth for standard sieves shall be woven (not twilled, except that the cloth of 0.062-mm. sieves 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 number of wires per centimeter of the cloth of any given sieve shall be that shown in the accompanying Table 1, in the second column, headed "Mesh," and the number of wires in any whole centimeter shall not differ from this amount by more than the tolerance given in the 5th column, that headed "Mesh" under the heading "Tolerances." No opening between adjacent parallel wires shall be greater than the nominal width of opening for that sieve by more than the following amounts:

Table I.-Standard Screens for Mechanical Analyse3

of Sand. Ratio Wire

			Ratio with			
Metric Customary Manufactured .	Width of Openings. . 8.00 . 0.315 . 8.05	Mesh. 1.00 2.54 2.5	Wire Diam. 2.00 0.079 0.083	Diam. to Opening. 0.25 0.25 0.26	Toler Mesh. 0.01 0.03	ances. Diam. 0.008 0.003
Metric Customary Manufactured .	5.66 0.223 5.66	1.4 3.56 3.5	1.48 0.056 0.063	0.26 0.26 0.28	0.01 0.03	0.08 0.003
Metric Customary Manufactured .	. 4.00 . 0.157 . 4.04	2.0 5.1 5.0	1.00 0.039 0.041	0.25 0.25 0.26	0.02 0.05	0.05 0.002
Metric Customary Manufactured .	2.83 0.111 2.82	2.75 7.0 7.0	0.81 0.032 0.032	0.29 0.29 0.29	0.02 0.05	0.05 0.002
Metric Customary Manufactured	2.00 0.079 2.03	3.9 9.9 10.0	0.56 0.022 0.020	0.28 0.28 0.25	0.04 0.1	0.05 0.002
Metric Customary Manufactured .	1.41 0.0555 1.42	5.0 12.7 12.0	0.59 0.0232 0.027	0.42 0.42 0.69	0.08 0.2	0.025 0.001
Metric Customary Manufactured		7.0 17.8 18.0	0.43 0.0169 0.016	0.43 0.43 0.41	0.15 0.4	0.020 0.0008
Metric Customary Manufactured	0.71 0.0280 0.72	9.0 ·22.9 22.0	0.40 0.0157 0.017	0.56 0.56 0.60	0.3 0.75	0.012 0.0005
Metric Customary Manufactured	0.50 0.0197 0.50	12.0 30.5 3.0	0.33 0.0130 0.0135	0.66 0.66 0.68	0.4 1.0	0.012 0.0005
Metric Customary Manufactured	0.36 0.0142 0.36	16.0 40.6 40.0	0.26 0.0102 0.011	0.72 0.72 0.79	0.6 1.5	0.010 0.0004
Metric Customary Manufactured	0.25 0.0098 0.25	23.0 58.4 60.0	0.185 0.0073 0.007	0.74 0.74 0.72	1 3	0.008 0.0003
Metric Customary Manufactured	0.17 0.0067 0.17	31.0 78.7 80.0	0.15 0.0059 0.00573	0.88 0.88 5 0.85	1 3	0.008
Metric Customary Manufactured	0.125 0.0049 0.119	47.0 119.4 120.0	0.089 0.0035 0.0036	0.71 0.71 0.77	1.5	0.008
Metric Customary Manufactured	0.088 0.0035 0.089	67.0 170.2 170.0	0.061 0.0024 0.0024	0.69 0.69 0.69	2.5	0.005
Metric Customary Manufactured	0.062 0.0024 0.061	98.0 248.9 250.0	0.040 0.0016 0.0016	0.65 0.65 0.67	3.5 9	0.005