Five per cent. of the nominal width of opening for the 8-mm. to 1-mm. sieve inclusive.

Ten per cent. of the nominal width of opening for the 0.71-mm. to the 0.36-mm. sieve, inclusive.

Twenty per cent. of the nominal width of opening for the 0.25-mm. to the 0.125-mm. sieve, inclusive.

Thirty per cent. of the nominal width of opening for the 0.088-mm. and the 0.62-mm. sieve, inclusive.

The diameters of the wires of the cloth of any given sieve shall be that shown in the third column of Table 1 headed "Wire Diameter," and the average diameter of the wires in either direction shall not differ from the specified diameter by more than the tolerance given in the last column of Table 1, that under "Tolerances" headed "Diameter."

Sieves shall be rejected for obvious imperfections in the sieve cloth or its mounting, as, for example, punctured, loose or wavy cloth, imperfections in soldering, etc.

Until further notice, to permit the use of sieves now on the market which have slightly different mesh and wire diameters from that specified above, sieves will be satisfactory if the measurements of mesh and wire diameters show the resulting average width of opening to be within 4 per cent. of the nominal opening of a given sieve, and the ratio of wire diameter to opening of the sieve in question is within 0.03 of that given in Table 1, in the column headed "Ratio Wire Dameter to Opening" for the 8-mm. to the 2-mm. sieves, inclusive, and within 0.06 of the ratio given for sieves of smaller openings than 2 mm.

The Bureau of Standards has announced that it will test sieves of the standard screen scale to determine whether they conform to the specifications which follow. This test will consist of an examination of the mesh of both the warp and shoot wires of the cloth to ascertain whether it comes within the tolerances allowed; also measurements of the diameter of wires in each direction to determine the average diameter; also a measurement of any large openings to determine whether they exceed the limits given in these specifications; also, an examination of the sieves to discover any imperfection of the sieve which may seriously affect its sieving value. Sieves which pass the specifications will be stamped with the seal of the Bureau and will be given an identification number and 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 the sieve was not up to the standard.

In the accompanying Table 1 the committee has shown the specifications for standard screens which it recommends for adoption by the Society. The first 7 sieves listed, that is, from the 8-mm. to the 1.0-mm. sieve, include the first 7 sieves of the entire screen scale. For the sieves smaller than the 1.0 mm. sieve, only the alternate sieves of the screen scale are included.

In the table are shown the meshes per inch and diameters of wire, together with their tolerances, all expressed in millimeters and inches. Widths of openings are expressed also in millimeters and inches. There is also shown for each standard screen specifications for that sieve now manufactured which most nearly approaches the suggested standard screen, as regards width of opening and ratio of wire diameter to opening.

The committee wishes to call attention to the importance of the latter factor or ratio. Referring to the table, it will be observed that the ratio of wire diameter to opening varies from 0.25 to 0.88, generally increasing with the finer cloth. In practice it is found that the diameter of wire used should be as small as will withstand the service required, because material will not pass cloth composed of coarse wire so freely as it will pass cloth woven of fine wire. This fact undoubtedly is the principal reason why confusion has arisen in the past when it has been attempted to establish a relation between the diameter of opening and the size of the particle passing the opening, that is the separation of the sieve. For instance, in the case of two sieves having the same width of opening, that in which the wire has the larger diameter will pass the larger particle, and vice versa.

Another feature of the manufacture of wire cloth which has considerable importance in affecting the separation of a screen, is the weave. The finer screens are frequently made of twilled cloth, that is, each wire crosses above and below each adjacent two wires, while in the plain woven cloth, each wire crosses above and below each adjacent wire. The plain woven cloth is always used for the coarser sieves. Experience shows that larger particles will pass through twilled cloth than through plain woven cloth of the same width of opening.

The committee recommends that the cloth in all of the standard sieves be plain woven and not twilled, although for the present it may be necessary to use twilled cloth for the 0.062 mm. sieve.

Methods of Making Mechanical Analysis.

A mechanical analysis of sand is generally accomplished in the following manner: The selected sieves are nested with the coarsest at the top varying to the finest at the bottom. For the 8 inch diameter sieves 300 grams and for the 6-inch sieves 100 grams of the sand to be analyzed are dried and placed in the top sieve, the nest of sieves is shaken in a mechanical shaker practically to refusal of any further separation, the sieves separated, and beginning with the finest sieve the sand remaining on each sieve is weighed accumulatively. The results are then plotted to a suitable scale.

There are six factors which control the results of a mechanical analysis, as follows: The selection of a representative sample; the quantity of material taken for analysis; the number and rapidity of the shakes; the accuracy of the weights of the separated portions; the rating of the sieves to determine their separations; and finally, the interpretation of results. Each of the above features has an important bearing on the accuracy and reliability of a mechanical analysis and should be given proper consideration.

The material to be analyzed should preferably be in its natural moist condition when sampled as otherwise it tends to separate. When dry it should be handled with a scoop and thoroughly mixed. In sampling a pile of moist sand a large sample should first be taken of several portions from different parts of the material, these portions mixed, the resultant sample quartered and the process continued until finally there is secured a sample of the required size.

The amount of sand used should be as large as practicable. For the 8-inch sieves 300 grains of graded sand and for the 6-inch sieves 100 grrams may well be used. More than these quantities tend to stretch and clog the cloth and are not readily separated by shaking.

A mechanical shaker is required, especially where a large number of analyses are to be made. Several satisfactory machines are on the market. The essential feature of such a machine is that its speed shall be properly controlled. Experience will readily indicate the period of shaking required in the machine which should be operated by trial, using the required amount of sand until there is practically no further passage of sand grains through the screens.