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Indian Standard

SPECIFICATION FOR TEST SIEVES

PART 3 METHODS OF EXAMINATION OF APERTURES OF TEST SIEVES

(Third Revision)

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Indian Standard

SPECIFICATION FOR **TEST SIEVES**

METHODS OF EXAMINATION OF PART 3 APERTURES OF TEST SIEVES

(Third Revision)

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Indian Standard

SPECIFICATION FOR TEST SIEVES

PART 3 METHODS OF EXAMINATION OF APERTURES OF TEST SIEVES

(Third Revision)

0. FOREWORD

0.1 This Indian Standard (Part 3) (Third Revision) was adopted by the Indian Standards Institution on 20 February 1985, after the draft finalized by the Sieves, Sieving and Other Sizing Methods Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 This standard was first issued in 1953 and revised in 1962 and 1978. The 1978 revision of this standard was published in three parts, namely, Part 1 dealing with wire cloth test sieves, Part 2 dealing with perforated plate test sieves and Part 3 dealing with methods of examination of test sieves whether made from wire cloth or perforated plates for determining their compliances with Part 1 and Part 2 of this standard. The present revision has been undertaken with a view to bring it in line with international standards ISO 3310/1-1982 ' Test sieves - Technical requirements and testing — Part 1 Test sieves of metal wire cloth ' and ISO 3310/2-1982 'Test sieves - Technical requirements and testing - Part 2 Test sieves of metal perforated plate', published by International Organization for Standardization (ISO). Assistance has also been derived from BS : 410-1976 'Specification for test sieves' published by the British Standards Institution, for calibration test. The details regarding mask in the calibration test and the measurement of average size of apertures for wire gauge sieves have also been modified. Since the standard covers the procedure for measurement of apertures and does not deal with the determination of material, thickness/diameter, etc, of sieving medium as well as frames, the title and the scope of the standard has been suitably modified.

0.3 In reporting the results of a test or analysis, made in accordance with the standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

^{*}Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This standard (Part 3) describes the methods of examination of apertures of wire cloth test sieves and perforated plate test sieves.

1.2 This standard covers acceptance tests and calibration tests. Normally the acceptance test is sufficient for determining the conformity of the apertures of the test sieve to Part 1 or Part 2 of this standard. However, when the test sieve is to be used as a master sieve and/or when more detailed information is required about it, a calibration test shall be performed.

2. ACCEPTANCE TEST

2.1 Wire Cloth Test Sieve

2.1.1 Every aperture in the metal wire cloth in a test sieve shall be eligible for inspection for compliance with the requirements given in Part 1 of this standard.

2.1.2 The examination shall proceed in stages from a survey of general condition, to a methodical scrutiny of individual apertures, and finally to measurement of aperture size for compliance with the tolerances. When a sieve has 20 apertures or less, all apertures shall be measured.

2.1.3 Examination of General Condition of the Wire Cloth — For this purpose the sieve cloth shall be viewed against a uniformly illuminated background. If obvious faults, for example, weaving defects, such as loose wire, creases, wrinkles are found, the sieve is unacceptable. Part apertures are likely to be found round the periphery but blinded apertures away from the periphery are unacceptable.

2.1.4 Measurement of Apertures — Tests shall be made with respect to each of the three tolerances X, Y and Z as listed in Part 1 of this standard, in warp and weft directions separately. The measurement of apertures may be conveniently done by the use of suitable optical projector or a microscope in combination with a coordinate measuring table.

2.1.5 Measurement of Oversize Apertures — The observer shall carefully and methodically examine the appearance of all the openings, in order to detect oversize apertures. Apertures whose width deviates by about 10 percent from the average value are apparent to the unaided eye of a skilled observer. Relatively large apertures shall be measured individually. If any of the aperture is found to be oversize by more than the maximum permissible deviation X, the sieve is unacceptable.

2.1.6 Measurement of Apertures Exceeding the Intermediate Limit — Those apertures whose width is between the limits of 'nominal + Z' and 'nominal + X' shall be counted and their proportion of the total number

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of apertures determined from representative sample regions. If these are more than the permitted, the sieve is unacceptable. The exploration shall be made across the two diameters of the sieve frame, parallel to the warp and weft directions and/or in areas of irregular apertures as listed in the survey mede in 2.1.3.

2.1.6.1 The test may be carried out rapidly using a limit gauge (tolerance band gauge) in the form of a scale (*see* Fig. 1) or by individual gauges for coarse sieves. The success of the test depends upon observing at least 100 apertures, if available, in each direction.



FIG. 1 TOLERANCE BAND GAUGE FOR OPTICALLY MAGNIFIED SIEVE CLOTH OF 355-µm Size with 50 Magnification

2.1.7 Measurement of Average Size of Aperture — After the sieve has been found acceptable by the above tests, the average size of apertures shall be measured over at least ten apertures, if available, in each direction in each of at least two positions widely dispersed on the cloth. If the results from the two fields fall in different tolerance bands or if they contradict the information from Table 2 of Part 1 of this standard, the average size at three more positions on the cloth shall be ckecked, if available. These average value of all these apertures at five positions shall lie within the prescribed limits.

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2.2 Perforated Plate Test Sieve

2.2.1 Every aperture in the perforated plate sieve shall be eligible for inspection for compliance with the requirements given in Part 2 of this standard.

2.2.2 The examination shall proceed in stages from a survey of general condition to a methodical scrutiny of individual apertures, and finally to measurement of aperture size for compliance with the tolerances. Where the minimum number of holes prescribed for examination in one or two directions (see 2.2.5) is not available in the plate, all the holes in the sieve shall be checked.

2.2.3 Examination of General Condition of the Perforated Plate — The perforated plate in the sieve shall be examined for general condition against a uniformly illuminated background and if obvious faults, such as irregularly formed holes, ragged edges, and burrs upward are found, the sieve is unacceptable.

2.2.4 Measurement of Oversize Apertures — The observer shall then carefully and methodically examine all the openings in order to detect oversize apertures. Suspected oversize apertures in coarser sieves may be checked with an engineer's calliper, or a limit gauge, segmental or calliper; those in finer sieves may be viewed when magnified optically.

2.2.5 Measurement of Individual Holes — Individual holes shall be checked for compliance with the prescribed tolerances. Square holes shall be enecked at the mid section in both directions across; round holes across various diameters. Callipers, tapered plate gauges, segmental plain limit plug gauges, or optical projection may be used. The following procedures shall be adopted for measurement of holes :

- a) In any selected area check the holes along each of two straight lines of at least 100 mm length and including at least 10 holes, 5 along each direction; the lines should be at 90° or 60° for round holes and at 90° for square holes.
- b) Alternatively for square holes, check holes along a line parallel to a diagonal of the holes for at least 150 mm and at least 8 holes.

2.2.6 Measurement of Pitch of the Apertures — The pitch of the apertures shall be checked. This can be done at the same time as the test . under 2.2.5.

3. CALIBRATION TESTS

3.1 Woven Wire. Cloth Test Sieve — The measurement of the aperture width shall be made in a number of fields evenly spread over the whole area of the sieve, and so chosen that no two fields are crossed by the same wire. The masks for this purpose are shown in Fig. 2. The maximum size (diameter) of the masks shall be the minimum effective

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diameter of the sieving surface. The number of fields and the minimum number of apertures that should be measured in each field, in both the warp and the weft directions separately are given in col 2 to 4 of Table 1.

| Nominal Aperture Width | NUMBER OF Fields | Minimum Number of Consecutive Apertures to be Measured in Each Direction | |
|---------------------------------------|---------------------|--------------------------------------------------------------------------------|---------------|
| | | In Each Field | In All Fields |
| (1) mm | (2) | (3) | (4) |
| 3.32 | 10 | 3 | 30 |
| 2.80 | 10 | 3 | 30 |
| 2.36 | 10 | 4 | 40 |
| 2.00 | 10 | 4 | 40 |
| 1.70 | 10 | 5 | 50 |
| 1.40 | 10 | 6 | 60 |
| 1.18 | 10 | 8 | 80 |
| 1.00 | 10 | 9 | 90 |
| μm | | | |
| 850 | 10 | 10 | 100 |
| 710 | 10 | 12 | 120 |
| 600 | 10 | 15 | 150 |
| 500 | 10 | 15 | 150 |
| 425 | 10 | 20 | 200 |
| 355 | 10 | 25 | 250 |
| 300 | 10 | 30 | 300 |
| 250 | 10 | 30 | 300 |
| 212 180 150 125 106 90 | 15 | 20 | 300 |
| 75 63 53 45 38 32 | 15 | 20 | 300 |

TABLE 1 NUMBER OF APERTURES TO BE MEASURED IN A TEST SIEVE

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SUGGESTED MASKS

3.1.1 For aperture sizes larger than 3.35 mm, 20 apertures may be assessed in each direction. If a sieve has 20 apertures or less, then all apertures shall be measured.

3:2 Perforated Plate Test Sieves - When more detailed information is required about the apertures in the perforated plate in a test sieve, either more apertures shall be checked by limit gauging or dimensions of apertures shall be measured directly.

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