
**Textile fabrics — Determination of
resistance to surface wetting (spray test)**

*Étoffes — Détermination de la résistance au mouillage superficiel
(essai d'arrosage)*



Reference number
ISO 4920:2012(E)

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 4920 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 2, *Cleansing, finishing and water resistance tests*.

This second edition cancels and replaces the first edition (ISO 4920:1981), which has been technically revised with the addition of tolerances to Clause 5 and figures, further clarification of Clause 8 procedures, and the replacement of Figure 3 in the original annex by Figure A.1, Spray chart.

Textile fabrics — Determination of resistance to surface wetting (spray test)

1 Scope

This International Standard specifies a spray test method for determining the resistance of any fabric, which might or might not have been given a water-resistant or water-repellent finish, to surface wetting by water.

It is not intended for use in predicting the rain-penetration resistance of fabrics, since it does not measure penetration of water through the fabric.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 139, *Textiles — Standard atmospheres for conditioning and testing*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

spray rating

measure of the resistance of the surface of a fabric to wetting

3.2

face

fabric surface that is intended to be the outer visible side in an end product

4 Principle

A specified volume of distilled or fully deionized water is sprayed on a test specimen that has been mounted on a ring and placed at an angle of 45° so that the centre of the specimen is at a specified distance below the spray nozzle. The spray rating is determined by comparing the appearance of the specimen with descriptive standards and photographs.

5 Apparatus and materials

5.1 Spray device¹⁾, consisting of a funnel of (150 ± 5) mm diameter held vertically, with a metal nozzle (5.2) connected to the end of the stem by rubber tubing of 10 mm bore (see Figure 1).

The distance from the top of the funnel to the bottom of the nozzle is (195 ± 10) mm.

1) A similar test method unit consisting of hoop, nozzle, funnel, stand and spray test rating chart is available from the American Association of Textile Chemists and Colorists (AATCC), PO Box 12215, Research Triangle Park, NC 27709-2215 (USA); tel: +1.919.549.8141; fax: +1.919.549-8933; email: orders@aatcc.org. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO.

5.2 Metal spray nozzle²⁾, having a convex face with 19 holes of $(0,86 \pm 0,05)$ mm diameter (see Figure 2).

The holes are distributed over the face of the nozzle. The duration of flow for the specified volume of (250 ± 2) ml of water poured into the funnel shall be between 25 s and 30 s.

5.3 Specimen holder, consisting of two wood or metal rings, which fit into each other, one of inside diameter (155 ± 5) mm and another of outside diameter (155 ± 5) mm (for example an embroidery hoop), into which the specimen can be secured (see Figure 1).

The rings should, when in position for a test, rest on a suitable support so that it is inclined at an angle of 45° with the centre of the test area (150 ± 2) mm below the centre of the face of the spray nozzle.

5.4 Water, distilled or fully deionized, at $(20 \pm 2)^\circ\text{C}$ or $(27 \pm 2)^\circ\text{C}$, or other temperatures, as agreed between interested parties.

The temperatures used shall be stated in the test report [10 c)]

5.5 Graduated cylinder, 250 ml, class B.

6 Conditioning and testing atmospheres

Conditioning and testing shall be carried out according to ISO 139. If so agreed, conditioning and testing may be carried out in the ambient atmosphere.

7 Test specimens

Take at least three test specimens, each at least 180 mm square, from different places in the fabric so that they represent the material as fully as possible and can be secured by the specimen holder (5.3). Do not take test specimens from places with creases or fold marks.

8 Procedure

8.1 Condition the test specimens for at least 4 h in the atmosphere defined in Clause 6.

8.2 After conditioning, mount the test specimen securely on the specimen holder (5.3) with the face of the fabric uppermost on the hoop support. Place the holder on the support as specified in 5.3. Unless otherwise stated in the material specification, the specimen shall be orientated so that the warp, or length, direction is parallel to the flow of water down the specimen.

8.3 Pour (250 ± 2) ml of water (5.4) into the funnel (see 5.1) quickly, but steadily so that the spraying shall be continuous once it has commenced. The duration of flow shall be between 25 s and 30 s.

8.4 Immediately after the spray has ceased, remove the holder with its specimen. Hold the specimen holder (5.3) by the bottom edge, with the plane of the fabric almost horizontal and the fabric face down. Tap the holder smartly against a solid object with the fabric facing the object. Rotate the specimen holder 180° and tap it smartly once more.

8.5 Immediately after tapping, with the specimen still on the holder, rate the degree of wetting of the face of the specimen only, according to Clause 9.

8.6 Repeat steps 8.1 through 8.5 for all specimens.

2) Suitable metal nozzles are available commercially. Details can be obtained from the ISO Central Secretariat or from the Secretariat of ISO/TC 38/SC 2.

9 Evaluation

9.1 Assign a rating to each test specimen which best corresponds to the degree of wetting as described in the spray rating scale (9.2) or the photographic spray rating standard scale (see Annex A and Figure A.1). Intermediate ratings can be used in increments of 0,5 for a rating corresponding to ISO 1 or AATCC 50, or higher.

Photographic standards are not entirely satisfactory for dark-coloured fabrics, for which more reliance should be placed on verbal descriptions.

9.2 The spray rating scale is defined as follows:

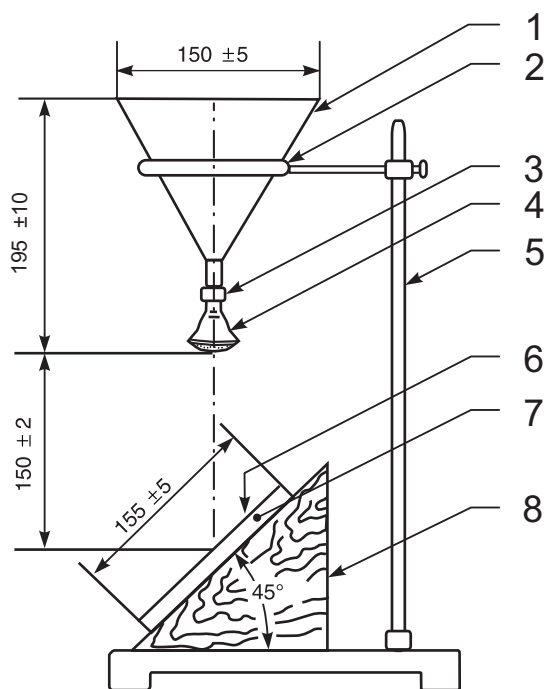
- 0 — Complete wetting of the entire face of the specimen;
- 1 — Complete wetting of the entire specimen face beyond the spray points;
- 2 — Partial wetting of the specimen face beyond the spray points;
- 3 — Wetting of specimen face at spray points;
- 4 — Slight random sticking or wetting of the specimen face;
- 5 — No sticking or wetting of the specimen face.

10 Test report

The test report shall include the following information:

- a) a reference to this International Standard;
- b) atmosphere used;
- c) temperature of the water;
- d) spray rating for each specimen tested.
- e) all data needed to identify the sample(s) tested;
- f) any deviation from the procedure specified.

Dimensions in millimetres unless otherwise indicated

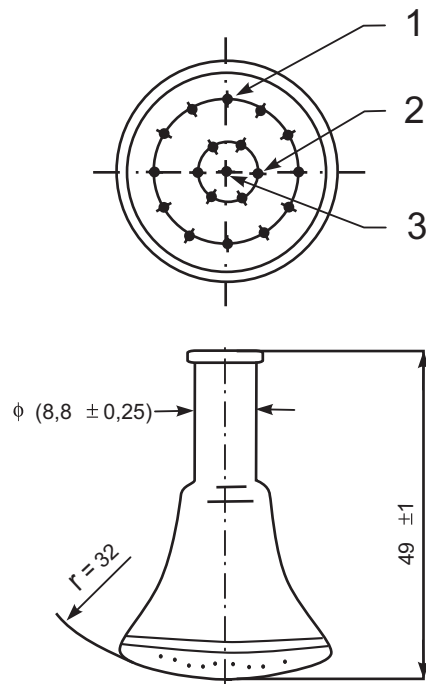


Key

- 1 funnel
- 2 ring support
- 3 rubber tubing
- 4 spray nozzle
- 5 stand
- 6 specimen
- 7 specimen holder
- 8 support

Figure 1 — Apparatus for spray test

Dimensions in millimetres



Key

- 1 12 holes $\varnothing(0,86 \pm 0,05)$ on a circle $\varnothing(21 \pm 0,5)$
- 2 6 holes $\varnothing(0,86 \pm 0,05)$ on a circle $\varnothing(10 \pm 0,5)$
- 3 1 hole $\varnothing(0,86 \pm 0,05)$ on centre

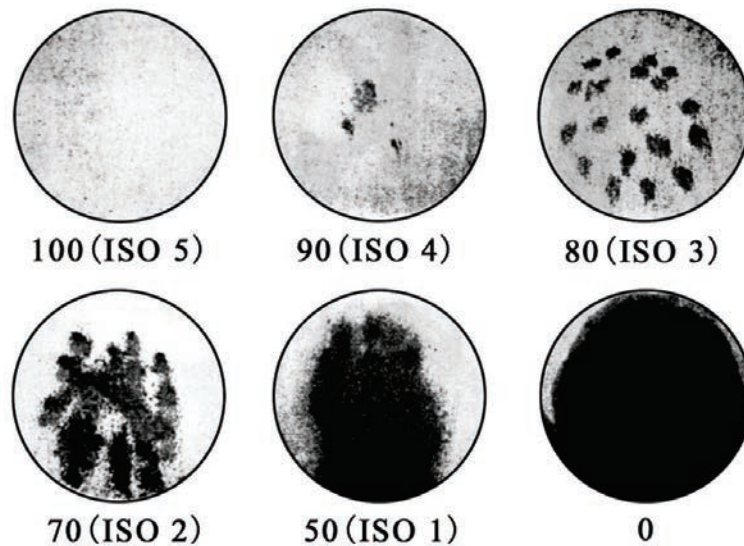
Figure 2 — Spray nozzle details

Annex A
(normative)

ISO photographic scale

The ISO descriptive rating scale corresponds to the AATCC photographic scale³⁾ as follows:

ISO 0 = AATCC 0,
ISO 1 = AATCC 50,
ISO 2 = AATCC 70,
ISO 3 = AATCC 80,
ISO 4 = AATCC 90,
ISO 5 = AATCC 100



- 100** no sticking or wetting of the specimen
- 90** slight random sticking or wetting of the specimen face
- 80** wetting of specimen face at spray points
- 70** partial wetting of the specimen face beyond the spray points
- 50** complete wetting of the entire specimen face beyond the spray points
- 0** complete wetting of the entire face of the specimen

Coloured water used for photographic effect

Figure A.1 — ISO spray test rating chart based on the AATCC photographic scale

3) A similar test method unit consisting of hoop, nozzle, funnel, stand and spray test rating chart is available from the American Association of Textile Chemists and Colorists (AATCC), PO Box 12215, Research Triangle Park, NC 27709-2215 (USA); tel: +1.919.549.8141; fax: +1.919.549-8933; email: orders@aatcc.org. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO.

Bibliography

- [1] ISO 3696, *Water for analytical laboratory use — Specification and test methods*
- [2] AATCC Test Method 22, *Water Repellency: Spray Test*

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