INTERNATIONAL STANDARD

ISO 9073-17

First edition
2008-05-15

Textiles — Test methods for nonwovens —

Part 17: Determination of water penetration (spray impact)

Textiles — Méthodes d'essai pour nontissés —

Partie 17: Détermination de la pénétration de l'eau (impact d'aérosol)

Reference number
ISO 9073-17:2008(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword iv
1 Scope 1
2 Normative references 1
3 Terms and definitions 1
4 Principle 1
5 Materials and reagents 2
6 Apparatus 2
7 Procedure 2
8 Calculation 3
9 Test report 3
Annex A (informative) **General information regarding reproducibility** 6

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 9073-17 was prepared by Technical Committee ISO/TC 38, *Textiles*.

ISO 9073 consists of the following parts, under the general title *Textiles — Test methods for nonwovens*:

— *Part 1: Determination of mass per unit area*

— *Part 2: Determination of thickness*

— *Part 3: Determination of tensile strength and elongation*

— *Part 4: Determination of tear resistance*

— *Part 5: Resistance to mechanical penetration (ball burst procedure)*[1)]

— *Part 6: Absorption*

— *Part 7: Determination of bending length*

— *Part 8: Determination of liquid strike-through time (simulated urine)*

— *Part 9: Determination of drapability including drape coefficient*

— *Part 10: Lint and other particles generation in the dry state*

— *Part 11: Run-off*

— *Part 12: Demand absorbency*

— *Part 13: Repeated liquid strike-through time*

— *Part 14: Coverstock wetback*

1) Under preparation.

— *Part 15: Determination of air permeability*

— *Part 16: Determination of resistance to penetration by water (hydrostatic pressure)*

— *Part 17: Determination of water penetration (spray impact)*

— *Part 18: Determination of breaking strength and elongation of nonwoven materials using the grab tensile test*

Textiles — Test methods for nonwovens —

Part 17:
Determination of water penetration (spray impact)

1 Scope

This part of ISO 9073 specifies a method for measuring the resistance of fabrics to the penetration of water by impact.

The water penetration (spray impact) test is applicable to fabrics that are expected to exhibit a degree of water resistance or water repellency.

The results obtained with this method depend on the water repellency of the fibres or the treatment applied to the finished material, as well as on the construction of the material.

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*

ISO 3951-5, *Sampling procedures for inspection by variables — Part 5: Sequential sampling plans indexed by acceptance quality limit (AQL) for inspection by variables (known standard deviation)*

ISO 9073-6, *Textiles — Test method for nonwovens — Part 6: Absorption*

3 Terms and definitions

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

3.1
water resistance of nonwoven materials
fabric characteristics which are resistant to wetting and penetration by water

4 Principle

This method measures the resistance of fabrics to the penetration of water by impact and can thus be used to predict the probable rain-penetration resistance of the fabric. The sample is used as a protective barrier covering a sheet of pre-weighed absorbent blotting paper. A specific volume of distilled or deionized water is then sprayed onto the sample and the blotter weighed again. The difference in the two weights is a measure of the amount of water passing through the barrier. The greater the difference, the more water that has passed through, i.e. the less water repellent the fabric. Thus, higher numbers indicate lower water resistance.

See Annex A for general information on reproducibility.

5 Materials and reagents

5.1 Blotting paper[2)] for spray impact penetration, 150 mm × 225 mm, meeting the following parameters:

a) no visible distortion in the paper when wetting while testing;

b) have an absorbent rate of 5 s or less (see ISO 9073-6);

c) have a minimum absorbent capacity of 480 % (see ISO 9073-6);

d) exhibit uniform sheet formation;

e) be traceable back to a production lot;

f) have a sheet density of (0,24 ± 0,05) g/cm^3;

g) have a basis weight of (124 ± 6) g/m^2;

h) have a sheet thickness of 0,500 mm to 0,560 mm at 10 kPa foot pressure.

5.2 Water, distilled, at a temperature of (27 ± 1) °C.

5.3 Balance, a laboratory balance capable of weighing the specimen to an accuracy of 0,01 g.

5.4 Stopwatch.

5.5 Baffle, 100 mm × 100 mm cut from 6 mm thick polymethyl methacrylate plastic or an equivalent inert material, to be positioned in the funnel to eliminate liquid swirling.

5.6 Drip catcher, e.g. standard blotting paper or any type of absorbent material to catch the last large drops and keep them from hitting the test specimen.

6 Apparatus

6.1 Impact penetration apparatus (impact penetration tester), as shown in Figure 1 (spray head) and Figure 2 (complete unit minus the weighed clamp).

6.2 Clamp that will clamp across the width of the specimen and which has been modified to provide a total weight of 454 g.

7 Procedure

7.1 Specimens should be sampled in accordance with ISO 3951-5.

7.2 Bring the specimens and the blotting papers from the prevailing atmosphere to moisture equilibrium for testing in the standard atmosphere as specified in ISO 139. These blotting papers should be exposed to the atmosphere on all sides (hanging on a clothes line is satisfactory). Care in handling should be observed so that specimens do not contact any contaminants, such as soap, salt, oil, etc., which might facilitate or hinder water penetration.

2) Such paper is available, for example, from Hollingsworth and Vose, Cheltenham, United Kingdom, under the reference ERTFF3. This information is given for the convenience of users of this part of ISO 9073 and does not constitute an endorsement by ISO of the product. Equivalent products may be used if they can be shown to lead to the same results.

7.3 Specimens should be cut 175 mm × 325 mm, with the long dimension in the machine direction.

NOTE The accuracy of this procedure is highly depended on the care taken when calibrating the apparatus.

7.4 Weigh a 150 mm × 225 mm piece of blotting paper to the nearest 0,01 g and designate this as the initial mass (m_1).

7.5 Clamp one end of the test specimen under the 150 mm spring clamp at the top of the inclined stand.

7.6 Affix a second 150 mm clamp, modified to provide a total mass of 454 g, to the other end of the fabric specimen.

7.7 Position the pre-weighed blotting paper beneath the clamped fabric as shown in Figure 2.

7.8 Pour 500 ml of distilled water, at a temperature of (27 ± 1) °C, into the funnel of the tester and allow it to spray onto the test specimen.

7.9 Upon completion of the spraying period, and at the proper time (2 s after the continuous flow stops), insert the “drip catcher” blotting paper to stop the remaining water from hitting the test area.

7.10 Lift the test specimen carefully and remove the blotting paper beneath it.

7.11 In order not to allow any evaporation loss, immediately weigh the blotting paper to the nearest 0,01 g (m_2).

8 Calculation

The increase in mass from m_1 to m_2 of the blotters is calculated in grams, and the individual, average and standard deviation results for each test sample are reported.

9 Test report

The test report shall include the following:

a) a reference to this part of ISO 9073, i.e. ISO 9073-17;

b) type or designation of material tested;

c) number of test pieces tested;

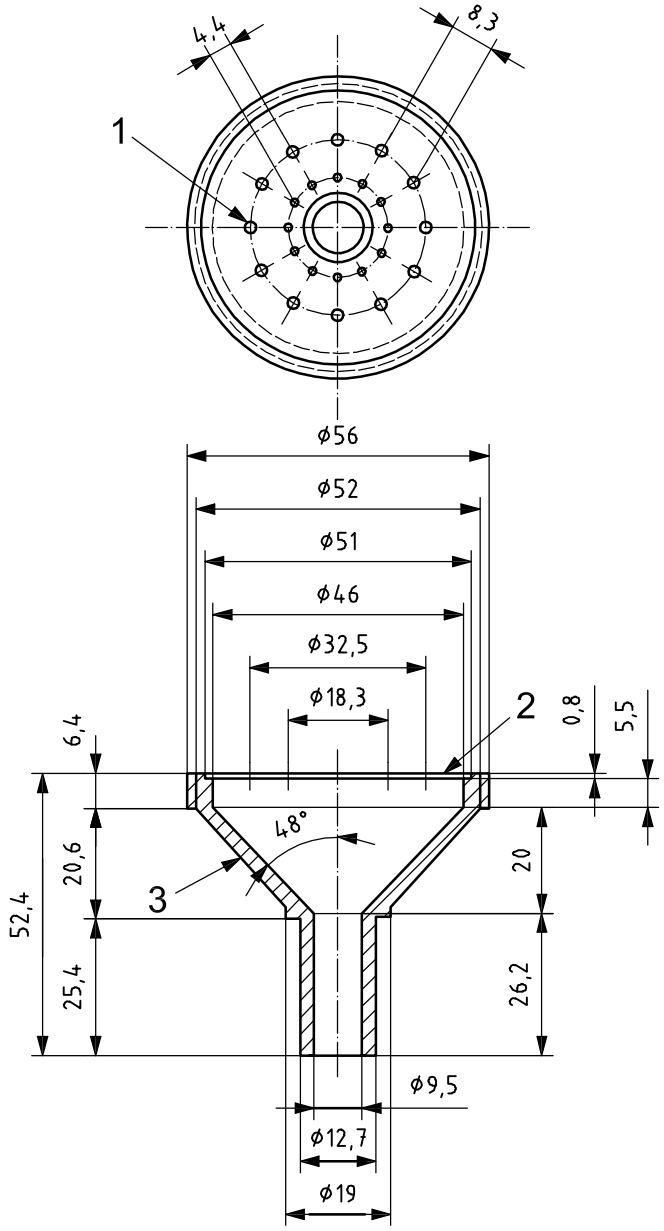
d) testing conditions;

e) individual spray impact, expressed in grams, to an accuracy of 0,01 g;

f) the average and standard deviation of the spray impact, expressed in grams;

g) any deviation from the standard procedure.

Dimensions in millimetres

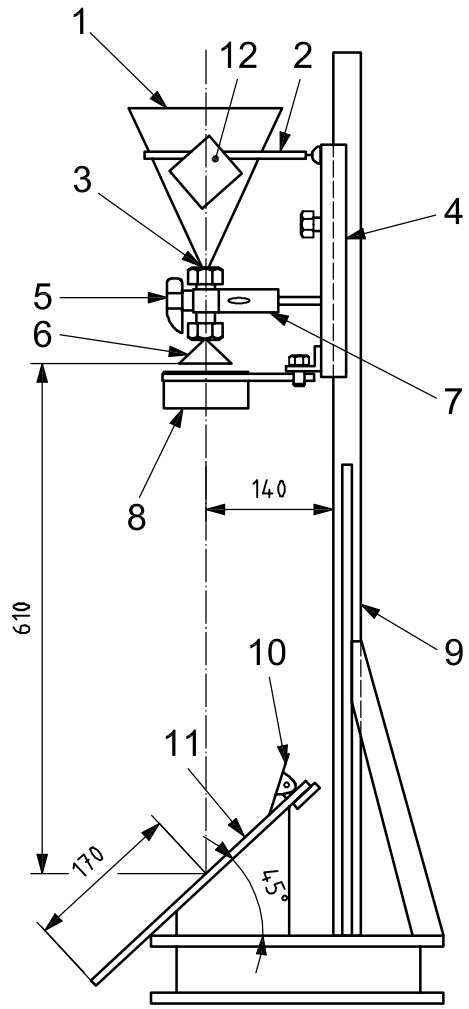


Key

1 25 holes, 61 drill
2 brass
3 bronze

Figure 1 — Spray head or nozzle for impact penetration tester

Dimensions in millimetres



Key

1	funnel	7	clamp
2	extension ring	8	drip catcher
3	ferrule	9	test stand
4	slide assembly	10	spring clip
5	valve	11	specimen and blotting paper on clipboard
6	spray head	12	baffle

Figure 2 — Impact penetration tester

Annex A
(informative)

General information regarding reproducibility

This interlaboratory study was based on using six laboratories, 30 specimens of one material and two types of blotting paper. The two blotting papers were type A, blotting paper that met all the test-procedure parameters, and type B blotting paper that was supplied as “routine” but did not meet any of the test-procedure requirements. It was more dense, more variable, had a slow absorbent rate and distorted greatly when wet. Table A.1 illustrates what the six laboratories found and how the two blotting papers compared. All the observations are taken by well-trained operators using specimens randomly tested from one lot of standard material specification (SMS) material. This procedure requires the use of a blotting paper with very tight control standards, as stated in 5.1.

Table A.1 — Comparison between two blotting papers

	Blotting-paper sample A	**Blotting-paper sample B**
No. of participating laboratories	6	6
No. of non-eliminated laboratories	6	6
No. of single values at each of the non-eliminated laboratories	30	30
Grand average	0,522	4,319
Standard deviation of repeatability, s_r	0,607	2,592
Standard deviation of reproducibility, s_R	0,607	2,726

One population of SMS material was used for all testing.

A blotting paper that has a low absorbent rate and a high density will distort and give unreliable results.

ICS 59.080.30

Price based on 6 pages