International Standard 811

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Textile fabrics — Determination of resistance to water penetration — Hydrostatic pressure test

Étoffes — Détermination de la résistance à la pénétration de l'eau — Essai sous pression hydrostatique

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 811 was developped by Technical Committee ISO/TC 38, *Textiles*, and was circulated to the member bodies in October 1979.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Portugal
Belgium	India	Romania
Brazil	Indonesia	South Africa, Rep. of
Canada	Italy	Spain
China	Japan	Sweden
Cyprus	Korea, Rep. of	Switzerland
Czechoslovakia	Libyan Arab Jamahiriya	Thailand
Denmark	Mexico	Turkey
Egypt, Arab Rep. of	Netherlands	United Kingdom
Finland	New Zealand	USA
Germany, F.R.	Norway	USSR
Ghana	Poland	

The member body of the following country expressed disapproval of the document on technical grounds :

France

This International Standard cancels and replaces ISO Recommendation R 811-1968, of which it constitutes a technical revision.

Printed in Switzerland

Textile fabrics — Determination of resistance to water penetration — Hydrostatic pressure test

1 Scope and field of application

This International Standard specifies a hydrostatic pressure method for determining the resistance of fabrics to penetration by water. The method is primarily intended for dense fabrics, e.g. ducks, tarpaulins and tentings.

2 Reference

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

3 Principle

The hydrostatic head supported by a fabric is a measure of the opposition to the passage of water through the fabric. A specimen is subjected to a steadily increasing pressure of water on one face, under standard conditions, until penetration occurs in three places. The pressure at which the water penetrates the fabric at the third place is noted. The water pressure may be applied from below or from above the test specimen. The chosen alternative should be stated in the test report.

The result is immediately relevant to the behaviour of fabric articles which are subjected to water pressure for short or moderate periods of time.

4 Apparatus

4.1 The apparatus used for the test should be designed to comply with the following conditions.

4.1.1 It should be possible to clamp the specimen of fabric in such a way that

a) it is horizontal and is not bulging;

b) an area of the fabric of 100 cm^2 * is subjected to steadily increasing water pressure from below or from above the fabric;

c) no leakage of water takes place at the clamps during the test period (see annex, clause A.1);

d) the specimen does not slip in the clamps;

e) any tendency for penetration to occur at the clamped edge of the specimen is minimised (see annex, clause A.1).

4.1.2 The water in contact with the test specimen should be distilled or fully deionized water maintained at either 20 ± 2 °C or 27 ± 2 °C. The chosen alternative shall be stated in the test report. (The use of water at the higher temperature will yield lower values of hydrostatic head; the magnitude of this effect may vary from fabric to fabric.)

4.1.3 The rate of increase of water pressure shall be 10 ± 0,5 cm or 60 ± 3 cmH_2O/min**. Results obtained by the two different rates may not be the same. The chosen alternative shall be stated in the test report.

4.1.4 A manometer connected to the testing head(s) should allow pressures to be read to an accuracy of 0,5 cmH_2O (see annex, clause A.2).

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* Equipment which necessitates the use of smaller specimens, such as a circular area of 20 cm^2, or of square specimens is still in use in some countries. Although these are not strictly in compliance with this International Standard, they may be used for the time being and any variation from a circular specimen of area 100 cm^2 should be stated in the test report. This is an interim measure and it is intended that this provision be deleted when the standard is reviewed 5 years after publication.

** This relates to pressure in millibars.

1 $cmH_2O \approx$ 1 mbar

and 1 cmH_2O = 98,066 5 Pa (exactly) (1 mbar = 100 Pa).

However, the actual measurement made is in conventional centimetres head of water per minute.

5 Conditioning

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

6 Test specimens

After receipt, handle the fabric as little as possible, avoid folding it sharply and do not treat it in any way (e.g. by ironing it) other than by conditioning. Take at least five test specimens from different places in the fabric so that they represent the material as fully as possible. The fabric may be tested without cutting specimens.

Areas with deep creases or fold marks shall not be tested.

7 Test procedure

Provide freshly distilled water for each specimen tested (see annex, clause A.3).

Wipe all water from the clamping surfaces. Clamp the conditioned specimen in the test head so that the face of the fabric will be in contact with the water. The clamping shall be carried out in such a way that water will not be forced through the specimen prior to the start of the test. Subject the specimen immediately to increasing water pressure. Watch continuously for evidence of penetration by water.

Record the pressure, as conventional centimetres of water, at which water first appears at the third place in the specimen. The accuracy for recording the pressure shall be the following :

- until 1 mH_2O : 0,5 cm
- more than 1 mH_2O and until 2 mH_2O : 1 cm
- more than 2 mH_2O : 2 cm

Do not take into account very fine droplets which do not grow after being formed. Do not count subsequent drops which penetrate through the same place in the fabric. Note whether the penetration of water at the third place occurs at the edge of the clamp and reject as unsatisfactory any test in which such penetration occurs at a pressure less than the lowest pressure recorded for the other specimens from the same sample. Test further specimens until the requisite number of satisfactory results is obtained.

8 Calculation and expression of results

Calculate the mean of the pressures recorded for the specimens tested according to clause 7. Report the individual results and the mean result in conventional centimetres of water.

9 Test report

The test report shall include the following information :

a) reference to this International Standard;

b) the atmosphere used (standard temperate or standard tropical or other atmosphere);

c) the temperature of the water (20 or 27 °C or other temperature);

d) whether the water pressure was applied from below or from above the test specimen;

e) the rate of increase of water pressure, (10 or 60 cmH_2O/min);

f) which side of the fabric was tested;

g) any variation in size or shape of the test specimen;

h) the individual results and their mean.

Annex

Advice on conducting the test

(Forms part of the standard)

A.1 Clamping the specimen(s)

With some forms of apparatus, it has been found that correct conditions of clamping can be attained if the clamps are faced with a suitable grade of rubber.

A.2 Manometer

a) It is necessary to provide a manometer of suitable range. A manometer which provides for pressures up to 1 mH_2O is suitable for fabrics similar in construction to gaberdines; for fabrics of closer construction it is advisable to use a manometer which provides for pressures up to 2 mH_2O.

b) If more than one testing head is used in conjunction with the manometer, means shall be provided for separately disconnecting them. This is to prevent a high rate of leakage through test specimens already penetrated at three places. With most forms of apparatus, such a leakage can markedly reduce the rate of increase of pressure on the remaining specimens still under test.

A.3 Provision of clean water surface

If the instrument used is of the type in which the water to be used for testing is contained in the testing head(s) and rises to come into contact with the specimen, the surface of the water in the testing head(s) may be cleaned in one of the following ways, stated in order of preference :

a) Empty the testing head(s) and refill with sufficient freshly distilled water.

b) Allow the distilled water to overflow from the testing head(s) so that the surface of the water is cleared. Sweep the surface of the water with a glass slide freshly coated with paraffin wax.

c) Allow the distilled water to overflow from the testing head(s) so that the surface of the water is cleared.

A.4 Presence of vapours of volatile organic liquids

The presence of vapours of volatile organic liquids, such as diethyl ether, in the laboratory when this test is being carried out can affect the results.