

STANDARDS ASSOCIATION OF AUSTRALIA

 Australian Standard
 METHODS OF TEST FOR TEXTILES

PART 2—PHYSICAL TESTS

 AS 2001.2.17
 DETERMINATION OF RESISTANCE OF FABRICS TO
 WATER PENETRATION—HYDROSTATIC
 PRESSURE TEST

PREFACE

This edition of this standard was prepared by the Association's Committee on Testing of Textiles to supersede AS 1066—1973, Method 2.

It is one of a series of methods which takes cognizance of the work of a technical committee of the International Organization for Standardization (ISO/TC 38, Textiles) and is being adapted to suit Australian conditions.

This standard varies from AS 1066—1973 and from corresponding Department of Defence methods in the following ways:

1. The method includes an application to coated fabrics.
2. The title of the method has been changed to 'Hydrostatic Pressure Test' and test results are reported in the pressure unit, kPa.
3. The variations between Defence and Australian standards with respect to specimen size, rate of increase of pressure and inclusion of tests on 'standard creased' specimens have been rationalized.

 METHOD

1 SCOPE. This standard sets out a method for determining the resistance of textile fabrics to penetration by water at a constant rate of increase of pressure.

2 APPLICATION. The method is applicable to all fabrics which are water-repellent or coated to impart resistance to water penetration.

3 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

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| AS 1349 | Bourdon Tube Pressure and Vacuum Gauges |
| AS 2001 | Methods of Test for Textiles |
| | 2001.1 Conditioning Procedures |

4 DEFINITIONS. For the purpose of this standard, the following definitions apply:

4.1 Coated fabric—a textile fabric on which there has been formed, in situ, on one or both surfaces, a layer, or layers, of firmly adherent coating material.

4.2 Water-repellent—a state characterized by the non-spreading of a globule of water on a textile material.

NOTE: This term is not normally applied to a water-repellent finish impervious to air; the latter is generally referred to as 'water-proof'.

4.3 Standard creased specimen—a specimen which is folded and creased as described in this method.

5 PRINCIPLE. The hydrostatic pressure supported by a fabric is a measure of the resistance to the passage of water through the fabric. A specimen is subjected to a uniformly increasing pressure of water on one face, under standard conditions, until penetration occurs in three different places. The hydrostatic pressure at which water penetrates the fabric at the third place is noted.

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

6 REAGENT.

6.1 Distilled or deionized water.

7 APPARATUS.

7.1 Conditioning facility. Means of providing and maintaining a standard atmosphere as described in AS 2001.1.

7.2 Testing head assembly. A testing head made from a non-corrosive material, onto which the specimen is clamped, and designed to meet the following conditions:

- The mounted specimen is horizontal.
- An area of fabric, 75 ± 2 mm diameter, is subjected to steadily increasing water pressure.
- A means is provided by which the water pressure can be uniformly increased in the testing head at the prescribed rate.
- No leakage of water occurs at the clamps during the test.
- The specimen does not slip in the clamps.
- Any tendency for penetration to occur at the clamped edge of the specimen is minimized.
- Provision is made for draining water from the apparatus.
- Provision is made for a manometer, graduated in divisions of 0.1 kPa, to measure a minimum pressure of 10 kPa. The zero mark of the manometer shall be on the same horizontal plane as the location at which the specimen is clamped.

NOTE: The manometer is normally required for assessment of water-repellent fabrics.

- Provision is made for one or more pressure gauges. Selection and use of pressure gauges shall be in conformance with AS 1349.

NOTE: Pressure gauges are mainly required for assessment of coated fabrics.

7.3 Mass. Apparatus for applying a mass of 5 ± 0.5 kg uniformly to the test area of a test specimen.

NOTE: A suitable piece of apparatus consists of a rigid, semi-circular template of radius 37.5 ± 1 mm marked at the centre of the diameter, made of non-corrosive material such as stainless steel, together with an augmenting mass to give a total mass of 5.0 ± 0.5 kg.

8 SAMPLE AND TEST SPECIMENS. Care shall be taken to ensure that the operator's hands are dry. Excessive handling of the sample and test specimens shall be avoided.

8.1 Sample. The sample shall be selected in one of the following ways:

- According to directions given in the relevant material specification.
- According to the procedure agreed upon by the interested parties, if such directions are not included in the material specification.
- According to the procedures approved by SAA for textile products*, if directions on sampling are not included in the material specification.

8.2 Conditioning. Condition the fabric sample in accordance with AS 2001.1. Prepare test specimens from the fabric sample and preferably conduct subsequent testing without removal from the standard atmosphere.

8.3 Test specimens.

8.3.1 Uncreased specimens. Prepare a sufficient number of specimens to produce three valid results. The specimens shall be of sufficient size and of any convenient shape so as to be capable of being clamped on the testing head, and shall provide a test area of 75 ± 2 mm diameter. The specimens shall be selected so as to be representative of the sample under test and shall not be taken from creased or folded areas of the sample.

When in doubt as to which surface is to be tested, prepare a set of specimens for each surface.

8.3.2 Standard creased specimens. If tests are required on standard creased specimens, prepare a sufficient number of specimens to produce three valid results as described in Clause 8.3.1.

Fold each specimen firstly in one direction and again in a direction perpendicular to the first fold. Using the apparatus described in Clause 7.3 apply a mass of 5.0 ± 0.5 kg for 2 min onto the area of the specimen of radius 37.5 ± 1 mm measured from the intersection of the two folds. Remove the mass, open out the specimen and test the standard creased area of the specimen.

9 PROCEDURE. The procedure for each test specimen shall be as follows:

- Condition and preferably test all specimens in the standard atmosphere (7.1). If the test is not conducted in the standard atmosphere, it shall commence within 2 min of the specimen being removed from the standard atmosphere.
- Fill the testing head with distilled or deionized water previously adjusted to $20 \pm 2^\circ\text{C}$. Use a fresh supply of water for each specimen.
- Wipe any spillage of water from the clamping surfaces.
- Clamp the specimen on the testing head so that the face side of a water-repellent specimen, if known, is in contact with the water. A coated specimen is clamped on the testing head with the coated side or the uncoated side in contact with the water according to specification requirements, or by agreement between interested parties.
- Raise the pressure of the water in the testing head at a rate of 1 ± 0.05 kPa per min or at a rate to produce a result within 10 ± 2 min.
- Watch the specimen continuously for evidence of water penetration.
- When water penetration occurs at the third place in the specimen, record the hydrostatic pressure to the nearest 0.05 kPa if a manometer is used or to the nearest one-fifth of a division if a pressure gauge is used.

NOTES:

- Do not take into account very fine droplets which do not enlarge after being formed.
- Do not count subsequent drops which penetrate through the same place in the fabric.
- Note whether the penetration of water at any place occurs at the edge of the clamping ring and reject as invalid any test in which such penetration occurs at a head of water less than the lowest head recorded for the other specimens and from the same sample.
- The presence of vapours, e.g. diethyl ether, in the laboratory at times when this test is being carried out can affect the determinations.

* In course of preparation.