INTERNATIONAL STANDARD

ISO 4074-9

Second edition
1996-08-15

Rubber condoms —

Part 9:
Determination of tensile properties

Préservatifs masculins en caoutchouc —
Partie 9: Détermination des propriétés de résistance à la traction

Reference number
ISO 4074-9:1996(E)

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.

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.

International Standard ISO 4074-9 was prepared by Technical Committee ISO/TC 157, *Mechanical contraceptives*.

This second edition cancels and replaces the first edition (ISO 4074-9:1980), of which it constitutes a technical revision.

ISO 4074 consists of the following parts, under the general title *Rubber condoms*:

— *Part 1: Requirements*

— *Part 2: Determination of length*

— *Part 3: Determination of width*

— *Part 5: Testing for holes — Water leak test*

— *Part 6: Determination of bursting volume and pressure*

— *Part 7: Oven conditioning*

— *Part 9: Determination of tensile properties*

— *Part 10: Packaging and labelling — Condoms in consumer packages*

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland
Printed in Switzerland

Rubber condoms —

Part 9:
Determination of tensile properties

1 Scope

This part of ISO 4074 specifies the method of determining the tensile properties of rubber condoms.

2 Principle

Cutting of a test piece from a condom, stretching it until it breaks, and measuring the force at break and the elongation.

3 Apparatus

3.1 Cutting die, consisting of two parallel knives 20 mm ± 0,1 mm apart, set in a press above a suitable replaceable cutting board of suitable material. The length of the cutting edge of each knife shall be not less than 70 mm.

3.2 Tensile testing machine, capable of an essentially constant rate of traverse and meeting the following requirements:

a) stresses within a specimen shall be equalized either by rotating one roller mechanically or by lubricating the cylindrical surfaces of the rollers with a material that does not affect the rubber. If one roller is mechanically rotated, its rotational frequency shall be approximately 7 min^{-1};

b) a force range of 0 N to 200 N;

c) a roller separation speed of 8,5 mm/s ± 0,8 mm/s (500 mm/min ± 50 mm/min);

d) manual or preferably automatic recording of the separation distance of the rollers and of the force during the test.

4 Preparation of sample specimens

4.1 Move the condom inside the package such that it is away from the area where the package is to be torn. Tear the package and remove the condom.

4.2 Dust the test piece with a suitable powder. Lay the condom flat with its length at right angles to the cutting edge of the die.

Obtain the test piece by cutting across the condom with one stroke of the press at 80 mm ± 5 mm from the open end.

If the portion 80 mm from the open end is not parallel-sided or textured, take the test piece from an adjacent parallel-sided, nontextured region. If no region of the condom is parallel-sided and nontextured, take the test piece from the region 80 mm from the open end.

Only a test piece which has been completely separated at the first attempt shall be used. Carefully wipe the test piece with a sufficient quantity of propan-2-ol, or water for water-soluble lubricants, to remove any dressing material and allow it to dry for not less than 16 h at 23 °C ± 2 °C and 45 % to 55 % RH.

5 Procedure

5.1 Conduct the test at 23 °C ± 2 °C and 45 % to 55 % RH.

5.2 Lay the cylindrical test piece flat, and measure, to the nearest millimetre, the distance between the two edge folds.

5.3 Mount the test piece over the rollers and stretch it until it breaks.

5.4 At break, measure the force, at least to the nearest 0,1 N, and the separation distance (between centres of the rollers) to the nearest millimetre.

6 Expression of results

6.1 The force at break shall be expressed in newtons.

6.2 Calculate the elongation at break, E, expressed as a percentage, of each test piece using the following equation:

$$E = \frac{l_1 + 2d - l_2}{l_2} \times 100$$

where

l_1 is the length of the test piece, rounded to the nearest millimetre, in contact with the rollers (equal to 47 mm with rollers of 15 mm diameter);

d is the final distance, in millimetres, between the centres of the rollers;

l_2 is the original perimeter, in millimetres, of the test piece, equal to twice the distance obtained in 5.2.

The result should be rounded to the nearest 10 %.

7 Test record

The test record shall include the following particulars:

a) the identification of the sample;

b) the number of samples tested;

c) the force and elongation at break of each test piece (see clause 6);

d) the date of test.

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