SRI LANKA STANDARD 1234 Part 2 : 2002
ISO 13938 - 2 : 1999

SRI LANKA STANDARD

BURSTING PROPERTIES OF FABRICS PART 2: PNEUMATIC METHOD FOR DETERMINATION OF BURSTING STRENGTH AND BURSTING DISTENSION

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SLS 1234 Part 2 : 2002
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Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

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SRI LANKA STANDARD
BURSTING PROPERTIES OF FABRICS
PART 2: PNEUMATIC METHOD FOR DETERMINATION OF BURSTING STRENGTH AND BURSTING DISTENSION

NATIONAL FOREWORD

This standard was approved by the Sectoral Committee on Textiles, Clothing and Leather and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2002-06-03.

This Sri Lanka standard is identical with ISO 13938-2:1999. hydraulic method for determination of bursting strength and bursting distension published in 1999 by the International Organization for Standardization (ISO).

TERMINOLOGY AND CONVENTIONS

The text of the international standard has been accepted as suitable for publication, without deviation, as a Sri Lanka Standard. However certain terminology and conversions are not identical with those used in Sri Lanka Standards, attention is therefore drawn to the following:

a) Wherever the words “International Standard/Publication” appear referring to this standard they should be interpreted as “Sri Lanka Standard”.

b) The comma has been used throughout as a decimal marker. In Sri Lanka Standards it is the current practice to use a full point at the base as the decimal marker When ever page numbers are quoted, they are ISO page numbers.

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INTERNATIONAL STANDARD

ISO 13938-2

First edition
1999-08-01

Textiles — Bursting properties of fabrics —

Part 2:
Pneumatic method for determination of bursting strength and bursting distension

Textiles — Propriétés de résistance à l'éclatement des étoffes —

Partie 2: Méthode pneumatique pour la détermination de la résistance et de la déformation à l'éclatement

Reference number
ISO 13938-2:1999(E)

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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 3.

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 member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 13938 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13938-2 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 38, *Textiles*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this standard, read "...this European Standard..." to mean "...this International Standard...".

ISO 13938 consists of the following parts, under the general title *Textiles — Bursting properties of fabrics*:

— *Part 1: Hydraulic method for determination of bursting strength and bursting distension*

— *Part 2: Pneumatic method for determination of bursting strength and bursting distension*

Annex A of this part of ISO 13938 is for information only.

Annex ZA provides a list of corresponding International and European Standards for which equivalents are not given in the text.

For the purposes of this part of ISO 13938, the CEN annex regarding fulfilment of European Council Directives has been removed.

Foreword

The text of EN ISO 13938-2:1999 has been prepared by Technical Committee CEN/TC 248 "Textiles and textile products", the secretariat of which is held by BSI, in collaboration with Technical Committee ISO/TC 38 "Textiles".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.

EN ISO 13938 is in two parts as follows:

EN ISO 13938-1 Textiles - Bursting properties of fabrics - Part 1: Hydraulic method for determination of bursting strength and bursting distension (ISO 13938-1:1998)

EN ISO 13938-2 Textiles - Bursting properties of fabrics - Part 2: Pneumatic method for determination of bursting strength and bursting distension (ISO 13938-2:1998)

NOTE: Normative references to International Standards are listed in annex ZA (normative).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard describes a pneumatic pressure method for the determination of bursting strength and bursting distension of textile fabrics.

NOTE : EN ISO 13938-1 describes a method using hydraulic pressure.

The method is applicable to knitted, woven, nonwoven and laminated fabrics. It may be suitable for fabrics produced by other techniques. The test is suitable for test specimens in either the conditioned or wet state.

From the available data there appears to be no significant difference in the bursting strength results achieved using hydraulic or pneumatic burst testers, for pressures up to 800 kPa. This pressure range covers the majority of performance levels expected of general apparel. For speciality textiles requiring high bursting pressures, the hydraulic apparatus is more suitable.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of this International Standard dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of curently valid International Standards.

ISO 139:1973	Textiles - Standard atmospheres for conditioning and testing
EN ISO 3696	Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)
EN 30012-1:1993	Quality assurance requirements for measuring equipment - Part 1:Metrological confirmation system for measuring equipment (ISO 10012-1:1992)

3 Definitions

For the purposes of this standard the following definitions apply:

3.1 test area: Area of the test specimen within the circular clamping device.

3.2 bursting pressure (pressure at burst): Maximum pressure applied to a test specimen clamped over an underlying diaphragm until the test specimen ruptures.

3.3 bursting strength (strength at burst): Pressure obtained by subtracting the diaphragm pressure from the mean bursting pressure.

3.4 diaphragm pressure: Pressure applied to the diaphragm, with no test specimen present, to distend it to the mean bursting distension of the test specimen.

3.5 bursting distension (distension at burst): Expansion of a test specimen at the bursting pressure.

It is expressed as height at burst.

3.6 height at burst: Distance between the upper surface of the test specimen before distension and the top of the test specimen at the bursting pressure.

3.7 time to burst: Time taken to distend a test specimen to burst.

4 Principle

A test specimen is clamped over an expansive diaphragm by means of a circular clamping ring. Increasing compressed air pressure is applied to the underside of the diaphragm, causing distension of the diaphragm and the fabric. The pressure is increased smoothly until the test specimen bursts. The bursting strength and bursting distension are determined.

5 Sampling

Either select samples in accordance with the procedure laid down in the material specification for the fabric, or as agreed between the interested parties. In the absence of an appropriate material specification an example of a suitable sampling procedure is given in annex A. Avoid areas that are folded or creased, selvedges and areas not representative of the fabric. The system of clamping used generally permits tests to be applied without cutting out test specimens.

6 Apparatus

6.1 Bursting tester

Metrological confirmation of the bursting tester shall be carried out in accordance with EN 30012-1:1993.

The bursting tester shall comply with the following requirements:

6.1.1 The apparatus shall be capable of producing an increase in air pressure to achieve a testing time to burst of (20 ±5) s. To achieve responsive adjustment of the air velocity, an indicating control valve is needed in addition to the main air valve of the apparatus.

6.1.2 Bursting pressure shall be indicated with an accuracy of ± 2 % of full scale range above the first 20 % of range.

6.1.3 Height at burst up to 70 mm shall be indicated with an accuracy of ±1 mm. Zero position of the measuring gauge shall be adjustable to accommodate the thickness of the test specimen.

6.1.4 A test area of 50 cm^2 (79,8 mm diameter) shall be used.

Other test areas of 100 cm^2 (112,8 mm diameter) or 10 cm^2 (35,7 mm diameter) or 7,3 cm^2 (30.5 mm diameter) may be used, if the preferred test area is not applicable in the existing testing equipment or due to high or low expansion of the fabric or other fabric requirements, or by mutual agreement.

6.1.5 The clamping device shall provide for clamping of the test specimen securely without distortion or damage and prevent slippage during the test. The clamping ring shall allow undisturbed vaulting of highly expansive fabrics (e.g. fabric test specimens whose height at burst is greater than half of the test specimen diameter). All test specimen clamping ring inner diameters shall be accurate to ±0,2 mm. To avoid test specimen damage a small curvature at the inner edge of the clamping ring facing the test specimen is recommended.

6.1.6 A safety cover shall enclose the clamping device during the test when the expansion of the test specimen takes place. It shall allow clear observation of the expansion of the test specimen during the test.

6.1.7 The diaphragm shall meet the following requirements:

- thickness up to 2 mm;
- highly expansive;
- if the diaphragm is to be used several times, it shall be elastic within the range of height at burst observed during the test.

7 Atmospheres for conditioning and testing

The atmospheres for preconditioning, conditioning and testing shall be as specified in ISO 139:1973

Preconditioning and conditioning are not required for wet tests.

8 Procedure

8.1 Prior to testing the sample shall be conditioned in the relaxed state in accordance with clause 7. During testing maintain the test specimens in the atmosphere for conditioning and testing in accordance with clause 7.

8.2 Set a test area of 50 cm^2 (see 6.1.4).

NOTE 1 : For most fabrics, particularly knitted fabrics, the test area of 50 cm^2 is applicable. For fabrics with low extensibility (known from previous experience or preliminary testing), e.g. for fabrics for technical application, a test area of 100 cm^2 is recommended. In cases where these conditions cannot be met or are not appropriate, alternative test areas in accordance with 6.1.4 may be used if mutually agreed.

NOTE 2 : Comparison of results requires the test to be performed with the same test areas.

8.3 Adjust the control valve of the bursting tester so that the mean time to distend a test specimen to burst falls within (20 ± 5) s. Preliminary trials may be needed to fix the correct setting of the control valve. Time to burst is to be recorded between the beginning of vaulting and the bursting of the test specimen.

8.4 Place the test specimen over the diaphragm so that it lies in a flat tensionless condition, avoiding distortion in its own plane. Clamp it securely in the circular holder, avoiding jaw damage, to prevent slippage during the test. Place the distension recording device into the measuring position and adjust it to the zero position. Fasten the safety cover in position according to machine requirements. Apply pressure to the test specimen until the fabric bursts.

Immediately after burst, close the main air valve. Note bursting pressure and height at burst. If the test specimen bursts close to the edge of the clamping device, record this fact. Reject jaw breaks occurring within 2 mm of the clamping line. Repeat the test at least four more times at different places on the fabric. The number of test specimens may be increased if agreed mutually.

8.5 Diaphragm correction

With the same test area and the same setting of the control valve as that employed in the above tests, distend the diaphragm without the presence of a test specimen by an amount equal to the mean height at burst of the test specimen. Note the pressure at this distension of the diaphragm as the "diaphragm pressure".

8.6 Wet test

For tests in the wet condition, immerse the test specimen for a period of 1 h in grade 3 water in accordance with EN ISO 3696 at a temperature of (20 ± 2)°C. For tropical regions temperature according ISO 139: 1973 may be used. An aqueous solution containing not more than 1 g/l of a nonionic wetting agent may be used instead of water. Immediately after removal of a test specimen from the liquid and briefly placing it on blotting paper to remove excess water, perform the test according to 8.2 to 8.5.

9 Calculation and expression of results

9.1 Calculate the arithmetic mean of the bursting pressure values in kilopascals. From this subtract the diaphragm pressure in kilopascals as determined according to 8.5 to obtain the bursting strength. Round the result to three significant figures.

9.2 Calculate the arithmetic mean of the height at burst values in millimetres. Round the result to two significant figures.

9.3 If required, calculate the coefficient of variation and the 95 % confidence limits for the bursting pressure and height at burst. Round the coefficient of variation to the nearest 0,1% and the 95 % confidence limits in accordance with the mean values.

10 Test report

The test report shall include the following information

10.1 General

a) The number and year of publication of this standard and date of test;
b) identification of test sample and sampling procedure, if required;
c) make and model of bursting tester used;
d) test area used, in square centimetres;
e) number of test specimens tested, number of bursts close to clamping device and number of tests rejected;
f) observations of bursting behaviour (e.g. rupture of one or both thread directions);
g) state of test (conditioned or wet);
h) any deviation from the given procedure.

10.2 Test results

a) Mean bursting strength, in kilopascals;
b) mean height at burst, in millimetres;
c) the coefficient of variation of the relevant values, in percent, if required;
d) the 95% confidence limits, in units of the relevant mean values, if required.

ANNEX A (informative)
Selection of testing areas

In the absence of a specification for fabric sampling, the example given in figure A.1 may be used.

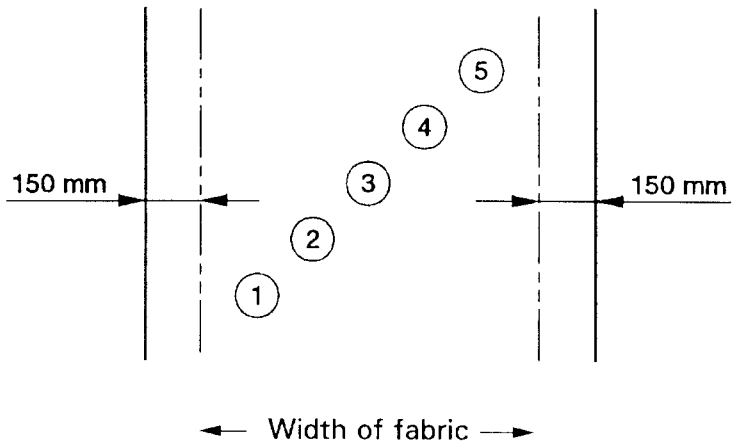

Figure A.1 - Recommended position of testing areas or test specimens.

Annex ZA (normative)
Normative references to International publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendments or revision. For undated references the latest edition of the publication referred to applies.

Publication	Year	Title	EN	Year
ISO 139	1973	Textiles - Standard atmospheres for conditioning and testing	EN 20139	1992

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SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

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The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

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