STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 2001.2.7—1987
Methods of test for textiles
Part 2.7: Physical tests—Determination of breaking force and extension of yarns

RECONFIRMATION NOTICE

Technical Committee TX-020 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 6 July 2016.

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Council of Textile and Fashion Industries of Australia
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National Association of Testing Authorities Australia
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NOTES

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS OF TEST FOR TEXTILES

PART 2—PHYSICAL TESTS

AS 2001.2.7
DETERMINATION OF BREAKING FORCE AND EXTENSION OF YARNS

PREFACE

This edition of this standard was prepared by the Association's Committee on Testing of Textiles. It supersedes AS L54—1970.

This standard is based on ISO 2062-1972, Textiles—Yarn from packages—Method for determination of breaking load and elongation at the breaking load of single strands—(CRL, CRE and CRT testers).

The principal changes in this edition are:

(a) Precludes the use of testing machines not based on the constant rate of extension principle.

(b) Provides for a testing machine capable of operating at a rate of jaw separation of 200 ± 10 mm/min, and the use of 500 ± 1 mm gauge length. Alternative gauge lengths may be used as agreed by the interested parties.

(c) Includes sampling from bulk consignment.

(d) Mentions the use of automatic testing machines for product control testing from packages.

(e) Includes additional points relating to the use of automatic testing machines as an option to manual testing.

METHOD

1 SCOPE. This standard sets out a method for determining the breaking force and breaking extension of various types of yarn. It is designed primarily for yarn taken from skeins or packages, but can be used for yarns extracted from a fabric. The method uses a tensile machine based on the constant rate of extension principle.

2 APPLICATION. This method is applicable to monofilament, multifilament and spun yarns, either single, plied or cabled with the exception of yarns which stretch more than 0.5 percent when the tension is increased from 0.5 to 1.0 centinewton per unit of linear density (cN/tex).

The method is not applicable to yarns having a linear density greater than 2000 tex.

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

AS 1010 Method for the Determination of Linear Density of Textile Yarn from Packages.

AS 2001 Methods of Test for Textiles
AS 2001.1 Conditioning Procedures

AS 2193 Methods of Calibration and Grading of Force Measuring Systems of Testing Machines

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

4.1 Breaking force—the maximum force applied to a specimen in a tensile test carried to rupture. It is expressed in N, cN or mN.

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4.2 Extension at break—the increase in length at rupture of a specimen during a tensile test expressed as a percentage of the original length.

4.3 Tenacity—the tensile stress expressed as the ratio of the breaking force to the linear density of the unstrained specimen.

4.4 Gauge length—the length of a specimen under specified pretension measured from nip to nip of the jaws of the holding clamps in their starting position at the beginning of the test, and including any portion of the specimen in contact with bollard or snubbing surfaces.

4.5 Yarn package—a length or lengths of yarn in a form suitable for use, handling, storing or shipping. Packages may be unsupported, such as balls, skeins or cakes or supported such as bobbins, cops, cones, pirns, spools, tubes or beams.

4.6 Yarn—a product of substantial length and relatively small cross-section consisting of fibres or filaments or both, with or without twist.

5 PRINCIPLE. A specimen is gripped in a tensile testing machine of suitable capacity and extended until it breaks. The tenacity may be calculated if required.

6 APPARATUS.

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

6.2 Tensile testing machine. A constant rate of extension (CRE) testing machine complying with the following requirements:

(a) The machine shall comply with the requirements of Grade B machines specified in AS 2193, except that error in measurement of length shall not exceed 1.0 mm.

(b) The machine shall provide means for indicating the maximum force applied in breaking the specimen; the force shall be indicated clearly to an accuracy of 1 percent on a dial, scale or chart. The machine shall provide means for indicating or recording the extension at the breaking point.

(c) The machine capacity or measuring range selected shall be such that the value of the breaking force of the yarns under test shall not be less than 20 percent of the selected range of the machine.

(d) The machine shall be capable of operating at a constant rate of 200 ± 10 mm/min.

(e) The force measuring mechanism of the machine shall allow little or no movement of the fixed jaws in the direction of the applied load.

(f) The fixed and moving jaws of the machine shall be in the same plane, parallel to one another and at right angles to the direction of the force.

(g) The jaws of the clamps shall be smooth, flat, and capable of holding the specimens without slippage and without apparent damage. When specimens cannot be suitably held with unlined flat-faced jaws, lined jaws or, if necessary, bollard clamps, or some other type of snubbing device which is satisfactory to all interested parties may be used. Such use shall be noted in the report and attention shall be drawn to the fact that the specimen length is not determined precisely. Consequently the indicated extension should not be compared with that obtained with unlined flat jaws.

(h) The machine shall be capable of testing specimens with a nominal gauge length of 500 ± 1 mm, or as agreed upon by the interested parties.

(j) Means of applying the pretension force of 0.5 ± 0.1 cN/tex.

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

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

(a) According to the directions given in the relevant material specification.

(b) According to the procedure agreed upon by the interested parties, if such directions are not included in the material specification.

(c) According to the procedures approved by SAA for textile products*, if directions on sampling are not included in the material specification.

(d) *Yarn from packages.*

(i) *Bulk sample.* Take a bulk sample of one or more cases, as representative of the lot to be tested, according to Table 1.

TABLE

RELATIONSHIP BETWEEN BULK SAMPLE AND MINIMUM NUMBER OF CASES TO BE SELECTED

Number of cases in shipment or lot	Minimum number of cases to be selected at random
3 or less	1
4 to 10	2
11 to 30	3
31 to 75	4
76 or more	5

Take care that none of the cases selected for sampling shows signs of damage or dampness incurred during transit.

(ii) *Number of laboratory sample packages.* In the absence of a material specification, select 10 yarn packages from the bulk sample, taking as nearly as possible the same number of packages from each case and choosing packages at random from the top, middle and bottom layers in the cases and from the middle and sides of the layers. Take, as nearly as possible, the same number of specimens from each package of the laboratory sample.

In cases where the bulk sample contains less than 10 yarn packages, all available packages shall form the laboratory sample.

If woven or knitted fabrics need to be sampled the sample shall be large enough to furnish a sufficient number of test specimens. The test specimens shall be taken in such a manner that the twist of the yarns is not changed during sampling. When yarns in a woven fabric are to be tested, warp specimens shall be taken from different ends, and weft yarns shall be

* In course of preparation.