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Textiles — Cotton yarns — Basis for specification

Textiles — Fils de coton — Spécifications

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 23, *Fibres and yarns*.

This second edition cancels and replaces the first edition (ISO 10290:1993), which has been technically revised. The main changes compared to the previous editions are as follows:

— the title has been changed to "*Textiles — Cotton yarns — Basis for specification*";

— in Clause 2, ISO 3951:1989 has been replaced by ISO 3951-4 and ISO 16549, ISO 17202, ASTM D2255, ASTM D5647 have been added;

— in Clause 3, the definitions of "tenacity", "breaking tenacity" and "twist factor" have been revised;

— in Clause 4, three subclauses ("yarn faults", "yarn appearance" and "yarn hairiness") have been added;

— in Clause 5, three items ("quality level of consignment", "end use of yarn" and "packing and storage condition") have been added;

— Table A.1 has been expanded to give examples of specifications of breaking elongation, hairiness and faults.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Textiles — Cotton yarns — Basis for specification

1 Scope

This document specifies criteria, with relevant test methods, to be applied in describing single spun grey cotton yarns. These yarns are widely used in international trade.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2, *Textiles — Designation of the direction of twist in yarns and related products*

ISO 2060, *Textiles — Yarn from packages — Determination of linear density (mass per unit length) by the skein method*

ISO 2061, *Textiles — Determination of twist in yarns — Direct counting method*

ISO 2062, *Textiles — Yarns from packages — Determination of single-end breaking force and elongation at break using constant rate of extension (CRE) tester*

ISO 3951-4, *Sampling procedures for inspection by variables — Part 4: Procedures for assessment of declared quality levels*

ISO 6741-1, *Textiles — Fibres and yarns — Determination of commercial mass of consignments — Part 1: Mass determination and calculations*

ISO 6939, *Textiles — Yarns from packages — Method of test for breaking strength of yarn by the skein method*

ISO 16549, *Textiles — Unevenness of textile strands — Capacitance method*

ISO 17202, *Textiles — Determination of twist in single spun yarns — Untwist/retwist method*

ASTM D2255, *Standard test method for grading spun yarns for appearance*

ASTM D5647, *Standard guide for measuring hairiness of yarns by the photo-electric apparatus*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
linear density
mass per unit length of a yarn

Note 1 to entry: It is expressed in tex or multiples or sub-multiples thereof (see ISO 1144).

[SOURCE: ISO 1139:1973, 3.7]

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3.2
tex
number of grams per kilometre of yarn

Note 1 to entry: The tex system is described in ISO 1144.

3.3
breaking load
maximum load (or force) applied to a specimen in a tensile test carried to rupture

Note 1 to entry: For yarns, it is preferably expressed in centinewton.

[SOURCE: ISO 3060:1974, 3.2, modified — Note 1 to entry has been added]

3.4
elongation at break
increase in length of a specimen produced by the *breaking load* (3.3)

Note 1 to entry: It is usually expressed as a percentage of the original nominal length.

3.5
tenacity
tensile force per unit of *linear density* (3.1) of the unstrained specimen

Note 1 to entry: It is preferably expressed in centinewtons per tex.

[SOURCE: ISO 3060:1974, 3.4]

3.6
breaking tenacity
tenacity (3.5) corresponding to the *breaking load* (3.3)

Note 1 to entry: For specimens of known linear density, the breaking tenacity can be obtained directly from tensile testing machines which can be suitable adjusted to indicate tenacity instead of breaking load.

[SOURCE: ISO 3060:1974, 3.4, modified — Note 1 to entry has been added]

3.7
twist
number of turns about the axis of a length equal to the nominal gauge length before untwisting

Note 1 to entry: Twist is preferably expressed as turns per metre (turns/m), but it may be expressed as turns per centimetre (turns/cm).

[SOURCE: ISO 2061:2015, 3.1]

3.8
twist factor
measure of the spiralling orientation of the fibres in a spun yarn or of the filaments in a filament yarn

Note 1 to entry: The twist factor is related to the angle which fibres on the surface of the yarn make with the axis of the yarn and is a measure of the hardness of the resulting yarn due to *twist* (3.7).

[SOURCE: ISO 2061:2015, 3.7]

3.9
grey cotton yarn
yarn made of cotton fibres as it leaves the spinning frame, without any bleaching, dyeing or finishing treatment

Note 1 to entry: The yarn may be waxed or unwaxed.

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4 Requirements

4.1 General

The performance requirements and tolerances applied to yarn for use in the textile industry shall be agreed between the purchaser and manufacturer. Examples, for information only, are given in Annex A.

Any details not clarified in the method used which may affect the results shall be agreed between both parties for clarity, e.g. imperfection sensitivity level or testing speed for tensile testing.

4.2 Yarn linear density

The linear density of the yarn shall be determined in accordance with ISO 2060.

4.3 Evenness and faults

The evenness of the yarn and yarn faults (thick places, thin places and neps) shall be determined in accordance with ISO 16549.

4.4 Breaking load/tenacity and elongation at break

The breaking load of single strands and elongation at break shall be determined in accordance with ISO 2062.

4.5 Skein breaking strength

The skein breaking strength of the yarn shall be determined in accordance with ISO 6939.

4.6 Yarn twist

The number of turns per unit length shall be determined in accordance with ISO 2061 or ISO 17202. The direction for twist shall be indicated by the capital letter "S" or "Z" as specified in ISO 2.

4.7 Moisture regain

Moisture regain shall be determined in accordance with ISO 6741-1.

4.8 Yarn appearance

Yarn appearance shall be evaluated in accordance with ASTM D2255.

4.9 Yarn hairiness

Yarn hairiness shall be determined in accordance with ASTM D5647.

5 Marking

The details of marking shall be subject to agreement between the purchaser and the manufacturer, where appropriate, individual units shall be identified.

It is recommended that the purchaser and the manufacturer select from the following list:

a) name of material;

b) linear density;

c) lot number;

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d) manufacturer's name, trademark or other means of identification;

e) spinning method used, e.g. ring or rotor;

f) individual package size/mass;

g) mass of consignment, in accordance with ISO 6741-1;

h) quality level of consignment;

i) end use of yarn, e.g. weaving or knitting;

j) whether carded or combed;

k) whether waxed or unwaxed;

l) packaging and storage condition.

6 Sampling and inspection

The sampling procedure for inspection shall be agreed between purchaser and manufacturer. In the absence of any agreed sampling procedure, reference shall be made to ISO 3951-4.

7 Quality control

It is recommended that manufacturers operate quality control procedures (e.g. in line with ISO 9001 and ISO 9004) in order to ensure that they are able to manufacture yarns consistently to the required standard.

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Annex A
(informative)

Examples of cotton yarn specifications

IMPORTANT — The data shown in Table A.1 are given only as examples, to illustrate the format which might be used to set out specifications for cotton yarn. They have been selected on the basis of available data to be as realistic as possible, but cannot in any way serve to replace requirements which may be contained in a commercial contract.

Table A.1 — Examples

Characteristic	Specification		
	Carded ring-spun for weaving	Combed ring-spun for knitting	Carded rotor-spun for weaving
Nominal count (tex)	36,9	19,7	36,9
Nominal count [Number English (Ne)]	16	30	16
% CV[a] of nominal count[b]	1,4 max.	1,4 max.	1,1 max.
Twist (T/m)	700	757	700
Direction of twist	S or Z	S or Z	S or Z
% CV of twist	3,4 max.	3,4 max.	3,4 max.
Breaking tenacity[b] (cN/tex)	17 min.	20 min.	12,5 min.
% CV of breaking tenacity	7,4 max.	7,6 max.	7,4 max.
Breaking elongation (%)	6,4 min.	5 min.	6,5 min.
% CV of breaking elongation	6,8 max.	7,5 max.	6,6 max.
Hairiness	6,4 max.	5,1 max.	5,3 max.
Number of thick places per 1 000 m	90 max.	20 max.	36 max.
Number of thin places per 1 000 m	4 max.	1 max.	5 max.
Number of neps per 1 000 m	91 max.	36 max.	152 max.
Evenness (% CV)	17,5 max.	14,5 max.	16 max.
Appearance of yarn	Grade D or better	Grade C or better	Grade C or better

[a] CV = coefficient of variation.

[b] Useful guidelines of these properties may be found in Uster Statistics 2013[4].

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