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Textiles — Methods for analysis of woven fabrics construction —

Part 6: Determination of the mass of warp and weft per unit area of fabric

Textiles — Méthodes d'analyse de la construction des tissus —

Partie 6: Détermination de la masse des fils de chaîne et de trame par unité de surface d'un tissu

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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 24, *Conditioning atmospheres and physical tests for textile fabrics*.

This second edition cancels and replaces the first edition (ISO 7211-6:1984), of which it constitutes a minor revision.

The main changes compared to the previous edition are as follows:

— the normative reference to ISO/TR 5090 (withdrawn) has been replaced by ISO 1833-1;

— a Clause 3, Terms and definitions has been added.

A list of all parts in the ISO 7211 series can be found on the ISO website.

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.

Introduction

It is common practice to describe fabrics by the mass per unit area (see ISO 3801) and the ends and picks per centimetre, but this leaves the proportions of warp and weft in the fabric uncertain. Any desired balance of cover between warp and weft can be stated without specifying the yarn linear densities by giving separate values for the masses of warp and weft per unit area of the fabric.

Textiles — Methods for analysis of woven fabrics construction —

Part 6: Determination of the mass of warp and weft per unit area of fabric

1 Scope

This document specifies methods for determining the mass of the warp and weft threads per unit area of fabric after the removal of any non-fibrous matter.

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 139, *Textiles — Standard atmospheres for conditioning and testing*

ISO 1833-1, *Textiles — Quantitative chemical analysis — Part 1: General principles of testing*

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Principle

Method A: The outline of the fabric specimen to be dissected is marked in the form of a square or rectangle, and the nonfibrous matter is removed while the marked area still forms part of a larger sample and the threads cannot, therefore, be lost from it. If the amount of non-fibrous matter is to be determined, it is stipulated that the larger sample shall be a square cut with its diagonals parallel to the directions of the threads in the fabric. If the amount of non-fibrous matter has not to be determined, the larger sample may be of any shape or size.

Method B: A specimen of known area is dissected and the non-fibrous matter is removed from the warp and weft threads.

5 Apparatus

5.1 Indelible marking ink.

5.2 Scissors.

5.3 Dissection needle.

5.4 Small template. Template to mark (or a **die** to cut) a square or a rectangle of known area of not less than 150 cm^2. The length to width ratio of the rectangle shall not exceed 4.

5.5 Large template. Template to mark (or a **die** to cut) a square which is sufficiently large to enclose the area marked with the smaller template (5.4) when placed with its diagonals parallel to the sides of the enclosed square or rectangle.

5.6 Balance, accurate to 0,1 % of the smallest quantity to be weighed.

6 Conditioning and testing atmosphere

The standard atmospheres for pre-conditioning, conditioning and testing textiles specified in ISO 139 shall be used.

7 Test specimens

7.1 Conditioning

Before marking or cutting, expose the samples from which the test specimens will be removed to the standard atmosphere for conditioning until it is in equilibrium with that atmosphere.

Take the specimens from each sample.

7.2 Method A

With the aid of the large template (5.5), mark in pencil on the sample a square with its diagonals in the direction of the warp and weft threads. In the centre of the square, and with the aid of the small template (5.4), mark in indelible ink (5.1) a square or rectangle with its sides in the directions of the warp and weft threads. Cut the larger square from the sample by means of the scissors (5.2) and identify the warp and weft directions. Alternatively, remove the larger square from the sample by means of a die.

When the amount of non-fibrous matter has not to be determined, the larger specimen may be of any shape or size, provided that the threads are retained in the inner marked area during the removal of added matter.

7.3 Method B

With the aid of the small template (5.4), mark in pencil a square or a rectangle with its sides as closely as possible parallel to the warp and weft threads. Cut the square or rectangle from the fabric by means of the scissors (5.2) and identify the warp and weft directions. Alternatively, remove a square of the appropriate size from the fabric by means of a die.

8 Procedure

8.1 Method A

Remove any non-fibrous matter from the sample according to one of the methods described in ISO 1833-1. Expose the sample to the atmosphere for conditioning and testing until equilibrium is attained.

Cut along the sides of the inner square or rectangle which was marked on the sample before the removal of added matter.

Determine the mass of the marked area to an accuracy of 0,1 %.

Working over paper of a colour suitable for showing up fragments of the yarn and fibre from the fabric being tested, fray out from one edge of the square or rectangle, and collect together the threads more easily removed from the fabric.

From time to time, cut off the fringe of threads remaining in the other direction of the fabric and collect the short lengths together, keeping them separate from the more easily removed threads. When the whole of the marked area has been dissected into warp and weft threads, determine the mass of the two sets of threads separately to an accuracy of 0,1 %. The sum of these two masses shall not differ from the mass of the fabric before dissection by more than 1 %. Where the sum of the masses of warp and weft threads differs by more than 1 % from the mass of the fabric specimen, the procedure has not been followed with sufficient accuracy. Repeat the procedure in order to achieve the required accuracy.

Long rectangular specimens are easier to dissect than squares, but the dissection of the latter may be facilitated by cutting into several rectangles with their lengths in the direction of the threads more easily removed from the fabric.

8.2 Method B

Dissect the specimen of known area into warp and weft threads over paper of a colour suitable for showing up fragments of yarn from the fabric being tested. When the dissection of the specimen has been completed, remove the non-fibrous matter from the two sets of threads separately by a method described in ISO 1833-1, taking care that no loss of fibre occurs during the process.

Dry the threads and bring them into equilibrium with the standard atmosphere for testing, from the dry side by exposing them freely to that atmosphere. Determine the mass of the two sets of threads separately to an accuracy of 0,1 %.

9 Calculation and expression of results

From the conditioned masses of warp and weft, free from added matter, and the known area of the specimens dissected, calculate the mass per unit area of warp, weft and fabric and express each in grams per square metre.

10 Test report

The test report shall include at least the following particulars:

a) a reference to this document (i.e. ISO 7211-6:2020);

b) atmosphere used (standard or one of the alternative atmospheres);

c) actual method used, i.e. method A or method B;

d) method used for removal of non-fibrous matter, if carried out;

e) the mass of warp and weft per unit area of each specimen and, if required, the mass per unit area of the fabric, all expressed in grams per square metre;

f) details of any deviation from the given procedure;

g) any unusual features observed;

h) date of the test.