International Standard 7211/5

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Textiles — Woven fabrics — Construction — Methods of analysis — Part 5: Determination of linear density of yarn removed from fabric

Textiles — Tissus — Construction — Méthodes d'analyse — Partie 5: Détermination de la masse linéique d'un fil prélevé dans un tissu

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 7211/5 was developed by Technical Committee ISO/TC 38, *Textiles*, and was circulated to the member bodies in November 1982.

It has been approved by the member bodies of the following countries:

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The member body of the following country expressed disapproval of the document on technical grounds:

France

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Textiles — Woven fabrics — Construction — Methods of analysis — Part 5: Determination of linear density of yarn removed from fabric

0 Introduction

The method for determining the linear density of yarn from a fabric differs from that of yarn from a package in that, in the former instance, the crimp imposed upon the yarn by the interlacing of warp and weft must be taken into account. Also, the long lengths of yarn used in tests from a package may not conveniently be taken from a fabric. The results obtained may be subject to appreciable personal error unless a standard method is adopted and adequate samples are taken.

This part of ISO 7211 is divided into four sections. Sections one and four deal with items applicable to both methods; section two specifies the method for determination of the linear density of yarn removed from fabric, without removal of non-fibrous matter; and section three specifies the method for determination of linear density of yarn removed from fabric after removal of non-fibrous matter.

It may be noted that the linear density of yarn obtained by these methods may not be same as that of the original yarn used in the fabric.

Section one: General

1 Scope and field of application

This part of ISO 7211 specifies methods for the determination of linear density of yarn removed from fabric. It relates to yarns of nominally uniform linear density; it describes the method of removing threads from fabric, and specifies the number of threads whose straightened length is to be determined and the methods of determining the mass of all the threads.

2 References

ISO 139, *Textiles — Standards atmospheres for conditioning and testing.*

ISO/TR 5090, *Textiles — Method for the removal of non-fibrous matter prior to quantitative analysis of fibre mixtures.*

ISO 6741/4, *Textiles — Fibres and yarns — Determination of commercial mass of consignments — Part 4: Values used for commercial allowances and commercial moisture regains.*[1)]

ISO 7211/3, *Textiles — Woven fabrics — Construction — Methods of analysis — Part 3: Determination of crimp of yarn in fabric.*

3 Principle

Threads are removed from rectangular strips of fabric, the straightened length of a portion of them is determined and their mass is determined either in equilibrium with the standard atmosphere for testing (method A) or oven-dry plus the commercial allowance given in ISO 6741/4 (method B). Linear density is calculated from the mass and the sum of the straightened lengths.

When heating to 105 °C is likely to cause appreciable loss of volatile matter other than water, method A should be used.

The determination may be carried out without removal of non-fibrous matter (section two), or after removal of non-fibrous matter (section three).

4 Apparatus

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

4.2 Apparatus for determining the straightened length of threads (see apparatus specified in ISO 7211/3).

4.3 Ventilated drying oven (method B).

5 Conditioning and testing atmosphere

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

6 Test specimens

Expose to the atmosphere for testing for at least 24 h sufficient fabric, which should preferably include yarn from at least five weft packages, to provide the required number of test specimens.

Cut from the conditioned fabric at least two rectangular strips containing different warp ends for determining the linear density of warp yarns, and at least five rectangular strips representing different weft packages for determining the linear density of weft yarns.

NOTE — All the strips should preferably be of the same length and about 50 cm long. Their width should be such as to contain at least 50 lengths of either warp or weft yarn, whichever is under examination.

Obtain the threads from these strips as required as specified in ISO 7211/3. During these operations, keep warp threads separate from weft threads.

1) At present at the stage of draft Technical Report.

Section two: Determination of linear density of yarn removed from fabric without removal of non-fibrous matter

7 Procedure

7.1 Separation of threads and measurement of length

Remove the first 10 threads from each strip and determine their straightened lengths, all as specified in ISO 7211/3. Then remove at least 40 more threads from each strip.

7.2 Method A — Conditioning to equilibrium with the standard atmosphere

Pre-condition the specimen for 4 h in the standard atmosphere for pre-conditioning specified in ISO 139.

After pre-conditioning, bring the specimens to moisture equilibrium with the standard atmosphere for testing by exposing them to that atmosphere for 24 h or until there is no progressive change in mass greater than 0,1 % in successive exposures of at least 30 min duration.

Weigh all the warp threads together and each group of 50 weft threads separately.

7.3 Method B — Oven-dry plus commercial allowance

Dry the specimens to constant mass in the ventilated drying oven (4.3) until successive weighings at intervals of 20 min (specimen weighed inside oven) or 40 min (specimen weighed outside oven) show no progressive change in mass greater than 0,1 %. Weigh all the warp threads together and each group of 50 weft threads separately.

Section three: Determination of linear density of yarn removed from fabric after removal of non-fibrous matter

8 Procedure

8.1 Separation of threads and measurement of length

Remove the first 10 threads from each strip and determine their straightened lengths, all as specified in ISO 7211/3. Then remove at least 40 more threads from each strip.[1)]

8.2 Removal of non-fibrous matter

Remove any non-fibrous matter, using a procedure given in ISO/TR 5090.

After removal of non-fibrous matter from the specimens, follow the procedure in method A (see 7.2) or method B (see 7.3) as given in section two.

1) Where the non-fibrous matter interferes with the separation of threads, it will be necessary to remove it first, but it should be noted that this may affect the length of the threads. If the non-fibrous matter is removed before the threads are separated, expose the extracted fabric to the standard atmosphere for testing for at least 6 h before determining the straightened length.

Section four: Calculation and expression of results and test report

9 Calculation and expression of results

Calculate the linear density by converting the total length and total mass of warp threads and weft threads into units of the tex system, as shown in the equations below.

9.1 Method A

Calculate the linear density of the yarns from the following equation:

Linear density of the conditioned yarn, in tex units

$$= \frac{\text{mass of threads taken from fabric, in grams} \times 1\,000}{\text{total length of threads, in metres}}$$

where total length = mean straightened length × number of threads weighed.

9.2 Method B

Calculate the linear density of the yarns from the following equation:

Linear density of the oven-dry yarn, in tex units

$$= \frac{\text{mass of the oven-dry threads taken from fabric, in grams} \times 1\,000}{\text{total length of threads, in metres}}$$

where total length = mean straightened length × number of threads weighed.

Linear density of the oven-dry yarn plus commercial allowance

$$= \frac{\text{linear density of oven-dry yarn} \times (100 + K)}{100}$$

where K is the commercial allowance given in ISO 6741/4.

10 Test report

The test report shall include the following particulars:

a) a reference to this International Standard (ISO 7211/5);

b) the standard atmosphere used (temperate or tropical);

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

1) without removal of non-fibrous matter (section two) or

2) after removal of non-fibrous matter (section three);

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

e) the linear density of the warp;

f) the linear density of the weft;

g) details of any deviation from the method.