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International Standard 7211/3

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Textiles — Woven fabrics — Construction — Methods of analysis — Part 3: Determination of crimp of yarn in fabric

Textiles — Tissus — Construction — Méthodes d'analyse — Partie 3: Détermination de l'embuvage d'un fil 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.

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

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Bulgaria	Israel	Spain
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France

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INTERNATIONAL STANDARD ISO 7211/3-1984 (E)

Textiles — Woven fabrics — Construction — Methods of analysis — Part 3: Determination of crimp of yarn in fabric

0 Introduction

The interlacing of threads in a fabric imposes a waviness or crimp on both warp and weft yarns. Hence, the distance between the ends of a warp thread, for instance, as it lies in a piece of fabric, is less than the length of the straightened thread, and the difference between these two lengths is used in the measurement of crimp.

In this technique it is necessary to apply a tension to straighten the crimped thread. Ideally, this tension would be one which removes all crimp without extending the thread, but this will rarely be possible. Consequently, a table of tensions has been included (see the annex) as a guide with the aim of striking a balance between some inevitable extension and the incomplete removal of crimp; any residual crimp is then ignored.

When a figured fabric is under examination, it will be necessary to ensure that threads for testing are taken from a complete repeat of the pattern.

1 Scope and field of application

This part of ISO 7211 specifies a method for the determination of crimp of yarn in fabric. The method is applicable to most woven fabrics but is unsuitable for fabrics manufactured in such a way as to render removal of the crimp from the yarns impossible or impractical under the specified straightening tension.

2 Reference

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

3 Definitions

For the purposes of this part of ISO 7211, the following definitions apply:

3.1 percentage crimp: The mean difference between the straightened thread length and the distance between the ends of the thread while in the fabric, expressed as a percentage of the latter.

3.2 straightening tension: The minimum force which, when applied to a yarn, removes the crimp caused by weaving.

4 Principle

Threads are removed from a strip of fabric of known length, straightened by a tension which is varied according to the nature and linear density of the yarn and measured in the straightened state. The difference between the straightened length of the thread and the distance between the ends while in the fabric is expressed as a percentage of the latter.

5 Apparatus

5.1 Thread straightening and measuring device, horizontal or vertical and complying with the following requirements:

a) there shall be two yarn grips, each of which closes at its rear end first and when closed has parallel gripping-surfaces;

b) it shall be possible to alter the distance between the grips;

c) it shall be possible to measure the distance between the grips;

d) a datum line shall be marked on one gripping-surface of each grip, about 2,5 mm from the edge nearest the other grip, which is visible when the grip is closed;

e) it shall be possible to apply the specified straightening tension to the yarn through one of the grips.

5.2 Rule, graduated in the same units as the thread-straightening device.

5.3 Dissecting needle.

6 Conditioning and testing atmosphere

One of the atmospheres for conditioning and testing textiles as defined in ISO 139 shall be used for conditioning and testing.

7 Test specimens

Condition the sample for at least 16 h. Lay the conditioned fabric flat, free from tension and free from creases. Mark five rectangular strips on the fabric, two with their long sides parallel to the warp threads and three with their long sides parallel to the weft threads.

Ensure that each strip is at least ten threads in width, and is at least 20 times as long as the parts of the test specimen that will be gripped within both jaws of the apparatus.

Cut along the two short sides and one long side of each rectangular strip so as to produce five flaps in the fabric. Measure the distance between the two short sides of each flap in millimetres.

NOTE — If it is desired to combine the determination of crimp with a determination of yarn linear density, it will be necessary to prepare a further two weftway strips and to ensure that five different weft packages are represented. All the strips should then be preferably of the same length and about 250 mm long and their width should be such as to contain at least 25 lengths of either warp or weft yarn, whichever is under examination.

8 Procedure

8.1 Setting of apparatus

Set the tensioning device (5.1) attached to one of the yarn grips (see 5.1) so that it will remove as much of the crimp as possible from the specimens without stretching them unduly. State the tension chosen when reporting the results. Straightening tensions for certain types of yarns are provided in the annex as a guide.

8.2 Insertion of threads in the apparatus

By means of the dissecting needle (5.3), gently remove from a flap the middle of the outermost thread of a set of 10, leaving about 1 cm at each end still interlaced with the crossing threads.

Remove one end of the thread from the crossing threads, holding it as close to the end as possible so as to avoid the loss of twist. Insert a slight excess of this end into one grip of the apparatus. Begin to close the grip so as to be able to withdraw the thread under slight tension until its end coincides with the datum line. Close the grip completely (the portion of thread between the datum line and the edge of the grip should now be approximately straight).

Remove the other end of the thread from the fabric and insert it into the other grip in a similar manner.

8.3 Straightened length of thread

Separate the grips so that the chosen tension is developed gradually. Measure the straightened length of the thread in millimetres between the datum lines on the grips.

8.4 Number of threads

Repeat the measurements to obtain the straightened lengths of 10 threads from each of the five rectangular flaps.

9 Calculation and expression of results

For each group of 10 threads, calculate the mean straightened length in millimetres.

The percentage crimp C [i.e. the difference between the mean straightened length and the length occupied by the threads in the fabric (that is the "flap" width) as a percentage of the latter] is given by the formula

$$C = \frac{L - L_o}{L_o} \times 100$$

where

L is the mean measured length, in millimetres, of 10 threads removed from the fabric;

L_o is the length, in millimetres, occupied by the thread in the fabric, that is the flap width.

10 Test report

The test report shall include the following particulars:

a) a reference to this International Standard (ISO 7211/3);

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

c) the specimen length of fabric, that is the flap width;

d) the straightening tension used;

e) the mean measured straightened length, in millimetres, for each group of 10 threads in warp and weft;

f) the percentage crimp in each group;

g) the mean percentage crimp for warp and weft;

h) details of any deviation from the method.

Annex

Straightening tensions

(Forms part of the Standard.)

In the absence of instructions to the contrary, the tension to be used to straighten the threads after removal from the fabric is given in the table.

Table — Straightening tensions

Yarn	Linear density tex	Straightening tension cN*
Cotton spun	7 tex or finer coarser than 7 tex	(0,75 × tex value) (0,2 × tex value) + 4
Woollen and worsted spun	15 tex to 60 tex 61 tex to 300 tex	(0,2 × tex value) + 4 (0,07 × tex value) + 12
Man-made continuous filament non-textured	all	(0,5 × tex value)

* 1 cN ≈ 1 gf