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Textile fibres — Some methods of sampling for testing

Fibres textiles — Diverses méthodes d'échantillonnage en vue des essais

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 38 has reviewed ISO Recommendation R 1130 and found it technically suitable for transformation. International Standard ISO 1130 therefore replaces ISO Recommendation R 1130-1969 to which it is technically identical.

ISO Recommendation R 1130 was approved by the Member Bodies of the following countries :

Australia	India	Romania
Belgium	Iran	Spain
Canada	Israel	Sweden
Colombia	Japan	Switzerland
Cuba	Korea, Rep. of	Thailand
Czechoslovakia	New Zealand	Turkey
Denmark	Norway	United Kingdom
Egypt, Arab Rep. of	Poland	U.S.A.
France	Portugal	U.S.S.R.
Hungary	South Africa, Rep. of	

The Member Bodies of the following countries expressed disapproval of the Recommendation on technical grounds :

Germany
Netherlands*

* Subsequently, this Member Body approved the Recommendation.

The Member Bodies of the following countries disapproved the transformation of ISO/R 1130 into an International Standard :

Germany
Hungary
U.S.S.R.

Textile fibres — Some methods of sampling for testing

0 INTRODUCTION

No single technique of sampling can be devised that will serve in all circumstances. Sampling from a bale of cotton, for example, presents problems quite different from those encountered in sampling from a consignment of yarn packages, while sampling from a card web is again different from either.

If the fibres in the bulk have been well mixed, so that there is no variation in composition from one part to another, i.e. the individual fibres are distributed at random, the sample can without disadvantage be taken from one place anywhere in the bulk.

If the fibres in the bulk are not known to have been well mixed, so that the composition may vary from one part to another, a sample taken from any one place would not be representative of the whole bulk.

A selection of methods is therefore presented, illustrating techniques that have been found acceptable in meeting the commoner types of problem encountered in sampling for the assessment of fibre quality. Methods peculiar to the requirements of research are not included, nor are such special techniques as have to be used, for example, in sampling of wool from the fleece, or cotton from the seed.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies several methods for preparing laboratory samples of fibres, and presents a limited treatment of the problem of drawing specimens for testing.

The field of application of each method is given at the beginning of the clause dealing with the method.

It is not possible for the coverage of each individual procedure to be fully comprehensive; in many instances, the selection of test samples or test specimens must necessarily be covered by the appropriate method of test.

The selection of length-biased samples is not within the scope of this International Standard, nor are particular requirements relating to the determination of commercial weights.

An annex and tables are given in this International Standard for general guidance in determining the size of the test sample to be taken in order that the determined sample mean shall have given confidence limits.

2 GENERAL DEFINITIONS

For the purposes of this International Standard the following general definitions apply. Definitions particular to different types of fibres will be found in the appropriate clause.

2.1 individual : Any single fibre that might be taken for the purpose of measurement.

2.2 population : The aggregate of individuals that it is desired to characterize in one or more particulars (for example : fibres contained in a bale of cotton; all the constituent fibres in a set of yarn cops).

2.3 zoning : When the population to be sampled is known to vary from part to part with respect to the property to be investigated, the individuals or groups of individuals in the population are taken at random from within the different parts or zones, chosen so that all variations of the property are represented in due proportion. This operation is known as zoning.

2.4 laboratory sample : A sample intended to be representative of a large bulk of material, in the state in which it is sent to the laboratory. A convenient size of sample for many types of test involving only small test specimens is about 25 to 50 g; a larger amount will be required for tests involving relatively large test specimens.

2.5 laboratory test sample : That portion of fibres taken from the laboratory sample in such a way as to ensure its representative character and to provide a quantity small enough to be easily convertible into test specimens.

2.6 test specimen : That part of the laboratory sample (yarns, fibres, etc.) which is tested at one time.

2.7 numerical sample : A sample in which all fibres in the population have an equal chance of being represented.

2.8 length-biased sample : A sample in which the chance of any fibre of the population being represented is proportional to the length of that fibre.

3 SAMPLING METHODS FOR BAST FIBRES

NOTE — Bast fibres require to be broken in the preliminary stages of processing, and consequently sampling for fibre length measurement is carried out on sliver or yarn, and not on the raw fibre.

3.1 Field of application

Raw bast fibres are usually sampled only for fibre fineness and fibre strength and the methods adopted depend on the type of bast fibre. Flax and hemp need different handling from jute and kenaf.

Method A applies to bales or other bulks of bast fibres such as flax and hemp in the raw state and to bulks of dressed line in bunches.

Method B applies to bales or bulks of jute or kenaf in the raw state.

3.2 Definitions

3.2.1 reed : The fibrous strands obtained from a jute stem after retting.

3.2.2 head : A bunch of jute reeds, given a twist and folded over before being made into a bale.

3.2.3 bunch : The aggregate of pieces of flax tied up with two or more ties preparatory to baling.

3.2.4 strick : A small bunch of flax straws, or scutched flax, or of hackled flax, of a size that can be held in the hand, or a bunch of jute similar to a head, but smaller, usually 1 to 2 kg in mass.

3.3 Sampling the bulk

Take a representative sample by abstracting small sub-samples from various parts of the bulk and reduce each of these to a convenient number of fibres by repeated halving.

3.4 Method A

Select a number of bunches (preferably not less than twenty) at random from various parts of the bale or bulk, and remove a strick of fibre from each one. Divide each strick lengthwise by gripping the centre and pulling transversely to the length of the fibres to separate the two portions. Discard one portion and retain the identity of the root and tip of the retained portion. Repeatedly halve the retained portion until the amount of fibre retained is sufficiently small. Make a composite sample for test purposes by combining the retained fibre from each strick, placing root ends together and tip ends together.

3.5 Method B

Take a number of heads of jute (preferably not less than fifty) at random from the bulk, and remove a reed from each head. Cut each of these reeds into root end, middle,

and tip end, keeping the sections separate and the corresponding cut lengths from all reeds bundled together. Then tease out each of the three composite bundles by hackling on pins, or by other means, to remove cross-linked and tangled fibres.

For determinations of fibre fineness and single fibre breaking load, cut small bundles of fibres, each weighing a few milligrams and of fixed length (30 mm is suitable), from a composite bundle at a number of points and put them together to form a test sample (25 mg is often a convenient mass).

4 SAMPLING METHODS FOR COTTON FIBRES

4.1 Field of application

Clause 4 gives methods for the preparation of numerical laboratory samples.

The methods described in 4.2 to 4.6 are applicable to bulks of cotton fibres in various forms.

The methods described in 4.6.1 to 4.6.3 are applicable to all fibres spun on the cotton system.

4.2 Sampling from a small bulk of raw or blended cotton

If the bulk consists of less than 5 kg of loose raw cotton, it shall be spread out in an even layer. Unless otherwise stated, obtain the laboratory sample by selecting at random a minimum of a hundred tufts, each of 0,25 to 0,50 g.

If the bulk is greater than 5 kg, divide it into a number of equal portions, and take an equal number of tufts (of 0,25 to 0,50 g each) from each portion such that the total number from all portions exceeds a hundred.

4.3 Sampling from a bulk consisting of a bale of cotton

4.3.1 General

There is variation in most fibre properties between and within layers of the same bale of cotton. The values of coefficients of within- and between-layer variation and of the ratio of these coefficients of variation vary according to the fibre characteristics under consideration, and also with the type of cotton.

4.3.2 Procedure

If the bale is open, a suitable laboratory sample may be obtained by selecting ten tufts at random throughout each of ten equally spaced layers.

If the bale has not been opened, the above procedure cannot be followed. In this case, the following procedure may be feasible :

Extract the required number of tufts by removing cotton from one or more of the edges that are perpendicular to the layers in the bale, so that the sample includes material from many layers. In taking the tufts, reject any soiled cotton

from the outside of the bale (the procedure may be facilitated by cutting one of the end bands round the bale).

NOTE — A less satisfactory sample is yielded by selecting tufts from various places over the upper and lower sides of a bale.

Although this cotton is easily accessible, any laboratory sample obtained in this manner will represent at the most two layers, one on each side of the bale.

4.4 Sampling from a bulk consisting of several bales of cotton

4.4.1 General

The detailed method of sampling depends on the type of test to be carried out, the number of bales, and the likely variation between the bales.

4.4.2 Procedure

The following procedure shall be used unless the specification states otherwise.

4.4.2.1 WHEN THE NUMBER OF BALES IS GREATER THAN 10 AND THE REAL VARIATION IN THE BULK IS NOT APPRECIABLY GREATER THAN THE PRECISION REQUIRED IN THE TEST RESULT

Make a random choice of 10 % of the bales (or ten bales if 10 % of the bulk is less than ten bales); then from the selected bales take a minimum of a hundred tufts, taking an equal number of tufts from each layer of each bale.

4.4.2.2 IN OTHER CASES

Select a minimum of a hundred tufts; take an equal number of tufts from each layer of each bale.

NOTE — For most commercial purposes, when selecting a commercial sample from a bale of cotton it is impracticable to obtain a representative sample by opening a bale and following the procedure described in 4.2 above. Samples prepared by selecting cotton from one or two layers in a bale are acceptable for many purposes of quality classification, and for some forms of testing (for example, determination of micronaire value) when past experience indicates that the feature under consideration varies appreciably more from bale to bale in a commercial lot than between layers in the same bale. Under such circumstances, it is recommended that a commercial sample be prepared in the form of two clumps of cotton, similar in surface area and mass, taken from opposite outer layers of the bale. The face of the sample should be not less than 120 mm X 150 mm and the total mass not less than 150 g. A sample consisting of a clump, of the same surface area and total mass, cut from one outer layer only, is less representative and will be deemed to fulfil the requirements of this International Standard only if mutually agreed by the parties concerned.

4.5 Preparation of laboratory test samples

In certain cases, it may be necessary to have a laboratory test sample, prepared from the laboratory sample.

These laboratory test samples should be prepared by a method which takes into consideration the test to be performed and the degree of accuracy desired.

In general, fibre blending by a mechanical blender is preferable, particularly when the test specimen is small in size, as is the case in the flat-bundle strength test. However, in some cases, samples prepared by hand are adequate.

When the laboratory sample consists of tufts taken by cutting into the bales, cut fibres shall not be included in the laboratory test sample.

4.5.1 Mechanical blending (preferred method)

The mechanical blender is designed to use a certain mass of fibres, for example up to 10 g.

Spread out the laboratory sample so that pinches can be taken from it at any point. Take small pinches of fibre from at least 32 different evenly spaced points in the laboratory sample.

Perform a light drafting action on the pinches before feeding them into the mechanical blender, so as to form as uniform a sheet of fibre as possible. Blend the fibres using the blender so as to produce a practically homogeneous sample, taking care not to damage the fibres.

4.5.2 Manual methods

Different methods have been described in national standards. They are designed for different methods of test, for example "cut-squaring", making hand slivers and making small samples for successive halving and combining. In some cases, it is preferable to prepare test specimens direct from the laboratory sample.

4.6 Sampling from a bulk consisting of processed material

4.6.1 Sliver, roving

If the bulk consists of many cans or packages each prepared and processed in the same manner, obtain the laboratory sample sufficiently accurate for most purposes by taking equal lengths from a minimum of four cans or packages, chosen from different parts of the bulk. If the number of cans or packages is smaller than four, take equal lengths from each.

4.6.2 Yarns

In testing packages of yarn from a consignment, select four from different parts of the bulk; if the bulk consists of fewer than four packages, select all of them.

4.6.3 Cloth

Select a minimum of four threads for testing. Select warp threads at approximately equal intervals across the width; generally it will be found convenient to select about sixteen in this manner. If possible take weft threads from different places along the cloth so as to include yarn of different cops.

NOTE — A test sample or test specimen may be subsequently prepared from the selected packages or yarns by untwisting fibres from equal lengths of each, as described in 4.6.2 and 4.6.3, care being taken to exclude the fibres from cut ends of the lengths of yarn.