INTERNATIONAL STANDARD

ISO 20193

Second edition
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Tobacco and tobacco products — Determination of the width of the strands of cut tobacco

Tabac et des produits du tabac — Détermination de la largeur des brins de tabac haché

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Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 126, *Tobacco and tobacco products*, Subcommittee SC 1, *Physical and dimensional tests*.

This second edition cancels and replaces the first edition (ISO 20193:2012), which has been technically revised. The main change compared to the previous edition is as follows:

— measurement of 20 strands along a single line rather than 5 lines previously.

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.

Tobacco and tobacco products — Determination of the width of the strands of cut tobacco

1 Scope

This document specifies a method for the determination of the width of strands of cut tobacco. This method is only applicable on samples of strands of cut tobacco with a uniform cut width.

NOTE There are other ways of measuring the width of the strands of cut tobacco. A system with the same accuracy can be used, for example a microscope with an internal fitted ruler or a camera with image processing system.

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 216, *Writing paper and certain classes of printed matter — Trimmed sizes — A and B series, and indication of machine direction*

ISO 3402, *Tobacco and tobacco products — Atmosphere for conditioning and testing*

ISO 8243, *Cigarettes — Sampling*

ISO 15592-1, *Fine-cut tobacco and smoking articles made from it — Methods of sampling, conditioning and analysis — Part 1: Sampling*

ISO 15592-2, *Fine-cut tobacco and smoking articles made from it — Methods of sampling, conditioning and analysis — Part 2: Atmosphere for conditioning and testing*

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
cut width
width of a strand of tobacco

3.2
cut tobacco with a uniform cut width
homogeneous products mainly constituted of cut strands with visually minimal strand width difference between them

4 Principle

Taking into consideration the fact that the tobacco samples to be analysed have a uniform cut width and that the mass of the individual tobacco strands may be disregarded, 20 strands of at least 10 mm

long are taken from the total test portion and measured along a perpendicular line to determine their cut width.

A statistical conclusion for the population may be drawn from the resulting 20 values.

5   Apparatus

Normal laboratory apparatus and, in particular, the following items.

5.1   Sample holder, capable of holding the strands in a fixed position.

Annex A gives an example of a holder (see Figure A.1) including guidance for its suitable dimensions.

5.2   Measuring device, with an accuracy of at least ±0,1 mm.

6   Procedure

6.1   General

For production control, samples can be selected just after cutting and measured rapidly in order to minimize the influence of ambient conditions.

If packed samples are analysed (for example in pouch, bag, box or cigarette pack), the atmosphere for the preparation of the strands and for the determination of the cut width of fine-cut tobacco shall be in accordance with the testing atmosphere specified in ISO 15592-2. For cigarettes, ISO 3402 shall be applied accordingly.

6.2   Sampling

Take the samples in accordance with ISO 15592-1 or ISO 8243.

6.3   Preparation of the samples

If samples are prepared from the packed product, a test portion of 50 g is taken.

If samples are prepared from the packed product, they shall be conditioned according to ISO 15592-2 for fine-cut tobacco or ISO 3402 for cigarettes. After conditioning, spread out the test portion.

Spread out the test portion as evenly as possible on an area of size A3 in accordance with ISO 216.

6.4   Preparation of the strands

From the test portion, randomly take 20 strands of at least 10 mm long which have been cut in parallel.

Secure the strands to a sample holder (5.1). Affix each strand to the surface of the sample holder perpendicular to the line(s) on the sample holder (some sample holders may have more than one line), taking care to ensure that the strands lie flat and are not twisted.

When the strands have been affixed to the sample holder, it is covered with a transparent strip in order to secure the strands' position.

When securing the strands, take care to avoid stretching. Artificial damage to the strands should be avoided.

6.5   Determination of cut width

6.5.1   General

Determine the cut width immediately after securing the strands.

Measure the cut width of each of the strands prepared in accordance with 6.4 in accordance with the procedure described in 6.5.2.

6.5.2   Single measurements

The single measurements shall be made either on or directly adjacent to a line on the sample holder (5.1).

State the cut width to the nearest 0,05 mm.

7   Expression of results

Calculate the arithmetic mean from the individual measurements and report to the nearest 0,1 mm and the standard deviation to the nearest 0,01 mm.

Enter the evaluated data in a data sheet as illustrated in the example in Annex B.

8   Repeatability and reproducibility

The difference between the mean of 20 measurements per holder, obtained within the shortest feasible time interval by the same operator working on identical sample material and using the same apparatus will exceed the repeatability limit, r, on average not more than once in 20 cases in the normal operation of the method.

The difference between two results, reported by two laboratories for the same sample material will exceed the reproducibility limit, R, on average not more than once in 20 cases in the normal operation of the method.

An interlaboratory study involving 10 laboratories to determine the cut width yielded the values shown in Table 1 for the repeatability limit, r, and reproducibility limit, R, as well as for the standard deviations for repeatability and reproducibility, s_r and s_R (see References [1] and [2]). Samples were conditioned according to ISO 15592-2 prior measurement.

The collaborative study has shown that the variability between the lines of a same holder could be neglected compared with the variability between the strands. Measurement of 20 strands along a single line is then sufficient.

Table 1 — Summary of results of the collaborative study

Precision data	Width of strands of cut tobacco mm			
	0,42	**1,05**	**1,68**	**3,27**
Repeatability limit, r	0,04	0,08	0,07	0,15
Standard deviation for repeatability, s_r	0,014	0,030	0,024	0,053
Reproducibility limit, R	0,08	0,28	0,42	0,61
Standard deviation for reproducibility, s_R	0,030	0,099	0,148	0,216
NOTE Higher relative variability is observed at low cut width levels due to cutter capabilities.				

An interlaboratory study conducted in 2017 with 5 laboratories applying the method specified in ISO 20193:2012 using microscope and 3 laboratories using video camera method, has shown that video camera method was able to deliver similar results to the method specified in ISO 20193:2012

using microscope. However, the number of strands and measurement resolution shall at least be those specified in this document.

9 Test report

The test report shall contain at least the following information:

a) all particulars necessary for identification of the sample (type of sample, origin of sample, designation);

b) a reference to this document, i.e. ISO 20193:2019;

c) time and manner of sampling;

d) information on conditioning;

e) time of delivery of the sample;

f) date and time of testing;

g) room temperature at the time of testing;

h) test results and units in which these are stated;

i) special features observed during the test.

Annex A
(informative)

Example of a sample holder with 5 lines — Holder with a single line is a suitable alternative

A.1 General

Date : _____   Lab : _____   Sample : _____

Lab. Conditions : RH : _____   Temp : _____

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

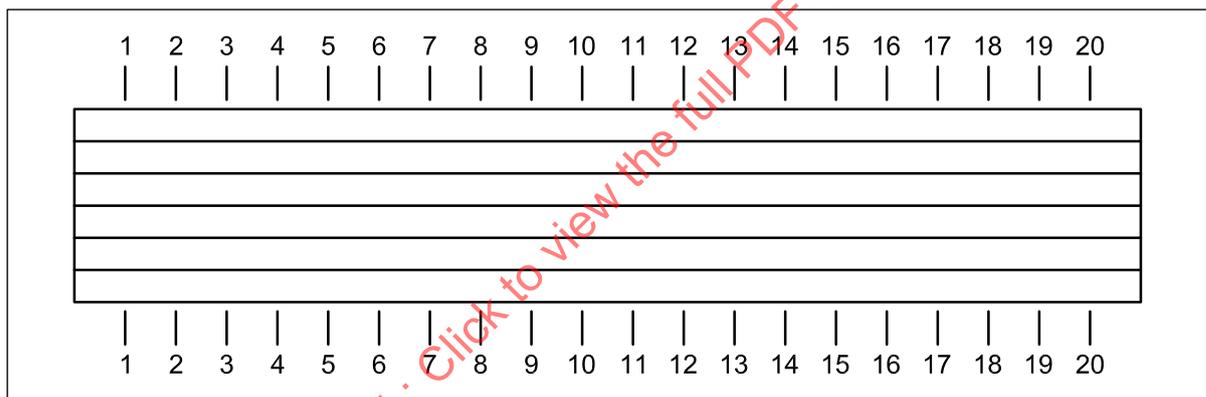1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Figure A.1 — Example of a sample holder

A.2 Guidance for suitable dimensions

Sample holder with dimensions 20 mm × 110 mm, subdivided by five parallel lines, to the longer side, distance between the lines (3,5 ± 0,5) mm.

NOTE   A microscope with an internal fitted ruler can be used.

Annex B
(informative)

Example of data sheets

B.1 One measurement per strand

Laboratory:

Time and kind of sampling:

Measurement procedure applied:

	Cut width (mm)	Sample
1st strand		
2nd strand		Date of measurement:
3rd strand		
4th strand		
5th strand		Ambient air temperature:
6th strand		
7th strand		
8th strand		Ambient air relative humidity:
9th strand		
10th strand		
11th strand		Start time of measurement:
12th strand		
13th strand		
14th strand		End time of measurement:
15th strand		
16th strand		
17th strand		Operator:
18th strand		
19th strand		
20th strand		

Measurements with an accuracy of ± 0,1 mm.

Comments:

B.2 Five measurements per strand

Laboratory:

Time and kind of sampling:

Measurement procedure applied:

	Cut width (mm)						Sample
	1st measure-ment	2nd measure-ment	3rd measure-ment	4th measure-ment	5th measure-ment	Mean per strand	
1st strand							
2nd strand							Date of
3rd strand							measurement:
4th strand							
5th strand							Ambient air
6th strand							temperature:
7th strand							
8th strand							Ambient air
9th strand							relative humidity:
10th strand							
11th strand							Start time of
12th strand							measurement:
13th strand							
14th strand							End time of
15th strand							measurement:
16th strand							
17th strand							Operator:
18th strand							
19th strand							
20th strand							

Measurements with an accuracy of ± 0,1 mm.

Comments: