

# CORESTA RECOMMENDED METHOD N° 43

## FINE-CUT TOBACCO - SAMPLING

(June 1997)

### 0. INTRODUCTION

When this CORESTA Recommended Method was prepared there were no existing national standards, rules, regulations or laws which had to be taken into account. However, experience with manufactured cigarettes suggests that two different procedures are required.

- ◆ Sampling at the point of sale.
- ◆ Sampling at the producer's premises or importer's and distributor's warehouses.

The principle underlying all sampling procedures is to produce a sample representative of the whole. With manufactured cigarettes it is possible to sample from a number of sources and mix the sample before sub-sampling to produce a sample for testing. With fine-cut tobacco, this is not possible since mixing of the tobacco with very long, fine strands is ineffective and results in the degradation of the tobacco. Thus, if the analysis is to be performed on smoking articles made from the tobacco, it is necessary to make smoking articles from all samples and then to mix the fine-cut smoking articles before sub-sampling. This may require sampling a large quantity of tobacco, and making a large number of smoking articles.

Sophisticated sampling plans are often too expensive to be used. The two procedures in this CORESTA Recommended Method are both simple and reliable.

Sampling is carried out either as a single procedure or as part of a series of samplings.

Sampling is carried out "at one point in time" *e.g.* of tobacco available for distribution from a factory/warehouse or available at a retail outlet on the market on a particular day. When a sample is required which represents fine-cut tobacco available over an appreciable period of time (*e.g.* fine-cut tobacco representing several months' production) a number of sub-period samples will be taken at different times and the test results combined.

The sampling plan depends upon the purpose of sampling, *e.g.* determination of physical properties or of smoke constituents. Further background considerations on the choice of sampling procedures are given in Annex C. It concludes that determinations of smoke yield should be made on the population manufactured for sale, sampled at manufacturers' factories or importers' warehouses.

Detailed sampling plans are given in Annexes A and B.

## 1. FIELD OF APPLICATION

This CORESTA Recommended Method specifies two methods of sampling a population of fine-cut tobacco manufactured for sale for the preparation of samples. Different procedures are specified, as follows; according to whether sampling is undertaken at the producer's premises or importer's and distributor's warehouses, or at the point of sale.

- a) Sampling "at one point in time" provides an instantaneous estimate of one or more characteristics of fine-cut tobacco. Sampling is carried out within as short a period as possible, not exceeding 14 days.
- b) Sampling "over a period of time" provides a continuous estimate of one or more characteristics of fine-cut tobacco. It can be considered for practical purposes as a series of samples each taken "at one point in time".

Clause numbers of the various sampling possibilities are given in Table 1

TABLE 1  
*Sampling Possibilities*

Sampling procedures	Sampling mode	
	1 At one time (Instantaneous)	2 Over a period (Continuous)
A. At producer's premises or importer's and distributor's warehouses.	4.1.	5.1.
B. At point of sale	4.2.	

This CORESTA Recommended Method provides information on the statistical treatment of data and provides guidance, based on practical experience of the order of ranking when a product is sampled in accordance with the specified procedures. In particular, when smoking articles made from the sampled fine-cut tobacco and smoking for the determination of NFDPM and nicotine according to the procedures described in CORESTA Recommended Method N° 44.

## 2. DEFINITIONS

For the purposes of this CORESTA Recommended Method, the following definitions apply.

### 2.1. *Fine-cut tobacco (FCT)*

Tobacco produced to be used by consumers for making into their own smoking articles with a wrapper specially prepared for this purpose .

### 2.2. *Wrapper (for fine-cut smoking articles)*

Material specially prepared and supplied in a form suitable for enclosing fine-cut tobacco so as to produce a fine-cut smoking article. These wrappers are normally sold in booklet form, in the form of a roll, or as pre-made tubes with or without a filter.

**2.3.** *Fine-cut smoking article (FCSA)*

An article, suitable for smoking, produced by combining fine-cut tobacco with a wrapper.

**2.4.** *Brand*

A manufacturer's term or name used to denominate a distinct blend of fine-cut tobacco that will be recognised by the consumer and which distinguishes it from other fine-cut tobacco.

**2.5.** *Sub brand*

A manufacturer's term or name used to denominate a distinct blend of fine-cut tobacco, retaining the original brand name, but with an additional description intended to denote a particular characteristic, *e.g.* Bright, Dark.

**2.6.** *Sale unit*

A quantity of fine-cut tobacco ready to be offered for sale to the public.

**Notes:**

1. The commonly sold pouch of 50 g fine-cut tobacco is used as the basis of this CORESTA Recommended Method, but fine-cut tobacco is also sold in other size pouches. The method of sampling different sizes is dealt with in the appropriate sections.
2. Fine-cut smoking tobacco is also sold in packaging forms other than pouches but throughout this CORESTA Recommended Method the unit of sale is referred to as a pouch.

**2.7.** *Population*

The aggregate of sale units of the fine-cut tobacco to be sampled, intended for sale to consumers in a given geographical area in a given time period. The definition includes different sub-populations, two of which are:

**2.7.1.** Population available to consumers

The aggregate of sale units in retail outlets in a given geographical area, at any time in a given time period.

**2.7.2.** Population manufactured for sale

The aggregate of sale units at a manufacturer's premises available for commercial distribution in a given geographical area, at any time in a given time period.

**2.8.** *Strata*

The lowest level of the population of the samples, *e.g.* samples from different machines, packaging types, etc. which arrive at the sampling point.

**2.9.** *Increment*

The sample of fine-cut tobacco taken at one time, at one sampling point, to be combined to produce the gross sample.

**2.10.** *Gross sample*

The aggregate of the increments.

**2.11.** *Sub-period sample*

That part of the whole sample taken in a brief period when sampling over a long period of time.

**2.12.** *Laboratory sample*

The sample intended for laboratory inspection or testing and which is representative of the gross sample or the sub-period sample.

**2.13.** *Test sample(s)*

Fine-cut tobacco for test taken at random from the laboratory sample, which are representative of each of the increments making up the laboratory sample. It shall never be smaller than a sale unit originally sampled.

**2.14.** *Test portion*

A group of fine-cut smoking articles made from the test sample(s), or a sample of fine-cut tobacco, prepared for a single determination and which is a random sample from the test sample or conditioned sample as appropriate.

**2.15.** *Laboratory smoking articles*

Fine-cut smoking articles made from the laboratory sample or test sample of fine-cut tobacco.

**2.16.** *Place of purchase*

The town, village or district within the area to be sampled, or that part of the area where the fine-cut tobacco is available.

Examples of boundaries are those of cantons, local government districts, electoral areas, postal code areas or any boundaries in accordance with the geographical context, or others.

**2.17.** *Sampling point*

The specific location (*e.g.* shop, specialist tobacco shop, vending machine, place in warehouse, place in manufacturer's premises etc.) from which an increment is to be taken.

**2.18.** *Manufacturer's premises*

The place of manufacture or its associated distribution depots or the warehouse of an importer.

**2.19.** *Bundle*

This may also be referred to as the "retailer unit".

A commercial package available within a manufacturer's premises (normally 10 pouches); *e.g.* pouches of 50 g fine-cut tobacco are usually put into bundles of 500 g fine-cut tobacco.

**2.20.** *Retailer unit*

See Bundle.

### **3. REFERENCES**

*CORESTA Recommended Method N° 24:1991*  
Cigarettes - Sampling.

*CORESTA Recommended Method N° 44:1997*  
Determination of total and nicotine-free dry particulate matter of smoking articles made from fine-cut tobacco using a routine analytical smoking machine including the preparation of the condensate for the determination of water and nicotine.

*ISO 2602:1980*  
Statistical interpretation of test results - Estimation of the mean - Confidence Interval

*ISO 5725-1:1994*  
Accuracy (trueness and precision) of measurement methods and results - Part 1: General principles and definitions.

*ISO 5725-2:1994*  
Accuracy (trueness and precision) of measurement methods and results - Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method.

#### **4. PROCEDURE FOR SAMPLING AT ONE TIME**

**Note:** When a sale unit does not consist of a pouch of 50 g fine-cut tobacco, adjust the number of sale units sampled to produce the required quantity of fine-cut tobacco.

Two alternative sampling procedures are described: in 4.1. a procedure for sampling at the premises of the manufacturer or importer and 4.2. a procedure for sampling at the point of sale.

##### **4.1. Procedure for sampling at the premises of the manufacturer or importer**

###### **4.1.1. Principles**

**4.1.1.1.** Sampling is, in general, carried out by an independent organisation, which will send to the manufacturer an accredited person referred to below as “the sampler”.

**4.1.1.2.** Sampling by an outside organisation, which shall only be done with the manufacturer’s consent unless otherwise required by law, shall be done within given short time periods (days) when the sampler visits the manufacturer’s premises. The sampler shall be accompanied by a manufacturer’s representative when he is on the manufacturer’s premises unless otherwise required by law.

**4.1.1.3.** If the manufacturer so requests, the sampler will take a replica sample for the manufacturer’s use (see 4.1.4.1.).

**4.1.1.4.** Samples shall only be taken from the finished product which is packed and ready for commercial distribution. All factories, stock rooms and warehouses containing finished products shall be included in the population to be sampled.

**4.1.1.5.** The person collecting the samples shall bring written details of the purpose of test, name of the fine-cut tobacco and number of sale units. Three copies shall be

provided, one for the sampler's record, a second to be packed with the samples, and a third for the manufacturer, to act as a receipt for the goods taken.

#### **4.1.2. Sampling**

**4.1.2.1.** For each increment required, draw one bundle (usually 500 g fine-cut tobacco) at random, from the population to be sampled. *i.e.* at each sampling point selected in the manufacturer's premises.

If the population has several strata, *e.g.* pouches from different machine rooms or factories, or different packaging types, then the increments should be drawn from all the strata, in proportion to their respective sizes.

**4.1.2.2.** If the sampler finds that the stock available is not adequate to take the number of increments required, he shall arrange a further visit to complete the sampling, but samples from different lots shall be considered as different laboratory samples.

#### **4.1.3. Constitution of the gross sample**

The gross sample is the aggregate of the increments. However, for reasons of convenience and also representativeness, it is preferable to prepare the laboratory sample directly from the increment (2.9.). This is particularly important in order to secure matched laboratory samples when several laboratories are to run tests.

#### **4.1.4. Constitution of the laboratory sample**

**4.1.4.1.** If fine-cut tobacco of the same name and characteristics is required for several tests, sufficient sale units shall be obtained from each sampling point. If several laboratories are to run tests, an equal number of sale units from each sampling point shall be contained in each laboratory sample.

**4.1.4.2.** Each laboratory sample shall be marked with at least the following information:

- a) name of the fine-cut tobacco and its characteristics;
- b) date of sampling;
- c) factory/warehouse at which the sale unit was taken;
- d) sampling point within the factory/warehouse;
- e) order number of sale unit of that day;
- f) destination (*i.e.* the laboratory to which the samples are to be sent);
- g) marks on stamp (if any);
- h) printed smoke yields (if any);
- i) manufacturer's pack codes (if any).

**4.1.4.3.** All the samples shall be packed securely with adequate protection against damage (mechanical damage, severe changes in humidity, temperature etc.) and sent to each laboratory by the most expeditious means.

**4.1.4.4.** A list of samples dispatched on that day shall be sent to each laboratory, under separate cover.

#### **4.2. Procedure for sampling at the point of sale**

**4.2.1.** Selection of the places of purchases

The required number of increments and the number of places of purchase to be used will depend on the purpose of the test and are given in Annexe A, clause A.3.

**4.2.2.** Selection of the sampling points

The increments obtained in each place of purchase shall originate from sampling points which are distributed over separate locations throughout the place of purchase.

The choice of sampling points shall, whenever possible reflect the pattern of retail distribution of fine-cut tobacco in that sampling place to be sampled. This is usually done by defining for each sampling scheme, several kinds of sampling points (*e.g.* automatic vending machines, supermarkets, specialist tobacco shops).

Each kind of sampling point is sampled at random throughout the place of purchase, and, in total, the sample from each kind of sampling point shall make up a defined proportion of the whole sample, (this is called a quota from each kind of sampling point).

Sampling shall only be carried out at another kind of sampling point after two unsuccessful attempts have been made at sampling points of the specified kind.

**4.2.3.** Constitution of the gross sample

The gross sample is the aggregate of the increments. However, for reasons of convenience and representativeness, it is preferable to prepare the laboratory sample directly from the increment (2.9.). This is particularly important in order to secure matched laboratory samples when several laboratories are to run tests.

**4.2.4.** Constitution of the laboratory sample

**4.2.4.1.** If fine-cut tobacco of the same name and characteristics is required for several tests, sufficient sale units shall be obtained from each sampling point. If several laboratories are to run tests, an equal number of sale units from each sampling point shall be contained in each laboratory sample.

**4.2.4.2.** Each laboratory sample shall be marked with at least the following information:

- a) name of the fine-cut tobacco and its characteristics;
- b) date of sampling;
- c) place of purchase;
- d) kind of sampling point (if defined);
- e) sampling point (address of retail outlet);
- f) destination (*i.e.* the laboratory to which the samples are to be sent);
- g) marks on stamp (if any);
- h) printed smoke yields (if any);
- i) manufacturer's pack codes (if any).

**4.2.4.3.** The fine-cut tobacco in the gross sample shall be obtained in as short a time as possible. This time should not exceed 14 days.

**4.2.4.4.** All the samples shall be packed securely with adequate protection against damage (*e.g.* mechanical damage, severe changes in humidity, temperature etc.) and sent to each laboratory, by the most expeditious means.

**4.2.4.5.** A list of samples dispatched on that day shall be sent to each laboratory, under separate cover.

## **5. PROCEDURE FOR SAMPLING OVER A PERIOD OF TIME**

For some purposes a sample representing fine-cut tobacco available over a period of time (*e.g.* four to six months) is required and can be obtained by dividing the sample required into a number of sub-period samples which are obtained and tested at different times. It is important that each sub-period sample be tested at the time of collection and not saved in order to test the whole sample at the end of the period. This avoids potential problems connected with ageing of the sample and ensures that variations over time in both the fine-cut tobacco and the laboratory determinations are taken into account in the measure of sample variability.

### **5.1.** *Procedure for sampling over a period of time at the premises of the manufacturer or importer*

The time period shall be divided into at least four equal sub-periods, one sub-period sample taken in each sub-period from every manufacturer's premises (or importer's and distributor's warehouse) where the fine-cut tobacco is made (or imported and distributed). Whenever possible, the number of sub-periods multiplied by the number of sampling points should equal the number of increments required in the bulk sample. The total number shall be the same as that required for a sample at one point in time and they shall be equally divided between sub-periods.

At each manufacturer's premises, no more than one increment shall be drawn from a sampling point. Sampling points shall be selected from all the possible sample points in the manufacturer's premises.

Principles, sampling and constitution shall be as described in 4.1.

The procedure of sampling is illustrated in Figure 1.

## **6. CONSTITUTION OF THE TEST SAMPLE**

### **6.1.** *General requirements*

In general, the laboratory sample will contain fine-cut tobacco for a number of different kinds of test. Each may require a different size of test sample (*e.g.* condensate and nicotine can be determined as one test, after the fine-cut tobacco is made into laboratory smoking articles but determination of nicotine in tobacco is a separate test requiring a smaller test sample). The sample for each kind of test shall contain fine-cut tobacco from every increment of the sample, except in the case where the possibility envisaged in 6.2. is used.

For nearly all kinds of tests there will be several individual determinations (replicates, smoking channels) carried out at each laboratory. At some stage the test sample or the laboratory smoking articles made from it will be divided into test portions, one for each individual determination.

Each laboratory should arrange its work as described in 6.2. to 6.6.

### **6.2.** *Identification of the test samples*

The increments intended to form the laboratory sample are first individually identified. They are then inspected and, if several versions are found (fine-cut tobaccos with visible differences) they are separated so that separate tests can be carried out on each of them.

**6.3.** *Initial selection*

If the laboratory sample is constituted of  $K$  increments, and  $k$  individual determinations are to be carried out (*i.e.*  $k$  test portions are required), then the increments of any version for which  $K < k$  are discarded).

**6.4.** *Division of the increments into portions*

If the laboratory sample still contains several versions with  $K_1 K_2 \dots$  increments, divide the  $k$  test portions - which will be formed later - between the versions in the proportion  $K_1 K_2 \dots$ . Within each version, divide the increments into test portions of approximately equal size (*e.g.* for five determinations and 13 increments, two groups of two increments and three groups of three increments).

**6.5.** *Provision of the test portion*

Take an equal number of pouches of fine-cut tobacco from each increment in a group to provide a test portion on which one determination will be carried out. Alternatively, make fine-cut smoking articles from each increment and provide a test portion consisting of fine-cut smoking articles.

**Note:** A different number of pouches of fine-cut tobacco may be taken from increments in another group if it contains more or fewer increments.

**6.6.** *Labelling*

Ensure that each test portion is labelled to show which increments are represented.

**Note:** This information may be needed later for the statistical analysis. If the variability of the sample is required, see clause 7.

## **7. STATISTICAL EVALUATION AND REPORTING**

**7.1.** *Statistical evaluation*

This CORESTA Recommended Method is concerned only with sampling and the report of the results from the laboratory or the sampling organisation to the users.

This CORESTA Recommended Method does not consider problems of comparisons between laboratories or of predicting results of one laboratory from those at another laboratory.

ISO 5725 considers comparisons between laboratories.

ISO 5725 defines various measures of reproducibility and repeatability, but these are concerned with variations between and within laboratories due to testing errors and techniques. They are not directly relevant to sampling variations.

The combined variations of tobacco products (see Annex C) and the analytical procedures are important.

**Notes:**

1. There are many reasons for sampling commercial fine-cut tobacco e.g. to check that it complies with the specification marked on the pouch, to publish comparative tables and to see whether the smoke yields of fine-cut smoking articles made from one population is higher or lower than another. The statistical evaluation of the results will, therefore, depend on the purposes of the sampling and the users will have to interpret results in the light of those reasons and prepare tables appropriate for their needs.
2. It is strongly recommended when interpreting the results to take into account the Confidence Interval of the mean values.

**7.2. Outliers**

In any body of experimental data there might be outliers, observations in which something may have gone wrong to give a faulty result. The tests for outliers described in ISO 5725 shall be used and its recommended criteria for rejecting observations followed.

**7.3. Confidence Interval**

The method described in ISO 2602 to calculate confidence intervals shall not be used because samples taken according to this CORESTA Recommended Method are not strictly random.

## **8. SAMPLING REPORT**

The sampling report shall include the following particulars:

- a) dates between which sampling was carried out;
- b) areas from which samples were drawn (or the area served by the factories/warehouses sampled);
- c) number of times sampling was carried out and the number of increments sampled;
- d) number of places sampled, principles of factory/warehouse sampling (detailed tables of number of increments from each factory/warehouse are not necessary);
- e) note on anomalies, missing or re-tested values, very variable fine-cut tobacco, etc.;
- f) intentional changes to the product, e.g. change in printed smoke yield (C.1);
- g) any details required by Annexes A and B.

## Annex A

### **SAMPLING FOR THE DETERMINATION OF MEAN VALUES OF TOTAL AND NICOTINE-FREE DRY PARTICULATE MATTER.**

(This Annex forms an integral part of this CORESTA Recommended Method)

#### **A.1.** *Scope and Field of application*

This Annex establishes procedures for sampling fine-cut tobacco which is intended to be made into fine-cut smoking articles for the determination of the mean values of condensate (water and nicotine-free) and nicotine.

**Note:** The relevant test procedures are according to

*CORESTA Recommended Method N° 7:1991*

Determination of nicotine in the mainstream smoke of cigarettes by Gas chromatographic analysis.

*CORESTA Recommended Method N° 8:1991*

Determination of water in the mainstream smoke of cigarettes by Gas chromatographic analysis.

*CORESTA Recommended Method N° 22:1991*

Routine analytical cigarette smoking machine - Specifications, definitions and standard conditions.

*CORESTA Recommended Method N° 25:1991*

Ambient air flow around the cigarettes in routine analytical smoking machines : Control and monitoring.

*CORESTA Recommended Method N° 44:1997*

Determination of Total and nicotine- free dry particulate matter of smoking articles made from fine-cut tobacco using a routine analytical smoking machine including the preparation of the condensate for the determination of water and nicotine.

*ISO 3308:1991*

Routine analytical cigarette smoking machine - definitions and standard conditions.

*ISO 10315:1991*

Cigarettes - Determination of nicotine in smoke condensates - Gas chromatographic method.

*ISO 10362-1:1991*

Cigarettes - Determination of water in smoke condensates - Part 1 Gas chromatographic method.

It is not necessary to refer to any of these International Standards in order to use CORESTA Recommended Method N° 43.

**A.2.** *Procedure for sampling at the premises of the manufacturer or importer and distributor at one point in time*

**A.2.1.** Sampling

To make up each increment required, draw one or more bundles of fine-cut tobacco at random from each sampling point to form the necessary gross sample.

Take the increments from as many sampling points as possible - at least 10 - distributed between the factories where the fine-cut tobacco is made or imported and distributed as far as possible in proportion to the production at these factories, provided that every manufacturer's premises is sampled.

**Note:** If the population has several strata, *e.g.* pouches of different size or from different machine rooms, then the increments should be drawn from all strata in proportion to their respective sizes.

**A.2.2.** Constitution of the laboratory sample

From each increment, take portions for the test laboratory and manufacturer (if required) in equal proportions, keeping the remainder as a reserve sample. Label each portion. The laboratory sample for each test of a population shall comprise the greater of 40 sales units or 2000 g fine-cut tobacco (comprising a minimum of 10 sales units), divided equally, or as nearly so as possible, among the increments.

**A.3.** *Procedure for sampling at the point of sale at one point in time*

**A.3.1.** Selection of the places of purchase

**Note:** The criteria specified in A.3.1.1. to A.3.1.4. are shown diagrammatically in Figure 2.

**A.3.1.1.** If the area in which the fine-cut tobacco is sold encompasses more than 20 places of purchase, two increments each shall be obtained in 20 randomly selected places of purchase in the area in which the fine-cut tobacco is sold.

**A.3.1.2.** If the area in which the fine-cut tobacco is sold encompasses 11 to 20 places of purchase, four increments each shall be obtained in 10 randomly selected places of purchase in which the fine-cut tobacco is sold.

**A.3.1.3.** If the area in which the fine-cut tobacco is sold encompasses 6 to 10 places of purchase, eight increments each shall be obtained in five randomly selected places of purchase in the area in which the fine-cut tobacco is sold.

**A.3.1.4.** If the area in which the fine-cut tobacco is sold encompasses one, two, three, four or five places of purchase, 40, 20, 14, 10, and 8 increments each shall be obtained in the one, two, three, four or five places of purchase in which the fine-cut tobacco is sold.

**A.3.1.5.** An alternative sampling procedure to that given in A.3.1.1. to A.3.1.4. can be used. This is independent of the size of the sales area, and not at random, but is satisfactory provided the sampling is done in at least six sampling points. If used, a total of at least 40 increments shall be obtained, which should, as far as possible, be evenly distributed among the sampling points.

**A.3.1.6.** Within each place of purchase, sampling points shall be selected in accordance with 4.2.2. Increments shall be marked in accordance with 4.2.4.2.

**A.3.1.7.** The volume of sampling shall be expressly stated in the report, giving the number of places of purchase.

**A.3.2.** Constitution of the laboratory sample

From each increment, take portions for the test laboratory and manufacturer (if required) in equal proportions, keeping the remainder as a reserve sample. Label each portion. The laboratory sample for each test of a population shall comprise the greater of 40 sales units or 2000 g fine-cut tobacco (comprising a minimum of 10 sales units), divided equally, or as nearly as possible, among the increments.

**A.4.** *Sampling over a period of time*

A sample representing a period of time shall be obtained from the manufacturer's premises by dividing the sample specified in A.2. into a number of sub-period samples taken at different times, as specified in clause 5.

**A.5.** *Constitution of the laboratory fine-cut smoking articles*

This depends on the analytical smoking procedure to be used. Some procedures involve smoking 20 fine-cut articles per trap, whereas others use only five fine-cut articles per trap. The test sample shall comprise sufficient fine-cut tobacco for an appropriately planned experiment to be made.

## Annex B

### **SAMPLING FOR THE DETERMINATION OF THE VALUES OF THE PARAMETERS OF FINE-CUT TOBACCO**

(This Annex forms an integral part of this CORESTA Recommended Method)

**B.0.** *Introduction.*

The properties of fine-cut tobacco can be measured on any sample of a product. However, except for experiments specifically designed as journey or storage tests, (*e.g.* to examine the protective properties of pouches or packaging) the data may only be meaningful when the properties are evaluated immediately after manufacture. For this reason this Annex limits certain of the options generally available in this CORESTA Recommended Method.

**B.1.** *Scope and field of application*

This Annex establishes methods for sampling fine-cut tobacco which is intended for the determination of the mean values of parameters of fine-cut tobacco itself or the determination of the mean values of parameters of fine-cut smoking articles made from the fine-cut tobacco.

**B.2.** *Procedure for sampling at the premises of the manufacturer or importer at one point in time.*

To make up each increment required, draw one or more bundles of fine-cut tobacco at random from each sampling point to form the necessary gross sample. Take the increments from as many sampling points as possible - at least 10 - distributed between the factories where the fine-cut tobacco is made or imported, as far as possible in proportion to the production at these factories, provided that every manufacturer's premises is sampled.

**Note:** If the population has several strata, *e.g.* pouches of different sizes or from different machine rooms, then the increments should be drawn from all strata in proportion to their respective sizes.

**B.3.** *Sampling over a period of time*

A sample representing a period of time can be obtained from the manufacturer's premises by dividing the sample specified in B.2. into a number of sub-period samples taken at different times, as specified in clause 5.

**B.4.** *Constitution of the laboratory and test samples*

The size of the laboratory and test samples should depend on:

1. The number of independent tests required.
2. The number of replicate results required for each parameter.
3. The number of pouches of fine-cut tobacco required to produce each result in (2).

**Note:** In some cases, tests are destructive - while others are not.

## Annex C

### **BACKGROUND CONSIDERATION ON THE CHOICE OF SAMPLING PROCEDURES**

(Informative, this Annex does not form an integral part of this  
CORESTA Recommended Method)

#### **C.1. Introduction**

It is particularly difficult to recommend a general method of sampling fine-cut tobacco. The objective of sampling, is, clearly, to provide a representative sample, but the problem arises because the specific purpose for which tests are required affects the recommendation.

#### **C.2. Variability**

Variability arises from the methods used to test fine-cut tobacco (*e.g.* see CORESTA Recommended Method N° 44) but there are also appreciable contributions to the variability of the product as fine-cut tobacco manufacture continues over a period of time. These are reflected in sources of variability described below.

Short term variability - The moisture content of the tobacco varies around its target value. Porosity and other properties of the wrapper used to make fine-cut smoking articles display similar variability. Thus, the design characteristics of the fine-cut smoking article being made at any one time vary in a random fashion around their target values, and these variations give rise to corresponding variations in smoke yields.

Medium term variability - Superimposed on the sources of short term variability are the sources of medium term variability, such as batch - to - batch changes in materials, grade substitutions in the blend, wear of machinery, etc.

Long term variability - In the long term there are changes in the blend due to different crop years. Machinery replacement programmes and the upgrading of manufacturing processes can influence the product. Suppliers of non-tobacco materials may also change. All these sources of long term variability are added to both the short term and medium term contributions.

These terms are described for practical convenience, but it should be remembered that these sources of variability operate as a continuum over time. Experience over numerous years has shown that when attempting to estimate a “true” overall mean (*i.e.* over all production runs) the contribution to the variability of medium term effects is larger than that of short term effects, with the influence of long term effects being larger than either of these.

For samples taken according to A.2., the implications are that 95% confidence limits (for the mean of the smoke yields of fine-cut smoking articles made from the fine-cut tobacco) calculated from the sample data reflect only short term variability. Increasing the size of the sample taken at any one point in time can only reduce the effect of the short term sources of variability on the precision of the mean of the sample. Thus, the mean of a sample taken at a single time point is of limited value in predicting the

mean likely to be obtained from any later sample, no matter how big these samples might be.

For samples taken according to A.4. the implications are that the 95% confidence limits (for the mean of the smoke yields of fine-cut smoking articles made from the fine-cut tobacco) calculated from the sample data reflect short term and medium term variability. In this case increasing the number of sub - period samples reduces the confidence limits. However, unless the sampling period is greatly extended, the calculated confidence limits will still not reflect the long term variability. Experience of sampling at point of sale (A.3.) has shown that the data are often of little value. The rotation of stocks in retail outlets is often very poor so that old pouches appear for sale on shelves and the conditions for storage are frequently far from ideal.

Determinations of the smoke yields of fine-cut smoking articles made from the fine-cut tobacco on a point of sale sample reflect the smoke yields from the product available to a buyer of that particular increment. However, a gross sample made up from point of sale increments may have a wider inherent variability arising from unspecified periods of manufacture, and may possibly include fine-cut tobacco manufactured before and after intentional design changes.

### C.3. *Recommendations*

These factors lead to the strong recommendation that determinations be made on the population manufactured for sale, sampled at manufacturers' factories or importers' warehouses.

(See Figures 1 & 2 on next page)

FIGURE 1  
*Sampling at the manufacturer's premises over a period of time*

	MANUFACTURER'S PREMISES 1	MANUFACTURER'S PREMISES 2
STRATA	Machines A; B; C; D;	Machines E; F;
SAMPLING POINTS	Warehouse	Warehouse
INCREMENTS (2 in this case)	6 Bundles 1; 2; 3; 4; 5; 6;	2 Bundles 7; 8;
SUB-PERIOD SAMPLE	8 Bundles 1; 2; 3; 4; 5; 6; 7; 8;	
SAMPLING SUB-PERIODS	January February March April May	
GROSS SAMPLE (Theoretical in this case)	5 Samples of 8 Bundles each. Total 40 Bundles (5 x 2 Increments. Total 10 Increments)	
LABORATORY sub-period SAMPLE	Constitution of the laboratory samples: 2 pouches per bundle for laboratory A 2 pouches per bundle for manufacturer's laboratory (see 4.1.4.1.) Remainder for reserve Size: 16 pouches per laboratory sample	

**Note:** Machines B and D are twice as fast as the other machines and hence the sampling rate is twice as high ( See 4.1.2.1. ).

FIGURE 2  
*Sampling at the point of sale at one point in time - selection of the place of purchase*

N° of places of potential purchase per area	N° of increments to be obtained	N° of places of purchase
More than 20	2	20 at random
11 to 20	4	10 at random
6 to 10	8	5 at random
5	8	5
4	10	4
3	14	3
2	20	2
1	40	1