CORESTA RECOMMENDED METHOD N° 47

CIGARS - SAMPLING

(January 2000)

0. INTRODUCTION

Existing national standards, rules, regulations and laws were taken into account when preparing this CORESTA Recommended Method and two different procedures are described:

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

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, for example of cigars 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 cigars available over an appreciable period of time (*e.g.*, cigars representing several months' production) a number of sub-period samples will be taken at different times and the results combined.

The sampling plan depends upon the purpose of sampling, for example determination of physical properties or of chemical constituents.

It is particularly difficult to recommend a general method of sampling cigars. The objective of sampling is clearly to provide a representative sample.

There are appreciable contributions to the variability of the product as cigar manufacture continues over a period of time. These are reflected in sources of variability described below. Variability also arises from the methods used to test cigars.

Short-term Variability - It is impossible to control the weight of every cigar precisely on target. The moisture content of the tobacco varies around its target value. Wrapper and binder contain similar variability. Thus the design characteristics of the cigars being manufactured at any one time vary in a random fashion around their target values and these variations give rise to corresponding variations in results.

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 (wrappers, binders), grade substitutions in the blend, wear of machinery, etc.

Long-term Variability - In the long-term there are changes in the wrapper, binder and blend due to different crop years. Machinery replacement programmes and the upgrading of manufacturing processes can influence the product. All these sources of long-term variability are added to both the short 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.3., the implications are that the 95% confidence limits (for the mean of results) 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 95% confidence limits (for the mean of results) 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 has shown that the data are often of little value. The rotation of stocks in retail outlets is often very poor so that old packs appear on shelves for sale and the conditions for storage are frequently far from ideal.

Determinations on a point of sale sample reflect the results 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 cigars manufactured before and after intentional design changes.

These factors lead to the conclusion that determinations be made on the population manufactured for sale, sampled at manufacturer's factories or importer's warehouses.

Because of the short, medium and long-term variations in cigar manufacture it is concluded that the "Sampling over a period of time" procedure should be used wherever possible.

Detailed sampling plans are given in the Annex.

1. FIELD OF APPLICATION

This Recommended Method specifies two methods of sampling a population of cigars manufactured for sale for the preparation of laboratory samples. Different procedures are specified according to whether sampling is undertaken at the point of sale, at the producer's premises or importer's and distributor's warehouses.

a) Sampling 'at one point in time' provides an instantaneous estimate of one or more characteristics of cigars (4.1) (4.2).

b) Sampling 'over a period of time' provides a continuous estimate of one or more characteristics of cigars. It can be considered for practical purposes as a series of samples each taken at one point in time (6.1).

2. DEFINITIONS

2.1. *Sale Unit*

A quantity of cigars ready to be offered for sale to the public. When a sale unit is mentioned, it is to be understood as at least one pack or a number of packs containing together at least 20 cigars.

2.2. *Population*

The aggregate of sale units of the cigar 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:

2.2.1. 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.

2.2.2. 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.

2.3. *Increment*

The sample of cigars taken at one time, at one sampling point, to be combined to produce the gross sample.

2.4. *Gross Sample*

The aggregate of the increments.

2.5. *Sub-period Sample*

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

2.6. *Laboratory Sample*

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

2.7. *Test Sample*

Cigars for test taken at random from the laboratory sample and which are representative of each of the increments making up the laboratory sample.

2.8. *Test Portion*

A group of cigars prepared for a single determination and which is a random sample from the test sample or conditioned sample as appropriate.

2.9. *Place of Purchase*

The town, village or district within the area to be sampled, or that part of the area where the cigars are available.

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

2.10. *Sampling Point*

The specific location (*e.g.* shop, specialist tobacco shop, petrol station, place in warehouse, place in factory, etc.) from which an increment is to be taken.

2.11. *Factory*

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

2.12. *Bundle*

A commercial package available within a factory. Packs are usually grouped into bundles, i.e. the largest quantity a consumer would buy.

3. REFERENCES

ISO 3534: 1993
Statistics - Vocabulary and symbols.

ISO 5725: 1994
Accuracy (trueness and precision) of measurement methods and results.

4. PROCEDURE FOR SAMPLING AT ONE TIME

Note: When a sale unit does not consist of a packet of 20 cigars, the number of sale units sampled shall be adjusted to produce the required number of cigars, only whole sale units shall be sampled.

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

4.1. *Procedure for sampling at the point of sale (population available to the consumers)*

4.1.1. Selection of the places of purchase.

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 clause A.2 of the Annex.

4.1.2. 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 the particular cigars in that sampling place to be sampled. This is usually done by defining for each sampling scheme several kinds of sampling points (*e.g.*, supermarkets, specialist tobacco shops, petrol stations).

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.

4.1.3. 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 (2.3). This is particularly important 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 cigars of the same name and characteristics are 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 cigars and their 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 destined);
g) marks on stamp (if any);
h) manufacturer's pack codes (if any).

4.1.4.3. The cigars in the gross sample shall be obtained in as short a time as possible. This time should not exceed 14 days.

4.1.4.4. 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 and safe means.

4.1.4.5. Send to each laboratory, under separate cover, a list of samples dispatched on that day.

4.2. *Procedure for sampling at the premises of the manufacturer or importer (population manufactured for sale)*

4.2.1. Principles.

4.2.1.1. 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".

4.2.1.2. 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 factory. The sampler shall be accompanied by a manufacturer's representative, unless otherwise required by law.

4.2.1.3. If the manufacturer so requests, the sampler will take a replicate sample for the manufacturer's use (see 4.2.4.1.).

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

4.2.1.5. The sampler shall bring written details of the purpose of test, name of the cigar and number of sale units. Three copies shall be required; 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.

4.2.2. Sampling.

4.2.2.1. For each increment required, draw one bundle at random from the population to be sampled, *i.e.*, at each sampling point selected in the factory.

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

4.2.2.2. 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.

4.2.3. 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. This is particularly important 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 cigars of the same name and characteristics are 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 cigars and their characteristics;
b) date of sampling;
c) factory/warehouse at which the sale unit was taken;
d) sampling point within the factory/warehouse;
e) destination (*i.e.*, the laboratory to which the samples are destined);
f) marks on stamp (if any);
g) manufacturer's pack codes (if any).

4.2.4.3. 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 and safe means.

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

5. CONSTITUTION OF THE TEST SAMPLE

5.1. In general, the laboratory sample will contain cigars for a number of different kinds of tests. Each may require a different size of test sample. The sample for each kind of test shall contain cigars from every increment of the sample, except in the case where the possibility envisaged in 5.2. is used.

For nearly all kinds of tests there will be several individual determinations carried out at each laboratory. At some stage, the test sample will be divided into test portions, one for each individual determination.

Each laboratory should arrange its work as described in 5.2. to 5.6.

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

5.3. 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.

5.4. If the laboratory sample still contains several versions with K1, K2... increments, divide the k test portions - which will be formed later - between the versions in the proportion K1 :K2... Within each version divide the increments into test portions of as near as possible equal size (*e.g.*, for 5 determinations and 13 increments, 2 groups of 2 increments and 3 groups of 3 increments).

5.5. Take an equal number of cigars from each increment in a group to provide a test portion on which one determination will be carried out. A different number of cigars may be taken from increments in another group if it contains more or fewer increments.

5.6. Ensure that each test portion is labelled to show which increments are represented. This information may be needed later for the statistical analysis.

Note: If the variability of the sample is required, see Clause 7.

6. MODE FOR SAMPLING OVER A PERIOD OF TIME

The procedures described in Clauses 4 and 5 are concerned with sampling "at one point in time" (see 1 a).

For some purposes a sample representing cigars available over a period of time (*e.g.*, six months or a year) 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 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 cigars and the laboratory determinations are taken into account in the measure of sample variability.

6.1. *Mode for sampling over a period of time at the premises of the manufacturer or importer*

The time period shall be divided into at least five equal sub-periods, one sub-period sample taken in each sub-period from every factory. 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 factory, 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 factory.

Principles, selection and constitution are otherwise as set out in 4.2.

The mode of sampling is illustrated in figure 1.

7. STATISTICAL EVALUATION AND REPORTING

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

This 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 cigars and the analytical procedures are important. It is, therefore, strongly recommended when interpreting the results to take into account the confidence interval of the mean values.

8. SAMPLING REPORT

The sampling report shall include the following particulars:

a) the dates between which sampling was carried out;

b) the area from which samples were drawn (or the area served by the factories/warehouses sampled);

c) the number of times sampling was carried out and the number of increments sampled;

d) the number of places sampled, principles of factory/warehouse sampling (detailed tables of number of increments from each factory/warehouse are not necessary);

e) notes on anomalies, missing or re-tested values, very variable cigars, etc.;

f) intentional changes to the product;

g) any other details required.

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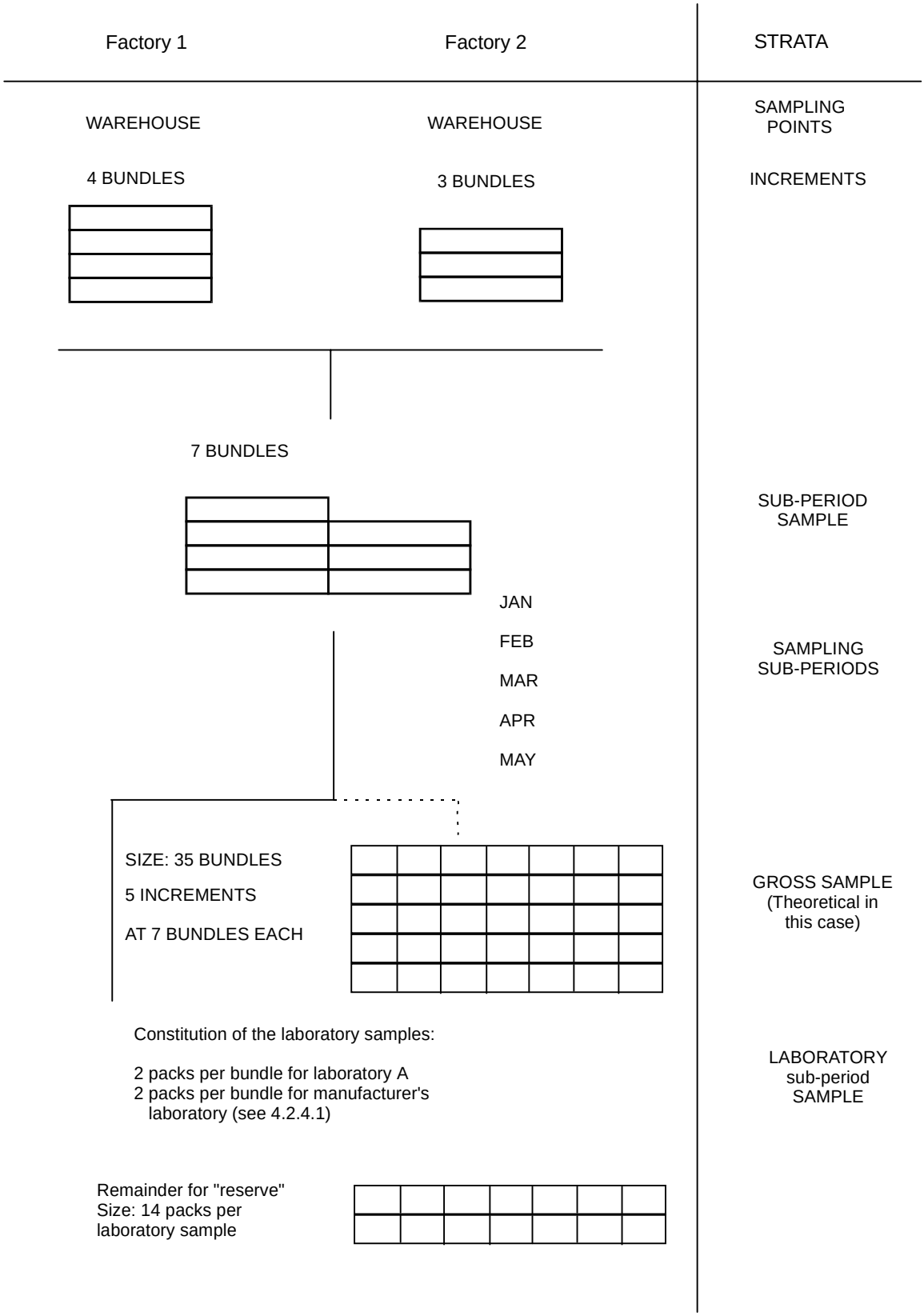
Figure 1. Sampling at the manufacturer's premises over a period of time



ANNEX

SAMPLING FOR THE DETERMINATION OF MEAN VALUES OF CHARACTERISTICS OF CIGARS.

(This annex forms an integral part of the Recommended Method).

A.1. *Scope and Field of Application*

This annex establishes procedures for sampling cigars that are intended for the determination of the mean values of any characteristics of cigars.

A.2. *Procedure for sampling at the point of sale at one point in time*

A.2.1. Selection of the places of purchase.

A.2.1.1. If the area in which the cigars are sold encompasses more than 10 places of purchase, 1 sale unit each is to be obtained in 10 randomly selected places of purchase in the area in which these cigars are sold.

A.2.1.2. If the area in which the cigars are sold encompasses 6 to 10 places of purchase, 2 sale units each are to be obtained in 5 randomly selected places of purchase in which these cigars are sold.

A.2.1.3. If the area in which the cigars are sold encompasses 1, 2, 3, 4 or 5 places of purchase, 10, 5, 4, 3 and 2 sale units each are to be obtained in the 1, 2, 3, 4 or 5 places of purchase.

A.2.1.4. Within each place of purchase, sampling points shall be selected according to 4.1.2. Increments shall be marked according to 4.1.4.2.

A.2.1.5. The volume of sampling shall be expressly stated in the report, giving the number of places of purchase.

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 200 cigars, or 10 sale units, divided equally, or as nearly so as possible, among the increments.

A.3. *Procedure for sampling at the premises of the manufacturer or importer at one point in time*

A.3.1. Sampling.

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

Take the increments from as many sampling points as possible distributed between the factories where the cigars are made or imported and distributed as far as possible

in proportion to the production at these factories, provided that every factory is sampled.

Note: If the population has several strata, then the increments should be drawn from all strata in proportion to their respective sizes.

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 200 cigars, or 10 sale units, divided equally, or as nearly so 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 factory by dividing the sample specified in Clause A.3 into a number of sub-period samples taken at different times, as specified in Clause 6.

A.5. *Constitution of the test sample*

This depends on the analytical procedure to be used. The test sample shall comprise sufficient cigars for an appropriately planned experiment to be made.