



**Cooperation Centre for Scientific Research
Relative to Tobacco**

CORESTA Guide N° 8
Technical Guide
for CORESTA Monitor Test Piece
Production and Evaluation Requirements

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Routine Analytical Chemistry
Sub-Group



CORESTA TECHNICAL GUIDE N° 8

Title:

CORESTA Monitor Test Piece Production and Evaluation Requirements

Status: Valid

Note: This document will be periodically reviewed by CORESTA

Document history:

Date of review	Information
April 2009	Version 1
December 2020	Version 2: In the section 4. "Additional Notes Concerning Production Requirements", the acceptable standard deviation of the weight of individual monitor test pieces was changed from 16 mg to 25 mg and the estimation procedure for the standard deviation was added.

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1. Introduction

Monitor test pieces are used to monitor the stability of the analytical processes involved when using a cigarette smoking machine for routine analysis. In particular, they are used to assess whether the analytical process related to the machine smoking of cigarettes is in statistical control. An International Standard, ISO 16055:2003 describes the requirements for and use of a monitor test piece. This guideline gives additional details on specification, production, packaging and evaluation of a CORESTA monitor test piece.

2. Monitor Test Piece Specification

It is recommended that the following specifications be met for CORESTA monitor test piece production:

Tobacco blend and cut rag

Type of tobacco	Flue cured lamina without stems
Additives	Preferably none, but $\leq 2\%$ glycerol (w/w) is acceptable if necessary
Cut width	~ 0.9 mm

Monitor test piece dimensions

Test Piece length	~ 83 mm (king size)
Test Piece diameter	~ 7.8 mm
Test Piece weight	~ 980 mg
Test Piece pressure drop	~ 140 mmWG
Rod length	~ 62 mm
Rod weight	~ 820 mg
Tobacco weight	~ 780 mg
Tobacco density	~ 260 mg/cm ³
Tobacco moisture	~ 12.0 %

Monitor test piece non-tobacco materials

Filter rod diameter	~ 7.8 mm
Tow specification	2.5 Y32HK or similar
Filter pressure drop	In the range 75 - 80 mmWG
Plasticiser	~ 7 % triacetin
Plug wrap	nonporous
Filter length	~ 21 mm
Tipping	distinguishable from commercial products (i.e. grey tipping) with CM logo, no perforation preferable
Tipping width	~ 29 mm
Test Piece paper	wood pulp, precipitated calcium carbonate filler ~ 30 %, ~ 40 to 50 CU, Citrate ~ 0.7 %
Paper width	~ 26 mm

Smoke yields

NFDPM	~ 14 mg/monitor test piece
Nicotine	~ 1.4 mg/monitor test piece
CO	~ 14 mg/monitor test piece
Puff number	~ 9

If it is necessary to use humectants for the tobacco only glycerol ($\leq 2\%$) is allowed. Propylene glycol cannot be used due to its high vapour pressure, which may lead to uncontrolled (undetected) weight loss during conditioning.

The product design must ensure that the smoke yields (NFDPM, Nicotine and CO) are sufficiently high (~14 mg NFDPM) so that the influence from a possible offset in the smoking machine settings can be distinguished from the normal variation of the smoke yields.

3. General Production Requirements for Monitor Test Piece

- The monitor test piece shall be produced from one production batch.
- The number of monitor test pieces produced shall be sufficient to cover the needs of a period of at least 2 years. It is recommended that the production amount be set according to the maximum storage capacity of the suppliers.
- For reasons of homogeneity, the cut tobacco used shall be taken from one well-mixed batch. If possible, it is advisable to use a single grade tobacco with no further addition of materials, such as stems, humectants or flavours, to avoid unnecessary heterogeneity of the blend.
- The non-tobacco materials used, such as wrapping paper and filters, shall be taken from one production batch and strict quality-control measures shall be applied during the production of the filters.

- Specifications for the length and diameter of the monitor test piece and for its filter length, tipping length and filter material shall be set before the production. The specifications must encompass not only the target values but also the maximum variability.
- The requirements include a stable CO yield which is best obtained with a non-ventilated filter. The recommendation is that the monitor test piece is unventilated.
- The production tolerances for tobacco mass, circumference and draw resistance of the monitor test piece shall be controlled as precisely as possible. It will be necessary to increase the quality control measures and to decrease the production machine speed to obtain the required constancy in physical, chemical and smoke yields of the monitor test pieces. It is important that the variability is markedly lower than for normal commercial cigarette production.

4. Additional Notes Concerning Production Requirements

- As the monitor test piece is frequently used as an indicator for stable conditioning the tobacco mass and total mass of the product must be controlled as tightly as possible.
- To facilitate the control of uniform rod filling and high end stability it may be advantageous to increase the target tobacco weight by up to 30 mg compared to the recommended tobacco weight in the table "Monitor test piece dimensions".
- Weight control is critical in the production of a reliable monitor test piece. Excessive weight variation contributes to unacceptable variation in smoke yields.
- It is recommended that the weight of individual monitor test pieces is controlled to a standard deviation of less than 25 mg.
- The standard deviation of weight for individual monitor test pieces is estimated as follows:
 - Sampling

More than 20 monitor test pieces are sampled at the cigarette making machine at least 40 times with the same interval throughout the production batch. [Refer to ISO 8243 4.1.1 Note] This will generate a minimum of 800 individual measurements.
 - Measurement

The 20 monitor test pieces from each sampling are weighed individually without conditioning directly after sampling during the ongoing production. Intermediate standard deviations are used to monitor the quality of the ongoing production.
 - Evaluation

Finally, the overall standard deviation is calculated by all values of individual (≥ 800) monitor test piece weights.

5. Packaging

It is essential that the monitor test piece be clearly distinguishable from commercial cigarettes. The products must be packed in hard boxes of 20 test pieces which shall carry a text similar to the text given below and as illustrated in the attached Figures 1-3:

**CORESTA approved
MONITOR No. X**

**FOR NON-CONSUMER LABORATORY TESTING PURPOSES ONLY
NON-COMMERCIAL PRODUCT
DATE OF PRODUCTION: XXXXX**

10 packets are packed in outers carrying a similar text.

The shipping cartons should carry a text similar to the following:

CM X

**Quantity: XXXX test pieces
Producer: XXXXXXXX
Date of production: XXXXXX**

**FOR NON-CONSUMER LABORATORY
TESTING PURPOSES ONLY**

6. Evaluation of CORESTA Monitor Test Piece

- The monitor test pieces in a production batch must show consistent values for the content of nicotine-free dry particulate matter, nicotine and CO in smoke. The consistency shall be assessed by means of a comparative study of sufficient size using samples representing the entire production run.
- This comparative study is coordinated by the CORESTA Smoke Analysis Sub-Group and results statistically evaluated to ensure acceptably low variation in physical parameters and smoke yields prior to the release of the monitor test piece for sale.
- The packaged monitor test pieces shall be stored at a temperature below +4 °C until they are to be used.

Figure 1 – Monitor Test Piece with CM Logo and Hard Box (example)



Figure 2 – CM X Outer Carton and Flat (example)

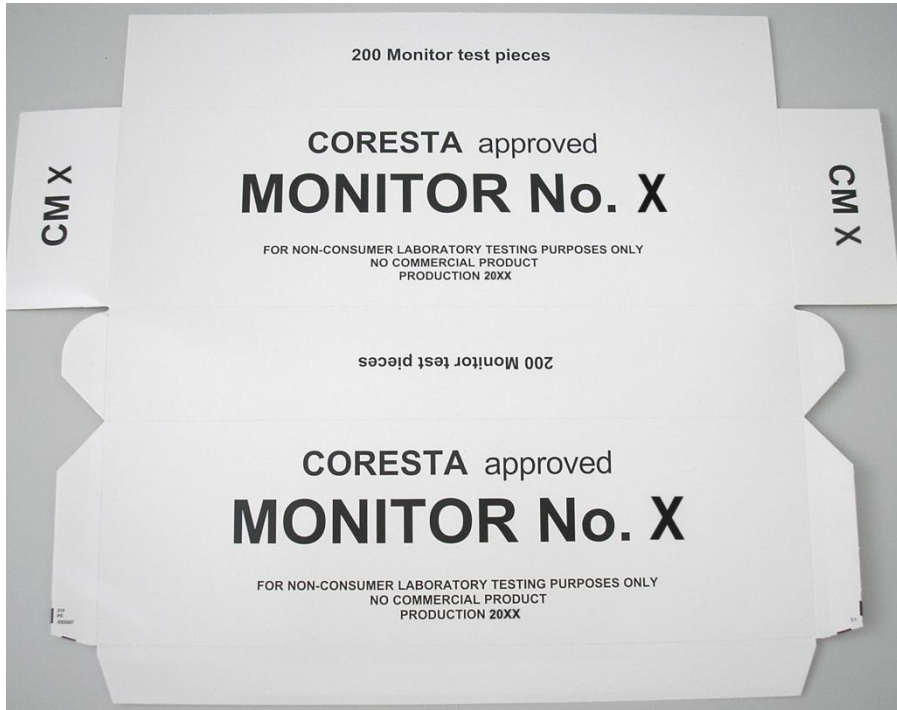


Figure 3 – Label for Shipping Carton (*example*)

