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**Cigarettes — Determination of  
ammonia in cigarette mainstream  
smoke using ion chromatography**

*Cigarettes — Dosage de l'ammoniac dans le courant principal de la  
fumée de cigarette par chromatographie par échange d'ions*



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## 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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 126, *Tobacco and tobacco products*.

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](http://www.iso.org/members.html).

## Introduction

The CORESTA Smoke Analytes Sub-Group<sup>1)</sup> conducted a survey among its members and determined that most laboratories used a method involving ion chromatography for the determination of ammonia in cigarette mainstream smoke. Two alternative trapping systems were used, either with a combination of glass fibre filter pad followed by impinger traps or with an impregnated glass fibre filter pad followed by a glass fibre filter pad.

A CORESTA recommended method (CRM) was written<sup>[1]</sup> on the basis of the results obtained in an interlaboratory study conducted in 2015 involving 17 laboratories from 8 countries using cigarettes manufactured from a range of blend styles<sup>[2]</sup>. The results demonstrated equivalency of the data obtained by using both trapping systems. It was observed that the method is not applicable to dark-air cured blended cigarettes.

This document is based upon the CRM 83 and includes statistical evaluations carried out according to ISO 5725-1 and ISO 5725-2.

No machine smoking regime can represent all human smoking behaviour.

- It is recommended that cigarettes also be tested under conditions of a different intensity of machine smoking than those specified in this document.
- Machine smoking testing is useful to characterize cigarette emissions for design and regulatory purposes, but communication of machine measurements to smokers can result in misunderstandings about exposure and risk across brands.
- Smoke emission data from machine measurements may be used as inputs for product hazard assessment, but they are not intended to be nor are they valid as measures of human exposure or risks. Communicating differences between products in machine measurements as differences in exposure or risk is a misuse of testing using ISO standards.

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1) Until 2017, the sub-group has been previously known as CORESTA Special Analytes Sub-Group.



# Cigarettes — Determination of ammonia in cigarette mainstream smoke using ion chromatography

**WARNING** — The use of this document involves hazardous materials, operations and equipment. This document does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and determine the applicability of any other restrictions prior to use.

## 1 Scope

This document specifies a method for the quantification of ammonia by ion chromatography in mainstream smoke using ISO 3308 smoking parameters.

This method is applicable to cigarettes with ammonia yields between 1 µg/cigarette and 30 µg/cigarette. It is not applicable for the determination of ammonia in dark-air cured cigarettes.

## 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 3308, *Routine analytical cigarette-smoking machine — Definitions and standard conditions*

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

ISO 4387, *Cigarettes — Determination of total and nicotine-free dry particulate matter using a routine analytical smoking machine*

ISO 8243, *Cigarettes — Sampling*

## 3 Terms and definitions

No terms and definitions are listed in this document.

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/>

## 4 Principle

Ammonia is collected by passing the mainstream smoke of cigarettes through either

- a) a glass fibre filter pad as specified in ISO 3308 followed by impinger traps containing dilute sulphuric acid (trapping system 1 in the document), or
- b) an impregnated glass fibre filter pad followed by an untreated glass fibre filter pad (trapping system 2 in the document).

The glass fibre filter pad is extracted either with the impinger solutions (trapping system 1) or with dilute hydrochloric acid (trapping system 2). The obtained solutions are analysed by ion chromatography using an external standard calibration.