
**Cigarettes — Determination
of benzo[a]pyrene in cigarette
mainstream smoke using GC/MS —
Part 1: Method using methanol as
extraction solvent**

*Cigarettes — Dosage du benzo[a]pyrène dans le courant principal
de la fumée de cigarette par CG/SM — Partie 1: Méthode utilisant
du méthanol comme solvant d'extraction*

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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

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

This first edition of ISO 22634-1 cancels and replaces ISO 22634:2008, of which it constitutes a minor revision.

The main changes compared to the previous edition are as follows:

- the number of ISO 22634 has been changed to ISO 22634-1 as a new part 2 of ISO 22634 has been elaborated;
- the titles of the two parts have been modified accordingly;
- the text has been editorially revised.

A list of all parts in the ISO 22634 series can be found on the ISO website.

Introduction

Between 1999 and 2003, a task force composed of Cooperation Centre for Scientific Research Relative to Tobacco (CORESTA) members studied the existing methodologies for the determination of benzo[a]pyrene (B[a]P) in the mainstream smoke of cigarettes. Several methods have been proposed for this determination, which are mainly based on two types of analytical methodology: high performance liquid chromatography (HPLC) with fluorescence detection and gas chromatography/mass spectrometry (GC/MS). In both cases, it is necessary to purify the smoke condensate extract before performing the chromatography in order to obtain a correct separation of the B[a]P peak.

The task force decided in the first instance to develop a method using HPLC with fluorescence detection. However, after several collaborative experiments, it appeared that achieving a significant reduction of the initially observed variability would be technically very difficult. The task force then decided to investigate a GC/MS method as an alternative and was able to demonstrate, through collaborative experiments, that a lower variability can be obtained with this methodology.

This document, produced through collaborative experiments involving many laboratories in many countries, provides an optimized procedure for the determination of B[a]P in cigarette mainstream smoke. The repeatability and reproducibility of this method have been assessed according to ISO recommendations and are included.

No machine smoking regime can represent all human smoking behaviours:

- 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 differences in 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 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.

