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**Cosmetics — Analytical methods —  
Determination of traces of mercury  
in cosmetics by atomic absorption  
spectrometry (AAS) cold vapour  
technology after pressure digestion**

*Cosmétiques — Méthodes d'analyse — Dosage des traces de mercure  
dans les cosmétiques par la technique de spectrométrie d'absorption  
atomique (SAA) de vapeur froide après digestion sous pression*



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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 217, *Cosmetics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 392, *Cosmetics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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

This document has been developed in parallel with ISO 23674. Knowing this, an interlaboratory test using either one or the other method was performed on same tailor-made cosmetic products in order to establish that both methods fulfilled the same requirements (see [Annex B](#)). This method was validated by means of an interlaboratory test according to ISO 5725-2<sup>[2]</sup> using lipstick, body lotion, toothpaste and eyeshadow, with a mercury concentration in the range of 0,110 mg/kg to 5,84 mg/kg. Statistical characteristics regarding this interlaboratory test are provided in [Annex A](#), [Table A.1](#).



# Cosmetics — Analytical methods — Determination of traces of mercury in cosmetics by atomic absorption spectrometry (AAS) cold vapour technology after pressure digestion

## 1 Scope

This document specifies a method for determination of mercury in cosmetics by means of cold vapour atomic absorption spectrometry (AAS) with a prior pressure digestion.

## 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 3696, *Water for analytical laboratory use — Specification and test methods*

## 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 <https://www.electropedia.org/>

## 4 Principle

As a first step, the finished cosmetic product is digested in a closed vessel at high temperatures and pressure using mineral acids. Pressure digestion is carried out at a temperature of 200 °C obtained by means of microwave-assisted heating.

After digestion of the cosmetics, the concentration of mercury is determined by quantification using the AAS cold vapour technology.

During mineralisation of the sample, it is not possible to dissolve all cosmetics without residues, depending on their type and composition. In order to obtain comparable results, it is absolutely mandatory to conform with the conditions specified for this method.

The measurement solution is transferred to the reaction vessel of the mercury analysis unit. From there, mercury is rinsed out into the cuvette of the AAS instrument with the help of a carrier gas flow after reduction with divalent tin or sodium borohydride. Absorption at the mercury line of 253,7 nm is used as a measure for mercury concentration in the cuvette. By using a gold/platinum mesh (amalgam technology) for concentration of the rinsed-off mercury prior to measurement in the cuvette, it is possible to achieve lower limits of quantification (LOQs).

## 5 Reagents

The reagents and the water used shall be free of mercury to such an extent that the analysis is not impaired. Unless specified otherwise, pure-analysis chemicals shall be used, and solutions are