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Jewellery — Determination of silver in 999 $^{0}/_{00}$ silver jewellery alloys — Difference method using ICP-OES

Joaillerie, bijouterie — Dosage de l'argent dans de l'argent 999 $^{0}/_{00}$ — Méthode de la différénce utilisant ICP OES

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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).

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).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 174, *Jewellery*.

This second edition cancels and replaces the first edition (ISO 15096:2008), which has been technically revised with the following changes:

a) change in the scope that this method is the referee method;

b) addition of silver and silver nitrate in Clause 5;

c) addition of a warning in Clause 7 that suitable health and safety procedures should be followed;

d) change of sample solution in 7.1;

e) split of 7.2 "Calibration solution" into 7.2 "Silver matrix calibration solutions" and 7.3 "Aqua regia matrix calibration solutions";

f) change of 8.2 "Method of calculation";

g) change of repeatability to 0,1 ‰;

h) amendment of wavelengths in Table A.1;

i) standard editorially revised.

Introduction

The following definitions apply in understanding how to implement an ISO International Standard and other normative ISO deliverables (TS, PAS, IWA).

— "shall" indicates a requirement;

— "should" indicates a recommendation;

— "may" is used to indicate that something is permitted;

— "can" is used to indicate that something is possible, for example, that an organization or individual is able to do something.

ISO/IEC Directives, Part 2 (sixth edition, 2011), 3.3.1 defines a requirement as an "expression in the content of a document conveying criteria to be fulfilled if compliance with the document is to be claimed and from which no deviation is permitted."

ISO/IEC Directives, Part 2 (sixth edition, 2011), 3.3.2 defines a recommendation as an "expression in the content of a document conveying that among several possibilities, one is recommended as particularly suitable without mentioning or excluding others, or that a certain course of action is preferred, but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated, but not prohibited."

Jewellery — Determination of silver in 999 $^{0}/_{00}$ silver jewellery alloys — Difference method using ICP-OES

1 Scope

This International Standard specifies the analytical procedure for the determination of silver with a nominal content of at least 999 ‰ (parts per thousand) by measuring specific elements listed in Table A.1.

This International Standard specifies a method intended to be used as the recommended method for the determination of fineness in 999 ‰ silver alloys covered by ISO 9202.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11596, *Jewellery — Sampling of precious metal alloys for and in jewellery and associated products*

3 Principle

The sample is weighed and dissolved in nitric acid to prepare a 10 g/l solution. The suspension, which can be present in that solution, is isolated by centrifugation and dissolved in aqua regia. Both solutions are analysed separately by ICP-OES and the total content of each impurity in the sample is obtained by adding together the results of the two analyses. The silver content is obtained by subtraction of the total content of impurities in the sample from 1 000 ‰.

4 Sampling

The sampling procedure shall be performed in accordance with ISO 11596.

5 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

5.1 Hydrochloric acid (HCl), approximately 30 % to 37 % HCl (mass fraction).

5.2 Nitric acid (HNO_3), approximately 65 % to 70 % HNO_3 (mass fraction).

5.3 Stock solution 1 (shall not contain any chloride), all elements given in Table A.1 (100 mg/l each) in 1 mol/l HNO_3 (5.2). The solution should be prepared just before use.

5.4 Stock solution 2 (may contain both chlorides and nitrates), Al, Au, Cr, Fe, Mg, Ni, Pt, and Sn (100 mg/l each) in 1 mol/l HCl (5.2) or HNO_3 (5.3). The solution should be prepared just before use.

5.5 Aqua regia (should be prepared just before use).

Mix three volumes of hydrochloric acid (5.2) and one volume of nitric acid (5.3).