



**International  
Standard**

**ISO 18214**

**Jewellery and precious metals —  
Determination of high purity gold,  
silver, platinum and palladium —  
Difference method using SPARK-OES**

*Joaillerie, bijouterie et métaux précieux — Dosage de l'or, de  
l'argent, du platine et du palladium à haute pureté — Méthode  
par différence utilisant la SPARK-OES*

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## Foreword

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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 document 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)).

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This document was prepared by Technical Committee ISO/TC 174, *Jewellery and precious metals*.

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).

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# Jewellery and precious metals — Determination of high purity gold, silver, platinum and palladium — Difference method using SPARK-OES

## 1 Scope

This document specifies an analytical procedure for the determination of gold, silver, platinum and palladium with a nominal content of and above 999 ‰ (parts per thousand, by mass), using an optical emission spectrometer with excitation by spark discharge (SPARK-OES).

## 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 11596, *Jewellery and precious metals — Sampling of precious metals and precious metal alloys*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology 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/>

<https://standards.iteh.ai/catalog/standards/iso/b67968f7-46af-4b5b-a61f-8e9123fc92e4/iso-18214-2024>

### 3.1 SPARK-OES

optical emission spectrometer with excitation by spark discharge, suitable for the quantification of trace elements in a solid metallic sample

### 3.2 spot

target area on the sample where the spark strikes the surface and creates a burn mark

### 3.3 certified reference material CRM

reference material characterized by a metrologically valid procedure for one or more specified properties, accompanied by a reference material certificate that provides the value of the specified property, its associated uncertainty, and a statement of metrological traceability

[SOURCE: ISO 17034:2016, 3.2, modified — Notes to entry have been deleted.]

### 3.4 calibration standard

material with appropriate homogeneity whose exact composition is known and which can be used to calibrate the SPARK-OES ([3.1](#))

### 3.5

#### **quality control sample**

sample with appropriate homogeneity containing most or all impurities to be measured, used to detect drift of the *SPARK-OES* (3.1)

### 3.6

#### **standardization standard**

#### **setting up sample**

#### **SUS**

material with appropriate homogeneity used to recalibrate the *SPARK-OES* (3.1)

Note 1 to entry: It is not necessary to have a reference value for the concentration of each impurity.

## 4 Principle

The sample is prepared to obtain a flat surface. The impurities are determined by *SPARK-OES*, and the precious metal content is obtained by subtraction of the total content of impurities in the sample from 1 000 ‰.

Application of an electrical discharge between the sample and an inert counter-electrode generates a radiation whose wavelengths are characteristic of each element. The intensity of each wavelength is compared to calibration curves obtained from calibration standards, which allows to determine the concentration of each impurity in the sample.

Calibration standards, quality control samples and standardization standards are specific for each of the four matrixes (high purity gold, silver, platinum and palladium).

## 5 Reagents and equipment

### 5.1 Reagents

5.1.1 **Argon gas**, with a minimum purity of 99,998 % or as recommended by the *SPARK-OES* manufacturer.

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5.2 **Equipment** <https://standards.iteh.ai/catalog/standards/iso/b67968f7-46af-4b5b-a61f-8e9123fc92e4/iso-18214-2024>

5.2.1 **SPARK-OES**, spectrometer with spark excitation suitable for the measurement of the intensity of optical radiation emitted at specific wavelengths; The spectrometer should have a detection limit around 1 mg/kg for each quantified impurity.

5.2.2 **Hydraulic press**, of appropriate strength.

5.2.3 **Milling or turning machine** for the sample surface preparation.

## 6 Sampling

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

The samples to be analysed may be in the form of disk or some other shape sufficiently massive to prevent, once flattened, undue heating during analysis and to cover entirely the hole of the analysis table.

## 7 Procedure

**WARNING — Suitable health and safety procedures should be followed.**