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Jewellery and precious metals — Sampling of precious metals and precious metal alloys

Joaillerie, bijouterie et métaux précieux — Échantillonnage des métaux précieux et des alliages de métaux précieux

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Contents

Page

Foreword ... **iv**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**
3.1 Sampling ... 1
3.2 Precious metals and precious metal articles ... 2
3.3 Product classes ... 3
3.4 Products and manufacturing methods ... 3

4 Tools ... **4**
4.1 General ... 4
4.2 Use of tools ... 5

5 Sample selection ... **5**

6 Surface preparation before sampling ... **5**

7 Sampling methods ... **5**
7.1 General ... 5
7.2 Dip sampling of molten alloy ... 6
7.2.1 General ... 6
7.2.2 Method 1 – Pin sampling ... 6
7.2.3 Method 2 - Bead sampling, button sampling ... 6
7.3 Drilling ... 6
7.4 Scraping ... 7
7.5 Cutting ... 7
7.6 Sawing or filing ... 7

8 Retention of samples ... **7**

Annex A (informative) **Guidelines for the sampling of typical products and items** ... **8**

Bibliography ... **13**

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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 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.

This document was prepared by Technical Committee ISO/TC 174, J*ewellery 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.

This second edition cancels and replaces the first edition (ISO 11596:2008), which has been technically revised.

The main changes are as follows:

— The content has been reviewed to allow a broader field of application of the standard;

— The scope has been aligned with the ISO standards related to the present document and delimited more clearly;

— Terms and definitions have been reorganized.

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Jewellery and precious metals — Sampling of precious metals and precious metal alloys

1 Scope

This document specifies a method of sampling precious metals and precious metal alloys for the determination of their precious metal content and for the assessment of their homogeneity. The document is applicable to raw materials, semi-finished products and finished products and is intended to be used only for the sampling of entirely metallic materials.

NOTE 1 Standards for determination of precious metals contents for different metals are listed in the Bibliography.

NOTE 2 For assaying techniques different from the listed ones other sampling procedures can be required.

NOTE 3 For the purpose of production control or lot inspections the International Standards for the sampling indicated in the Bibliography or corresponding guidelines can be applied in addition.

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 3954, *Powders for powder metallurgical purposes — Sampling*

3 Terms and definitions

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

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/

3.1 Sampling

3.1.1
sampling
defined procedure whereby a part of a substance, material or product is taken to provide a representative *sample* (3.1.4), or samples, of the whole for analysis

3.1.2
dip sampling
sampling (3.1.1) method intended to produce primary samples representative for a melt

Note 1 to entry: A secondary sampling is then required in order to produce the samples for analysis.

Note 2 to entry: Depending on the specific sampling technique adopted, dip sampling is also referred to as pin sampling, or as bead (or button) sampling, respectively.

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3.1.3
portion
fraction of a lot, item or *sample* (3.1.4) obtained by appropriate sample subdivision techniques in order to represent correctly the properties of the whole to be tested

3.1.4
sample
quantity of representative material taken from a product, or part of a product

Note 1 to entry: In References [7] to [15] of the Bibliography, the term "sample" is used in some instances instead of the term "test portion".

3.1.5
sampling position
geometrically defined position specified by a *sampling* (3.1.1) scheme, from where the sampled material is taken from an item

Note 1 to entry: Depending on the quantity of material to be drawn it may consist in several individual points corresponding to the same geometrical definition.

3.1.6
test portion
part of the *sample* (3.1.4) used for a single determination of the precious metal content

3.1.7
lot
product, or collection of units of product, from which a *sample* (3.1.4) (or samples) is (or are) drawn

Note 1 to entry: Each lot consists of units of product manufactured under essentially the same conditions and visibly presenting the same characteristics, i.e. same type, grade, class, size and composition.

3.1.8
homogeneous
presenting the same physical and chemical characteristics down to the scale of the *sample* (3.1.4) and within the uncertainty of the relevant assaying method

3.2 Precious metals and precious metal articles

3.2.1
precious metal alloy
metal made by combining at least one precious metal as a major element with one or more metallic elements, constituted either by a solid solution of the metal elements or by a mixture of metallic phases at microscopic level

3.2.2
jewellery
jewels made of precious metal or *precious metal alloys* (3.2.1)

3.2.3
mixed precious metal articles
articles made from two or more separate precious metals, or *precious metal alloys* (3.2.1)

3.2.4
solder
alloy used to join metal parts

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3.3 Product classes

3.3.1
raw material
unprocessed material used to produce finished products, or intermediate materials which are feedstock for future finished products

3.3.2
crystals
precious metal in form of metallic crystals constituting the typical product of electrochemical refining and used as feedstock for further processing

3.3.3
powder
precious metal in finely dispersed form normally used as feedstock for further processing

3.3.4
casting grain
material in discrete droplet or granular form, only suitable for re-melting

3.3.5
cast product
product obtained by solidification of a molten metal or metal alloy usually poured into a mould

3.3.6
wrought product
product obtained by hot and/or cold plastic deformation processes, such as extruding, forging, hot rolling, cold rolling or drawing, either exclusively or in combination

3.3.7
semi-finished product
product that can be easily used to produce a finished item and/or a component part

3.3.8
component parts
products in a form that constitutes components of a finished article

3.4 Products and manufacturing methods

3.4.1
ingot
cast unwrought product suitable for further manufacture

3.4.2
bar
cast or minted finished product, or cast material intended to be refined

Note 1 to entry: These finished products are generally intended for investment.

3.4.3
rod
solid wrought semi-finished product of uniform cross-section along its own length, supplied in straight form in defined lengths

3.4.4
sheet
strip
flat wrought product of exact length and of rectangular cross-section and uniform thickness

Note 1 to entry: The term “foil” is also sometimes applied to thin sheet.

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3.4.5
tube
hollow wrought or cast product of uniform cross-section, with only one enclosed void along its whole length and with uniform wall thickness supplied in straight lengths or in coiled form

3.4.6
wire
solid wrought product of uniform cross-section along its own length, supplied in coil form, on spools or reels, or as individual lengths

3.4.7
electroform
article produced by an electrolytic process using a metallic or non-metallic substrate, in which the precious metal coating is sufficiently thick for the article to be used once the substrate is removed

Note 1 to entry: Electroforms from alloys are often not homogeneous.

3.4.8
hollow tube method
manufacturing method producing a *tube* (3.4.5) of precious metal alloy by mechanical means on a non-precious metal support that is removed at the end of the manufacturing process

4 Tools

4.1 General

The following list of tools shall be used, which satisfy the criterion of not contaminating the sample:

a) power drill mounted in a drilling stand and capable of operating in the range 500 r/min to 900 r/min, the stand shall have facilities for holding the material being sampled;

b) high speed twist drill bits, one for each type of alloy;

c) small bench cutter;

d) anvil with hard polished face;

e) anvil hammer with a convex face and a suitable mass;

f) hydraulic press with stainless steel plates, to be used instead of d) and e);

g) fine-grained grinding paper for cleaning the anvil and hammer or the plates of the hydraulic press after each use;

h) assay shears;

i) sample splitters in polished stainless steel;

j) fine (3 mm to 5 mm) bore quartz or graphite tube with appropriate suction device to extract molten alloy;

k) quartz, graphite or carbon-coated stainless steel ladle with a dip capacity of 5 ml to 10 ml;

NOTE Carbon coating can be achieved using a carbon-rich flame.

l) shallow open mould in material suitable for rapid cooling without contamination;

m) polished laboratory rolling mill;

n) saw;

NOTE Blades made of HSS (High Speed Steel) are appropriate.

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