

Australian Standard™

Gold and gold bearing alloys

Part 1: Determination of gold content (less than 30%)—Gravimetric (fire assay) method



This Australian Standard was prepared by Committee CH-010, Analysis of Metals. It was approved on behalf of the Council of Standards Australia on 13 October 2005.
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The following are represented on Committee CH-010:

Amdel
Australasian Institute of Mining and Metallurgy
Australian Aluminium Council
Institute of Materials Engineering Australasia
International Precious Metals Institute
National Association of Testing Authority
The Royal Australian Chemical Institute

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STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 3515.1—2005

Gold and gold bearing alloys

**Part 1: Determination of gold content (less than 30%)—Gravimetric (fire assay)
method**

RECONFIRMATION NOTICE

Technical Committee CH-010 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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Bureau of Steel Manufacturers of Australia
International Copper Association Australia
International Precious Metals Institute
National Association of Testing Authorities Australia

NOTES

Australian Standard™

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Part 1: Determination of gold content (less than 30%)—Gravimetric (fire assay) method

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CH-010, Analysis of Metals, to supersede AS 3515.1—1996, *Gold and gold bearing alloys, Part 1: Determination of gold content (less than 30%)—Gravimetric method*. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian, rather than an Australian/New Zealand Standard.

The objective of this Standard is to ensure that a gravimetric method for the determination of gold content less than 30% by gravimetric (fire assay) method is achieved.

This revision incorporates information on acceptance of results into a new Section.

This Standard is Part 1 of a series of Standards for the determination of gold content in gold and gold bearing alloys and reference should be made to the other documents in the series:

AS

3515 Gold and gold bearing alloys

3515.2 Part 2: Determination of gold content (30%–99.5%)—Gravimetric (fire assay) method

3515.3 Part 3: Determination of gold content (greater than 99.5%)—Gravimetric (fire assay) method

3515.4 Part 4: Determination of gold content (greater than 99.95%)—Inductively coupled plasma—Atomic emission spectrometry

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is for information and guidance only.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE OF SECTION	4
1.2 REFERENCED DOCUMENTS	4
1.3 DEFINITIONS	4
1.4 REAGENTS	5
1.5 APPARATUS.....	6
SECTION 2 SAMPLE PREPARATION AND PRELIMINARY DETERMINATION	
2.1 GENERAL	7
2.2 SAMPLE INSPECTION AND PREPARATION.....	7
2.3 PRELIMINARY DETERMINATION OF THE TOTAL PRECIOUS METALS, APPROXIMATE GOLD, SILVER AND TOTAL BASE METALS CONTENT	7
2.4 CRITERIA FOR SELECTION OF DETERMINATION METHOD	9
SECTION 3 TOTAL PRECIOUS METALS CONTENT LESS THAN 40%	
3.1 SCOPE OF SECTION	10
3.2 PRINCIPLE	10
3.3 NUMBER OF DETERMINATIONS	10
3.4 PROOF TESTS.....	10
3.5 PREPARATION OF TEST PORTION AND PROOF	10
3.6 CUPELLATION	11
3.7 PARTING	11
3.8 CALCULATIONS	12
SECTION 4 TOTAL PRECIOUS METALS CONTENT IS 40% OR GREATER	
4.1 SCOPE OF SECTION	14
4.2 PRINCIPLE	14
4.3 NUMBER OF DETERMINATIONS	14
4.4 PROOF TESTS.....	14
4.5 PREPARATION OF THE TEST PORTION AND PROOF	14
4.6 CUPELLATION	15
4.7 PARTING	15
4.8 CALCULATIONS	16
SECTION 5 PRECISION OF ACCEPTANCE OF RESULTS	
5.1 PRECISION	17
5.2 ACCEPTANCE OF RESULTS	17
5.3 TEST REPORT.....	17
APPENDIX A METHODS OF SAMPLING DORE BULLION	18

STANDARDS AUSTRALIA**Australian Standard****Gold and gold bearing alloys****Part 1: Determination of gold content (less than 30%)—Gravimetric (fire assay) method****SECTION 1 SCOPE AND GENERAL****1.1 SCOPE**

This Standard sets out gravimetric procedures for the determination of gold content in the range 0.2% to 30% in gold and gold bearing alloys with, <2% nickel, <0.05% rhodium, <0.05% tungsten and <0.5% tin. Platinum <10% and palladium <3%.

Two methods of gold determination are specified: the first method is used when the total precious metal content is less than 40% and the second method is used when the total precious metal content is 40% or greater.

NOTES:

- 1 A preliminary assay may first be performed to determine the gold, silver and base metal present.
- 2 The presence of the following elements may cause difficulties in obtaining a homogeneous sample: iron, lead, antimony, nickel or arsenic.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- | | |
|--------|---|
| 2830 | Good laboratory practice |
| 2830.1 | Part 1: Chemical analysis |
| 2850 | Chemical analysis—Interlaboratory test programs—For determining precision of analytical method(s)—Guide to the planning and conduct |

AS/NZS

- | | |
|--------|--|
| 2243 | Safety in laboratories |
| 2243.1 | Part 1: Planning and operational aspects |
| 2243.2 | Part 2: Chemical aspects |

ISO

- | | |
|------|--|
| 3696 | Water for analytical laboratory use—Specification and test methods |
|------|--|

1.3 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.3.1 Cornet

An alloy of gold and silver after it has been hammered, annealed and fashioned into a roll, prior to parting.

1.3.2 Cupellation

The process by which the precious metals are separated from the lead and other base metals with which they are alloyed. It is also the process whereby the sample, having been wrapped in lead sheet/foil with the necessary additives (i.e. silver or copper or both), is homogenized in the molten state prior to the separation of the gold and silver.

1.3.3 Gold cornet

A cornet that has been parted.

1.3.4 Laboratory sample

A sample as prepared for sending to the laboratory and intended for inspection or testing.

1.3.5 Parting

The separation of gold from other precious metals by means of nitric acid in a chloride-free environment, where the silver forms soluble silver nitrate and the gold remains undissolved.

1.3.6 Prill

The 'button' or 'bead' of precious metal obtained from the cupellation process.

1.3.7 Proof

A reference sample included in every batch of assays in order to monitor the effect of assay conditions.

1.3.8 Surcharge

The sum of the gains and losses of mass of the proofs during the assay process, determined as a mean value.

1.3.9 Test portion

The portion of material taken from the test sample or, if both are the same, from the laboratory sample, on which the test or assay is actually carried out.

1.3.10 Test sample

A sample prepared from the laboratory sample and from which test portions will be taken.

1.4 REAGENTS

WARNING: SOME REAGENTS USED IN THIS METHOD MAY CONSTITUTE A HEALTH AND SAFETY HAZARD AND THEIR HANDLING SHOULD BE IN ACCORDANCE WITH AS/NZS 2243 PARTS ONE AND TWO, AS 2508 AND AS 2830.1.

1.4.1 General requirements

Analytical reagent (AR) grade reagents and Grade 3 water, as defined by ISO 3696, shall be used throughout this method. Nitric acid shall not contain chloride ion at a concentration greater than 1 mg of chloride per litre.

The preparation of reagents shall be carried out in a fume hood.

1.4.2 Nitric acid ρ_{20} 1.42 g/mL

1.4.3 Nitric acid (1:2)

Cautiously add 1 volume of nitric acid (1.4.2) to 2 volumes of water with continuous stirring.

1.4.4 Nitric acid (1:1)

Cautiously add one volume of nitric acid (1.4.2) to 1 volume of water with continuous stirring.