AS ISO 12745:2016
ISO 12745:2008

AS ISO 12745:2016

Copper, lead and zinc ores and concentrates—Precision and bias of mass measurement techniques

This Australian Standard® was prepared by Committee MN-005, Copper, Lead, Zinc and Nickel Ores and Concentrates. It was approved on behalf of the Council of Standards Australia on 7 April 2016.
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The following are represented on Committee MN-005:

- Australasian Institute of Mining and Metallurgy
- Australian X-ray Analytical Association
- CSIRO
- Minerals Council of Australia

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Australian Standard®

Copper, lead and zinc ores and concentrates—Precision and bias of mass measurement techniques

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PREFACE

This Standard was prepared by the Standards Australia Committee MN-005, Copper, Lead, Zinc and Nickel Ores and Concentrates, to supersede AS 4595—1999, *Copper, lead and zinc sulfide concentrates—Precision and bias of mass measurement techniques*.

The objective of this Standard is to provide guidelines to test for bias over a wide range of mass measurement techniques, to estimate the precision for each technique and to calculate the precision for wet mass when estimated by applying one of those techniques.

This Standard is identical with, and has been reproduced from ISO 12745:2008, *Copper, lead and zinc ores and concentrates—Precision and bias of mass measurement techniques*.

As this Standard is reproduced from an International Standard, the following applies:

(a) In the source text ‘this International Standard’ should read ‘this Australian Standard’.

(b) A full point substitutes for a comma when referring to a decimal marker.

None of the normative references in the source document have been adopted as Australian Standards.

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

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AUSTRALIAN STANDARD

Copper, lead and zinc ores and concentrates—Precision and bias of mass measurement techniques

1 Scope

This International Standard provides guidelines to test for bias over a wide range of mass measurement techniques, to estimate the precision for each technique and to calculate the precision for wet mass when estimated by applying one of those techniques.

The guidelines are based on the application of statistical tests to verify that a mass measurement technique is unbiased, to estimate the variance as the most basic measure for its precision and to check the linearity of a static scale over its working range. Calibration methods and performance tests for compliance with applicable regulations generate test results that can be used to quantify precision and bias for each of these mass measurement techniques and to verify linearity for static weighing devices.

The guidelines apply to mass measurement techniques used to estimate the wet mass for cargoes or shipments of mineral concentrate as the basis for freight and insurance charges and for preliminary payments or for final settlements between trading partners.

The application of static scales requires that at least one certified weight with a mass of no less than one (1) tonne be either available on location or brought in for calibration purposes, and that this certified weight be applicable to the scale in accordance with the manufacturer's recommendations. A set of certified weights covering the entire working range of a weighing device simplifies the process of verifying its state of calibration, estimating its precision as a function of applied load and testing its linearity over the working range.

2 Normative references

The following referenced documents are indispensable for the application 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 3534-1:2006, *Statistics — Vocabulary and symbols — Part 1: General statistical terms and terms used in probability*

ISO 3534-2:2006, *Statistics — Vocabulary and symbols — Part 2: Applied statistics*

ISO 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principle and definitions*

3 Terms and definitions

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

NOTE 1 In authoritative textbooks on applied statistics the use of the sigma squared (σ^2) symbol is restricted to unknown population variances for which a measurement procedure gives an estimate only. By contrast, the symbol s^2 applies to variances of samples, and thus to finite sets of measurements. Standard methods on sampling of bulk materials often apply sigma-symbols (σ^2 or σ) indiscriminately.

