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Reconfirmed 2016

Australian Standard®

METHODS FOR THE ANALYSIS OF IRON AND STEEL

Part 25—DETERMINATION OF LEAD CONTENT (FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD)

This Australian standard was prepared by Committee CH/10—Analysis of Metals under the direction of the Chemical Standards Board. It was approved on behalf of the Council of the Standards Association of Australia on 16 April 1986 and published on 7 July 1986.

The following interests are represented on Committee CH/10:

Aluminium Development Council
Australasian Institute of Mining and Metallurgy
Australian Lead Development Association
Australian Mineral Development Laboratories
Australian Tin Information Centre
Australian Zinc Development Association
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Copper Technical Data Centre
Department of Defence
Electricity Supply Association of Australia
Metal Trades Industry Association of Australia
National Association of Testing Authorities
Railways of Australia Committee
Royal Australian Chemical Institute

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 1050.25—1986
Methods for the analysis of iron and steel
Part 25: Determination of lead content (flame atomic absorption spectrometric 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.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 31 July 2016.

The following are represented on Technical Committee CH-010:

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

NOTES

PREFACE

This edition of this standard was prepared by the Association's Committee on the Analysis of Metals under the direction of the Chemical Standards Board as one standard in the AS 1050 series. It supersedes AS K1, Methods for the Sampling and Analysis of Iron and Steel, Part 25—1969, Determination of Lead in Low Alloy and Carbon Steels (Atomic Absorption Spectrophotometric Method).

The Committee organized an inter-laboratory test program to obtain information on the repeatability and reproducibility of the method. Laboratories from the following organizations participated in the test program to provide the data given in Table 1:

Commonwealth Steel Co. Ltd
BHP Steel International, Melbourne
BHP Steel International, Newcastle
BHP Steel International, Whyalla
BRP Steel International, Port Kembla

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR THE ANALYSIS OF IRON AND STEEL

PART 25—DETERMINATION OF LEAD CONTENT (FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD)

1 SCOPE. This standard sets out a flame atomic absorption spectrometric method for the determination of lead in low alloy and carbon steels.

2 APPLICATION. The method is applicable to steel with lead contents in the range of 0.01 percent to 0.50 percent. It has been found satisfactory in the presence of the following elements at the concentrations indicated:

Nickel	1 percent
Chromium	2 percent
Molybdenum	1 percent
Silicon	1 percent
Manganese	2 percent
Sulphur	0.3 percent
Selenium	0.05 percent
Tellurium	0.05 percent

3 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1213 Iron and Steel—Methods of Sampling

AS 2134 Chemical Analysis of Materials by Flame Atomic Absorption Spectroscopy

AS 2164 One-mark Volumetric Flasks

BS 4237 Report on Reproducibility of Methods of Chemical Analysis Used in the Iron and Steel Industry.

4 PRINCIPLE. The sample is dissolved in hydrochloric and nitric acids and the lead content of the solution is determined by flame atomic absorption spectrometry.

5 REAGENTS.

5.1 General requirements. During the analysis only reagents of recognized analytical reagent grade, and only distilled water or water of equivalent purity, shall be used.

5.2 Solids.

5.2.1 *High purity iron.* Iron containing > 99.5 percent Fe and < 5 μg/g Pb.

5.3 Solutions.

5.3.1 *Hydrochloric acid (1 + 1).* Add 500 mL of hydrochloric acid (ϱ_{20} 1.18 g/mL) to 500 mL water and mix well.

5.3.2 *Nitric acid* (ϱ_{20} 1.42 g/mL).

5.4 Standard solutions.

5.4.1 *Standard lead solution (1 mL ≡ 1 mg Pb).* Dissolve 1.5985 g of lead nitrate [$Pb(NO_3)_2$] (previously dried at 80°C for 2 h) in water. Add 10 mL of nitric acid (5.3.2) and dilute to 1 L with water.

6 APPARATUS. The following apparatus is required:

6.1 Glassware. Grade A volumetric glassware complying with AS 2164 shall be used throughout.

6.2 Atomic absorption spectrometer.

6.2.1 *General.* The instrument and practice shall comply with AS 2134.

6.2.2 *Operating parameters.* Suitable operating parameters for this test are as follows:

Wavelength . . . . . 283.3 nm

Flame . . . . . A slightly lean air/acetylene flame (5 cm or 10 cm slot burner).

6.2.3 *Performance criteria.* Prior to the test, it is necessary to establish that the following performance criteria are met:

(i) *Minimum sensitivity.* The absorbance of the calibration solution of highest lead content (see Clause 9.1) shall be not less than 0.4.