AS 3550.2—1990
Reconfirmed 2016

Australian Standard®

Waters

Part 2: Determination of carbon dioxide—Alkalimetric titration method

This Australian Standard was prepared by Committee CH/22, Methods for Examination of Waters. It was approved on behalf of the Council of Standards Australia on 16 June 1989 and published on 19 January 1990.

The following interests are represented on Committee CH/22:

Australian Construction Services

Australian Government Analytical Laboratories

Australian Mining Industry Council

Confederation of Australian Industry

Department of Conservation, Forests and Lands

Department of Health, N.S.W.

Department of Local Government, Qld

Department of Water Resources, N.S.W.

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 3550.2—1990
Waters
Part 2: Determination of carbon dioxide—Alkalimetric titration method

RECONFIRMATION NOTICE

Technical Committee EV-008 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 15 August 2016.

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Australian Institute of Marine Science
Australian Water Association
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NOTES

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PREFACE

This Standard was prepared by the Standards Australia Committee on Methods for Examination of Waters under the direction of the Chemical Standards Board to supersede AS 2448—1981, *Waters—Determination of carbon dioxide—Alkalimetric titration method*. This edition incorporates editorial amendments only and is technically identical to AS 2448.

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STANDARDS AUSTRALIA

Australian Standard

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Part 2: Determination of carbon dioxide—Alkalimetric titration method

1 SCOPE. This Standard sets out a titrimetric method for the determination of free carbon dioxide in waters using either a coloured or potentiometric end-point.

As carbon dioxide may be present in the free form or chemically combined as carbonates or bicarbonates, a means for determining the total carbon dioxide from the concentration in all forms is provided in Appendix A. The method is applicable to waters containing free carbon dioxide in the concentration range 1 mg/L to 100 mg/L.

Interferences: Cations and anions that quantitatively disturb the normal carbon dioxide-carbonate equilibrium interfere with the determination. Aluminium, chromium, copper and iron are some of the metals whose salts contribute to high results. The iron(II) concentration should not exceed 1.0 mg/L. Positive errors are caused by amines, ammonia, borate, nitrite, phosphate, silicate and sulfide. Mineral solids and salts of strong acids and weak bases affect the determination and therefore should be absent. Negative errors may be introduced by high total dissolved solids, such as those encountered in seawater, or by adding excess indicator.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS
2031 Selection of containers and preservation of water samples for chemical and microbiological analysis
2031.1 Part 1: Chemical
2162 Code of practice for the use of volumetric glassware
2164 One-mark volumetric flasks
2165 Burettes and bulb burettes
2166 One-mark pipettes
3550 Waters
3550.4 Part 4: Determination of alkalinity—Acidimetric titration method

3 PRINCIPLE. The free carbon dioxide in water is determined by titration with standard alkali titrant to pH 8.3. The equivalence point may be indicated potentiometrically or by the development of the pink colour characteristic of phenolphthalein indicator at pH 8.3.

4 REAGENTS.

4.1 General requirements. Use only reagents of analytical reagent grade and only distilled or deionized water which has been freed of carbon dioxide. The water may be freed of carbon dioxide by boiling for 15 min and cooling to room temperature, immediately prior to use.

4.2 Solutions.

4.2.1 *Standard sodium carbonate solution* (approximately 0.025 mol/L). Dry 3 g to 5 g of primary standard sodium carbonate (Na_2CO_3) at 250°C for 4 h and cool in a desiccator. Weigh 2.5 ± 0.2 g to the nearest milligram, transfer to a 1 L volumetric flask, dissolve in water and dilute to volume. This reagent shall be maintained free of carbon dioxide but should be discarded after 1 week.

NOTE: 1.00 mL of 0.0227 mol/L $Na_2CO_3 \equiv 1.00$ mg CO_2.

4.2.2 *Phenolphthalein indicator solution.* Dissolve 1.0 g of phenolphthalein in 100 mL of ethanol (950 mL/L).

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

5 APPARATUS.

5.1 Glassware—volumetric flasks complying with AS 2164, burettes complying with AS 2165 and pipettes complying with AS 2166 shall be used. Use of volumetric glassware shall be in accordance with AS 2162. All glassware shall be thoroughly rinsed with nitric acid (4.2.3), and then water, before use.

5.2 Artificial light source—a 'daylight' fluorescent lamp may be used.

5.3 Electrometric titrator—any commercial pH meter or electrometric titrator that uses a glass electrode and can be read to 0.05 pH unit. The instrument should be calibrated in accordance with the manufacturer's instructions. Special attention should be paid to temperature compensation and electrode care.

5.4 Titration vessel—a 100 mL, 250 mL or 400 mL beaker, as appropriate.

NOTE: The size and form of the vessel will depend on the electrodes and the size of sample. The space above the sample should be kept as small as practicable, but sufficient space is needed for the titrant and full immersion of the indicating portions of the glass and reference electrodes.

6 SAMPLING AND SAMPLES.

6.1 General. The laboratory sample shall not be filtered, diluted, concentrated or altered in any way before performing the analysis procedure.

6.2 Container. The laboratory sample shall be contained in borosilicate glass or polyethylene containers prepared in accordance with AS 2031.1.

6.3 Collection and preservation. Collect the laboratory sample so that it completely fills the container, and seal. The determination should be performed immediately. If this is not possible, the sample shall be stored at 4°C to minimize loss of carbon dioxide, and the determination carried out