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Australian Standard 2029–1977

DETERMINATION OF

NITRATE AND NITRITE IN WATERS

STANDARDS ASSOCIATION OF AUSTRALIA
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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee which prepared this standard:

Associated Chambers of Manufactures of Australia
Australian Mining Industry Council
Australian Water Resources Council
CSIRO
Department of Construction
Department of Science
Department of the Environment of Tasmania
Engineering and Water Supply Department, S.A.
Environment Protection Authority (Vic.)
Health Commission of N.S.W.
Melbourne and Metropolitan Board of Works
Metropolitan Water Sewerage and Drainage Board, N.S.W.
Ministry for Conservation (Vic.) — Fisheries and Wildlife Division
National Association of Testing Authorities, Australia
National Health and Medical Research Council
Royal Australian Chemical Institute
Technical Association of the Australian and New Zealand Pulp and Paper Industry
Water Conservation and Irrigation Commission of N.S.W.
Water Quality Council of Queensland

This standard method, prepared by Committee CH/22, Methods for the Examination of Waters, was approved on behalf of the Council of the Standards Association of Australia on 28 October 1977, and was published on 31 December 1977.

To keep abreast of progress in industry, Australian standards are subject to regular review. Suggestions for improvement, addressed to the head office of the Association, are welcomed.

This method was issued in draft form for public review as DR 75107.

AUSTRALIAN STANDARD

METHOD FOR THE DETERMINATION OF NITRATE AND NITRITE IN WATERS

AS 2029–1977

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PREFACE

This standard method for determining the nitrate and nitrite content of waters was prepared by the Association's Committee on Methods for the Examination of Waters under the direction of the Chemical Standards Board as part of a program aimed at establishing a comprehensive series of standard methods for assessing water quality.

The method described was originally developed specifically for seawater and was based on the following publications:

CSIRO Division of Fisheries and Oceanography, *Report* 51, 1972, 'Laboratory Techniques in Marine Chemistry' by G. A. Major, G. Dal Pont, J. Klye and B. Newell.

'A Practical Handbook of Seawater Analysis' by J. D. H. Strickland and T. R. Parsons (1968) Fish. Res. Board Canada, *Bulletin* 167.

This standard requires reference to the following Australian and British standards:

AS 1152 Test Sieves

AS 2031 Recommendations for the Selection of Containers and Preservation of Water Samples for Chemical and Microbiological Analyses,

Part 1 — Chemical

Part 2 — Microbiological, in course of preparation

AS CK19 Code of Recommended Practice for Chemical Analysis of Materials by Ultraviolet Visible Spectrophotometry

BS 3875 Specification for Optical Spectrophotometric Cells.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
METHOD FOR THE DETERMINATION OF NITRATE AND NITRITE IN WATERS

1 SCOPE. This standard describes a method for measuring nitrate and nitrite in such natural waters as fresh, saline, bore and marine (seawater) and in waste waters and industrial effluents.

2 APPLICATION. The method is applicable to most waters having nitrate and nitrite concentrations within the ranges of 0·7 to 220 μg nitrogen per litre for nitrate and 0·14 to 300 μg nitrogen per litre for nitrite.

NOTES:

1. There is a slight salt effect in the copper-cadmium nitrate reduction (see Clause 7.4.1).
2. Strong oxidizing agents and reducing agents, if present to a significant extent may interfere, particularly in the determination of nitrite (Ref. 11). For instance, sulphide at levels greater than about 60 μg S/litre is reported to interfere in nitrite analysis (Ref. 8). Compounds which couple with diazonium ions, such as phenols and aromatic amines may also interfere. These substances may also interfere in the determination of nitrate.

3 PRINCIPLE AND REACTIONS (Refs 1, 4, 5). Nitrate present in the sample is reduced by copper-cadmium to nitrite. The latter is converted to nitrous acid in an acidic medium and thence, by reaction with sulphanilamide, to the diazonium salt. The 4-sulphonamide benzenediazonium chloride couples with *N*-(1-naphthyl)ethylenediamino dihydrochloride to form a pink dye which has an absorbance maximum at 543 nm. The absorbance of the dye is proportional to the nitrate or the nitrite concentration within the range stated and is measured spectrophotometrically. Ammonium chloride is flushed through the column to reduce the coating of metal particles by cadmium hydroxide or carbonate which presumably leads to column deactivation (Ref. 1).

4 REAGENTS AND MATERIALS.

4.1 General Requirements. During the analyses use only reagents of recognized analytical reagent grade and water purified so as to give a negligible blank.

NOTE: It is necessary that the water is prepared and used in an area free from nitric acid fumes.