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AMBIENT AIR— DETERMINATION OF OZONE— DIRECT-READING, INSTRUMENTAL METHOD

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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Chemical Industry Council

Australian Institute of Petroleum

Australian Mining Industry Council

Australian Timber Producers Council

Clean Air Society of Australia and New Zealand

Confederation of Australian Industry

CSIRO, Division of Fossil Fuels

Department of Home Affairs and the Environment

Department of the Environment, Tasmania

Electricity Supply Association of Australia

National Association of Testing Authorities, Australia

National Health and Medical Research Council

State Pollution Control Commission, N.S.W.

Technical Association of the Australian and New Zealand Pulp and Paper Industry

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PREFACE

This standard was prepared by the Association's Committee on Methods for Examination of Air.

The requirements for instruments specified in this standard were derived from and are substantially similar to those given in the United States Environmental Protection Agency (USEPA) Air Regulations Pollution Control Guide, Part 53—Ambient Air Monitoring Reference and Equivalent Methods, Section 8183, Subpart B—Procedures for Testing Performance Characteristics of Automated Methods. Acknowledgement is made of the assistance obtained therefrom.

Instruments bearing the USEPA equivalency designation dominate the Australian scene where scope for testing and certification is limited. Accordingly it is necessary to accept the USEPA designation of instruments with minor modifications, where appropriate, for local requirements. The USEPA definitions for performance characteristics vary considerably in presentation (if not in substance) from those currently prescribed in Document ISO/TC 146/SC 4 N 15 (3rd revision), Performance Characteristics and Related Concepts for Air Quality Measuring Methods, but have nevertheless been retained, virtually intact, for the sake of preserving consistency with the USEPA.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

AMBIENT AIR—DETERMINATION OF OZONE—DIRECT-READING, INSTRUMENTAL METHOD

1 SCOPE. This standard sets out a method for determining ozone in ambient air using a direct-reading, instrumental method.

2 APPLICATION. This method applies to the determination of ozone in ambient air where the concentration lies within the range 0 to 1000 $\mu g/m^3$. The method may also be used for measurement of enclosed air in industrial hygiene situations.

3 REFERENCED STANDARDS.

AS 1336	Industrial Eye Protection
AS 1337	Eye Protectors for Industrial Applications
AS 1338	Filters for Eye Protectors
AS 2521	Ambient Air—Determination of Gaseous Pollutants—Definitions for Instruments and General Requirements.

4 DEFINITIONS. For the purposes of this standard, the definitions given in AS 2521 apply.

5 PRINCIPLE. A sample of air is presented to a direct-reading instrument, measurements are made and the readings transformed (where necessary) to the required units of concentration.

For ultraviolet absorption type instruments, the sample air containing ozone is passed through a flow cell. Ultraviolet energy of wavelength 254 nm passes through the cell and the resultant energy is detected at the other end. The degree of absorption is dependent on the number of ozone molecules in the path, i.e. it is dependent on the length of the cell and is flow independent. The absorption is compared to the absorption with zero ozone and the difference in energy received at the detector is converted into an electrical output and measured.

For chemiluminescent type instruments, the sample air containing ozone is passed through a chamber where it comes into contact with a stream of ethylene and the two gases undergo a chemiluminescent reaction with the emission of photons at about 430 nm. This emission of energy is measured on a photomultiplier and converted to an electrical output which is measured.

6 APPARATUS.

6.1 General. A direct-reading instrument is required.

6.2 Types. Either of the following types of instrument is required:

(a) Ultraviolet absorption.

(b) Chemiluminescent.

6.3 Performance Requirements.

6.3.1 *General.* When the instrument is tested over the 0 to 0.5 p.p.m. range, the parameters shall conform to the performance requirements given in Table 1.

6.3.2 *Interference equivalent.* The instrument, when reading 0.08 p.p.m. ozone, shall not vary by more than 0.02 p.p.m. with each of the following concentrations of interference gases or by more than 0.06 p.p.m. when exposed to a combination of all the interferent gases:

hydrogen sulphide	— 0.1 p.p.m.
carbon dioxide	— 750 p.p.m.
water vapour	— 20 000 p.p.m.
ammonia	— 0.1 p.p.m.
sulphur dioxide	— 0.14 p.p.m.
nitrogen dioxide	— 0.5 p.p.m.
nitric oxide	— 0.5 p.p.m.