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SAFETY IN LABORATORIES
Part 3—MICROBIOLOGY

STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests are represented on Committee CH/26:

Australian Atomic Energy Commission

Australian Institute of Petroleum Ltd

The Broken Hill Pty Co Ltd

Commonwealth Scientific and Industrial Research Organization

Department of Science and Technology

Safety Institute of Australia

State Laboratories, Victoria

Representatives of the following interests also participated in the drafting of this Australian standard:

Australian Government Analytical Laboratories, Department of Science and Technology

Australian National Animal Health Laboratory, CSIRO

Institute of Clinical Pathology and Medical Research

Medical Laboratories Branch, Department of Health

National Association of Testing Authorities

National Biological Standards Laboratory

New South Wales Institute of Technology

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AUSTRALIAN STANDARD

SAFETY IN LABORATORIES
Part 3
MICROBIOLOGY

AS 2243.3—1985

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PREFACE

This new edition as AS 2243, Part 3, was prepared by the Association's Committee on Safety in Laboratories. The need for this standard was originally recognized by the committee and subsequently confirmed by an extensive survey conducted within government departments, industrial organizations and educational institutions.

It is the third in a series aimed at full coverage of the safety function in laboratories. It deals with microbiological aspects of laboratory work and is intended to be used in conjunction with other Parts in the series, each one relating to particular aspects of laboratory operations and to particular kinds of hazard. Emphasis is placed on awareness of risks, adequate hygiene and preventive action. Attention is given to the management and organization of work for preventing infection or contamination. Safety procedures and first aid measures are included, together with a useful bibliography.

Other Parts are as follows:

Part 1—General
Part 2—Chemical
Part 4—Ionizing Radiations
Part 5—Non-ionizing Radiations
Part 6—Mechanical Aspects
Part 7—Electrical Aspects

This Part deals specifically with microbiological practices in laboratories and does not cover the design and construction of laboratories, which is the subject of a separate standard being prepared by a committee within the Association's Building and Civil Engineering Group*.

Since publication of the first edition of this standard, a complete revision has been undertaken because of subsequent technical innovation and the requirement for additional material, revealed by the learning experience resulting from practical application of the standard. Users are invited to make revisional submissions in writing at any time to the Association.

*See DR 82209.

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FOREWORD

Safety attitudes

Safety in all laboratories must be regarded as an individual and personal, as well as a management responsibility. Staff training should be directed toward making safety considerations an attitude of mind and an integral part of all laboratory procedures, so that a constant, purposeful, control of the laboratory environment will result.

Specific microbiological problems

Microbiological laboratories pose specific problems in addition to many of those commonly encountered in chemical laboratories. Paramount is the possibility of infection, both of laboratory staff, and of the general public or of animals (by dissemination of pathogens outside the laboratory). Infection can result from ingestion, inhalation or skin penetration. In particular, staff having little or no microbiological training, e.g. service personnel, laboratory attendants and new recruits, should not be exposed to situations in which they may not appreciate the potential hazards.

It is also important to prevent cross-contamination or contamination with adventitious microorganisms since this may completely nullify experimental procedures or lead to erroneous results. The latter occurring in a hospital or public health laboratory could well result in erroneous, delayed or unnecessary treatment of patients.

Special awareness requirements

Microbiological hazards are particularly insidious because of the microscopic size of organisms. It is also essential to be aware that the 'unseen' hazard, e.g. formation of an invisible aerosol, may be of greater significance than the more obvious accident. Further, organisms not generally regarded as pathogens may, in some circumstances, assume that role.

THE SAFEST PROCEDURE IS TO REGARD ALL MICROORGANISMS AS POTENTIAL PATHOGENS AND TREAT THEM ACCORDINGLY.

All laboratories should note that classifications of microorganisms according to hazard have been published in the USA and the UK (see References D2.20 and D2.21). A list of organisms likely to be encountered in Australia and which should be handled in biological safety cabinets is given in Section 3.

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out recommended practices relating to safety in microbiological aspects of laboratory work. Hazards involved in other types of laboratory work are not considered. It is intended for laboratories, including animal houses, where microbiological work such as research, teaching, diagnosis, quality control, regulatory analysis, e.g. of foodstuffs, water and effluents, pharmaceuticals and cosmetics, is undertaken. This standard should be read in conjunction with other parts of AS 2243, particularly Parts 1 and 2.

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

AS 1113	Laboratory Humidity Cabinets (Non-injection Type)
AS 1132	Methods of Test for Air Filters for Use in Air Conditioning and General Ventilation
AS 1319	Rules for the Design and Use of Safety Signs for the Occupational Environment
AS 1324	Air Filters for Use in Air Conditioning and General Ventilation
AS 1336	Code of Practice for Industrial Eye Protection
AS 1337	Eye Protectors for Industrial Applications
AS 1885	Code of Practice for Recording and Measuring Work Injury Experience
AS 2013	Cleanroom Garments
AS 2014	Code of Practice for Cleanroom Garments
AS 2252	Biological Safety Cabinets Part 1—Biological Safety Cabinets (Class I) for Personnel Protection Part 2—Laminar Flow Biological Safety Cabinets (Class II) for Personnel and Product Protection Part 3—Class III*
AS 2508	Safe Storage and Handling Information Cards
AS 2567	Cytotoxic Drug Safety Cabinets
AS 2639	Cytotoxic Drug Cabinets—Installation and Use
AS 2647	Biological Safety Cabinets—Installation and Use
AS 0000	Laboratory Construction*
ANSI Z35.5	Biological Hazard Symbol
ISO 3864	Safety Colours and Safety Signs

1.3 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.3.1 Aerosol—a suspension in air of finely divided solids or liquids.

1.3.2 Antiseptic—a substance capable of destroying or preventing growth of microorganisms under prescribed conditions of use and specifically for application to living tissues.

1.3.3 Aseptic technique—the exercise of special procedures for maintaining the sterility of equipment, media, etc. or the purity of cultures by eliminating adventitious contamination and for protecting the operator and environment.

1.3.4 Cross-contamination—the undesirable transfer of organisms from one person, material or environment to another.

1.3.5 Decontamination—a physical or chemical process which kills or removes pathogenic microorganisms but does not necessarily result in sterility.

1.3.6 Disinfectant—a substance capable of killing pathogenic microorganisms, usually confined to the treatment of intact skin or inanimate objects.

1.3.7 Hazard—the potential risk from contamination with infectious agents or toxins which may lead to production of disease.

1.3.8 Infectious—capable of invading a susceptible host, multiplying in it, and causing an altered host reaction, commonly called a disease.

1.3.9 Microbiology—the study of living organisms which are of microscopic size or contain a microscopic stage in their life-cycle.

1.3.10 Pathogen—an organism capable of causing disease in man, animals or plants.

1.3.11 Sterilization—an act or process which kills all living organisms, applied particularly to bacteria and moulds, their spores, and viruses.

1.3.12 Viable—living: capable of growth even though resuscitation procedures may be required, e.g. when organisms are sub-lethally damaged by being frozen, dried, heated, etc.

*(in course of preparation)