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Australian Standard 2252, Part 1—1981

BIOLOGICAL SAFETY CABINETS

Part 1—BIOLOGICAL SAFETY CABINETS (CLASS I) FOR PERSONNEL PROTECTION

STANDARDS ASSOCIATION OF AUSTRALIA
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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 Institute of Refrigeration, Air Conditioning and Heating

Australian Medical Association

Commonwealth Serum Laboratories

Confederation of Australian Industry

CSIRO, Division of Animal Health

Department of Housing and Construction

Department of Defence

Department of Public Works, N.S.W.

Firms and consultants specializing in equipment and design for controlled environments

Health Commission of New South Wales

Health Commission of Victoria

National Association of Testing Authorities, Australia

National Biological Standards Laboratory

National Council of Chemical and Pharmaceutical Industries

Royal Australian Institute of Architects

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AUSTRALIAN STANDARD

BIOLOGICAL SAFETY CABINETS

Part 1

BIOLOGICAL SAFETY CABINETS (CLASS I) FOR PERSONNEL PROTECTION

AS 2252, Part 1—1981

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PREFACE

This edition of this standard was prepared by the Association's Committee on Controlled Environment. It is Part 1 of a 3-part standard for biological safety cabinets, and is a revision of the 1979 edition.

The other Parts of the standard are—

Part 2 Laminar Flow Biological Safety Cabinets (Class II) for Personnel and Product Protection

Part 3 Gas-tight Biological Safety Cabinets (Class III) for Personnel Protection Against Agents of Extreme Hazard

The issue in 1972 of a public review draft DR 72168 for cleanrooms and work-stations drew a comment from the Commonwealth Serum Laboratories which pointed to the need for work to be done under aseptic conditions and the need to contain potentially dangerous materials, and to the fact that the proposed standards did not adequately cater for these situations.

A need has also been established for standards applying to cabinets designed to minimize the inherent risks to personnel working with hazardous biological agents. There is an increasing awareness of the hazards of exposure to infectious agents that present an actual or potential risk to people handling them.

This edition aligns this Part with Part 2 in respect of style and format, and introduces an objective, quantitative method of test for indicating containment at the work access opening in place of the subjective, qualitative method for directional airflow.

In the preparation of this standard, reference was made to the booklet published by the United States Department of Health, Education and Welfare, Public Health Service entitled 'Classification of Etiological Agents on the Basis of Hazard'. Although written for American conditions, this booklet describes the basis for such classification of agents, and lists bacterial, fungal, parasitic, viral, rickettsial and chlamydial agents in five classes. The least hazardous agents are in Class 1 and those requiring the greatest restrictions are in Class 4. Class 5 contains agents which are specifically excluded from the U.S. by law. The list of organisms prohibited in Australia differs somewhat from the American list. Details can be obtained from the Quarantine Division of the Department of Health, Canberra.

Appendix A, Purchasing Guidelines, provides a basis for contractual matters.

This standard may require reference to the following standards:

AS 1132 Methods of Test for Air Filters for Use in Air Conditioning and General Ventilation
.5—Determination of Arrestance Efficiency, Average Arrestance Efficiency, Dust-holding Capacity and Dust-holding Capacity per Unit of Effective Face Area for Test Dusts Nos 1, 2 and 3

AS 1216 Classification, Hazard Identification and Information Systems for Dangerous Goods
Part 1—Classification and Class Labels for Dangerous Goods

AS 1217 Methods of Measurement of Airborne Sound Emitted by Machines

AS 1324 Air Filters for Use in Air Conditioning and General Ventilation

AS 1677 SAA Refrigeration Code

AS 1680 Code of Practice for Interior Lighting and the Visual Environment

AS 1807 Methods of Test for Cleanrooms, Work-stations and Their Accessories
.1 —Air Velocity and Uniformity of Clean Work-stations
.2 —Air Velocity Under Loaded Filter Conditions of Clean Work-stations
.5 —Induced Air Leakage
.6 —Final Filter Installation Integrity
.15—Light Intensity
.18—Vibration in Work-stations

AS C100 Approval and Test Specification for Definitions and General Requirements for Electrical Materials and Equipment

AS .... Guide for Installation and Use of Biological Safety Cabinets*.

*In course of preparation.

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FOREWORD

In order to adequately guard against inherent risks to personnel, products and experiments associated with hazardous biological agents, consideration is necessary in respect of the type of cabinet containment required and of the competence of operators. This, in turn, calls for definition of the degree of hazard, and the following terms, which relate directly to those used by the United States Public Health Service (PHS), have been adopted:

- *No or minimal hazard*—the risk level of agents and/or operations of no or minimal danger to personnel, animals, or plants under ordinary conditions of handling (PHS Class 1).
- *Ordinary or potential hazard*—the risk level associated with agents which produce disease in man, animals, or plants and which can be contained by normal microbiological techniques. The level of competence for personnel should be that expected of staff in a hospital diagnostic microbiological laboratory (PHS Class 2).
- *Special hazard*—the risk level associated with agents which are highly infectious or toxic for man, animals, or plants with the production of dangerous disease. Also included are agents with genetic alterations and those which may have a synergistic effect with other materials. Appropriate containment measures are required. The level of competence for personnel should be at least that expected in staff of a hospital diagnostic microbiological laboratory. In addition personnel must have had proper training in the handling of dangerous agents (PHS Class 3).
- *Extreme hazard*—the risk level associated with agents which are extremely dangerous for man, animals, or plants, or cause serious epidemic disease. They may have various dangerous combinations of the following characteristics:
  - (a) Low infective doses.
  - (b) High pathogenicity.
  - (c) Potential for spread outside the laboratory.
  - (d) Concentration.
  - (e) Genetic alteration or genetic recombination that significantly increases pathogenicity.

Stringent containment measures are required. Personnel must have a high level of competence in microbiology and must have had special training in the handling of dangerous agents (PHS Class 4).

To cope with risks posed by hazardous biological agents it has been necessary to design cabinets which fall into three separate classes. Each class has a specific application according to the hazard and as to whether protection is required for product and experiment in addition to personnel.

For recombinant DNA containment, the use of a biological safety cabinet (Class II) is appropriate. The Australian Academy of Science has established a Committee on Recombinant DNA Molecules and application for advice on containment conditions for specific experimental proposals should be submitted to the Executive Secretary, Australian Academy of Science, Canberra.