

Australian/New Zealand Standard™

Safety in laboratories

Part 3: Microbiological safety and containment



AS/NZS 2243.3:2010

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Safety in laboratories

Part 3: Microbiological safety and containment

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CH-026, Safety in Laboratories, to supersede AS/NZS 2243.3:2002, *Safety in laboratories, Part 3: Microbiological aspects and containment facilities*.

Major changes in this edition are as follows:

- (a) Revision of the requirements for laboratories dealing with infectious diseases and the classifications of microorganisms into the four risk groups.
- (b) Separate definitions are provided for the four risk groups for plant infectious microorganisms and for microorganisms carried by invertebrates.
- (c) The plant and invertebrate sections have been revised to acknowledge the different types of hazards associated with plant and invertebrate microorganisms.
- (d) The presentation of requirements for animal, plant and invertebrate containment facilities has been revised to make them independent of the requirements for laboratories.
- (e) Addition of a requirement for a pressure steam sterilizer to be accessible from within all PC3 facilities.

The Committee is currently addressing the need to develop a section for containment of water based species, including fish and aquatic invertebrates. Some applicable information may be found in the laboratory and animal facility sections of this Standard.

The containment of plant pathogens is primarily concerned with minimizing hazards due to inadvertent spread to the environment. This is in contrast to the containment of human and animal pathogens, where the principal aim is to avoid risk of infection or contamination of facility workers and the community.

The containment of invertebrate pathogens may involve the minimization of hazards associated with inadvertent spread to the environment or microbiological hazards associated with exposure to people or animals. It may involve both of these hazards simultaneously. Where hazards to personnel are present in an invertebrate facility, the invertebrates and laboratory work will need to be carried out in a laboratory of appropriate microbiological containment level to protect the personnel, along with the additional containment features associated with invertebrate containment.

The Parts of the series promoting safety in laboratories are as follows:

- Part 1: Planning and operational aspects
- Part 2: Chemical aspects
- Part 3: Microbiological safety and containment (this Part)
- Part 4: Ionizing radiations
- Part 5: Non-ionizing radiations—Electromagnetic, sound and ultrasound
- Part 6: Mechanical aspects
- Part 7: Electrical aspects
- Part 8: Fume cupboards
- Part 9: Recirculating fume cabinets
- Part 10: Storage of chemicals

Although many of the safety aspects of working in laboratories are addressed in other Parts of the series, some are repeated here in Part 3 because there is an increase in the risk in containment facilities.

This Standard is intended to cover safety and containment aspects of work with microorganisms, including genetically modified microorganisms. However, it does not cover the additional security requirement that may be implemented in response to community interest and concerns in genetic modification work. For these, the relevant regulatory authority should be consulted. Also, the Standard is not primarily intended to address containment of organisms for work that does not involve microorganisms.

This Standard is intended to assist in addressing the obligations placed on employers and employees under occupational health and safety legislation to take care of both themselves and others in the workplace. It should not be assumed that compliance with this Standard means that all aspects of appropriate legislation or all legal obligations are being fulfilled. This Standard is not intended to provide for compliance with a specific act or regulation.

It should be noted that nothing in this Standard is required by law in any jurisdiction unless the Standard has been specifically incorporated by an Act or regulation in that jurisdiction. The exact manner of incorporation will determine whether the whole document, or specific sections or provisions, are made legal requirements or whether the Standard becomes an Approved Code of Practice. However, it should also be noted that this Standard is recognized in common law as defining current knowledge in microbiological safety practice. The provisions in a Code are not mandatory but give practical guidance on how to comply with the relevant provisions of the Act or regulation. Provided an alternative method also fulfils the requirements of the Act or regulation, it may be used. Users will need to consult the relevant authority to determine if this Standard has been incorporated and the manner of incorporation, if any.

In recognition of the changes made to this Standard during its revision, existing facilities should be assessed for risk and interim control measures should be implemented.

Current facilities and procedures should be updated to conform to this Standard. Compliance improvements should be made within a time frame that takes into consideration the cost of upgrading and the severity of the associated risk.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard and contains requirements that have to be met for compliance with the objectives and intent of this Standard. An 'informative' appendix is only for information and guidance.

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FOREWORD

Safety in all laboratories is primarily a management responsibility, but is also an individual responsibility. It is the responsibility of management to provide and maintain protective equipment and containment areas, a policy relating to safe work practices within a laboratory and to promote the training in, and institution of, those practices. It is the responsibility of the laboratory staff to carry out the safe work practices and to use protective equipment to minimize injury or prevent occupational illness, not only to themselves, but also to their colleagues. It is also a responsibility of managers to ensure that consideration is given to hazards to the general environment when dispensing or handling biological material. Staff training must be directed toward making safety an attitude of mind and an integral part of all laboratory procedures, so that a constant, purposeful control of the laboratory environment will result. Accidents such as spillages are an obvious hazard, but the production of aerosols during some routine procedures is a less obvious hazard that can be a serious source of contamination. In addition to the many problems commonly encountered in chemical laboratories, microbiological laboratories can pose the following specific problems:

- (a) Infection of laboratory staff, the general public, animals and plants by dissemination of microorganisms inside and outside the laboratory.
- (b) Cross-contamination of research and diagnostic materials or animals.
- (c) Contamination with adventitious microorganisms.

The basic approach to working with microorganisms is to regard them as potential pathogens and to handle them with standard microbiological techniques. Nevertheless, microorganisms vary markedly in their pathogenicity. This Standard includes the classification of microorganisms into four risk groups and specifies work requirements for the corresponding four physical containment levels.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Safety in laboratories**Part 3: Microbiological safety and containment**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out requirements, responsibilities and general guidelines relating to safe handling and containment of microorganisms and prions in laboratories. It includes animal, plant and invertebrate containment facilities (these may be integral or separate to the laboratory) where microbiological work such as research, teaching, diagnosis, quality control and regulatory analysis, e.g. of foodstuffs, water and effluents, pharmaceuticals and cosmetics, is undertaken. It may also provide assistance to other laboratories where specimens that may contain pathogenic microorganisms and prions are handled, e.g. biochemistry and soil laboratories. This Standard should be read in conjunction with AS/NZS 2243.1, AS/NZS 2982.1, building codes in Australia and New Zealand and other relevant Parts of the AS/NZS 2243 series.

NOTES:

- 1 This Standard uses the term 'containment facility' instead of historical terms such as plant houses, glass houses, insectaries and animal houses. For example, an animal house is referred to as an animal containment facility.
- 2 This Standard is not intended for genetic modification work not involving microorganisms, for which the appropriate body should be consulted. See Clause 2.3.
- 3 In addition to referenced documents, Appendix A contains references and related documents that are included in this Standard for additional information and guidance.
- 4 This Standard does not address aquatic containment facilities.

1.2 OBJECTIVE

The objective of this Standard is to provide management and staff of laboratories and containment facilities with requirements and guidelines that promote microbiological safety and prevent the unintended spread of microorganisms and prions.

1.3 REFERENCED DOCUMENTS

Documents referred to in this Standard are listed in Appendix A.

1.4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.4.1 Aerosol

Suspension in air of finely dispersed solids or liquids.

NOTE: Any procedure that disrupts the surface of a liquid has potential to produce aerosols. Procedures such as shaking, mixing and ultrasonic disruption are particularly common examples for microbiological work.