Australian Standard™

Laminar flow cytotoxic drug safety cabinets

Standards Australia

This Australian Standard was prepared by Committee ME-060, Controlled Environment. It was approved on behalf of the Council of Standards Australia on 30 August 2002 and published on 29 October 2002.

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This Standard was issued in draft form for comment as DR 00214.

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Originated as AS 2567—1982.
Second edition 1994.
Third edition 2002.

Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 4826 0

PREFACE

This Standard was prepared by the Joint Australia/New Zealand Standards Committee ME-060, Controlled Environment to supersede AS 2567—1994, *Laminar flow cytotoxic drug safety cabinets*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this document is to satisfy the need for a Standard for laminar flow safety cabinets that offer both personnel and product protection in the preparation, manipulation and dispensing of cytotoxic drugs. At the same time this Standard provides a design which permits safe internal maintenance of the cabinet.

This edition is an update, reflecting current technology and policies, with editorial amendments to refer to other current Standards and authorities. The inclusion of a carbon filter has been restored to a mandatory requirement because of recent evidence concerning cytotoxic drug residues (see Foreword). The Committee is expecting further data that may lead to a specification for the activated carbon. An appendix has been added to provide guidance on ergonomic considerations.

During the preparation of this edition, consideration was given to using performance requirements, rather than design or construction requirements, in order to encourage innovation in product design and development. However, while a specification based only on performance would, in principle, be preferable, Committee ME-060 lacked evidence that stable, consistent and safe operation of a laminar flow cytotoxic drug safety cabinet could be assured on this basis. Therefore, the simplest available specifications to achieve the desired criteria have been chosen. Future revisions of this Standard will take account of developments in technology and new information on cabinet performance throughout its life, with a view to replacing design and construction requirements by performance requirements wherever possible.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

The Committee is considering the adoption of EN 12469, *Biotechnology—Performance criteria for microbiology safety cabinets* together with BS 5726, *Microbiological safety cabinets,* Part 2: *Recommendations for information to be exchanged between purchaser; vendor and installer and recommendations for installations*, and Part 4: *Recommendations for selection, use and maintenance* as a future revision of this Standard, AS 2252.1 and AS 2252.2. It may be noted that EN Standard also includes Class III cabinets.

EN 12469 contains two alternative barrier containment methods to the DOP method of AS 1807.22. The Potassium-iodide particle method of EN 12469 is in preparation for publication as an Australian/New Zealand Standard by Committee ME-060.

If the Potassium-iodide particle method is published, the Committee proposes to withdraw AS 1807.22 in due course.

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FOREWORD

The widespread use of cytotoxic drugs creates special problems in their preparation, manipulation and dispensing. Many have been demonstrated to be mutagens and some to be carcinogens in cell DNA and chromosomal studies, animal models and from experience with treated patients. A causal relationship has also been demonstrated between occupational exposure of unprotected pregnant females to cytotoxic drugs and an increased incidence of spontaneous abortions and of foetal malformations. Other effects of exposure to these compounds may not manifest themselves for many years.

The safety requirements were recognized as follows:

(a) Protection of all personnel and the environment from any aerosol, particles or vapours which may be liberated in the preparation, manipulation, and dispensing of cytotoxic drugs.

(b) Protection of drug products so that they are prepared or dispensed in an environment essentially free from particulate (including biological) matter.

(c) Protection of maintenance and testing personnel from exposure to the residue of drug products which may contaminate cabinet filters, mechanical components and other surfaces.

This Standard, together with its companion document, AS 2639, *Laminar flow cytotoxic drug safety cabinets—Installation and use*, specifies means of providing protection in all three of the areas listed above. Installations which provide a lesser degree of environmental and containment control than that specified in AS 2639 may not provide an adequate level of protection for personnel and drug products.

In particular, the air barrier at the cabinet work opening is vulnerable to disruption by air movements produced by personnel near the cabinet, room ventilation systems and the opening and closing of doors. Such air movements can cause temporary failure of the cabinet to contain aerosols of drug products. These items are discussed further in AS 2639.

Additionally, operation of the cabinet in a room which does not provide Class 350 air cleanliness may result in premature blockage of the exhaust filter and a reduced level of personnel and product protection.

Class I and Class II biological safety cabinets are unsuitable for handling cytotoxic drugs. In addition, experimental evidence published* demonstrated that when cytotoxic drugs were dispensed in Class II biological safety cabinets, the exhaust HEPA filters alone did not totally arrest all cytotoxic drug residues released as aerosols within the work zone. At least several drugs in regular clinical use have low vapour pressures, enabling any residue on the face of the exhaust HEPA filter to sublime into the vapour phase, to pass through the HEPA filter, and subsequently to settle as solid drug films on surfaces surrounding the cabinet.

Use of a cytotoxic drug safety cabinet fitted with an activated carbon filter fitted downstream of the exhaust HEPA filter, and operated in a cleanroom with a dedicated exhaust extraction system close to the cabinet exhaust, (as described in AS 2639) is the most effective method to counter this problem.

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* CONNOR, T.H., ANDERSON, R.W., SESSINK, P.J., BROADFIELD, L. and POWER, L.A. Surface contamination with antineoplastic agents in six cancer treatment centres in Canada and the United States. *Am. J. Health Syst. Pharm.*, Jul 15 1999, 56(14) p.1427-32.

STANDARDS AUSTRALIA

Australian Standard
Laminar flow cytotoxic drug safety cabinets

1 SCOPE

This Standard specifies requirements for open-fronted laminar flow cytotoxic drug safety cabinets which are intended to provide protection for personnel, the environment, and cytotoxic drug products. These cabinets may also find wider application for handling other hazardous drugs and materials (see AS 2639). They are primarily designed to contain aerosols, and are not intended to provide complete protection against particles which may be ejected during procedures such as tablet crushing and grinding.

This Standard should be read in conjunction with AS 2639 which describes recommended practices for installation and use of these cabinets.

NOTE: Ergonomic considerations for the design and use of cytotoxic drug safety cabinets are addressed in Appendix A.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS		
1319		Safety signs for the occupational environment
1324		Air filters for use in general ventilation and airconditioning
1324.2	Part 2:	Methods of test
1807		Cleanrooms, workstations, safety cabinets and pharmaceutical isolators—Methods of test
1807.1	Method 1:	Determination of air velocity and uniformity of air velocity in clean workstations, laminar flow safety cabinets and pharmaceutical isolators
1807.2	Method 2:	Determination of performance of clean workstations, laminar flow safety cabinets and pharmaceutical isolators under loaded filter conditions
1807.5	Method 5	Determination of work zone integrity
1807.6	Method 6:	Determination of integrity of terminally-mounted HEPA filter installations
1807.15	Method 15:	Determination of illuminance
1807.18	Method 18:	Determination of vibration in workstations, safety cabinets and pharmaceutical isolators
1807.22	Method 22:	Determination of air barrier containment of laminar flow safety cabinets
1939		Degrees of protection provided by enclosures for electrical equipment (IP Code)
2639		Laminar flow cytotoxic drug safety cabinets—Installation and use
2659		Guide to the use of sound measuring equipment
2659.1	Part 1:	Portable sound level meters
4260		High efficiency particulate air (HEPA) filters—Classification, construction and performance