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## SAFETY IN LABORATORIES Part 8—FUME CUPBOARDS

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AUSTRALIAN STANDARD

**SAFETY IN LABORATORIES**  
**Part 8**  
**FUME CUPBOARDS**

AS 2288—1986

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## PREFACE

This standard was prepared by the Association's Committee on Safety in Laboratories under the direction of the Chemical Standards Board as a further part of AS 2243. It has been prepared as a result of a request from the Royal Australian Chemical Institute for a standard covering minimum safety requirements for laboratory fume cupboards.

Other standards in the AS 2243 series are as follows:

- Part 1—General
- Part 2—Chemical
- Part 3—Microbiology
- Part 4—Ionizing Radiations
- Part 5—Non-ionizing Radiations
- Part 6—Mechanical Aspects
- Part 7—Electrical Aspects

The primary reason for using a fume cupboard is to provide safe working conditions for the operator and other laboratory personnel. The fume cupboard provides a mechanical means of capturing, diluting and exhausting all fume, especially fume which is hazardous or noxious.

The efficiency and safety of a fume cupboard depends upon its aerodynamic design, its siting with respect to air movement and laboratory ventilation, the materials used in its construction, the complete fume exhaust system and the safe and remote dispersal of fume to the atmosphere. This standard also provides guidance on the use and maintenance of fume cupboards, and methods of testing their performance.

This standard covers fume cupboards used for general chemical operations, and additional requirements for some special applications as specified.

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## STANDARDS ASSOCIATION OF AUSTRALIA

**Australian Standard**  
for  
**FUME CUPBOARDS**

## SECTION 1. SCOPE AND GENERAL

**1.1 SCOPE.** This standard specifies safety requirements for general-purpose fume cupboards and the methods of test to be used to determine their performance.

**1.2 APPLICATION.** Fume cupboards covered by this standard are intended primarily for use in general chemical operations but may be used for the special applications set out in Appendix C, provided that the additional relevant features described therein are incorporated.

Ductless 'fume cupboards' which recirculate air and do not extract to the outside atmosphere are excluded from this standard and are not recommended for general use.

Existing fume cupboard installations will, in many instances, not comply with this standard and consequently should not be used. In the interests of laboratory safety a high priority should be allocated to the preparation of a program for upgrading sub-standard fume cupboard installations to meet the requirements of this standard. Fully ducted fume cupboards which do not comply with this standard should be upgraded to the required levels as soon as practicable.

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

- AS 1259 Sound Level Meters
- AS 1345 Identification of the Contents of Piping, Conduits and Ducts
- AS 1444 Wrought Alloy Steels—AISI-SAE Standard, Hardened (A) and Stainless Series
- AS 1449 Wrought Alloy Steels—Stainless and Heat-resisting Steel Plate, Sheet and Strip
- AS 1530 Methods for Fire Tests on Building Materials, Components and Structures Part 3—Test for Early Fire Hazard Properties of Materials
- AS 1682 Fire Dampers
- AS 1815 Electrical Equipment for Explosive Atmospheres: Special Protection—Types of Protection
- AS 2208 Safety Glazing Materials
- AS 2243 Safety in Laboratories Part 1—General Part 4—Ionizing Radiations
- AS 2252 Biological Safety Cabinets Part 1—Biological Safety Cabinets (Class 1) for Personnel Protection Part 2—Laminar Flow Biological Safety Cabinets (Class 2) for Personnel and Product Protection

- AS 2430 Classification of Hazardous Areas
- AS 2444 Portable Fire Extinguishers—Selection and Location
- AS 3000 SAA Wiring Rules
- AS XXXX\* Laboratory Construction

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

**1.4.1 Air**

**1.4.1.1 Make-up air**—air needed to replace that taken from the room by laboratory fume cupboards and other air exhausting devices.

**1.4.1.2 Auxiliary air**—air delivered adjacent to a laboratory fume cupboard to reduce consumption of conditioned room air.

**1.4.2 Air pressure**

**1.4.2.1 Negative air pressure**—air pressure lower than atmospheric.

**1.4.2.2 Positive air pressure**—air pressure higher than atmospheric.

**1.4.3 Bypass**—a device which allows air to flow into a fume cupboard other than through the working aperture with the objective of preventing excessively high face velocities at low sash openings and allowing a constant total extract rate irrespective of sash position. At small sash openings in the absence of a by-pass, the air velocity may be so high (e.g. much greater than 1.5 m/s) as to have an adverse effect on the work being performed.

**1.4.4 Extract system**—all ductwork and associated equipment installed between the point of connection to the fume cupboard and the point of discharge.

**1.4.5 Face velocity**—velocity of the air passing through the working aperture measured in the plane of the sash (see Appendix B).

**1.4.6 Fume**—gases, vapours, aerosols or particulate materials in air possessing one or more of the following hazards:

- (a) Toxicity (injuries to health including asphyxiation, allergy, narcosis. Refer to NH&MRC documents and others).
- (b) Flammability (including risks of explosion).
- (c) Chemical activity (including corrosion).
- (d) Radioactivity.
- (e) Discomfort (e.g. lachrymosis and objectionable odours).

\* In course of preparation.