Australian Standard®

Cleanrooms, workstations, and safety cabinets—Methods of test

Part 0: List of methods and apparatus

This Australian Standard was prepared by Committee ME/60, Controlled Environments. It was approved on behalf of the Council of Standards Australia on 7 April 1989 and published on 13 June 1989.

The following interests are represented on Committee ME/60:

Australian Institute of Refrigeration, Air Conditioning and Heating
Australian Medical Association
Australian Pharmaceutical Manufacturers Association
Commonwealth Serum Laboratories
Confederation of Australian Industry
CSIRO, Australian Animal Health Laboratory
Department of Administrative Services
Department of Community Services and Health
Department of Health, N.S.W
Health Department, Vic.
National Association of Testing Authorities, Australia
National Council of Chemical and Pharmaceutical Industries
Public Works Department, N.S.W.
Society of Hospital Pharmacists of Australia
State Chamber of Commerce and Industry, N.S.W.

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PREFACE

These Standards were prepared by the Standards Australia Committee on Controlled Environments as a revision of and replacement for the AS 1807—1976 series, *Methods of test for cleanrooms, work-stations and their accessories*. They set out a series of methods for the testing of cleanrooms, workstations, and safety cabinets.

The test method in AS 1807.7—1976, *Integrity of ducted systems (positive and negative)*, has been replaced in this series of Standards by a method to test the installation integrity of not terminally mounted HEPA filters which is based on the test method in AS 1132.9—1973, *Methods of test for air filters for use in air conditioning and general ventilation, Method 9: Determination of local area flaws and pinhole leaks*. It is intended that this method will eventually supersede AS 1132.9—1973.

The test methods in AS 1807.12—1976 and AS 1807.13—1976 have been replaced by test methods for temperature (Method 12) and relative humidity in cleanrooms (Method 13). AS 1807.14—1976 has been incorporated in Method 13 and withdrawn without replacement.

Additional test methods for testing safety cabinets have been incorporated which are based on methods specified in appendices to AS 2252, *Biological safety cabinets, Part 1*—1981: *Biological safety cabinets (Class I) for personnel protection*, and *Part 2*—1985: *Laminar flow biological safety cabinets (Class II) for personnel and product protection*. In the course of the preparation of this series of test methods it was also suggested to incorporate the test method for the determination of gastightness of the outer shell of biological safety cabinets as currently specified in AS 2252. However, this test method uses fluorocarbons which are known to be deleterious to the ozone layer and, therefore, it was decided to develop a new test method for the determination of gastightness using alternative substances which do not damage the ozone layer. This new test method will then be incorporated in this series of methods in due course.

Test methods to determine the sound level at installed workstations and safety cabinets and to determine the recovery time(s) of cleanrooms have also been included.

This Standard specifies requirements for all testing apparatus used in the testing of cleanrooms, workstations, and safety cabinets in accordance with the test methods set out in the AS 1807 series of Standards.

LIST OF METHODS

AS Number	Date Published	Title
1807.1	June 1989	Determination of air velocity and uniformity of air velocity in clean workstations and laminar flow safety cabinets
1807.2	June 1989	Determination of performance of clean workstations and laminar flow safety cabinets under loaded filter conditions
1807.3	June 1989	Determination of air velocity and uniformity of air velocity in laminar flow cleanrooms
1807.4	June 1989	Determination of performance of laminar flow cleanrooms under loaded filter conditions
1807.5	June 1989	Determination of work zone integrity
1807.6	June 1989	Determination of integrity of terminally mounted HEPA filter installations
1807.7	June 1989	Determination of integrity of HEPA filter installations not terminally mounted
1807.8	June 1989	Particle counting in work zone by automatic particle counter
1807.9	June 1989	Particle counting in cleanrooms by microscopic sizing and counting
1807.10	June 1989	Determination of air pressure of cleanrooms
1807.11	June 1989	Determination of airflow parallelism in laminar flow cleanrooms
1807.12	June 1989	Determination of temperature in work zones
1807.13	June 1989	Determination of relative humidity in cleanrooms
1807.15	June 1989	Determination of illuminance
1807.16	June 1989	Determination of sound level in cleanrooms
1807.17	June 1989	Determination of vibration in cleanrooms
1807.18	June 1989	Determination of vibration in workstations and safety cabinets
1807.19	June 1989	Sizing and counting of particulate contaminants in and on cleanroom garments
1807.20	June 1989	Determination of sound level at installed workstations and safety cabinets
1807.21	June 1989	Determination of inward air velocity of Class I biological safety cabinets
1807.22	June 1989	Determination of air barrier containment of laminar flow safety cabinets
1807.23	June 1989	Determination of intensity of radiation from germicidal ultraviolet lamps
1807.24	June 1989	Determination of recovery times of cleanrooms

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1 SCOPE. This Standard specifies requirements for all testing apparatus used in the testing of cleanrooms, workstations, and safety cabinets in accordance with test methods set out in the AS 1807 series of Standards. The Standard also provides definitions used in the specific test methods.

NOTE: If not otherwise specified, calibration, certification, and performance specifications for instruments should be determined by the tester, using methods and intervals acceptable to the relevant Authority. Manufacturer's claimed performance data are not considered a suitable alternative.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS
1006 Solid stem general purpose thermometers
1042 Direct-acting indicating electrical measuring instruments and their accessories
1259 Sound level meters
1386 Cleanrooms and clean workstations
1386.1 Part 1: Principles of clean space control

ISO
4677 Atmospheres for conditioning and testing—Determination of relative humidity
4677.1 Part 1: Aspirated psychrometer method
4677.2 Part 2: Whirling psychrometer method

3 DEFINITIONS. For the purpose of this Standard the definitions given in AS 1386.1 and those below apply.

3.1 Authority—body that has legal powers and rights.

3.2 Fibre—a particle larger than 100 μm with a length-to-width ratio exceeding 10:1.

3.3 Laminar airflow—an airflow in which the entire body of HEPA-filtered air within a defined area moves in a uniform and unidirectional manner.

NOTES:
1. The term 'laminar flow' is used to characterize cleanrooms, workstations, or safety cabinets incorporating laminar airflow, e.g. 'laminar flow cleanroom', 'laminar flow safety cabinet'.
2. The term 'non-laminar flow' is used to characterize cleanrooms or safety cabinets not providing laminar airflow, viz 'non-laminar flow cleanroom', 'non-laminar flow safety cabinet'.

4 ANEMOMETER. An electronic, direct reading anemometer with rotating vane head of 100 mm nominal diameter, having an accuracy of ±5 percent in the range from 0.35 m/s to 1.0 m/s.

Where the anemometer is to be used in a freestanding mode, a suitable stand shall be used to hold the anemometer in a fixed position without interfering with airflow.

5 MANOMETERS. The following types of manometers shall be used:

(a) Inclined-tube, liquid-filled manometer with a range of 0 to 500 Pa, having minor scale divisions of not greater than 10 Pa and an accuracy of at least ±1% full scale deflection.

(b) Inclined-tube, liquid-filled manometer with a range of 0 to 60 Pa, having minor scale divisions of not greater than 1 Pa and an accuracy of at least ±1% full scale deflection.

(c) Any other manometer with range and accuracy as required in (a) or (b) above, as applicable.

(d) Manometers for particle counting test methods as specified in Clause 17.9.

6 RESTRICTIVE DEVICE. A device, e.g. loaded filter(s) or plate(s), capable of simulating the specified increase in static filter resistance.

7 AMMETERS. The following types of ammeters shall be used:

(a) Moving-iron ammeter with ranges such that the measured values shall be not less than one-fifth of full scale. It shall be a Class 0.5 instrument as defined in AS 1042.

(b) When specified, a hand-held clamp meter (tong-tester) with suitable range(s) may be used. The analog meter shall have range(s) such that the measured values are not less than one-fifth of full scale.

8 AEROSOL PHOTOMETER AND PHOTOMETER PROBE TIP.

8.1 Aerosol photometer. A light scattering mass concentration indicator with minimum threshold sensitivity of 10^{-3} μg/L and capable of measuring aerosol concentration in the range of 80 μg/L to 120 μg/L. The photometer sample flow rate shall be 0.5 ±0.05 L/s (30 ±3 L/min).

8.2 Photometer probe tip for filter integrity testing. For filter integrity testing a probe tip may be fitted. A typical design is illustrated in Figure 1. The probe tip shall have a maximum internal inlet diameter (*d*) of 30 mm. Any transition from initial inlet diameter to final inlet diameter shall be gradual. A maximum included angle (θ) of 21 degrees is recommended (see Figure 1).

9 COLD DOP AEROSOL GENERATOR AND FITTINGS.

9.1 Cold DOP aerosol generator. A cold DOP (dioctylphthalate) aerosol generator fitted with Laskin