AS 3547—1997
(Incorporating Amendment No. 1)

Australian Standard™

Breath alcohol testing devices for personal use

This Australian Standard was prepared by Committee CS/77, Blood Alcohol Testing Devices. It was approved on behalf of the Council of Standards Australia on 31 December 1996 and published on 5 March 1997.

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Australian Association of Certification Bodies

Australian Automobile Association

Australian Chamber of Commerce and Industry

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Breath alcohol testing devices for personal use

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PREFACE

This Standard was prepared by Standards Australia Committee CS/77, Blood Alcohol Testing Devices, to supersede AS 3547—1993.

This Standard incorporates Amendment No. 1 (June 2000). The changes required by the Amendment(s) are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure, or part thereof affected.

While the performance criteria for the breath alcohol testing devices specified within remain largely unchanged in this edition, the test requirements for these devices have been clarified and more closely aligned. Other changes to the Standard include—

(i) an alignment of the minimum calibration periods and display requirements for Type 2, Type 3 and Type 4 devices;

(ii) replacement of the vibration and dust exposure tests for Type 2 devices with a simple robustness test; and

(iii) removal of requirements for analogue displays, due to the increasing obsolescence of devices incorporating such displays.

The Committee was aware that recalibration of electronic breath alcohol testing devices at regular intervals is vital if accurate results are to be obtained. Provision of recalibration facilities to the general public at a reasonable price, should, in the opinion of the Committee, be a prerequisite for the sale of electronic breath alcohol devices for personal use. Obviously, such a requirement could not be included in an Australian Standard product specification, and it is therefore only included as a recommendation for consideration by the appropriate regulatory authorities and by the suppliers of these devices.

Requirements specified in Section 5 for breath alcohol testing devices such as those which are fitted to motor vehicles or machinery relate only to the performance and accuracy of these devices in measuring the alcohol content of expired air and in providing an appropriate output signal to the circuitry which interacts with the vehicle or machine. Requirements are not included for systems which are designed to ensure that only the driver's or operator's breath is measured and no other source of air is introduced into the device. The means by which these devices interact with motor vehicles or machinery to inhibit their use are also not specified. In both instances these functions were considered to be beyond the scope of this Standard.

The term 'normative' has been used in this Standard to define the application of the appendix to which it applies. A 'normative' appendix is an integral part of a Standard.

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Breath alcohol testing devices for personal use

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies requirements for the performance, testing and marking of disposable and re-useable breath alcohol testing devices for personal use, other than those devices used by the Police to obtain evidence which is used in the prosecution of drink-drivers.

1.2 OBJECTIVE The objective of this Standard is to provide manufacturers of breath alcohol testing devices for personal use with a set of minimum performance requirements, in order to enable users to determine their blood alcohol levels.

1.3 CLASSIFICATION Devices specified in this Standard are classified as follows:

(a) *Type 1* Single-use, disposable breath alcohol testing devices.

(b) *Type 2* Portable electronic breath alcohol testing devices (sometimes known as hand-held devices).

(c) *Type 3* Electronic breath alcohol testing devices designed for use in fixed installations.

(d) *Type 4* Electronic breath alcohol testing devices such as those which are installed to control the usage of motor vehicles or other machinery (sometimes known as interlock devices).

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

AS
1099 Basic environmental testing procedures for electrotechnology
A1 | 1099.2.31 Method 2.31: Test Ec—Drop and topple, primarily for equipment
3100 Approval and test specification—General requirements for electrical equipment

AS/NZS
2596 Seat belt assemblies for motor vehicles

A1 | IEC
| 60068 Environmental testing
| 60068-2-6 Part 2: Tests—Test Fc: Vibration (sinusoidal)

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

1.5.1 Alcohol—the unmodified term 'alcohol' refers specifically to the chemical substance ethanol which, in the context of this Standard, may occur in either a liquid or gaseous form.

NOTE: Ethanol is also commonly known as ethyl alcohol.

1.5.2 Automatic gas sampling system—a process incorporated into a breath alcohol testing device by which the device determines automatically when an appropriate amount of sample has been delivered for analysis.

1.5.3 Blood alcohol concentration (BAC)—the concentration of alcohol in the bloodstream expressed in grams of alcohol per 100 mL of blood.

NOTE: Grams of alcohol per 100 mL of blood is commonly referred to as 'percent'.

1.5.4 Breath alcohol testing device—a device which measures the alcohol content of an appropriate sample of expired air.

1.5.5 Calibration—the process of adjusting a breath alcohol testing device until the required calibration setting is achieved.

1.5.6 Calibration period—the minimum period over which the calibration setting of a breath alcohol testing device is maintained.

1.5.7 Calibration setting—the result of the adjustment made to a breath alcohol testing device during the process of calibration or recalibration so that the accuracy of the subsequent results given by the device meet the requirements of this Standard.

1.5.8 Caution result—a display or a colour change which, when interpreted according to the manufacturer's instructions, indicates a blood alcohol concentration marginally below the designated blood alcohol concentration.

1.5.9 Corridor air—expired air from the upper part of the respiratory tract, as opposed to deep lung air.

NOTE: The requirements of this Standard are based on the assumption that the first 330 mL of expired air is corridor air containing little or no alcohol.

1.5.10 Deep lung air—expired air from the lower part of the respiratory tract, including a proportion of alveolar air.

1.5.11 Designated blood alcohol concentration—the prescribed blood alcohol concentration against which the user's blood alcohol concentration is to be compared.

NOTE: The designated blood alcohol concentration is generally the prescribed legal limit for motor vehicle drivers.

1.5.12 Expiry date—for a Type 1 breath alcohol testing device, the date prior to which the accuracy of the result given by the device meets the requirements of this Standard.

1.5.13 Negative result—a display or a colour change which, when interpreted according to the manufacturer's instructions, indicates a blood alcohol concentration below the designated blood alcohol concentration.

1.5.14 Nominated flow rate—the rate of flow, nominated by the manufacturer of a breath alcohol testing device and measured in litres per minute, of any gas mixture to be introduced into the device for test purposes.

1.5.15 Normal room temperature—a temperature of 20 ±2°C.

1.5.16 Positive result—a display or a colour change which, when interpreted according to the manufacturer's instructions, indicates a blood alcohol concentration equal to or above the designated blood alcohol concentration.

1.5.17 Recalibration—the process of adjusting a breath alcohol testing device to restore its calibration setting.

NOTE: Periodic recalibration is required because the nature of breath alcohol testing devices means that they may drift from their calibration setting over time.

1.5.18 Recovery time—the time taken for a breath alcohol testing device to be ready to receive another sample of expired air after a peak result from one sample of expired air has been obtained.

1.5.19 Self-calibration—the process whereby a breath alcohol testing device automatically recalibrates without the need for manual intervention.

SECTION 2 TYPE 1 DEVICES

2.1 SCOPE The requirements for performance, testing and marking of single-use, disposable breath alcohol testing devices and the information to be supplied with such devices are specified in this Section.

2.2 PERFORMANCE REQUIREMENTS

2.2.1 Gas sample The device shall be capable of receiving at least 1 L of expired air when used in accordance with the manufacturer's instructions.

2.2.2 Legibility The result produced by the device shall be legible when viewed in daylight or in incandescent light by a person with normal colour vision.

2.3 TESTING

A1 **2.3.1 General** Twenty-six Type 1 devices, all of which shall have been stored in accordance with the manufacturer's instructions, shall be tested. Each device shall be tested once only, with testing taking place at normal room temperature and as close as practicable to the expiry date of the device.

The test method specified in Appendix A shall be modified for Type 1 devices which employ an inflatable bag, so that account is taken of the proportion of corridor air which would be included when the device is used in accordance with the manufacturer's instructions and the lower flow rate usually required.

A1 **2.3.2 Accuracy and flow sensitivity** When tested in accordance with Appendix A, the following results shall be obtained:

(a) When 10 Type 1 devices are tested at 0.020 g of alcohol per 100 mL of blood below their designated blood alcohol concentration, supplied at the manufacturer's nominated flow rate—a negative result for each device.

(b) When 10 Type 1 devices are tested at their designated blood alcohol concentration, supplied at the manufacturer's nominated flow rate — a positive result for each device.

(c) When 3 Type 1 devices are tested at their designated blood alcohol concentration, supplied at 20 percent below the manufacturer's nominated flow rate — a positive result for each device.

(d) When 3 Type 1 devices are tested at their designated blood alcohol concentration, supplied at 20 percent above the manufacturer's nominated flow rate — a positive result for each device.

2.4 INFORMATION AND MARKING

2.4.1 Information The following information shall be supplied with each packet of Type 1 devices:

(a) Instructions on how to use the device.

(b) A warning that alcohol should not be consumed for at least 10 min prior to using the device.

(c) An explanation that blood alcohol concentration can continue to rise for up to 2 h after the cessation of drinking and advice that care should be taken if a caution result or a result close to the designated blood alcohol concentration is indicated.

(d) An explanation that it can take 10 h or more for the blood alcohol level to return to zero after a high blood alcohol level has been reached and advice that, in such cases, a further test should be carried out later in the day or the following morning.

(e) Storage instructions.

(f) Instructions on how to interpret the result given by the device.

2.4.2 Marking Each packet of Type 1 devices shall be clearly marked with the following information:

(a) Name and address or the registered trademark of the Australian supplier of the devices.

(b) Manufacturer's batch identification code.

(c) Designated blood alcohol concentration.

(d) Expiry date, as specified by the manufacturer.

NOTE: Manufacturers making a statement of compliance with this Australian Standard on a product, packaging, or promotional material related to that product are advised to ensure that such compliance is capable of being verified.

SECTION 3 TYPE 2 DEVICES

3.1 SCOPE The requirements for performance, testing and marking of portable electronic breath alcohol testing devices (commonly known as hand-held devices) and the information supplied with such devices are specified in this Section.

3.2 PERFORMANCE REQUIREMENTS

3.2.1 Display

3.2.1.1 *General* The display of a Type 2 device shall be either a qualitative display complying with the requirements of Clause 3.2.1.2 or a quantitative display complying with the requirements of Clause 3.2.1.3. It shall be expressed in terms of the equivalent blood alcohol concentration, and the peak measurement shall be held on the display until it is either manually reset, or is automatically reset after a period of not less than 15 s.

A1 **3.2.1.2** *Qualitative display* Qualitative displays for BAC 0.02 devices shall give unambiguous indications of a negative result (see Clause 1.5.13) and a positive result (see Clause 1.5.16).

Qualitative displays for BAC 0.05 devices and BAC 0.08 devices shall give unambiguous indications of each of the following:

(a) A negative result (see Clause 1.5.13).

(b) A caution result (see Clause 1.5.8).

(c) A positive result (see Clause 1.5.16).

3.2.1.3 *Quantitative display* A quantitative display shall be digital and shall comply with the following requirements:

(a) The display units of measurement shall be capable of being expressed in grams of alcohol per 100 mL of blood. Where a device is capable of displaying different units of measurement, the display shall only be adjustable by the manufacturer or person servicing the device.

(b) If a display is LCD, it shall be backlit to enable reading in darkness.

(c) The display shall include the range from 0.000 g/100 mL to 0.100 g/100 mL.

(d) The display shall show either—

  (i) 3 digits to the right of the decimal point; or

  (ii) 2 digits to the right of the decimal point, provided the required accuracy to 3 digits to the right of the decimal point can be verified during calibration, recalibration and testing.

(e) For devices with a range which does not exceed 0.25 g/100 mL, any result exceeding the maximum capacity of the device shall be clearly indicated.

3.2.2 Calibration A Type 2 device shall have a minimum calibration period of 30 days and shall—

(a) be capable of being recalibrated;

(b) have a calibration setting which cannot be inadvertently adjusted; and

(c) have an indication on the device of when recalibration is due.

NOTES:

1 Suppliers of breath alcohol testing devices are advised that means of recalibration and servicing should be made available.

2 Clause 3.4.1.1(g) requires the manufacturer to provide the calibration period of the device.

3.2.3 Automatic gas sampling system When tested in accordance with Appendix B or Appendix C as appropriate, Type 2 devices which incorporate an automatic gas sampling system shall not display a reading when less than 1000 mL of air is introduced through the mouthpiece.

NOTE: The air may be at normal room temperature for the purpose of this requirement.

3.2.4 Recovery time The recovery time for a Type 2 device shall not exceed 5 min for samples within the range specified in Clause 3.2.1.3(c).

3.3 TESTING

3.3.1 General Type 2 devices which are designed to give a qualitative output shall comply with the relevant requirements of Clause 3.3.2. Type 2 devices which are designed to give a quantitative output shall comply with Clause 3.3.3.

3.3.2 Qualitative Type 2 devices

3.3.2.1 *General* Qualitative Type 2 devices which have a designated blood alcohol concentration of 0.02 g/100 mL shall comply with Clause 3.3.2.2. Qualitative Type 2 devices which have a designated blood alcohol concentration of 0.05 g/100 mL shall comply with Clause 3.3.2.3. Qualitative Type 2 devices which have a designated blood alcohol concentration of 0.08 g/100 mL shall comply with Clause 3.3.2.4.

3.3.2.2 *BAC 0.02 devices* When tested in accordance with Appendix B, with the device calibrated at a designated blood alcohol concentration of 0.02 g/100 mL, the following results shall be obtained both before and after the storage period:

(a) When tested 3 times at 0.000 g/100 mL at the manufacturer's nominated flow rate—a negative result each time.

(b) When tested 3 times at 0.030 g/100 mL at the manufacturer's nominated flow rate—a positive result each time.

(c) When tested 3 times at 0.030 g/100 mL supplied at a flow rate 5 L/min below the manufacturer's nominated flow rate—a positive result each time.

(d) When tested 3 times at 0.030 g/100 mL supplied at a flow rate 5 L/min above the manufacturer's nominated flow rate—a positive result each time.

3.3.2.3 *BAC 0.05 devices* When tested in accordance with Appendix B, with the device calibrated at a designated blood alcohol concentration of 0.05 g/100 mL, the following results shall be obtained both before and after the storage period:

(a) When tested 3 times at 0.000 g/100 mL supplied at the manufacturer's nominated flow rate—a negative result each time.

(b) When tested 3 times at 0.040 g/100 mL supplied at the manufacturer's nominated flow rate—a caution result each time.

(c) When tested 3 times at 0.060 g/100 mL supplied at the manufacturer's nominated flow rate—a positive result each time.

(d) When tested 3 times at 0.060 g/100 mL supplied at a flow rate 5 L/min below the manufacturer's nominated flow rate—a positive result each time.

(e) When tested 3 times at 0.060 g/100 mL supplied at a flow rate 5 L/min above the manufacturer's nominated flow rate—a positive result each time.

3.3.2.4 *BAC 0.08 devices* When tested in accordance with Appendix B, with the device calibrated at a designated blood alcohol concentration of 0.08 g/100 mL, the following results shall be obtained both before and after the storage period:

(a) When tested 3 times at 0.000 g/100 mL supplied at the manufacturer's nominated flow rate—a negative result each time.

(b) When tested 3 times at 0.070 g/100 mL supplied at the manufacturer's nominated flow rate—a caution result each time.

(c) When tested 3 times at 0.090 g/100 mL supplied at the manufacturer's nominated flow rate—a positive result each time.

(d) When tested 3 times at 0.090 g/100 mL supplied at a flow rate 5 L/min below the manufacturer's nominated flow rate—a positive result each time.

(e) When tested 3 times at 0.090 g/100 mL supplied at a flow rate 5 L/min above the manufacturer's nominated flow rate—a positive result each time.

3.3.3 Quantitative Type 2 devices

3.3.3.1 *Testing before storage period* When tested in accordance with Appendix C before the storage period, the following results shall be obtained:

(a) When tested 3 times at 0.000 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall not be greater than 0.010 g/100 mL each time.

(b) When tested 3 times at 0.020 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(c) When testing 3 times at 0.050 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated alcohol concentration used each time.

(d) When tested 3 times at 0.080 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(e) When tested 3 times at 0.100 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(f) When tested 3 times at 0.100 g/100 mL supplied at 5 L/min below the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(g) When tested 3 times at 0.100 g/100 mL supplied at 5 L/min above the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(h) When tested 3 times at 0.3 g/100 mL supplied at the manufacturer's nominated flow rate, either—

  (i) the reading shall be within 0.050 g/100 mL of the simulated blood alcohol concentration used each time; or

  (ii) in accordance with Clause 3.2.1.3(e), a clear indication that the maximum capacity of the device has been exceeded shall be given.

3.3.3.2 *Testing after storage period* When tested in accordance with Appendix C after the storage period, the following results shall be obtained:

(a) When tested 3 times at 0.000 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall not be greater than 0.010 g/100 mL each time.

(b) When tested 3 times at 0.020 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(c) When tested 3 times at 0.050 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated alcohol concentration used each time.

(d) When tested 3 times at 0.080 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(e) When tested 3 times at 0.100 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(f) When tested 3 times at 0.100 g/100 mL supplied at 5 L/min below the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(g) When tested 3 times at 0.100 g/100 mL supplied at 5 L/min above the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

3.4 INFORMATION AND MARKING

3.4.1 Information

3.4.1.1 *General* The following information shall be supplied with a Type 2 device:

(a) Instructions on how to use the device.

(b) A warning that alcohol should not be consumed for at least 10 min prior to using the device.

(c) An explanation that blood alcohol concentration can continue to rise for up to 2 h after the cessation of drinking and advice that care should be taken if a caution result or a result close to the designated blood alcohol concentration is indicated.

(d) An explanation that it can take 10 h or more for the blood alcohol level to return to zero after a high blood alcohol level has been reached and advice that, in such cases, a further test should be carried out later in the day or the following morning.

(e) Storage instructions.

(f) Instructions on how to interpret the result given by the device.

(g) The calibration period of the device and details of recalibration and servicing requirements, including advice on how relocation of the device (e.g. to an altitude different from that at which it was calibrated) may affect such requirements.

(h) For quantitative Type 2 devices, the maximum reading which can be displayed by the device, and how the device indicates that this maximum has been exceeded.

3.4.1.2 *Nominated flow rate* The manufacturer shall provide the nominated flow rate of the device, which shall be between 12 L/min and 30 L/min, to the testing organization.

3.4.2 Marking A Type 2 device shall be clearly and indelibly marked with the following information:

(a) Name and address or the registered trademark of the Australian supplier of the device.

(b) Manufacturer's batch identification code.

(c) For qualitative Type 2 devices—

  (i) the designated blood alcohol concentration; and

  (ii) an indication of how to interpret the result given in relation to the designated blood alcohol level.

NOTE: Manufacturers making a statement of compliance with this Australian Standard on a product, packaging, or promotional material related to that product are advised to ensure that such compliance is capable of being verified.

SECTION 4 TYPE 3 DEVICES

4.1 SCOPE The requirements for performance, testing and marking of electronic breath alcohol testing devices designed for general use in fixed installations and the information supplied with such devices are specified in this Section.

4.2 PERFORMANCE REQUIREMENTS

4.2.1 Display The display of a Type 3 device shall be digital and quantitative, and shall comply with the following requirements:

(a) The display units of measurement shall be capable of being expressed in grams of alcohol per 100 mL of blood. Where a device is capable of displaying different units of measurement, the display shall only be adjustable by the manufacturer or person servicing the device.

(b) If a display is LCD, it shall be backlit to enable reading in darkness.

(c) The display shall include the range from 0.000 g/100 mL to 0.100 g/100 mL.

(d) The display shall show at least 3 digits to the right of the decimal point.

(e) For devices with a range which does not exceed 0.25 g/100 mL, any result exceeding the maximum capacity of the device shall be clearly indicated.

4.2.2 Calibration

4.2.2.1 *General* Each Type 3 device shall have a minimum calibration period of 30 days and shall be either—

(a) self-calibrating; or

(b) manually recalibrated.

4.2.2.2 *Self-calibrating devices* A self-calibrating device shall—

(a) carry out the self-calibration procedure at the end of the calibration period;

(b) cease to operate should it fail to carry out the self-calibration procedure; and

(c) be able to have its calibration setting manually adjusted by the person servicing the device.

4.2.2.3 *Manually recalibrated devices* A manually recalibrated device shall cease to operate if it is not recalibrated at the end of the calibration period.

NOTES:

1 Suppliers of breath alcohol testing devices are advised that means of recalibration and servicing should be made available.

2 Clause 4.4.1.1(d) requires the manufacturer to provide the calibration period of the device.

4.2.3 Electrical safety Type 3 devices shall comply with the relevant requirements of AS 3100.

NOTE: Electricity supply authorities may have additional requirements for Type 3 devices.

4.2.4 Automatic gas sampling system When tested in accordance with Appendix D, Type 3 devices which incorporate an automatic gas sampling system shall not display a reading when less than 1000 mL of air is introduced through the mouthpiece.

NOTE: The air may be at normal room temperature for the purpose of this requirement.

4.2.5 Recovery time The recovery time for a Type 3 device shall not exceed 1 min for samples within the range specified in Clause 4.2.1(c).

4.2.6 Hygiene The device shall incorporate—

(a) a suitably hygienic system of dispensing disposable mouthpieces; and

(b) a means of preventing the user from inhaling the expired air from previous users.

4.2.7 Liquid contamination The introduction of liquids into the mouthpiece should not affect the subsequent accuracy of the device.

4.3 TESTING

4.3.1 Testing before storage period When tested in accordance with Appendix D before the storage period, the following results shall be obtained:

(a) When tested 10 times at 0.000 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall not be greater than 0.005 g/100 mL each time.

(b) When tested 10 times at 0.020 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.005 g/100 mL of the simulated blood alcohol concentration used each time.

(c) When tested 10 times at 0.050 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.005 g/100 mL of the simulated blood alcohol concentration used each time.

(d) When tested 10 times at 0.080 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.008 g/100 L of the simulated blood alcohol concentration used each time.

(e) When tested 10 times at 0.100 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(f) When tested 10 times at 0.100 g/100 mL supplied 5 L/min below the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(g) When tested 10 times at 0.100 g/100 mL supplied 5 L/min above the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(h) When tested 3 times at 0.3 g/100 mL supplied at the manufacturer's nominated flow rate, either—

  (i) the reading shall be within 0.050 g/100 mL of the simulated blood alcohol concentration used each time; or

  (ii) a clear indication that the maximum capacity of the device has been exceeded shall be given in accordance with Clause 4.2.1(e).

4.3.2 Testing after storage period When tested in accordance with Appendix D after the storage period, the following results shall be obtained:

(a) When tested 10 times at 0.000 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall not be greater than 0.005 g/100 mL each time.

(b) When tested 10 times at 0.020 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.005 g/100 mL of the simulated blood alcohol concentration used each time.

(c) When tested 10 times at 0.050 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.005 g/100 mL of the simulated blood alcohol concentration used each time.

(d) When tested 10 times at 0.080 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.008 g/100 L of the simulated blood alcohol concentration used each time.

(e) When tested 10 times at 0.100 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(f) When tested 10 times at 0.100 g/100 mL supplied 5 L/min below the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(g) When tested 10 times at 0.100 g/100 mL supplied 5 L/min above the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(h) When tested twice at 0.050 g/100 mL after four samples at 0.3 g/100 mL have been introduced to the device, the reading shall be within 0.005 g/100 mL of the simulated blood alcohol concentration used each time.

(i) When tested twice at 0.000 g/100 mL after four samples at 0.3 g/100 mL have been introduced to the device, the reading shall be less than 0.005 g/100 mL each time.

4.4 INFORMATION AND MARKING

4.4.1 Information

4.4.1.1 *General* The following information shall be supplied with a Type 3 device, with the information specified in Items (a), (b) and (c) made available to users:

(a) An explanation that blood alcohol concentration can continue to rise for up to 2 h after the cessation of drinking and advice that care should be taken if a caution result or a result close to the designated blood alcohol concentration is indicated.

(b) An explanation that it can take 10 h or more for the blood alcohol level to return to zero after a high blood alcohol level has been reached and advice that, in such cases, a further test should be carried out later in the day or the following morning.

(c) The maximum reading which can be displayed by the device, and how the device indicates that this maximum has been exceeded.

(d) The calibration period of the device and details of recalibration and servicing requirements, including advice on how relocation of the device (e.g. to an altitude different from that at which it was calibrated) may affect such requirements.

4.4.1.2 *Nominated flow rate* The manufacturer shall provide the nominated flow rate of the device, which shall be between 12 L/min and 30 L/min, to the testing organization.

4.4.2 Marking A Type 3 device shall be clearly and indelibly marked with the following information, with the information specified in Items (a) and (b) in a prominent position on the front of the device:

(a) Instructions on how to use the device.

(b) A warning that alcohol should not be consumed for at least 10 min prior to using the device.

(c) Name and address or registered trademark of the Australian supplier of the device.

(d) Manufacturer's batch identification code.

NOTE: Manufacturers making a statement of compliance with this Australian Standard on a product, packaging, or promotional material related to that product are advised to ensure that such compliance is capable of being verified.

SECTION 5 TYPE 4 DEVICES

5.1 SCOPE The requirements for performance, testing and marking of electronic breath alcohol testing devices such as those which are installed to control the usage of motor vehicles or other machinery and the information supplied with such devices are specified in this Section.

5.2 PERFORMANCE REQUIREMENTS

5.2.1 General A Type 4 device shall interact with the motor vehicle or machine in such a way that a positive result at the designated blood alcohol level will inhibit the use of the motor vehicle or machine.

5.2.2 Display The display of a Type 4 device shall be digital and quantitative, and shall comply with the following requirements:

(a) The display units of measurement shall be capable of being expressed in grams of alcohol per 100 mL of blood. Where a device is capable of displaying different units of measurement, the display shall only be adjustable by the manufacturer or person servicing the device.

(b) If a display is LCD, it shall be backlit to enable reading in darkness.

(c) The display shall include the range from 0.000 g/100 mL to 0.100 g/100 mL.

(d) The display shall show either—

  (i) 3 digits to the right of the decimal point; or

  (ii) 2 digits to the right of the decimal point, provided the required accuracy to 3 digits to the right of the decimal point can be verified during calibration, recalibration and testing.

(e) For devices with a range which does not exceed 0.25 g/100 mL, any result exceeding the maximum capacity of the device shall be clearly indicated.

5.2.3 Calibration

5.2.3.1 *General* A Type 4 device shall have a minimum calibration period of 30 days and shall be either—

(a) self-calibrating; or

(b) manually recalibrated.

5.2.3.2 *Self-calibrating devices* A self-calibrating device shall—

(a) carry out the self-calibration procedure at the end of the calibration period;

(b) cease to operate should it fail to carry out the self-calibration procedure; and

(c) be able to have its calibration setting manually adjusted by the person servicing the device.

5.2.3.3 *Manually recalibrated devices* A manually recalibrated device shall—

(a) incorporate a means of indicating that the end of the calibration period is imminent, with such indication commencing not less than 3 days before recalibration is due; and

(b) activate an audible or visible alarm if it is not recalibrated at the end of the calibration period.

NOTES:

1 Suppliers of breath alcohol testing devices are advised that means of recalibration and servicing should be made available.

2 Clause 5.4.1.1(g) requires the manufacturer to provide the calibration period of the device.

5.2.4 Automatic gas sampling system When tested in accordance with Appendix E, Type 4 devices which incorporate an automatic gas sampling system shall not display a reading when less than 1000 mL of air is introduced via the mouthpiece.

NOTE: The air may be at normal room temperature for the purpose of this requirement.

5.2.5 Recovery time The recovery time for a Type 4 device shall not exceed 5 min for samples within the range specified in Clause 5.2.2(c).

5.3 TESTING

5.3.1 Testing before storage period When tested in accordance with Appendix E before the storage period, the following results shall be obtained:

(a) When tested 3 times at 0.000 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall not be greater than 0.010 g/100 mL each time.

(b) When tested 3 times at 0.020 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(c) When tested 3 times at 0.050 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(d) When tested 3 times at 0.080 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(e) When tested 3 times at 0.100 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(f) When tested 3 times at 0.100 g/100 mL supplied at 5 L/min below the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(g) When tested 3 times at 0.100 g/100 mL supplied at 5 L/min above the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(h) When tested 3 times at a temperature of 0 ±2°C at 0.050 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(i) When tested 3 times at a temperature of 40 ±2°C at 0.050 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(j) When tested 3 times at 0.3 g/100 mL supplied at the manufacturer's nominated flow rate, either—

  (i) the reading shall be within 0.050 g/100 mL of the simulated blood alcohol concentration used each time; or

  (ii) in accordance with Clause 5.2.2(e), a clear indication that the maximum capacity of the device has been exceeded shall be given.

5.3.2 Testing after storage period When tested in accordance with Appendix E after the storage period, the following results shall be obtained:

(a) When tested 3 times at 0.000 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall not be greater than 0.010 g/100 mL each time.

(b) When tested 3 times at 0.020 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(c) When tested 3 times at 0.050 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(d) When tested 3 times at 0.080 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(e) When tested 3 times at 0.100 g/100 mL supplied at the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(f) When tested 3 times at 0.100 g/100 mL supplied at 5 L/min below the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

(g) When tested 3 times at 0.100 g/100 mL supplied at 5 L/min above the manufacturer's nominated flow rate, the reading shall be within 0.010 g/100 mL of the simulated blood alcohol concentration used each time.

5.3.3 Activation of interlock function When tested in accordance with Appendix E, the device shall not activate the interlock function when the reading on the display is below the designated blood alcohol concentration, and shall activate the interlock function when the reading on the display is equal to or above the designated blood alcohol concentration.

For devices which are designed so that the designated blood alcohol concentration can be varied, the test shall be performed with the designated blood alcohol concentration set at 0.050 g/100 mL. The test shall be repeated on a second device with the designated blood alcohol concentration set at 0.020 g/100 mL.

The readings used to demonstrate the interlock function shall not be more than 0.005 g/100 mL above or below the designated blood alcohol concentration.

NOTE: The tests specified in Clauses 5.3.1 and 5.3.2 may be used to partially or wholly satisfy the requirements of Clause 5.3.3.

5.4 INFORMATION AND MARKING

5.4.1 Information

5.4.1.1 *General* The following information shall be supplied with a Type 4 device:

(a) Instructions on how to use the device.

(b) A warning that alcohol should not be consumed for at least 10 min prior to using the device.

(c) An explanation that blood alcohol concentration can continue to rise for up to 2 h after the cessation of drinking and advice that care should be taken if a caution result or a result close to the designated blood alcohol concentration is indicated.

(d) An explanation that it can take 10 h or more for the blood alcohol level to return to zero after a high blood alcohol level has been reached and advice that, in such cases, a further test should be carried out later in the day or the following morning.

(e) Storage instructions.

(f) Instructions on how to interpret the result given by the device.

(g) The calibration period of the device and details of recalibration and servicing requirements, including advice on how relocation of the device (e.g. to an altitude different from that at which it was calibrated) may affect such requirements.

(h) The maximum reading which can be displayed by the device, and how the device indicates that this maximum has been exceeded.

5.4.1.2 *Nominated flow rate* The manufacturer shall provide the nominated flow rate of the device, which shall be between 12 L/min and 30 L/min, to the testing organization.

5.4.2 Marking A Type 4 device shall be clearly and indelibly marked with the following information:

(a) Name and address or registered trademark of the Australian supplier of the device.

(b) Manufacturer's batch identification code.

(c) The designated blood alcohol concentration at which the interlock function of the device is set.

NOTE: Manufacturers making a statement of compliance with this Australian Standard on a product, packaging, or promotional material related to that product are advised to ensure that such compliance is capable of being verified.

APPENDIX A

TEST METHOD FOR BREATH ALCOHOL TESTING DEVICES USING SIMULATED EXPIRED AIR

(Normative)

A1 SCOPE This Appendix sets out a method for testing breath alcohol testing devices by using simulated expired air.

A2 PRINCIPLE Simulated expired human breath representing a specific blood alcohol concentration is produced by passing air through an ethanol solution of the required concentration. The resultant gas mixture is then introduced into the breath alcohol testing device at a specified flow rate.

A3 REAGENTS

A3.1 Ethanol Anhydrous ethanol or a certified aqueous solution of ethanol.

A3.2 Carrier gas Gas introduced into the breath alcohol testing device shall, unless otherwise specified, be at the nominated flow rate and shall meet the following requirements:

(a) Temperature (T): 34 ±0.1°C.

(b) Humidity: Fully equilibrated with water.

NOTE: For Type 2, 3 and 4 devices, flow rates 5 L/min greater than or less than the nominated flow rate are used to test whether the device's response is flow-sensitive. For Type 1 devices, flow rates 20 percent above or below the nominated flow rate are used for this purpose.

A4 APPARATUS

A4.1 Glassware—grade A volumetric glassware shall be used throughout.

A4.2 Expired air simulator—capable of introducing a gas sample meeting the requirements of Paragraph A3.2 into a breath alcohol testing device. The simulator shall have sufficient capacity (through the use of large capacity vessels or extra vessels) to deliver the required number of gas samples for the simulated blood alcohol concentration in use without the required concentration of the ethanol solution in the final vessel deviating more than 2 percent. The apparatus shown in Figure A1 is suitable.

NOTES:

1 The outlet tube carrying the gas sample to the device under test should be as short as practicable (preferably less than 100 mm) or a means of heating it should be provided.

2 The simulator should be checked for leaks before use.

A4.3 Flowmeter—capable of measuring the flow rate delivered to the device under test.

A4.4 Temperature measuring device—capable of measuring to ±0.1°C.

NOTE: Critical measuring devices such as flowmeters and temperature probes should be calibrated regularly against a known standard.

A5 PROCEDURE The procedure shall be as follows:

(a) Prepare the appropriate ethanol solution according to the blood alcohol concentration to be simulated, using the concentration of ethanol in distilled water specified in Table A1. Check that the solutions prepared are within 2 percent of the required concentrations.

When testing a Type 1 device which collects the whole of the gas sample in an inflatable bag, the concentration of ethanol shall be multiplied by a factor of 0.67 to allow for the presence of corridor air when the device is used with actual expired breath.

(b) Adjust the gas flow rate by means of a double regulator and monitor the flowmeter until the required gas flow rate is achieved.

(c) Monitor the temperature at point T, indicated on Figure A1, to maintain a temperature of 34 ±0.1°C.

(d) Connect the device under test to the test apparatus and pass in excess of 1 L of gas into the device. If a flow rate other than the nominated flow rate is being used, pass gas into the device for the same time interval as used for the nominated flow rate.

(e) Disconnect the device and read the result displayed by the device.

TABLE A1

CONCENTRATION OF ETHANOL SOLUTION

Simulated blood alcohol concentration g/100 mL	Ethanol concentration in distilled water g/L
0.020	0.224
0.030	0.336
0.040	0.447
0.050	0.559
0.060	0.671
0.070	0.783
0.080	0.895
0.090	1.007
0.100	1.119
0.300	3.356

NOTE: The concentrations listed in Column 2 are based on a figure of 2300:1 for the ratio of the concentration of alcohol in a person's blood to that in their breath.

A6 TEST REPORT The test report shall contain the following:

(a) The simulated blood alcohol concentration tested.

(b) The flow rate and time interval used for passing the gas into the device.

(c) Whether or not it was possible to read the result displayed by the device.

(d) The result displayed by the device.

(e) Reference to this test method, i.e. Appendix A, AS 3547.

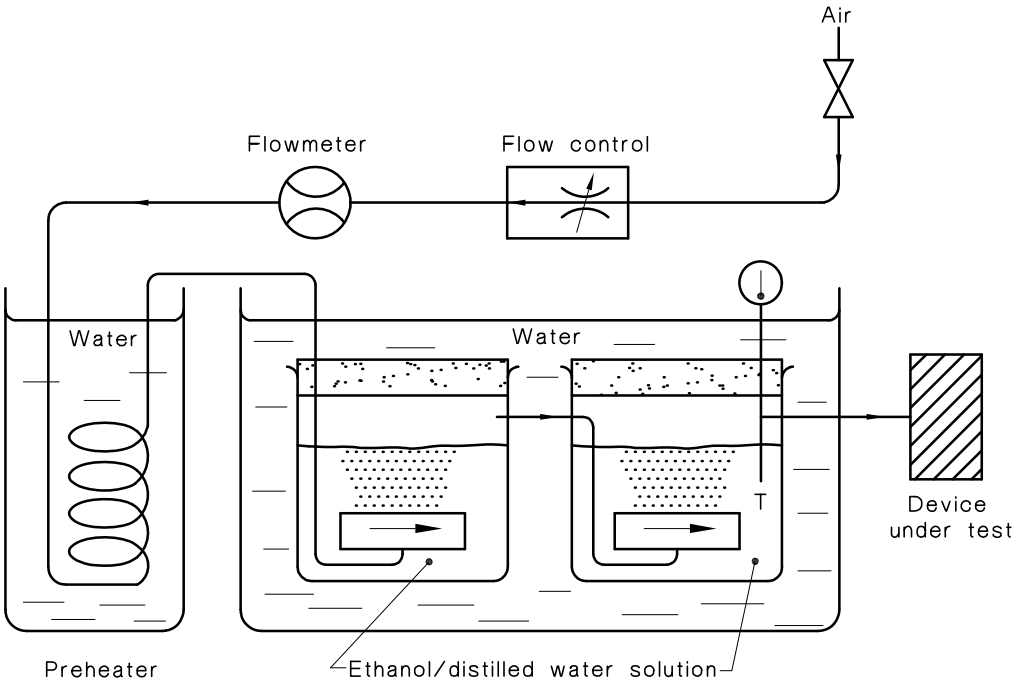

FIGURE A1 TYPICAL EXPIRED AIR SIMULATOR

APPENDIX B
TEST METHOD FOR QUALITATIVE TYPE 2 DEVICES
(Normative)

B1 SCOPE This Appendix sets out a method for testing the accuracy of a qualitative Type 2 breath alcohol testing device and its ability to maintain that accuracy over the calibration period of the device.

B2 PRINCIPLE The accuracy of the device is tested by the introduction of simulated expired human breath into the device at various simulated blood alcohol concentrations and flow rates, and recording the results displayed by the device. The ability of the device to maintain accuracy is tested by repeating the process after a storage period during which the device is subjected to robustness testing.

B3 PROCEDURE

B3.1 General Testing and storage shall be conducted at normal room temperature, with Steps (a) to (f) of Paragraph B3.3 and the individual tests therein carried out consecutively and as quickly as the recovery time of the device permits.

The entire test procedure shall be completed within the calibration period, and shall be scheduled to ensure that the storage period specified in Paragraph B3.4 between testing after calibration (Paragraph B3.3) and testing prior to the end of the calibration period (Paragraph B3.5) is maximized.

No 'trial runs' shall be performed during the test procedure once calibration has been completed. Only those results which are due to failure to correctly follow the test procedure may be discarded and the test repeated using the correct procedure.

The order in which Steps (a) to (f) of Paragraph B3.3 are conducted may be varied from that listed.

B3.2 Calibration Calibrate the device in accordance with the manufacturer's instructions.

B3.3 Testing after calibration The following tests shall be conducted as soon as practicable after calibration of the device:

(a) For devices incorporating an automatic gas sampling system, test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.000 g/100 mL supplied at the manufacturer's nominated flow rate and deliver 900 ±50 mL of sample to the device. Record whether or not a reading was displayed by the device each time, and the recovery times.

(b) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration equal to 0.000 g/100 mL and supplied at the manufacturer's nominated flow rate. Record the results displayed by the device and the recovery times.

(c) For BAC 0.05 or 0.08 devices, test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration equal to 0.010 g/100 mL below the designated blood alcohol concentration and supplied at the manufacturer's nominated flow rate. Record the results displayed by the device and the recovery times.

(d) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration which is 0.010 g/100 mL above the designated blood alcohol concentration and supplied at the manufacturer's nominated flow rate. Record the results displayed by the device and the recovery times.

(e) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration which is 0.010 g/100 mL above the designated blood alcohol concentration and supplied at 5 L/min below the manufacturer's nominated flow rate. Record the results displayed by the device and the recovery times.

(f) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration which is 0.010 g/100 mL above the designated blood alcohol concentration and supplied at 5 L/min above the manufacturer's nominated flow rate. Record the results displayed by the device and the recovery times.

B3.4 Storage period Store the device at normal room temperature for the maximum period allowed by completion of the entire test procedure within the specified calibration period. Within this storage period, the device shall undergo a robustness test by being dropped and toppled in accordance with the procedures laid out in AS 1099.2.31 for—

(a) dropping on to a face;
(b) dropping on to a corner; and
(c) toppling.

A1 For the drop tests, a distance of 100 mm shall be used between the test surface and the device.

B3.5 Testing after storage The following tests shall be conducted no earlier than 5 days prior to the end of the calibration period:

(a) For devices incorporating an automatic gas sampling system, repeat Step (a) of Paragraph B3.3.
(b) Repeat Steps (b) to (f) of Paragraph B3.3 for all qualitative Type 2 devices.

B4 TEST REPORT The test report shall contain the following:

(a) For devices incorporating an automatic gas sampling system, the 3 results of testing the system in accordance with Step (a) of Paragraph B3.3.
NOTE: See Clause 3.2.3.

(b) The initial results displayed by the device as recorded in accordance with Steps (b) to (f) of Paragraph B3.3—12 results for BAC 0.02 devices and 15 results for BAC 0.05 or 0.08 devices.

(c) The period (in days) for which the device was stored in accordance with Paragraph B3.4, and confirmation that the robustness tests specified within this storage period were carried out.

(d) For devices incorporating an automatic gas sampling system, the 3 results of testing the system in accordance with Paragraph B3.5(a) following the storage period specified in Paragraph B3.4.
NOTE: See Clause 3.2.3.

(e) The results displayed by the device as recorded in accordance with Paragraph B3.5(b) following the storage period specified in Paragraph B3.4—12 results for BAC 0.02 devices and 15 results for BAC 0.05 or 0.08 devices.

(f) Whether the recovery time exceeded that specified in Clause 3.2.4 for any test requiring the recovery time to be recorded and, if so, identification of the test(s) where this occurred.

(g) Whether or not the recalibration indication was present in accordance with Clause 3.2.2(c).

(h) Confirmation that testing and storage were carried out in accordance with all procedures specified in Paragraph B3.

(i) All relevant details (including the manufacturer, model, type and serial number) to fully describe and identify the device under test.

(j) Reference to this test method, i.e. Appendix B, AS 3547.

APPENDIX C
TEST METHOD FOR QUANTITATIVE TYPE 2 DEVICES
(Normative)

C1 SCOPE This Appendix sets out a method for testing the accuracy of a quantitative Type 2 breath alcohol testing device and its ability to maintain that accuracy over the calibration period of the device.

C2 PRINCIPLE The accuracy of the device is tested by the introduction of simulated expired human breath into the device at various simulated blood alcohol concentrations and flow rates, and recording the results displayed by the device. The ability of the device to maintain accuracy is tested by repeating the process after a storage period during which the device is subjected to robustness testing.

C3 PROCEDURE

C3.1 General Testing and storage shall be conducted at normal room temperature, with Steps (a) to (i) of Paragraph C3.3 and the individual tests therein carried out consecutively and as quickly as the recovery time of the device permits.

The entire test procedure shall be completed within the calibration period, and shall be scheduled to ensure that the storage period specified in Paragraph C3.4 between testing after calibration (Paragraph C3.3) and testing prior to the end of the calibration period (Paragraph C3.5) is maximized.

No 'trial runs' shall be performed during the test procedure once calibration has been completed. Only those results which are due to failure to correctly follow the test procedure may be discarded and the test repeated using the correct procedure.

The order in which Steps (a) to (i) of Paragraph C3.3 are conducted may be varied from that listed.

C3.2 Calibration Calibrate the device in accordance with the manufacturer's instructions.

C3.3 Testing after calibration The following tests shall be conducted as soon as practicable after calibration of the device:

(a) For devices incorporating an automatic gas sampling system, test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.000 g/100 mL supplied at the manufacturer's nominated flow rate and deliver 900 ±50 mL of sample to the device. Record whether or not a reading was displayed by the device each time, and the recovery times.

(b) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.000 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(c) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.020 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(d) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.050 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(e) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.080 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(f) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(g) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at 5 L/min below the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(h) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at 5 L/min above the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(i) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.3 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, or any other indication as required by Clause 3.2.1.3(e).

C3.4 Storage period Store the device at normal room temperature for the maximum period allowed by completion of the entire test procedure within the specified calibration period. Within this storage period, the device shall undergo a robustness test by being dropped and toppled in accordance with the procedures laid out in AS 1099.2.31 for—

(a) dropping on to a face;

(b) dropping on to a corner; and

(c) toppling.

A1 For the drop tests, a distance of 100 mm shall be used between the test surface and the device.

C3.5 Testing after storage The following tests shall be conducted no earlier than 5 days prior to the end of the calibration period:

(a) For devices incorporating an automatic gas sampling system, repeat Step (a) of Paragraph C3.3.

(b) Repeat Steps (b) to (h) of Paragraph C3.3 for all quantitative Type 2 devices.

C4 TEST REPORT The test report shall contain the following:

(a) For devices incorporating an automatic gas sampling system, the 3 results of testing the system in accordance with Step (a) of Paragraph C3.3.

NOTE: See Clause 3.2.3.

(b) The 21 initial blood alcohol concentration readings as recorded in accordance with Steps (b) to (h) of Paragraph C3.3.

(c) The 3 blood alcohol concentration readings or other indicator recorded in accordance with Step (i) of Paragraph C3.3.

(d) The period (in days) for which the device was stored in accordance with Paragraph C3.4, and confirmation that the robustness tests specified within this storage period were carried out.

(e) For devices incorporating an automatic gas sampling system, the 3 results of testing the system in accordance with Paragraph C3.5(a) following the storage period specified in Paragraph C3.4.

NOTE: See Clause 3.2.3.

(f) The 21 blood alcohol concentration readings as recorded in accordance with Paragraph C3.5(b) following the storage period specified in Paragraph C3.4.

(g) Whether the recovery time exceeded that specified in Clause 3.2.4 for any test requiring the recovery time to be recorded and, if so, identification of the test(s) where this occurred.

(h) Whether or not the recalibration indication was present in accordance with Clause 3.2.2(c).

(i) Confirmation that testing and storage were carried out in accordance with all procedures specified in Paragraph C3.

(j) All relevant details (including the manufacturer, model, type and serial number) to fully describe and identify the device under test.

(k) Reference to this test method, i.e. Appendix C, AS 3547.

APPENDIX D
TEST METHOD FOR TYPE 3 DEVICES
(Normative)

D1 SCOPE This Appendix sets out a method for testing the accuracy of a Type 3 breath alcohol testing device and its ability to maintain that accuracy over the calibration period of the device.

D2 PRINCIPLE The accuracy of the device is tested by the introduction of simulated expired human breath into the device at various simulated blood alcohol concentrations and flow rates, and recording the results displayed by the device. The ability of the device to maintain accuracy is tested by repeating the process after a storage period.

D3 PROCEDURE

D3.1 General Testing and storage shall be conducted at normal room temperature, with Steps (a) to (i) of Paragraph D3.3 and the individual tests therein carried out consecutively and as quickly as the recovery time of the device permits. The device shall remain connected to a suitable power source during all stages of the procedure including the storage period.

The entire test procedure shall be completed within the calibration period, and shall be scheduled to ensure that the storage period specified in Paragraph D3.4 between testing after calibration (Paragraph D3.3) and testing prior to the end of the calibration period (Paragraph D3.5) is maximized.

No 'trial runs' shall be performed during the test procedure once calibration has been completed. Only those results which are due to failure to correctly follow the test procedure may be discarded and the test repeated using the correct procedure.

The order in which Steps (a) to (i) of Paragraph D3.3 are conducted may be varied from that listed.

D3.2 Calibration Calibrate the device in accordance with the manufacturer's instructions. For self-calibrating devices, prior to testing in accordance with Paragraph D3.3, the calibration setting of the device shall be manually adjusted so that the reading is incorrect. The device shall then be allowed (or caused) to undergo the recalibration procedure itself.

D3.3 Testing after calibration The following tests shall be conducted as soon as practicable after calibration of the device:

(a) For devices incorporating an automatic gas sampling system, test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.000 g/100 mL supplied at the manufacturer's nominated flow rate and deliver 900 ±50 mL of sample to the device. Record whether or not a reading was displayed by the device each time, and the recovery times.

(b) Test the device 10 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.000 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(c) Test the device 10 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.020 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(d) Test the device 10 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.050 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(e) Test the device 10 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.080 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(f) Test the device 10 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(g) Test the device 10 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at 5 L/min below the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(h) Test the device 10 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at 5 L/min above the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(i) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.3 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, or any other indication as required by Clause 4.2.1(e).

D3.4 Storage period Store the device at normal room temperature for the maximum period allowed by the completion of the entire test procedure within the specified calibration period.

D3.5 Testing after storage The following tests shall be conducted no earlier than 5 days prior to the end of the calibration period:

(a) For devices incorporating an automatic gas sampling system, repeat Step (a) of Paragraph D3.3.

(b) Repeat Steps (b) to (h) of Paragraph D3.3 for all Type 3 devices.

(c) Test the device by introducing, as quickly as the recovery time of the device permits, four samples with simulated blood alcohol concentrations of 0.3 g/100 mL followed by two samples with simulated blood alcohol concentrations of 0.050 g/100 mL at the manufacturer's nominated flow rate. Record the reading displayed by the device and the recovery time for each 0.050 g/100 mL sample.

(d) Test the device by introducing, as quickly as the recovery time of the device permits, four samples with simulated blood alcohol concentrations of 0.3 g/100 mL followed by two samples with simulated blood alcohol concentration of 0.000 g/100 mL at the manufacturer's nominated flow rate. Record the reading displayed by the device and the recovery time for each 0.000 g/100 mL sample.

(e) For self-calibrating devices, allow the device to reach the end of the specified calibration period and carry out the self-calibration procedure (or cease to operate should self-calibration not occur) in accordance with Clause 4.2.2.2.

(f) For manually recalibrated devices, allow the device to reach the end of the specified calibration period and cease to operate thereafter in accordance with Clause 4.2.2.3.

D4 TEST REPORT The test report shall contain the following:

(a) For devices incorporating an automatic gas sampling system, the 3 results of testing the system in accordance with Step (a) of Paragraph D3.3.

NOTE: See Clause 4.2.4.

(b) The 70 initial blood alcohol concentration readings as recorded in accordance with Steps (b) to (h) of Paragraph D3.3.

(c) The 3 blood alcohol concentration readings or other indicator recorded in accordance with Step (i) of Paragraph D3.3.

(d) The period (in days) for which the device was stored in accordance with Paragraph D3.4.

(e) For devices incorporating an automatic gas sampling system, the 3 results of testing the system in accordance with Paragraph D3.5(a) following the storage period specified in Paragraph D3.4.

NOTE: See Clause 4.2.4.

(f) The 74 blood alcohol concentration readings as recorded in accordance with Paragraph D3.5(b) to (d) following the storage period specified in Paragraph D3.4.

(g) Whether the recovery time exceeded that set out in Clause 4.2.5 for any test requiring the recovery time to be recorded and, if so, identification of the test(s) where this occurred.

(h) For self-calibrating devices, confirmation that the device carried out the self-calibrating procedure at the end of the specified calibration period (or ceased to operate if self-calibration did not occur) in accordance with Paragraph D3.5(e).

(i) For manually recalibrated devices, whether or not the device ceased to operate at the end of the specified calibration period in accordance with Paragraph D3.5(f).

(j) Confirmation that testing and storage were carried out in accordance with all procedures specified in Paragraph D3.

(k) All relevant details (including the manufacturer, model, type and serial number) to fully describe and identify the device under test.

(l) Reference to this test method, i.e. Appendix D, AS 3547.

APPENDIX E
TEST METHOD FOR TYPE 4 DEVICES
(Normative)

E1 SCOPE This Appendix sets out a method for testing the accuracy of a Type 4 breath alcohol testing device, as well as its ability to maintain that accuracy under extreme conditions over the calibration period of the device, and its ability to operate accurately at high and low temperatures.

E2 PRINCIPLE The accuracy of the device is tested by the introduction of simulated expired human breath into the device at various simulated blood alcohol concentrations, flow rates and temperatures, and recording the results displayed by the device. The ability of the device to maintain accuracy is tested by repeating the process after a storage period during which the device is subjected to extreme conditions. The interlock function is also tested using simulated expired human breath.

E3 PROCEDURE

E3.1 General Testing and storage shall be conducted at normal room temperature unless otherwise specified, with Steps (a) to (m) of Paragraph E3.3 and the individual tests therein carried out consecutively and as quickly as the recovery time of the device permits. Where the specified temperature varies from one Step to another, the device shall be exposed to the specified temperature for a minimum of 3 h before testing commences. The device shall remain connected to a suitable power source during all stages of the procedure including the storage period.

Where the designated blood alcohol concentration of a device is variable, two devices shall be required for Steps (l) and (m) of Paragraph E3.3, with the designated blood alcohol concentrations specified in Clause 5.3.3 set for each device prior to calibration.

The entire test procedure shall be completed within the calibration period, and shall be scheduled to ensure that the storage period specified in Paragraph E3.4 between testing after calibration (Paragraph E3.3) and testing prior to the end of the calibration period (Paragraph E3.5) is maximized.

No ‘trial runs’ shall be performed during the test procedure once calibration has been completed. Only those results which are due to failure to correctly follow the test procedure may be discarded and the test repeated using the correct procedure.

The order in which Steps (a) to (i) of Paragraph E3.3 are conducted may be varied from that listed.

E3.2 Calibration Calibrate the device in accordance with the manufacturer’s instructions. For self-calibrating devices, prior to testing in accordance with Paragraph E3.3, the calibration setting of the device shall be manually adjusted so that the reading is incorrect. The device shall then be allowed (or caused) to undergo the recalibration procedure itself.

E3.3 Testing after calibration The following tests shall be conducted as soon as practicable after calibration of the device:

(a) For devices incorporating an automatic gas sampling system, test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.000 g/100 mL supplied at the manufacturer’s nominated flow rate and deliver 900 ±50 mL of sample to the device. Record whether or not a reading was displayed by the device each time, and the recovery times.

(b) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.000 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(c) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.020 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(d) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.050 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(e) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.080 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(f) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(g) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at 5 L/min below the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(h) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.100 g/100 mL supplied at 5 L/min above the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(i) Test the device 3 times in accordance with Appendix A using a simulated blood alcohol concentration of 0.3 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, or any other indication as required by Clause 5.2.2(e).

(j) Test the device 3 times in accordance with Appendix A at a temperature of 0 ±2°C using a simulated blood alcohol concentration of 0.050 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(k) Test the device 3 times in accordance with Appendix A at a temperature of 40 ±2°C using a simulated blood alcohol concentration of 0.050 g/100 mL supplied at the manufacturer's nominated flow rate. Record the reading displayed by the device each time, and the recovery times.

(l) Test the device in accordance with Appendix A to demonstrate that the interlock function is not activated when a reading below the designated blood alcohol concentration is displayed by the device. This shall be demonstrated 3 times when a reading not more than 0.005 g/100 mL below the designated blood alcohol concentration is displayed by the device. Record the reading displayed by the device along with the performance of the interlock function each time. For devices with a variable designated blood alcohol concentration, repeat this Step for a second device with the designated blood alcohol concentration set at 0.020 g/100 mL.

(m) Test the device in accordance with Appendix A to demonstrate activation of the interlock function when a reading equal to or above the designated blood alcohol concentration is displayed by the device. This shall be demonstrated 3 times when a reading equal to or not more than 0.005 g/100 mL above the designated blood alcohol concentration is displayed by the device. Record the reading displayed by the device along with the performance of the interlock function each time. For devices with a variable designated blood alcohol concentration, repeat this Step for a second device with the designated blood alcohol concentration set at 0.020 g/100 mL.

E3.4 Storage period Store the device at normal room temperature (unless otherwise specified) for the maximum period allowed by completion of the entire test procedure within the specified calibration period. Within this storage period, the device shall undergo exposure to extreme temperatures, a vibration test and a dust exposure test as follows:

(a) Store the device at −10 ±2°C for 48 h.

(b) Store the device at 70 ±2°C for 48 h.

A1 (c) Mount the device to simulate installation in accordance with the manufacturer's instructions, and vibrate the device in accordance with IEC 60068-2-6. The vibration applied shall have the following parameters:

(i)	Frequency range:	10 Hz to 200 Hz.
(ii)	Vibration amplitude:	displacement amplitude of 0.35 mm or acceleration amplitude of 5 G.
(iii)	Crossover frequency:	approximately 58 Hz.
(iv)	Type and duration of vibration:	endurance by sweeping, 10 sweeps per axis.
(v)	Axes of vibration:	3 axes.

(d) Cover the mouthpiece of the device to prevent dust entry, and expose the device to dust for 5 h using the dust testing apparatus, materials and procedure specified for the dust resistance test in AS/NZS 2596.

After completion of the dust exposure test, remove the mouthpiece cover and store the device at normal room temperature for the remainder of the storage period.

E3.5 Testing after storage The following tests shall be conducted no earlier than 5 days prior to the end of the calibration period:

(a) For devices incorporating an automatic gas sampling system, repeat Step (a) of Paragraph E3.3.

(b) Repeat Steps (b) to (h) of Paragraph E3.3 for all Type 4 devices.

(c) Repeat Step (l) of Paragraph E3.3 for all Type 4 devices.

(d) Repeat Step (m) of Paragraph E3.3 for all Type 4 devices.

(e) For self-calibrating devices, allow the device to reach the end of the specified calibration period and carry out the self-calibration procedure (or cease to operate should self-calibration not occur) in accordance with Clause 5.2.3.2.

(f) For manually calibrated devices—

(i) observe whether the imminent end of the calibration period is indicated in accordance with Clause 5.2.3.3(a); and

(ii) allow the device to reach the end of the calibration period and activate the audible or visible alarm in accordance with Clause 5.2.3.3(b).

E4 TEST REPORT The test report shall contain the following:

(a) For devices incorporating an automatic gas sampling system, the 3 results of testing the system in accordance with Step (a) of Paragraph E3.3.

NOTE: See Clause 5.2.4.

(b) The 21 initial blood alcohol concentration readings as recorded in accordance with Steps (b) to (h) of Paragraph E3.3.

(c) The 3 blood alcohol concentration readings or other indicator recorded in accordance with Step (i) of Paragraph E3.3.

(d) The 6 blood alcohol concentration readings recorded in accordance with Steps (j) and (k) of Paragraph E3.3.

(e) The designated blood alcohol concentration(s) used in Steps (l) and (m) of Paragraph E3.3.

(f) The readings displayed and whether the interlock function activated or failed to activate when tested in accordance with Step (l) of Paragraph E3.3.

(g) The readings displayed and whether the interlock function activated or failed to activate when tested in accordance with Step (m) of Paragraph E3.3.

(h) The period (in days) for which the device was stored in accordance with Paragraph E3.4, and confirmation that the temperature, vibration and dust exposure tests specified within this storage period were carried out.

(i) For devices incorporating an automatic gas sampling system, the 3 results of testing the system in accordance with Paragraph E3.5(a) following the storage period specified in Paragraph E3.4.

NOTE: See Clause 5.2.4.

(j) The 21 blood alcohol concentration readings as recorded in accordance with Paragraph E3.5(b) following the storage period specified in Paragraph E3.4.

(k) Whether the recovery time exceeded that set out in Clause 5.2.5 for any test requiring the recovery time to be recorded and, if so, identification of the test(s) where this occurred.

(l) The readings displayed and whether the interlock function activated or failed to activate when tested in accordance with Paragraph E3.5(c).

(m) The readings displayed and whether the interlock function activated or failed to activate when tested in accordance with Paragraph E3.5(d).

(n) For self-calibrating devices, confirmation that the device carried out the self-calibrating procedure at the end of the specified calibration period (or ceased to operate if self-calibration did not occur) in accordance with Paragraph E3.5(e).

(o) For manually recalibrated devices, whether or not—

(i) the imminent end of the calibration period was indicated in accordance with Paragraph E3.5(f)(i); and

(ii) the audible or visible alarm was activated at the end of the calibration period in accordance with Paragraph E3.5(f)(ii).

(p) Confirmation that testing and storage were carried out in accordance with all procedures specified in Paragraph E3.

(q) All relevant details (including manufacturer, model, type and serial number) to fully describe and identify the device under test.

(r) Reference to this test method, i.e. Appendix E, AS 3547.

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