Australian/New Zealand Standard™

# Air admittance valves (AAVs) for use in sanitary plumbing and drainage systems



Standards Australia

STANDARDS NEW ZEALAND
Paerewa Aotearoa

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee WS-002, Sanitary Plumbing Fittings. It was approved on behalf of the Council of Standards Australia on 14 August, 2002 and on behalf of the Council of Standards New Zealand on 24 July 2002. It was published on 2 September 2002.

---

The following are represented on Committee WS-002:

Australian Chamber of Commerce
Brisbane Water
Business New Zealand
Certification Bodies (Australia)
Department of Land and Water Conservation
Department of Local Government (Queensland)
Master Plumbers, Gasfitters and Drainlayers New Zealand
Plumbers, Gasfitters and Drainlayers Board
Queensland Brassware Industry Advisory Panel
South Australian Water Corporation
The Open Polytechnic of New Zealand
Water Corporation Western Australia

---

**Keeping Standards up-to-date**

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Australia web site at www.standards.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia International or Standards New Zealand at the address shown on the back cover.

---

*This Standard was issued in draft form for comment as DR 01380.*

Australian/New Zealand Standard™

# Air admittance valves (AAVs) for use in sanitary plumbing and drainage systems

First published as AS/NZS 4936:2002.





Jointly published by Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 4760 4

# PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WS-002, Sanitary Plumbing Fittings.

The objective of this Standard is to provide performance requirements for air admittance valves suitable for use in plumbing systems designed in accordance with AS/NZS 3500.2.1 and AS/NZS 3500.2.2.

This Standard takes cognisance of prEN 12380.2-2001, *Air admittance valves — For use in drainage systems*, from which it has been generally adapted but extends its scope to include those air admittance valves that are integral with the fixture trap.

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.

# CONTENTS

*Page*

1 SCOPE ..... 4
2 REFERENCED DOCUMENTS ..... 4
3 DEFINITIONS ..... 4
4 MARKING ..... 4
5 CLASSIFICATION ..... 5
6 DESIGN ..... 5
7 PERFORMANCE REQUIREMENTS ..... 5
8 INSTALLATION INSTRUCTIONS ..... 6

APPENDICES
A OPENING CHARACTERISTIC AND AIRFLOW TEST ..... 7
B DROP TEST ..... 9
C AIRTIGHTNESS TEST ..... 11
D ENDURANCE AND TEMPERATURE TEST ..... 13
E INSTALLATION INSTRUCTIONS ..... 15

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

# Australian/New Zealand Standard

# Air admittance valves (AAVs) for use in sanitary plumbing and drainage systems

## 1 SCOPE

This Standard specifies the requirements and test methods for air admittance valves including those that are integral to a fixture trap. This Standard does not cover air admittance valves for use where the air temperature is either below 0°C or above 60°C.

## 2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

| | |
|---|---|
| AS | |
| 2888 | Methods of testing plastics waste fittings |
| 2888.8 | Thermal cycling test |
| 3500 | National plumbing and drainage |
| 3500.2.1 | Part 2.1: Sanitary plumbing and drainage—Performance Requirements |
| AS/NZS | |
| 3500 | National plumbing and drainage |
| 3500.0 | Part 0: Glossary of terms |
| 3500.2.2 | Part 2.2: Sanitary plumbing and drainage—Acceptable solutions |
| EN | |
| 12380.2 | Air admittance valves—For use in drainage systems |

## 3 DEFINITIONS

For the purpose of this Standard the definitions below apply.

### 3.1 Air admittance valve

A component fitted to a plumbing system allowing air to enter the piping system, but not allowing air or gases out.

### 3.2 Determined airflow capacity

The airflow, in litres per second, measured on the apparatus described in Appendix A of this Standard whilst producing a pressure of –250 ±10 Pa at the manometer tapping.

## 4 MARKING

Each valve shall be marked with the following information using means that do not interfere with the valve's function:

(a) The manufacturer's name, brand or trademark.

(b) The number of this Standard.

(c) The mark of the certifying body.

(d) The determined airflow capacity of the valve in litres per second.

(e) The maximum fixture unit loadings of—

(i) discharge pipes and

(ii) discharge stacks that the valve may use to vent.

(f) Suitability for use in direct sunlight.

Certification of resistance to ultra-violet by the supplier of the material used for manufacture of the valve body shall be sufficient for verification of this claim

## 5 CLASSIFICATION

Air admittance valves complying with this Standard are suitable for location below the flood level of the appliance or fixture and suitable for operation in the temperature range 0°C to 60°C.

## 6 DESIGN

The connections of air admittance valves shall be dimensionally compatible with the product to which the connection is to be made, as specified in the relevant Standard for the product.

The air admittance valve shall be designed to be installed in accordance with the manufacturer's instructions in respect to jointing methods, the orientation of the valve, minimum clearances from the pipe obvert and provision of access for inspection, maintenance, testing and replacement.

## 7 PERFORMANCE REQUIREMENTS

### 7.1 General

Air admittance valves shall be tested as supplied by the manufacturer, and installed in the manner recommended by the manufacturer. Where air admittance valves are supplied with one or more adaptors, the tests shall be repeated with each adaptor, to ascertain any effect that the adaptor may impose on the performance of the valve. The tests shall be carried out with the air admittance valve mounted within 5° of the vertical and fitted with any insulation, insect screen or other device normally supplied with the valve by the manufacturer of the air admittance valve.

### 7.2 Sampling for tests

Three samples of each type and variation of types shall be selected at random and the same valves subjected to all performance tests.

Sample valves shall be subjected to the tests in the following order:

(a) Drop test

(b) Airtightness test

(c) Endurance and temperature test (on one sample only).

(d) Opening characteristic and airflow test.

(e) Thermal cycling test (only for products incorporating both a fixture trap and an air admittance valve).

### 7.3 Durability—Normal handling

Air admittance valves shall be durable under conditions of normal handling. They shall be deemed to comply with this requirement if, when subjected to the drop test in accordance with Appendix B, each valve shows no visible signs of damage or deformation likely to affect the functioning of the valve.

### 7.4 Airtightness

Air admittance valves shall withstand a positive internal pressure up to 10 000 Pa without leakage. When tested in accordance with Appendix C, the valves shall show no signs of leakage.

### 7.5 Endurance and temperature

Air admittance valves shall operate reliably throughout their service life. They shall be deemed to comply with this requirement if, when tested in accordance with Appendix D, valves pass the airtightness test of Appendix C after operating at the test temperatures over the given time periods.

### 7.6 Opening characteristic and flow

Air admittance valves shall have a measurable airflow when a constant pressure of −150 ±10 Pa is applied to the inside of the valve. When tested in accordance with Appendix A, the valve shall have an airflow no less than the determined airflow capacity when a constant pressure of −250 ±10 Pa is applied to the inside of the valve.

### 7.7 Thermal cycling test for fixture traps

Products where the air admittance valve is integral with a fixture trap shall additionally comply with the thermal immersion cycling test of AS 2888.8 for 1 000 cycles at 20 +2, −0°C and 60 +2,−0°C as the upper and lower test temperatures respectively. For this test the product shall be supported or suspended in such a manner that water drains from it between immersions.

## 8 INSTALLATION INSTRUCTIONS

Each valve shall be packaged with a complete set of installation instructions in accordance with Appendix E.

Valves shall be installed in accordance with AS/NZS 3500.2.2.

# APPENDIX A

# OPENING CHARACTERISTIC AND AIRFLOW TEST

(Normative)

## A1 SCOPE

This Appendix sets out the method for determining the opening characteristic and airflow in an air admittance valve.

## A2 PRINCIPLE

The valve is subjected to a suction, to establish the opening characteristics of its mechanism and the airflow is measured at a specified pressure.

## A3 APPARATUS

A suitable rig (see Figure A1) comprised of—

(a) an appropriate pipe with a static pressure tapping for a suitable manometer;

(b) a manometer;

(c) a variable rated electric fan or equivalent means to induce and maintain an airflow through the pipe; and

(d) an instrument to measure the volumetric airflow in the pipe.

NOTE: Tests should be conducted in a draught-free constant-temperature environment.

## A4 PROCEDURE

The procedure shall be as follows:

(a) Connect the air admittance valve to the top of the pipe in accordance with the manufacturer's instructions.

(b) Start the fan to induce an airflow down the pipe while recording the developed static air pressure and flow rate.

(c) Slowly increase the speed of the fan until the valve opens.

(d) Record the value of the pressure at the instant of opening—this is the opening pressure.

(e) Adjust the airflow rate so that the measured pressure is −250 ±10 Pa.

(f) Measure and record the airflow rate—this is the 'determined air flow capacity'.

(g) Reduce the airflow rate so that the measured pressure is −150 ±10 Pa.

(h) Measure and record the airflow rate.

## A5 CRITERIA

The opening pressure shall be between 0 and −150 Pa. There shall be a measurable airflow rate when the applied pressure is −150 Pa.

## A6 TEST REPORT

The following shall be reported:

(a) Manufacturer, model, type and size of valve.

(b) The opening pressure.

(c) The determined airflow rate capacity.

(d) Whether both criteria have been met.

(e) Reference to this test method, i.e. AS/NZS 4936, Appendix A.

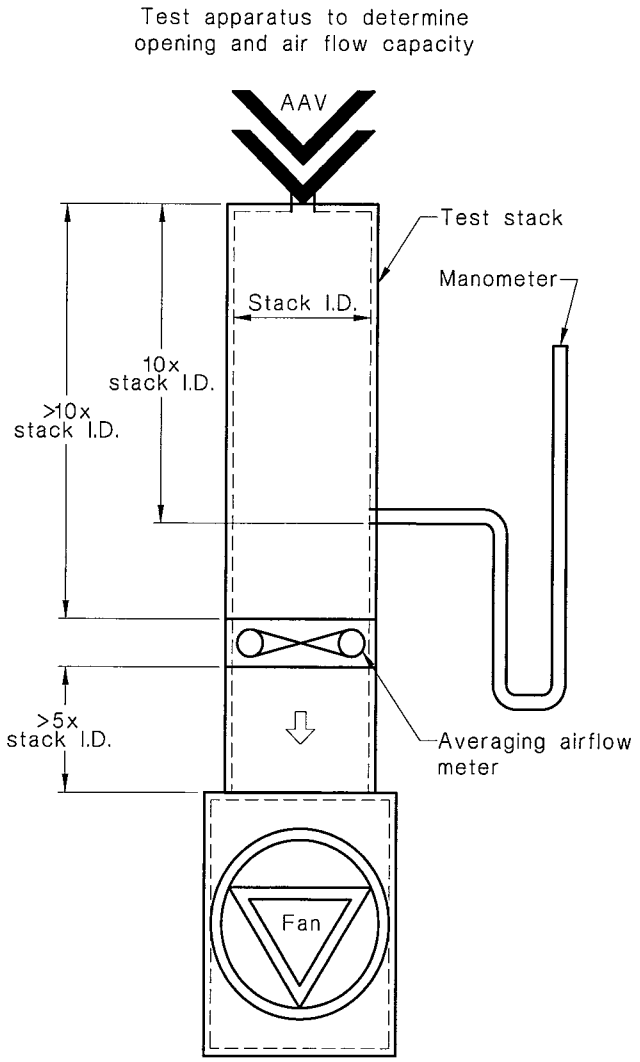


FIGURE A1 TYPICAL AIR FLOW ARRANGEMENT

# APPENDIX B

# DROP TEST

(Normative)

## B1 SCOPE

This Appendix sets out the method for determining the resistance to deformation or breakage of air admittance valves, which might occur in handling before installation.

## B2 PRINCIPLE

The valve is dropped from a predetermined height, at different orientations.

## B3 PROCEDURE

This test shall be carried out over a smooth clean concrete surface (see method in Figure B1.)

Valves with removable insulation shall be tested with the insulation removed.

The procedure shall be as follows:

(a) Ensure that the test surface is clean.

(b) Hold the air admittance valve with its lowest point 1 +0.02, –0 m above the concrete as shown in orientation 1.

(c) Release the air admittance valve.

(d) Pick up the air admittance valve, change to orientation 2 and drop the air admittance valve.

(e) Pick up the air admittance valve, change to orientation 3 and drop the air admittance valve.

## B4 TEST REPORT

The following shall be reported:

(a) Manufacturer, model, type and size of valve

(b) Any cracks, breakages, deformation or other failure.

(c) Reference to this test method, ie. AS/NZS 4936, Appendix B.

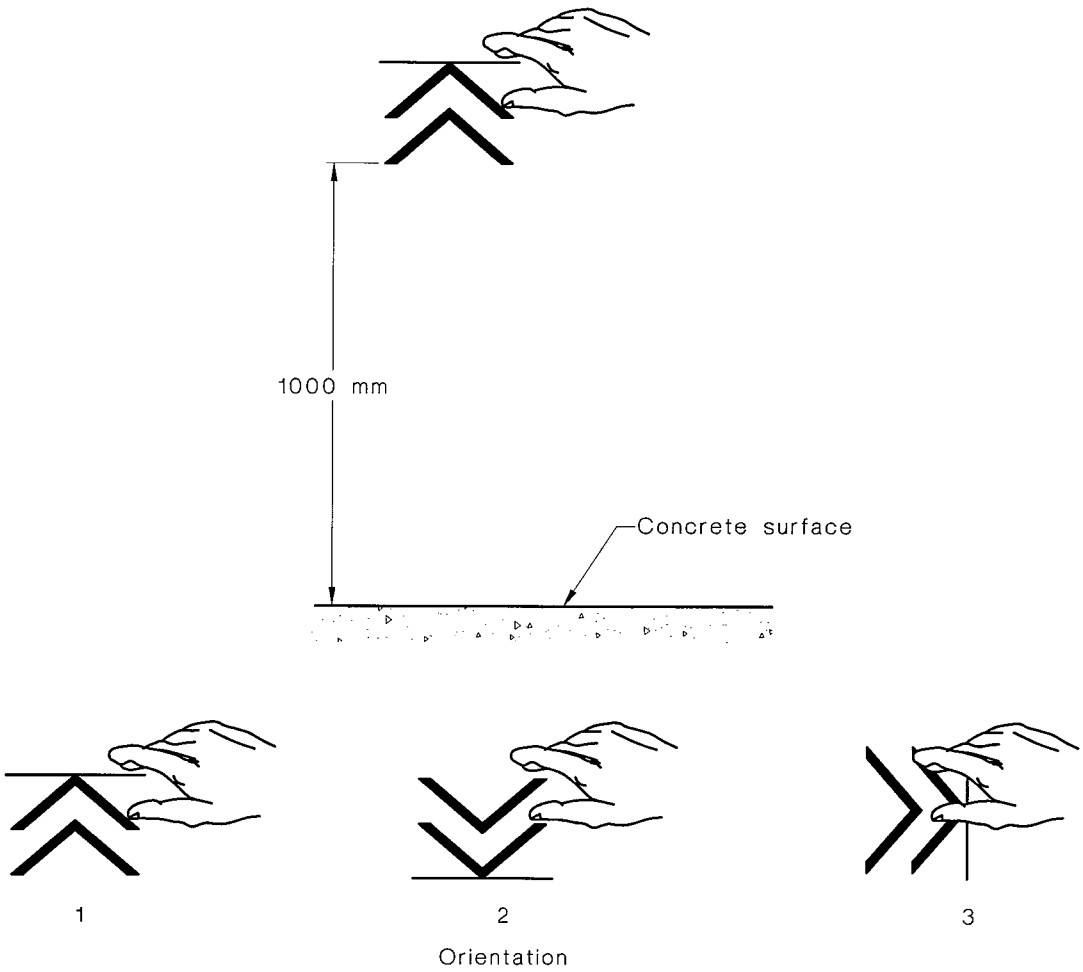


FIGURE B1 DROP TEST

# APPENDIX C

# AIRTIGHTNESS TEST

(Normative)

## C1 SCOPE

This Appendix sets out the method for determining airtightness of air admittance valves.

## C2 PRINCIPLE

The valve is subjected to various pressure tests, to determine leakage.

## C3 APPARATUS

(a) An insulated pipe of appropriate diameter and material with a length at least 2.5 times the diameter and sealed at the base (see Figure C1).

(b) Air-isolating valve.

(c) Air pump.

(d) Manometer.

(e) Means for attaching a plug and the air admittance valve to be tested so that it can be installed in accordance with the manufacturer's instructions.

NOTES:

1 Air admittance valves intended for installation by solvent welding may be solvent welded into the length of pipe and tested by fitting an airtight cap or plug to the free end. This cap or plug may carry the connections for the manometer and air inlet valve. The tests in Appendices C and D may be carried out by fitting the air admittance valve and the attached pipe to the respective test rig.

2 Air admittance valves integral with a fixture trap may require a suitable bend or adaptor for fitting to the test rig.

3 Tests should be conducted in a draught-free constant-temperature environment.

## C4 PROCEDURE

The procedure shall be as follows:

(a) With a plug fitted, check that the test apparatus is airtight when subject to a pressure of 10 000 +0,–100 Pa for a period of at least 5 min.

(b) Remove the plug and fit the air admittance valve as required by the manufacturer's instructions.

(c) Open the air inlet valve and slowly raise the air pressure to 30 +10,–0 Pa. Close the air inlet valve.

(d) After 5 min, record the internal pressure.

(e) If the internal air pressure is less than 90% of the initial value, check that the apparatus is still airtight. If a leak is detected in the apparatus, rectify and repeat from Step (c).

(f) Open the air inlet valve and slowly raise the pressure to 500 +10,–0 Pa. Close the air inlet valve.

(g) After 5 min, record the internal pressure.

(h) If the pressure is less than 450 Pa, check that the apparatus is airtight. If a leak is detected in the apparatus, rectify and repeat from Step (c).

(i) If the previous test criteria are achieved, raise the pressure by opening the air inlet valve and pumping air into the apparatus until it reaches 10 000 +0,–100 Pa. Close the air valve.

(j) After 5 min, record the internal pressure.

(k) If the test pressure is less than 9 000 Pa, check the apparatus is airtight using a soap solution and inspecting for air bubbles. If a leak is detected in the apparatus, rectify and repeat from Step (f).

## C5 CRITERIA

The pressures recorded in Clause B4 shall not be less than—

(a) 90% of the initial value (30 +10,–0 Pa)

(b) 450 Pa; and

(c) 9 000 Pa, respectively.

## C6 TEST REPORT

The following shall be reported:

(a) Manufacturer, model, type and size of valve.

(b) Whether all criteria have been met.

(c) Reference to this test method, i.e., AS/NZS 4936, Appendix C.

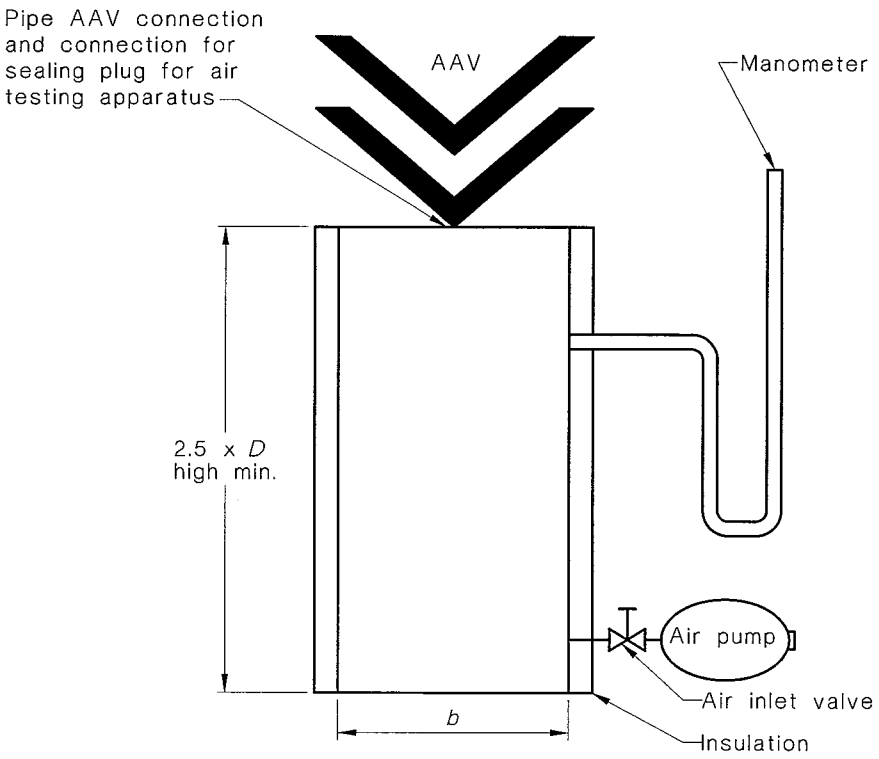


FIGURE C1 TYPICAL AIRTIGHTNESS RIG

# APPENDIX D

# ENDURANCE AND TEMPERATURE TEST

(Normative)

## D1 SCOPE

This Appendix sets the method for determining the endurance of air admittance valves.

## D2 PRINCIPLE

The valve is operated at various temperatures for specified periods of time.

## D3 APPARATUS

A rig assembled according to Figure D1, comprised of—

(a) A pipe fitted with an electric fan at one end;

(b) A means for diverting air flow in the pipe;

(c) Temperature measuring and pressure recording devices.

An atmospheric vent may be required to ensure that the air admittance valve closes and that the applied suction is within the specified limits.

## D4 PROCEDURE

When supplied with an insulating cap, the cap shall be in place on the air admittance valve. Tests are conducted on only one valve randomly selected from the three sample valves.

The procedure shall be as follows:

(a) The air admittance valve and test apparatus shall be placed and operated in an environment where the ambient air is maintained at 20 ±5°C for a period of 480 ±5 min.

(b) Upon completion of this test, conduct again the airtightness test given in Appendix C.

(c) The air admittance valve and test apparatus shall be placed and operated in an environment where the ambient air is maintained at 60 +0,-10°C for a period of 480 ±5 min.

(d) Upon completion of this test, conduct again the airtightness test given in Appendix C.

## D5 CRITERIA

The means of diverting airflow shall open and close the air admittance valve 15 ±2 times each minute and result in the specified pressure/time functions shown in Figure D2.

## D6 TEST REPORT

The following shall be reported:

(a) Manufacturer, model, type and size of valve.

(b) Whether all criteria have been met.

(c) Reference to this test method, ie AS/NZS 4936, Appendix D.

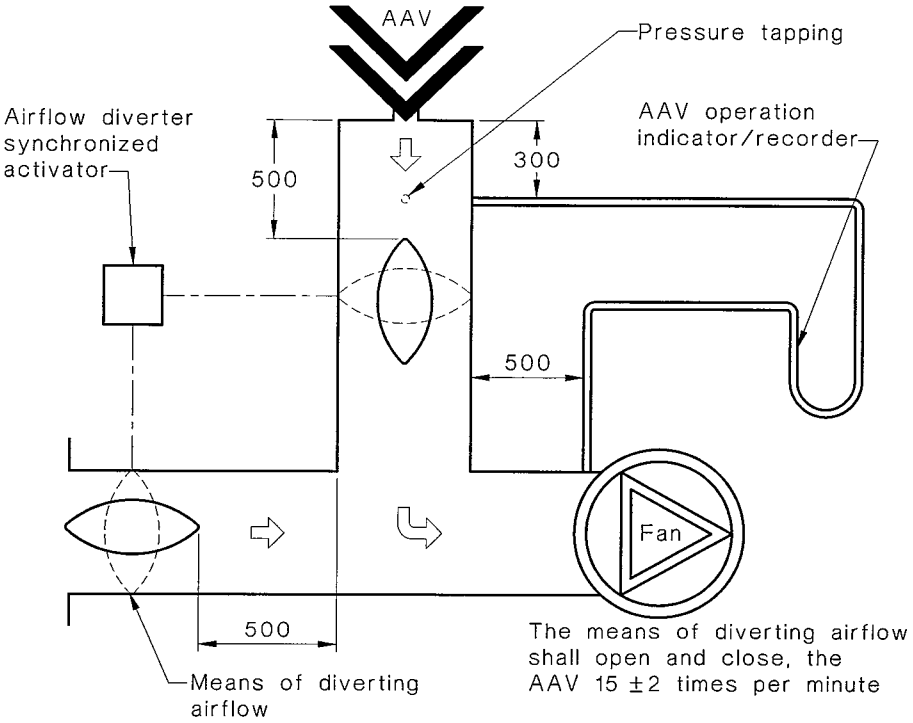


FIGURE D1 TYPICAL ENDURANCE AND TEMPERATURES RIG

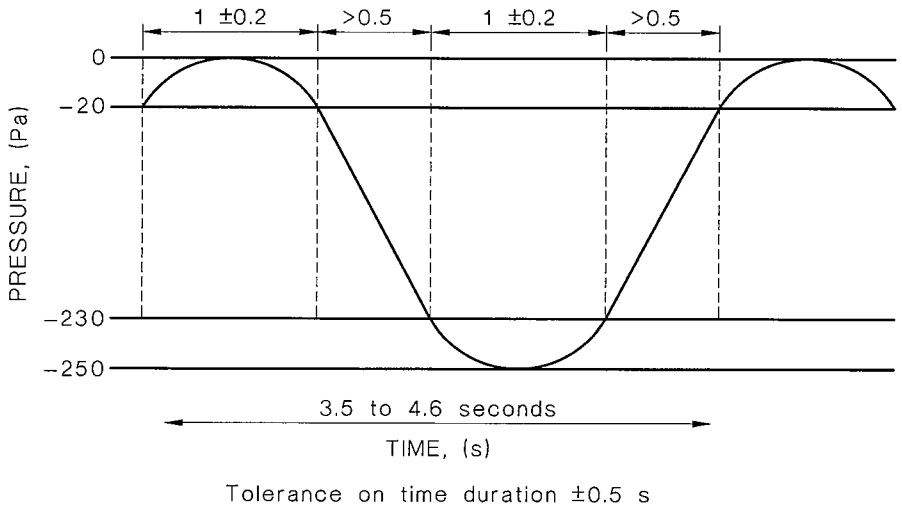


FIGURE D2 TIME/PRESSURE GRAPH

NOTE: An atmosphere vent may be required to ensure that the air admittance valve closes and that the applied suction is within the specified limits.

# APPENDIX E

## INSTALLATION INSTRUCTIONS

(Normative)

Each valve shall be packaged with a complete set of installation instructions that shall provide all information necessary for the correct installation of the valve.

Where applicable, the instructions shall include the following information:

(a) The maximum capacity of the valve, expressed in fixture units, being the values from Table 1 corresponding to the determined airflow capacity, and which state the maximum loading of—

  (i) the discharge pipe to which it may be connected when used for trap or group venting; and

  (ii) the discharge stack when used for stack venting.

(b) Permissible locations for the valve.

(c) Orientation of the valve.

(d) Minimum clearances from the pipe obvert.

(e) Jointing methods or method of connection to the vent pipe.

(f) Necessary clearances to allow access for inspection, maintenance, testing and replacement.

## TABLE 7.1

## CAPACITY OF VALVES

| Determined airflow capacity, L/s | Maximum fixture unit loading for discharge pipes | Maximum fixture unit loading for discharge stacks |
|---|---|---|
| 1 | 6 | — |
| 2 | 8 | — |
| 2.5 | 10 | — |
| 3 | 15 | — |
| 4 | 27 | 1 |
| 6 | 60 | 3 |
| 8 | 108 | 6 |
| 10 | 168 | 10 |
| 12 | 243 | 15 |
| 15 | 379 | 23 |
| 20 | — | 42 |
| 25 | — | 65 |
| 30 | — | 94 |
| 40 | — | 168 |
| 60 | — | 379 |
| 80 | — | 675 |
| 100 | — | 1054 |

NOTE: Intermediate values may be calculated from the following equations on which this table is based and rounded down to the nearest integer value.

For discharge pipes with fixture unit values greater than 8 the maximum fixture unit loading at the point of connection is equal to:

$$6.75\ (Q/2)^2,$$

For discharge stacks the maximum fixture unit loading at base of stack is equal to:

$$6.75\ (Q/8)^2$$

Q is the determined air flow capacity in litres per second

**Standards Australia**

Standards Australia is an independent company, limited by guarantee, which prepares and publishes most of the voluntary technical and commercial standards used in Australia. These standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth government, Standards Australia is recognized as Australia's peak national standards body.

**Standards New Zealand**

The first national Standards organization was created in New Zealand in 1932. The Standards Council of New Zealand is the national authority responsible for the production of Standards. Standards New Zealand is the trading arm of the Standards Council established under the Standards Act 1988.

**Australian/New Zealand Standards**

Under an Active Co-operation Agreement between Standards Australia and Standards New Zealand, Australian/New Zealand Standards are prepared by committees of experts from industry, governments, consumers and other sectors. The requirements or recommendations contained in published Standards are a consensus of the views of representative interests and also take account of comments received from other sources. They reflect the latest scientific and industry experience. Australian/New Zealand Standards are kept under continuous review after publication and are updated regularly to take account of changing technology.

**International Involvement**

Standards Australia and Standards New Zealand are responsible for ensuring that the Australian and New Zealand viewpoints are considered in the formulation of international Standards and that the latest international experience is incorporated in national and Joint Standards. This role is vital in assisting local industry to compete in international markets. Both organizations are the national members of ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission).

**Visit our Web sites**

www.standards.com.au www.standards.co.nz

Standards Australia

GPO Box 5420 Sydney NSW 2001
**Administration**
**Phone** (02) 8206 6000
**Fax** (02) 8206 6001
**Email** mail@standards.com.au
**Customer Service**
**Phone** 1300 65 46 46
**Fax** 1300 65 49 49
**Email** sales@standards.com.au
**Internet** www.standards.com.au

STANDARDS
NEW ZEALAND
Paerewa Aotearoa

Level 10 Radio New Zealand House
155 The Terrace Wellington 6001
(Private Bag 2439 Wellington 6020)
**Phone** (04) 498 5990
**Fax** (04) 498 5994
**Customer Services** (04) 498 5991
**Information Service** (04) 498 5992
**Email** snz@standards.co.nz
**Internet** www.standards.co.nz

ISBN 0 7337 4760 4

Printed in Australia