



Air admittance valves

This technical note has been developed as a guide to the Western Australian plumbing industry for the correct use and installation of air admittance valves (AAVs) for sanitary and drainage plumbing work.

Permitted uses for AAVs

► **As a trap vent in:**

- (a) a fully ventilated stack system of plumbing;
- (b) a fully ventilated modified stack system of plumbing;
- (c) a single stack system of plumbing; or
- (d) a sanitary plumbing system - where a fixture discharge pipe exceeds the maximum permitted distance.

► **As a group vent in:**

- (a) a fully ventilated modified stack system of plumbing; or
- (b) a sanitary plumbing system - where a common discharge pipe connecting a group of fixtures requires a vent.

► **As a stack vent in:**

- (a) any sanitary stack system of plumbing not more than nine (9) floor levels in height, excluding reduced velocity aerator stack systems.

► **As an upstream drainage vent in:**

- (a) any drainage system branch drain that requires a vent.

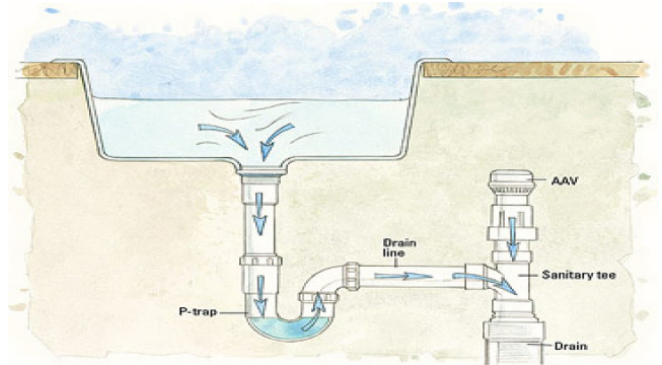
► **As a downstream drainage vent in:**

- (a) any sanitary drainage system connected to a vacuum sewer system.

AAVs shall only be used in sanitary drainage systems that have at least one (1) open upstream vent off the main drain. Where three (3) or more buildings on an allotment discharge to a main drain, the drainage system of each building shall have at least one (1) open upstream vent.

The upstream vent shall be sized as a drainage vent in accordance with AS/NZS 3500.2:2021, clause 3.9.3 and shall be at least DN 50 in size.

AAVs shall not be used for the upstream venting of the main drain.



Locating AAVs

► **AAVs shall be located so that:**

- (a) they are accessible for repair or replacement;
- (b) the replacement air flow as specified by the flow rate of the valve is maintained;
- (c) when within a wall or roof space, ventilation openings are provided;
- (d) they are not installed where air is contaminated with solvents;
- (e) the valve shall be clear of any ceiling or wall insulation;
- (f) the ambient air temperature does not vary below 0 °C or above 60 °C unless the AAV is designed to perform outside these temperatures; or
- (g) they are protected from insect entry, ultra-violet rays if installed outside and mechanical damage.

Installing AAVs

- ▶ When installing an AAV, other than those that form an integral part of a fixture trap, the valve shall:
 - (a) be installed upright within 5° of the vertical;
 - (b) have a 100 mm minimum air cushion from the soffit of the graded pipe to the inlet of the valve;
 - (c) for trap vents and group vents be no more than 1000 mm below the flood level of the lowest fixture served by the AAV, as shown in diagrams 1, 2, 3 and 4;
 - (d) connect to a fixture or common discharge pipe in accordance with AS/NZS 3500.2:2021, clause 8.5.1.1; and
 - (e) connect to the sanitary piping in accordance with the manufacturer's instructions.

Selecting AAVs

AAVs shall have a determined airflow capacity not less than that shown in AS/NZS 3500.2:2021, tables 6.10.2(A) and 6.10.2(B).

The determined airflow in litres/second (L/s) is indicated on each valve along with all other marking requirements of the WaterMark Certification Scheme.

Sizing examples of AAVs

▶ As a trap vent:

An AAV with a minimum airflow capacity of 1 L/s is suitable for any trap vent size.

The minimum air flow capacity of 1 L/s is suitable for a maximum of six (6) fixture units. The maximum fixture unit rating assigned to any single fixture, for example a toilet pan with a flush valve.

▶ As a group vent or upstream vent on a branch discharge pipe:

The principles for sizing AAVs for a single group of up to 10 fixtures connected to a common discharge pipe is not that dissimilar to sizing a group vent pipe. AAVs are based on total fixture unit loading of the common discharge pipe whereas a group vent is based on the largest section of common discharge pipe, which has been derived from certain factors that includes fixture unit rating.

As an example, AAVs shall be provided for a fixture group of two (2) basins (2 fixture units), two (2) showers (4 fixture units) and three (3) water closets with cisterns (12 fixture units) equalling a total of 18 fixture units.

Calculation:

From table 6.10.2(A), 18 fixture units require 3.3 L/s of airflow and therefore an AAV capable of supplying 3.3 L/s or more to the common discharge pipe shall be installed.

The AAV shall be installed on the group vent pipe connected to the common discharge pipe as per AS/NZS 3500.2:2021, figure 8.5.2.3.

Minimum determined airflow capacity of AAV when used as a trap vent, group vent or branch drain vent	
Fixture unit loading of discharge pipe	Minimum airflow capacity of AAV, L/s
6	1.9
9	2.3
10	2.4
12	2.7
18	3.3
24	3.8
30	4.2
36	4.6
42	5.0
48	5.3
54	5.7
60	6.0

Table 6.10.2(A)

Minimum determined airflow capacity of AAV venting discharge stacks	
Fixture unit loading of discharge stack	Minimum determined airflow capacity of AAV, L/S
1	3
2	4
4	6
6	7
10	9
12	10
15	11
20	13
25	15
30	16
40	18
60	23
80	26
100	29
200	41
300	51
400	58
500	65
600	72
1000	92

Table 6.10.2(B)

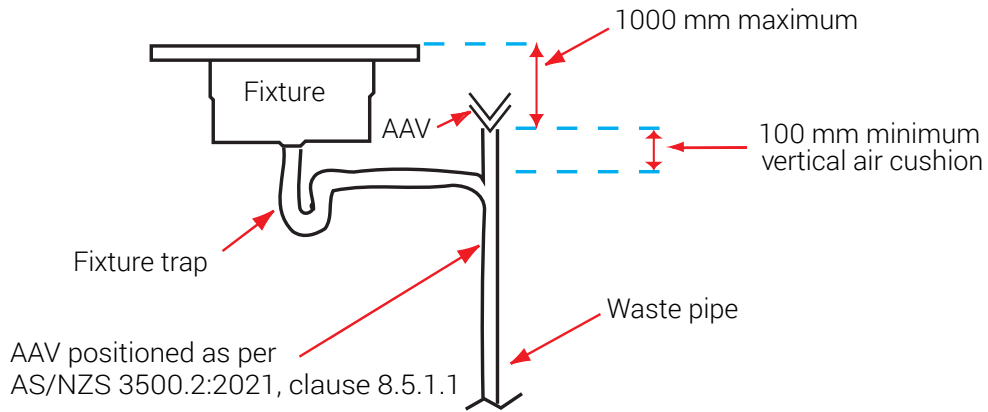


Diagram 1: AAV trap vent installation (P trap with dropper)

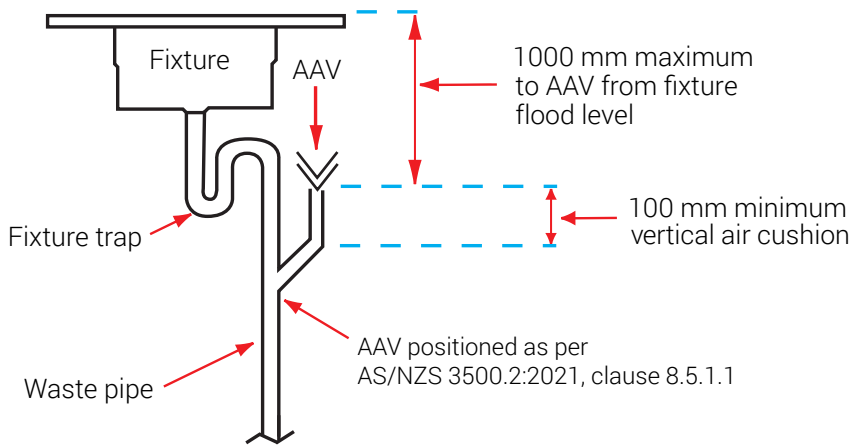


Diagram 2: AAV trap vent installation (S trap with dropper)

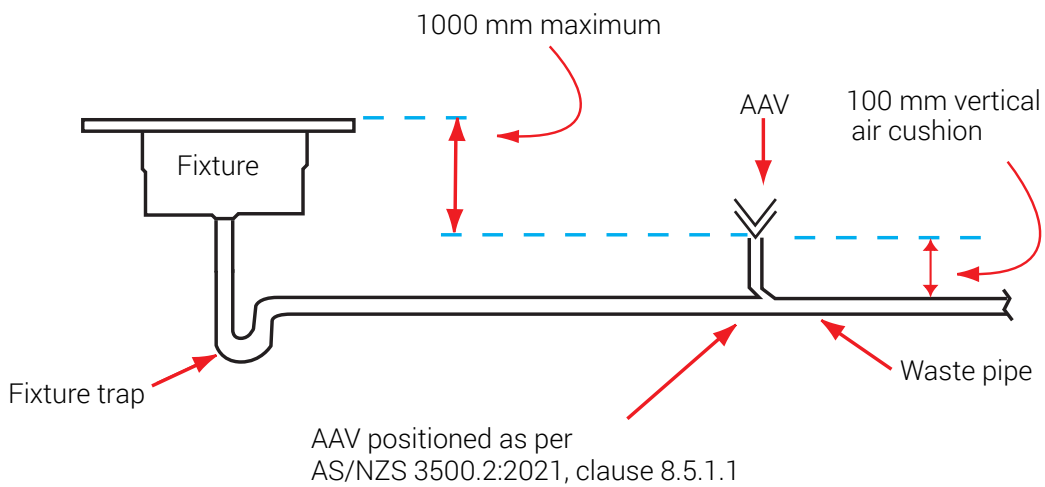


Diagram 3: AAV trap vent installation (P trap)

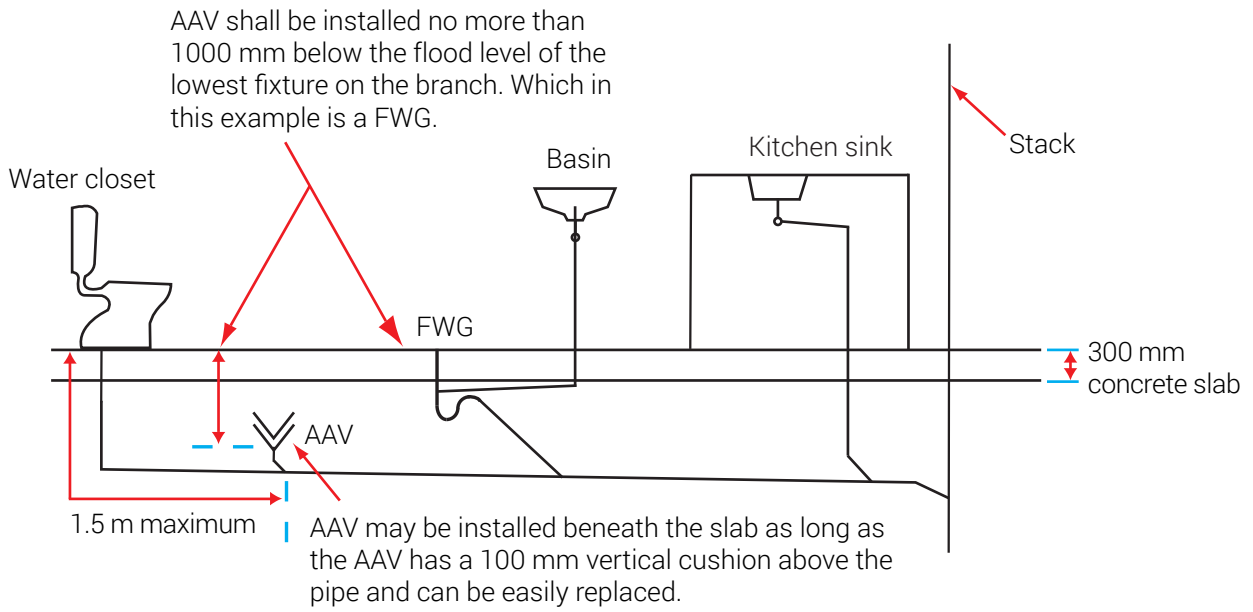


Diagram 4: AAV group vent installation

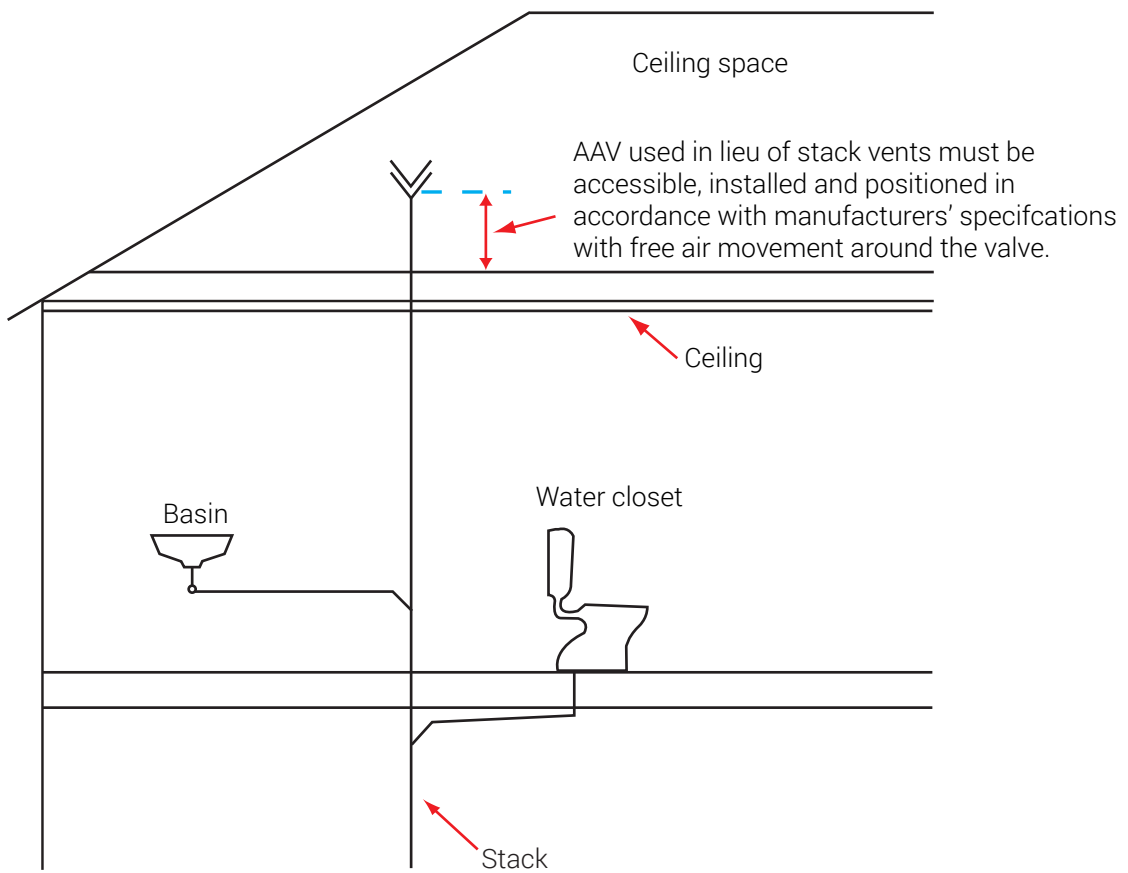


Diagram 5: AAV stack vent installation

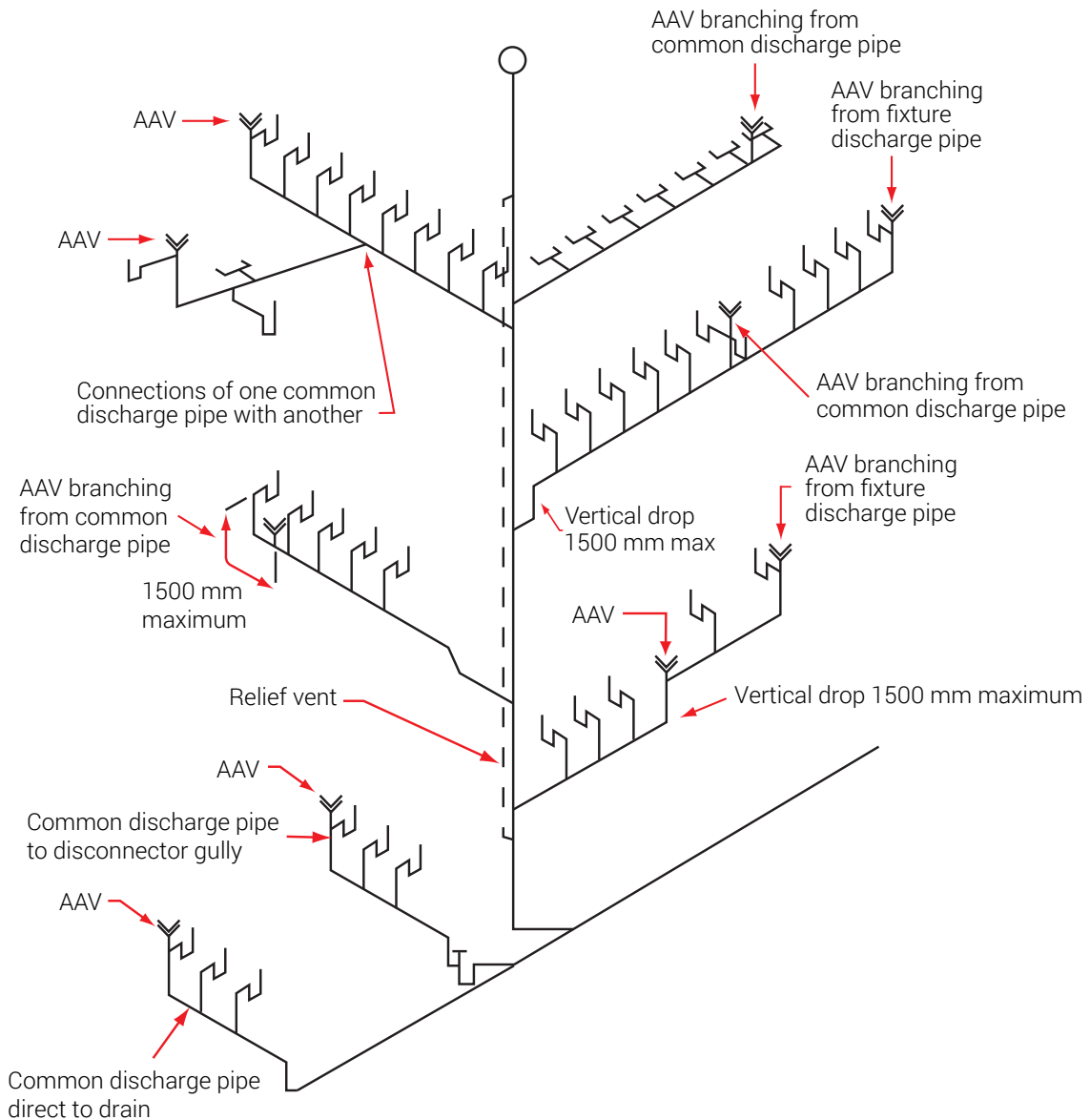


Diagram 6: AAVs as group vents on a fully vented modified system, disconnector gully and direct to drain

AAVs as group vents

Group vents shall also be installed with a 100 mm vertical air cushion and no more than 1000 mm below the flood level of the lowest fixture connected to the common discharge pipe served by the AAV.

One group AAV shall be provided for each ten (10) fixtures, or part thereof, in any group connected to a common discharge pipe.

Where a common discharge pipe for a group of fixtures (10 fixtures or less) branches from another common discharge pipe, each fixture group would require its own AAV. Each valve's minimum airflow would be determined by the total fixture unit loading on that valve, as shown in diagram 6.

Fixture traps with integral AAVs must only serve single fixtures. The requirements for connection of vents to fixtures in AS/NZS 3500.2:2021, clause 8.5.1.1 need not apply.



Photo 1: Fixture trap with integral AAV

Do not use AAVs:

- (a) as a relief vent in any sanitary stack system of plumbing;
- (b) as the sole upstream vent of the main drain. AAVs may be used on a drainage plumbing system in conjunction with at least one open upstream vent off the main drain;
- (c) as a sealed disconnecter gully vent in a sanitary or drainage system;
- (d) as an upstream vent on a drainage system to a trade waste pre-treatment fixture. AAVs may be used as additional venting for fixtures and branch drains on the system with an open upstream vent. For example a drain to a grease arrestor, wet well; or
- (e) as a vent serving:
 - (i) greywater system holding tanks;
 - (ii) wet wells;
 - (iii) waste water pumping apparatus;
 - (iv) small bore macerator/pumps;
 - (v) trade waste pre-treatment apparatus (water services provider's requirements); or
 - (vi) a boundary trap.

For further information see Plumbers Licensing Board technical notes:

- ▶ Pumping apparatus and venting.
- ▶ Trade waste applications.



Photo 2: Typical AAV for downstream venting applications

When used as a downstream vent serving vacuum sewerage systems, the AAV shall terminate a minimum of 150 mm above finished surface level or the adopted flood level. Downstream vents shall be supported if they extend more than 250 mm above finished surface level.

For further information see Plumbers Licensing Board technical note on vacuum sewers.

Notes

The technical note series is issued by the Plumbers Licensing Board to assist the plumbing industry to comply with the Plumbers Licensing and Plumbing Standards Regulations 2000 (the Regulations) applicable to plumbing work in Western Australia.

Each technical note is to be read in conjunction with Part 6 of the Regulations that currently adopt the Plumbing Code of Australia (PCA) and the deemed to satisfy provisions of AS/NZS 3500:2021, parts 0, 1, 2 and 4 but modified in certain matters to suit the State's building approach and other local conditions.

Feedback

The Plumbers Licensing Board welcomes your feedback. If you have any questions on this technical note or any suggestions on any areas of plumbing work that the technical notes should cover, please contact the Board's Senior Technical Officer on (08) 6251 1377.

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