



Reduced velocity aerator stack systems (RVASS)

Reduced velocity aerator stack systems (RVASS) are sanitary stack systems that use specialised fittings and pipework configurations in order to eliminate the need for additional venting required in traditional sanitary stack systems.

General requirements

RVASS is a sanitary stack system that uses proprietary aerator junction fittings in stacks at each floor level where sanitary fixtures are connected. A de-aerator must be included at the base of the stack and at the base of offsets in RVASS stacks.

Discharge pipes and common discharge pipes must connect to the aerator fittings in the stack using drainage principles. Therefore branch drains that exceed the maximum allowable length or fixture unit loading as per AS/NZS 3500.2:2021, clause 3.10 must be vented in accordance with clauses 6.9 or 6.10.



Photo 1: Typical aerator junction fitting

Size of stacks

Stacks using RVASS shall be sized in accordance with AS/NZS 3500:2021, clause 8.4, items (a), (b), (c), (e) and tables 6.3(A), 8.2.2(A) and 8.2.2(B).

Stacks must not be reduced in size in any direction.

De-aerators at base of stacks

A de-aerator must be installed at the base of every stack to provide a pressure relief bypass between the stack and the drain to which it is connected. The de-aerator pressure relief bypass pipe shall be raised to a minimum of 2 m above the invert of the drain.

The pressure relief bypass pipe for de-aerators connected to either a DN 100 or DN 150 stack shall be a minimum of DN 100. The bypass pipe shall run at least 2.5 m from the centre-line of the stack to the centre of the pressure relief bypass junction, see diagram 1 below.

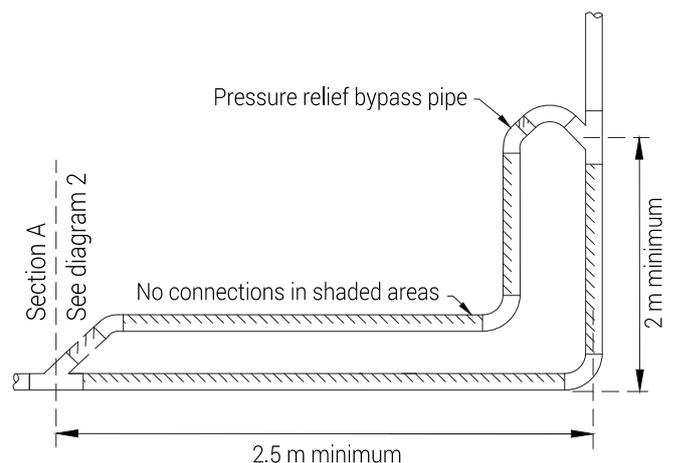


Diagram 1: De-aerator with pressure relief bypass pipe

De-aerator relief bypass pipes

Pressure relief bypass pipes for de-aerators shall run parallel to the base of the de-aerator with the invert of the pressure relief bypass pipe no lower than the centre-line of the drain or graded offset as shown in diagram 2.

No connections are permitted between the base of the stack and the connection of the pressure relief bypass pipe to the drain or graded pipe and no connections are permitted to any section of the de-aerator assembly.

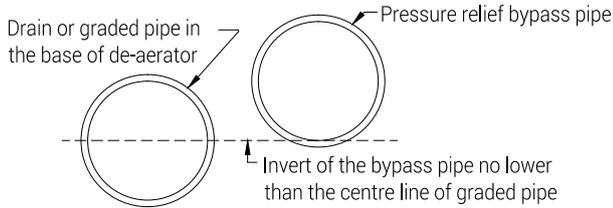


Diagram 2: Section A, minimum height of bypass pipe

Aerator junction fittings

An aerator junction shall be installed at each floor level that receives discharge from a fixture discharge pipe, common discharge pipe or a stack.

The vertical distance between any aerator junction or a de-aerator shall be no more than 5 m. Where the distance exceeds 5 m as shown in diagram 4, either an aerator junction or a double inline offset, as shown in diagram 3, shall be installed.

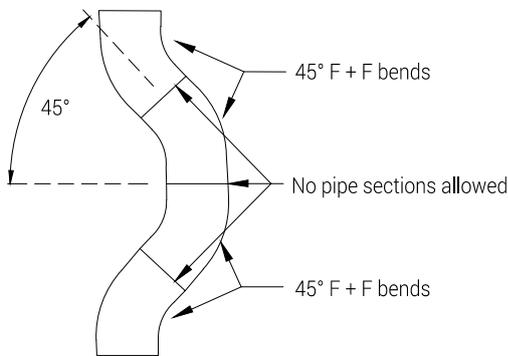


Diagram 3: Double inline offsets using 45° fittings

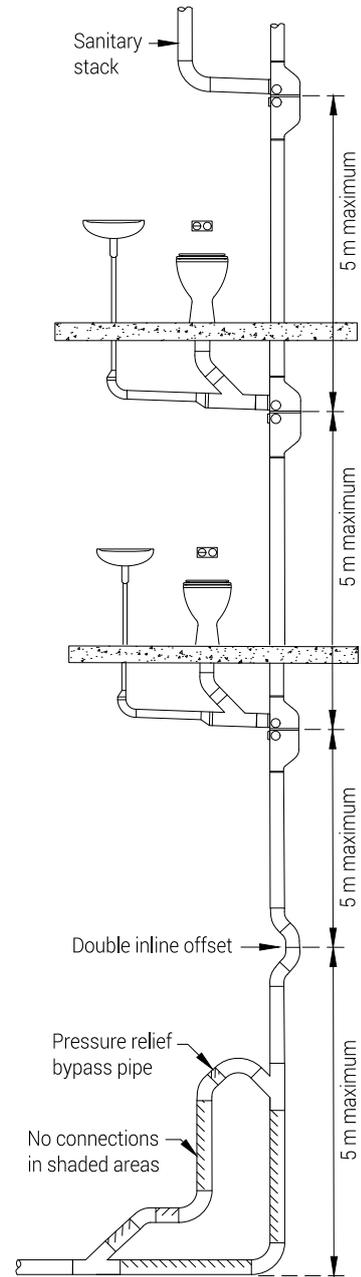


Diagram 4: Maximum of 5 m between de-aerators, aerator junctions or double inline offsets

Sizes and lengths of discharge pipes

The size and length of unvented graded discharge and common discharge pipes shall be in accordance with AS/NZS 3500.2:2021, clause 3.10 and appendix B.

Any unvented discharge pipe or unvented common discharge pipe shall not exceed 10 m in length. Unvented fixture discharge pipes shall not include a vertical drop, between the crown of the trap and the invert of the graded section of pipe exceeding;

- 2.0 m for water closet pans;
- 1.5 m for basins and bidets with DN 40 discharge pipes;
- 2.5 m for basins and bidets incorporating DN 65 discharge pipes; and
- 2.5 m for all other fixtures.

Connection of water closets

Where a discharge pipe from water closet is connected to a common discharge pipe or to an aerator junction, above or below finished surface level, the maximum vertical drop shall not exceed 2 m, see diagrams 5 and 6.

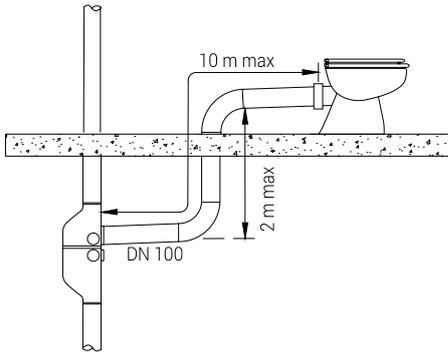


Diagram 5: Water closet with 'P' trap

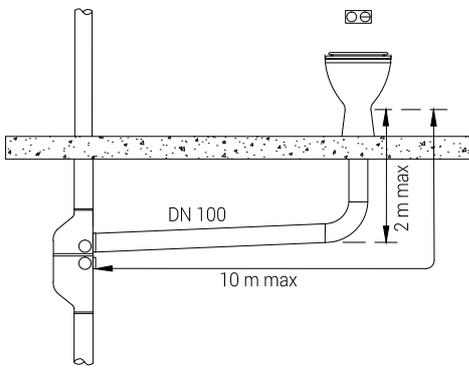


Diagram 6: Water closet with 'S' trap

Connection of basins and bidets

Where a DN 40 discharge pipe from a basin or bidet is connected to a DN 65 or larger discharge pipe above finished surface level on any floor, the maximum vertical drop to the graded DN 65 discharge pipe shall not exceed 2.5 m as shown in diagram 7.

Where a DN 40 discharge pipe from a basin or bidet is connected directly to a DN 65 or larger common discharge pipe, below finished surface level, the maximum vertical drop of DN 40 pipe shall not exceed 1.5 m as shown in diagram 8.

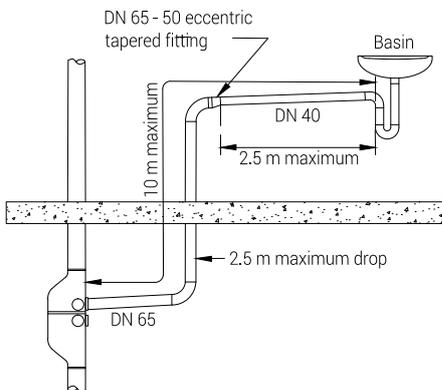


Diagram 7: Basin connection using a 'P' trap

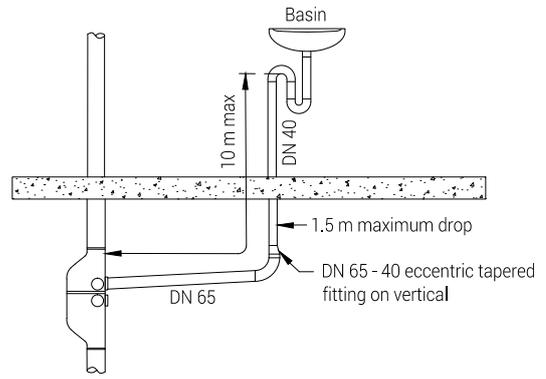


Diagram 8: Basin connection using an 'S' trap

Connection of other fixtures

For all other fixtures, the connection to a common discharge pipe or to an aerator junction, above or below finished surface level shall not have a vertical drop exceeding 2.5 m as shown in diagrams 9 and 10.

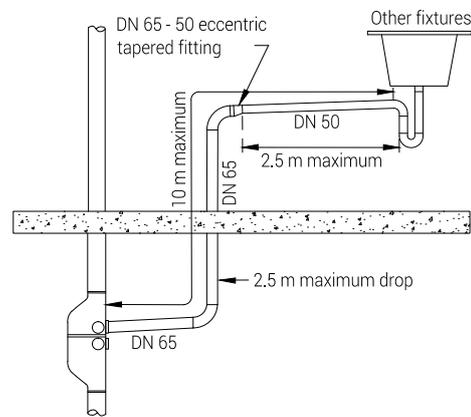


Diagram 9: Other waste fixtures with 'P' traps

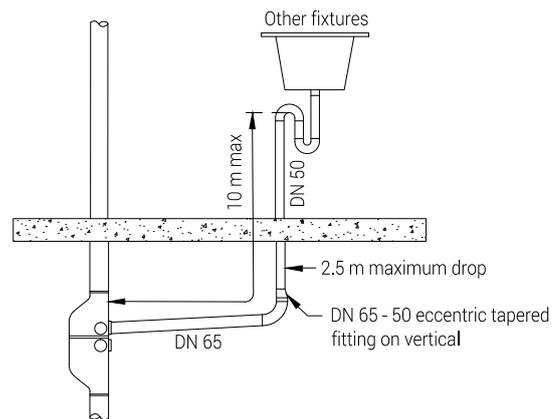


Diagram 10: Other waste fixtures with 'S' traps

Stack offsets and de-aerators

Where any stack is offset, the offset section shall be sized and installed:

- ▶ as a straight stack, if the offset is 45° or more to the horizontal; or
- ▶ as a graded pipe, if the offset is less than 45° to the horizontal.

A de-aerator with a pressure relief bypass pipe shall be installed on every stack offset that is less than 45° to the horizontal. The centre of the junction forming the pressure relief bypass pipe shall be at least 500 mm from the centre-line of the stack for 2 floors or less above the offset or 2.5 m for 3 or more floors as shown in diagram 11.

The de-aerator pressure relief bypass pipe shall be raised to a minimum of 2 m above the invert of the graded offset.

The minimum grade of a graded offset shall be in accordance with AS/NZS 3500.2:2021, table 8.6.2.2 and sized in accordance with AS/NZS 3500.2:2021, table 8.2.2(A).

The vertical distance between any aerator junction and the lower bend of a graded offset shall be no more than 5m. Where the distance exceeds 5 m a double inline offset or aerator junction shall be installed.

A fixture discharge pipe, common discharge pipe or stack may connect to the graded section of the stack offset or the lower section of the stack in accordance with the following:

- (a) The maximum fixture unit loading for graded offsets shall be as given in AS/NZS 3500.2:2021, table 8.2.2(A);
- (b) No connections shall be made within 450 mm upstream of the lower bend on the graded offset or within 600 mm downstream from the lower bend as shown in diagram 11;
- (c) The size and length of any unvented discharge pipe shall be in accordance with AS/NZS 3500.2:2021, clause 3.10 and appendix B;
- (d) No connections are permitted to any section of the de-aerator assembly; and
- (e) A 45° junction shall be used for all connections into a graded offset.

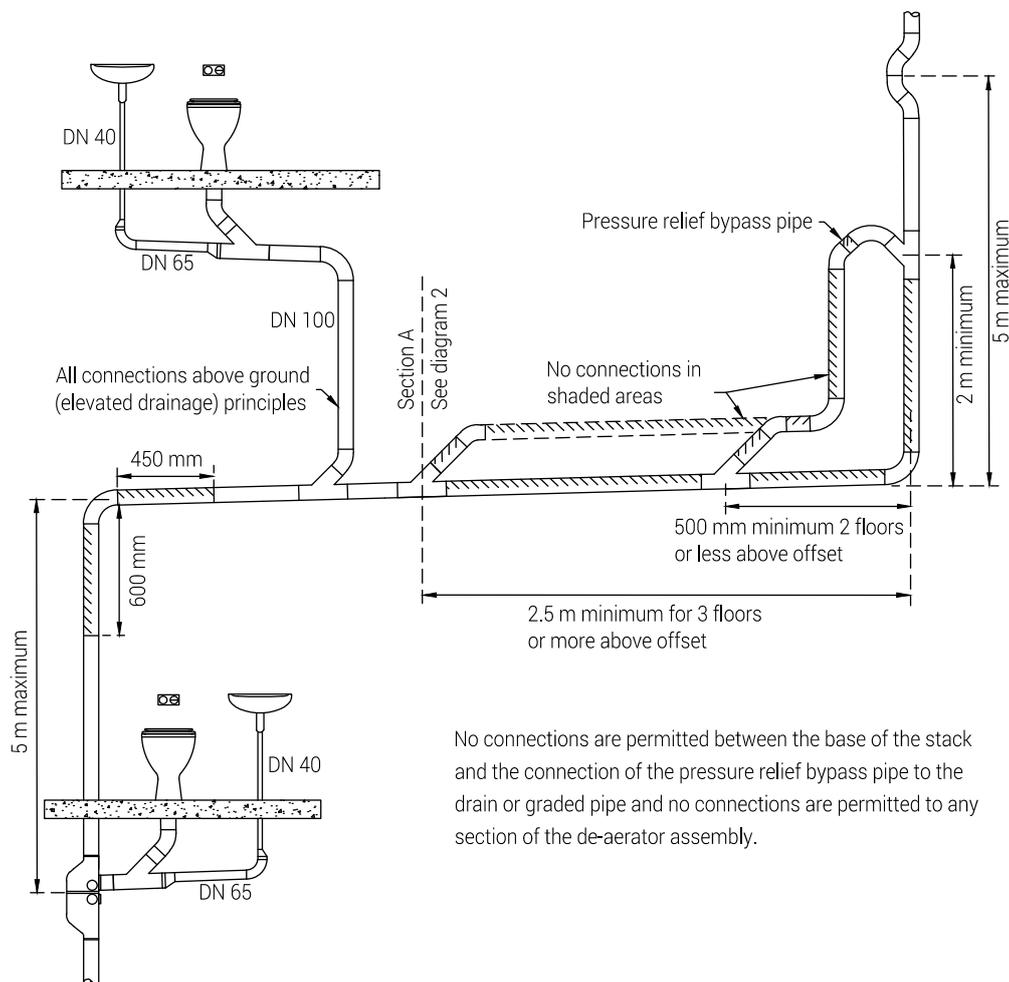


Diagram 11: Typical offset in stack

Top floor connections

The fixtures on the top floor may be connected directly to an aerated junction or the stack may roll over and fixtures connected to the graded section using drainage principles as shown in diagrams 12 and 13.

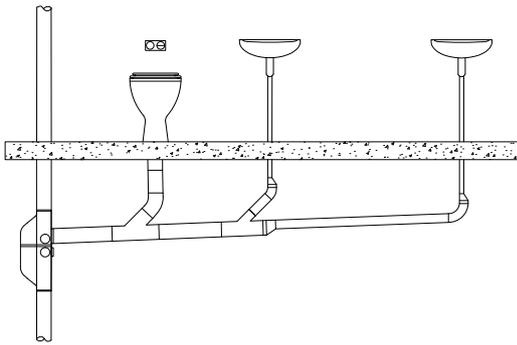


Diagram 12: Top floor fixtures must be connected using aerator junction fitting

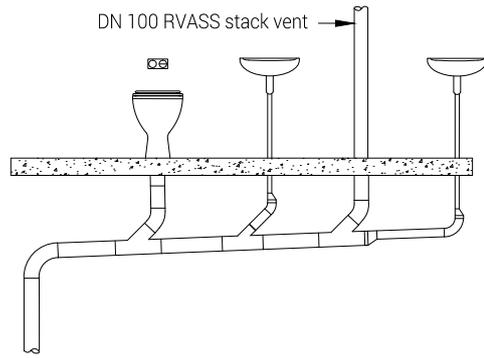


Diagram 13: Stack may be offset on top floor (rolled over) instead of using an aerator junction fitting

Stack vents

Stack vents shall be the same size as the stack and terminate to atmosphere at all times.

If the stack vent is offset and the horizontal length of the offset does not exceed 12 m, the size of the stack vent and offset does not require an increase in size. Stack vent offsets greater than 12 m shall be increased by one pipe size as shown in diagram 14.

Where stack vents are connected at the uppermost end into a common header vent it shall terminate to atmosphere at one point. The size of the header vent shall be increased by one pipe size downstream of each interconnection junction as shown in diagrams 15 and 16.

The interconnection and offsets of stack vents shall occur not less than 1 m above the flood rim level of the highest fixture.

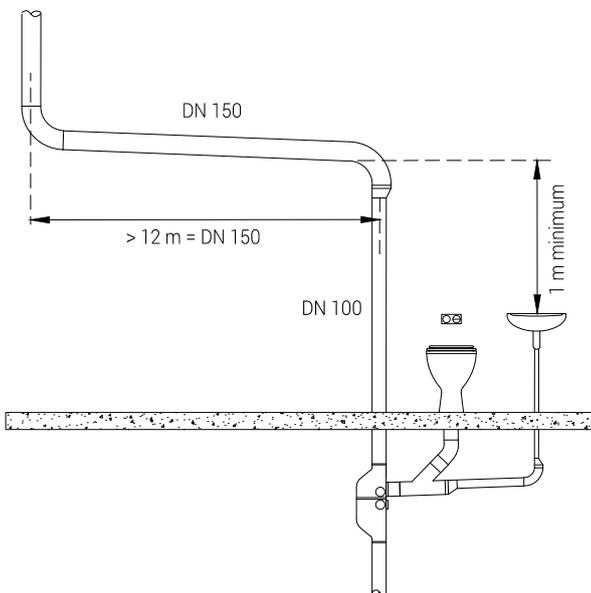


Diagram 14: Stack vent offset exceeding 12 m

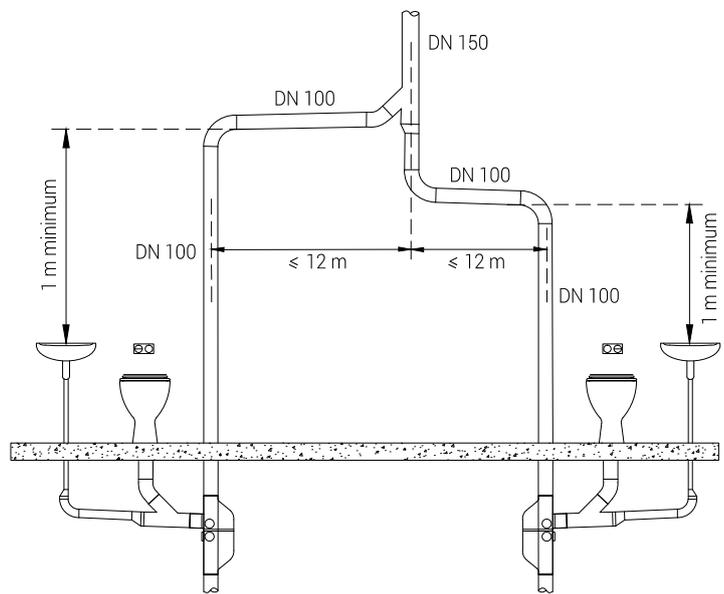


Diagram 15: Interconnection of stack vents less than 12 m

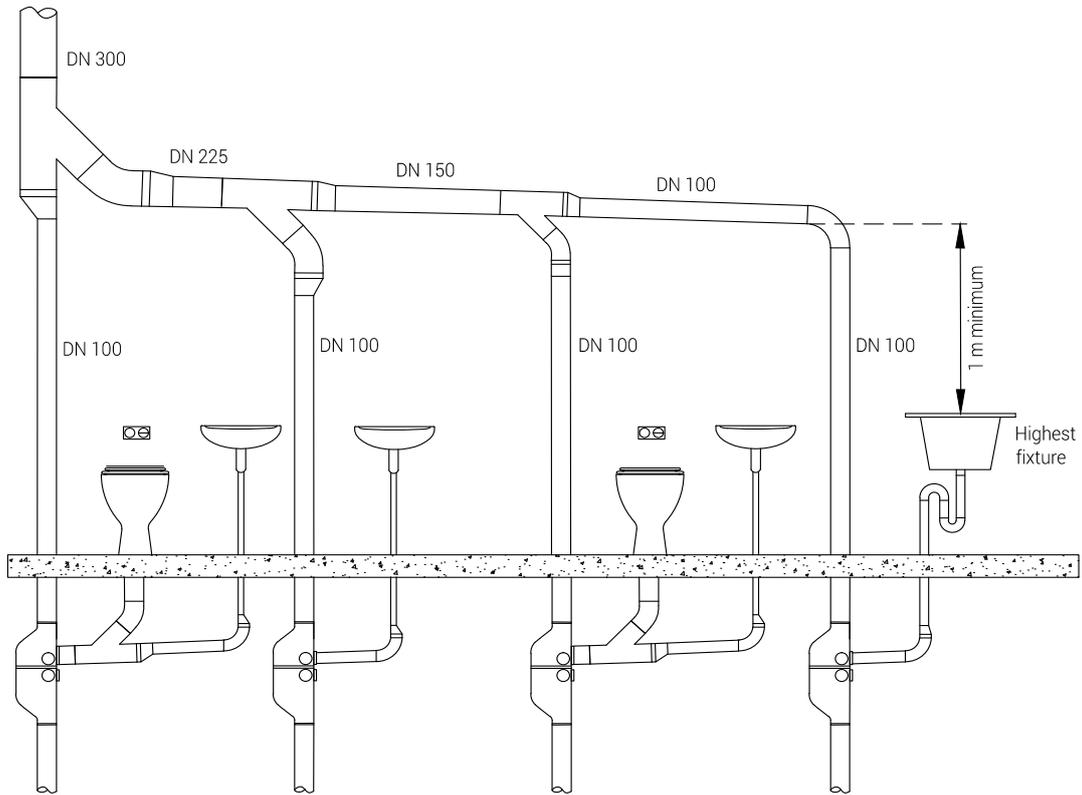


Diagram 16: Interconnection of stack vents

Notes

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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.

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