

Air Admittance Valves

Statewide Alternate Methods are approved by the division administrator in consultation with the appropriate advisory board. The advisory board's review includes technical and scientific facts of the proposed alternate method. In addition:

- *Building officials shall approve the use of any material, design or method of construction addressed in a statewide alternate method;*
- *The decision to use a statewide alternate method is at the discretion of the applicant; and*
- *Statewide alternate methods do not limit the authority of the building official to consider other proposed alternate methods encompassing the same subject matter.*

Date(s): Issued—Dec. 14, 2007
Last updated—Oct. 1, 2023

Subject: Air admittance valves as an alternate method of venting a plumbing fixture

Background:

Air Admittance Valves (AAVs) are venting devices designed for use with plumbing systems.

AAV is defined as *a one-way mechanical engineered valve that is installed locally at the site of a plumbing fixture or fixtures allowing venting to occur without a connection to a larger venting system and stack vent.*

AAVs are gravity-activated devices installed close to plumbing fixtures or on stack vents. Because AAVs are gravity-activated they can protect water-trap seals from failing due to “negative pressure” fluctuations. However, AAVs do not protect against “positive pressure” events; accordingly, AAVs need to be installed along with at least one roof vent.

AAVs were introduced in Europe in 1979. After undergoing various tests, in several countries, they were approved for use in Sweden, Belgium, France and the United Kingdom. Currently more than 2.5 million AAVs are in use outside of the United States. Since 1988, AAVs have been approved for use in 32 states, either statewide or by local jurisdictions. The US Department of Housing and Urban Development (HUD) has also approved the use of AAVs in manufactured homes. See 24 CFR 3280.604 (2007).

Based on Studor's submission, the division made a recommendation to the State Plumbing Board to review the scientific and technical facts of the proposed alternate method ruling at its Dec. 7, 2007, regular meeting and proposed revisions to the ruling at its April 1, 2010, regular meeting. At the December meeting the State Plumbing Board discussed various jurisdictions outside Oregon that currently allow for AAVs, with limitations, in construction. The State Plumbing Board recommended evaluating the practices of other jurisdictions in regard to regulation of AAVs in Oregon. The Plumbing Board also discussed restricting the use of AAVs to remodel and repair situations and to areas where structural design hinders the use of traditional plumbing installations, such as island sinks. The board discussed limiting the use of AAVs to low rise residential construction.

At the April meeting the State Plumbing Board discussed revision of the previous ruling and recommended changing the scope of the ruling to remove the limitation of three (3) AAVs per building and one (1) AAV per individual plumbing fixture. The State Plumbing Board recommended instead that the scope allow each valve to function as a vent for a maximum of three (3) fixtures and may function as a vent for up to three (3) fixtures only when those fixtures served are part of a plumbing fixture grouping such as a bathroom, kitchen or laundry area on the same floor level within the dwelling. Also, the State Plumbing Board recommended that the product standards in the ruling be revised to the latest 2009 Editions.

The Residential and Manufactured Structures Board evaluated the scientific and technical facts of the proposed alternative method ruling at its Dec. 11, 2007, regular meeting. The Residential and Manufactured Structures Board reviewed and approved the scientific and technical facts as they apply to AAVs used in residential structures subject to the Oregon Residential Specialty Code.

Discussion:

Technical discussion:

Under Oregon law, when the division considers making an alternate method ruling on a method of construction, it must consider "standards and interpretations published by the body that promulgates any nationally recognized model code adopted as a specialty code of this state." ORS 455.060.

The International Code Council (ICC), through its Evaluation Services and in the text of the International Plumbing code (IPC), recognizes AAVs and their product performance standards. The IPC indicates that with adequate conditions upon installation and use, AAVs are effective. In terms of authoritativeness, several promulgated ICC model codes form the basis of the state building code in Oregon. AAVs are also listed by the International Association of Plumbing and Mechanical Officials (IAPMO), which promulgates the model plumbing code adopted by Oregon.

In addition to the standards published by entities that supply Oregon's model codes, several authoritative sources have published standards that recognize AAVs as a suitable construction material. One authoritative source is the American Society of Sanitary Engineers (ASSE), which published national consensus performance standards Nos. 1050-2009 and 1051-2009. ASSE standards require testing for factors such as endurance, air tightness, pressure containment, and frost closure. AAVs meet these national consensus standards for performance. Also, AAVs meet the national consensus standards for materials contained in NSF Standard 14-2009.

Other sources that provide standards for AAVs include the Canadian Standards Association (CSA) and Underwriters Laboratories (UL). These listing organizations, in addition to the National Sanitation Foundation (NSF) and ASSE standards, are used for approving other plumbing products in Oregon.

Facts:

As approved by the State Plumbing Board, the following scientific and technical facts apply to AAVs as an alternate method:

1. AAVs are venting devices designed for use with plumbing systems. AAVs are gravity-activated devices installed close to plumbing fixtures or on stack vents. Because AAVs are gravity-activated they can protect water-trap seals from failing due to "negative pressure" fluctuations.
2. AAVs are pressure activated, and placed close to the fixture, to immediately increase airflow when there is a drop in pressure, preventing water from being sucked away from the trap seal.
3. AAVs do not protect against "positive pressure" events; accordingly, AAVs need to be installed along with at least one roof vent.
4. Studies show AAVs have an advantage in wet environments because they require fewer exterior roof penetrations. Documentation of this is incorporated by reference.
5. VAAVs are listed by IAPMO, ITS, ICC Evaluation Services Inc., CSA, and UL. AAVs meet the national consensus standards for materials, NSF 14-2009, and national consensus performance standards ASSE No. 1050-2009 and 1051-2009.
6. The ASSE standards require testing for endurance, air tightness, pressure containment, and frost closure and are incorporated by reference.

Scope of ruling:

Following consideration of standards promulgated by entities that publish model codes in use by Oregon, the division rules that AAVs are conditionally acceptable for the construction, alteration, and repair of detached one- and two-family dwellings and townhouses and row houses, not more than three stories above-grade in height with a separate means of egress, and their accessory structures. The acceptability of AAVs as an alternate material are contingent on construction meeting the following conditions:

1. Plumbing systems shall be installed in a workmanlike manner and in accordance with the Oregon Plumbing Specialty Code, applicable standards, and the manufacturer's installation instructions.
2. The alternative use of AAVs for plumbing venting are in addition to the other requirements of the Oregon Plumbing Specialty Code.
3. Each AAV may function as a vent for a maximum of three (3) fixtures and may function as a vent for two (2), or three (3), fixtures, only if those fixtures are part of a plumbing fixture grouping such as a bath, kitchen or laundry area, and all fixtures in the grouping are located on a single level within the dwelling.
4. AAVs shall be rated in accordance with the standard for the size of the vent to which the valve is connected.
5. AAVs shall be located not less than four (4) inches (102 mm) above the fixture drain being vented.
6. AAVs shall be located within the maximum developed length permitted for the vent connection.
7. Access shall be provided to all AAVs for inspection, maintenance and removal. The valve shall be located within a ventilated space that allows air to enter the valve.
8. Each plumbing system shall have at least one stack vent extending outdoors to the open air, as required by the Oregon Plumbing Specialty Code.
9. AAVs shall not be installed to serve sumps, chemical wastes, or in supply or return air plenums.
10. AAVs must meet the NSF 14-2009 standard as well as either the ASSE 1050-2009 standard or the 1051-2009 standard.

Conclusion:

After considering the technical and scientific approval by the State Plumbing Board, the division rules that AAVs are acceptable as a construction method, subject to the stated limitations, and the revised Alternate Method Ruling OPSC 07-01 is approved.

Contact:

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