

RB290-22

Proposed Change as Submitted

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crccd.org)

2021 International Residential Code

Revise as follows:

AF103.6.1 Subslab Vent pipe. A minimum 3-inch-diameter (76 mm) ~~ABS, PVC or equivalent~~ gastight pipe shall be embedded vertically into the subslab aggregate or other permeable material before the slab is cast. A "T" fitting or equivalent method shall be used to ensure that the pipe opening remains within the subslab permeable material. Not less than 4 feet (102 cm) of perforated pipe or geotextile matting shall be connected to each of the horizontal openings of the tee fitting. Alternatively, the 3-inch (76 mm) pipe shall be inserted directly into an interior perimeter drain tile loop or through a sealed sump cover where the sump is exposed to the subslab aggregate or connected to it through a drainage system. The pipe shall be extended up through the building floors, and terminate not less than 12 inches (305 mm) above the surface of the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the building that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent buildings. All above ground material used shall comply with Section P3002.1.

Reason: This proposal prevents a common field problem where the plumbing "tee" fitting fills with concrete when the slab is cast and clarifies that the pipe and fitting material requirements shall be consistent with the IRC.

Cost Impact: The code change proposal will increase the cost of construction. Additional 10-foot pipe, costing approximately \$10-15, is required.

RB290-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The committee disapproved this modification to the Appendix for Radon Control Methods because the felt that passive systems did not fail in the manner described in the reason. The proposed language does not provide a beneficial system and the additional 4 feet is not necessary. (Vote: 7-3)

RB290-22

Individual Consideration Agenda

Public Comment 1:

IRC: AF103.6.1

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crccd.org); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Submitted

Commenter's Reason: This is a very common problem in the field where concrete from the slab pour leaks past the soil retarder and fills the "Tee Fitting". Gravel can also close off the "Tee Fitting" openings. Adding the pipe extenders keeps the suction point open.

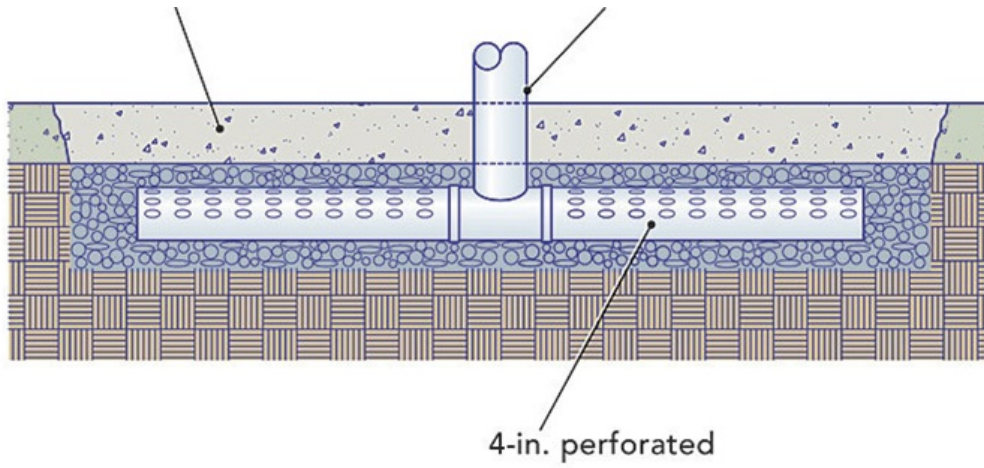
Tee Fitting Clogged with Concrete and Tee Fitting Filled with Gravel



Extending the Tee Fitting with perforated pipe prevents closure of the suction point. This is a minimal cost to the builder.

Concrete Slab

Riser Pipe



Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction

Additional 10-foot pipe, costing approximately \$10-15, is required.

RB291-22

Proposed Change as Submitted

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org)

2021 International Residential Code

Revise as follows:

AF103.8 Vent pipe accessibility. Radon vent pipes shall be accessible for future fan installation through an attic ~~or other area outside the habitable space.~~ The pipe shall be centered in an unobstructed cylindrical space having a height of not less than 36 inches (91 cm) and a diameter of not less than 18 inches (46 cm) in the location where the fan would be installed.

Exception: The radon vent pipe need not be ~~accessible~~ accessed from in an attic space where an ~~approved roof top~~ electrical supply is provided for future use on the roof top or other area outside the habitable space.

Reason: This change simply reserves adequate space in the attic for future installation of a radon fan. If there is not enough room to add a fan if needed then the entire piping system must be abandoned and redone. This is a common field failure where the pipe is run too close to the eave and is inaccessible.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This proposal defines a volume of space in an attic location where a radon fan can be installed, if necessary. No new material costs are added, however, the defined volume space requirement assists with proper pipe layout design to facilitate any future fan installation.

RB291-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: This proposal to the appendix for Radon Control Methods was disapproved because it is not clear how this will work with a low slope roof with limited access space. What impact do additional elbow have on the system operation? Details were not provided to provide any guidance on how this is to be achieved. The 36 inch minimum clearance is excessive. (Vote: 10-0)

RB291-22

Individual Consideration Agenda

Public Comment 1:

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Submitted

Commenter's Reason: Appendix F allows for mounting the fan on the roof when there is insufficient room because of a low roof slope. Elbow bends have a minimal effect on passive systems because the airflow is so small (around 10 cubic feet per minute) that there is little resistance lost in a 90 degree fitting. If there is not enough room to mount a radon fan then the entire passive system may be abandoned and a new piping system installed that will allow for an active system when high radon levels are present. 36 inches is a minimum space for a workman to access the pipe and install a fan.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal defines a volume of space in an attic location where a radon fan can be installed, if necessary. No new material costs are added, however, the defined volume space requirement assists with proper pipe layout design to facilitate any future fan installation.

RB292-22

Proposed Change as Submitted

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org)

2021 International Residential Code

Revise as follows:

AF103.5.3 Submembrane Vent pipe. A plumbing tee or other *approved* connection shall be inserted horizontally beneath the sheeting and connected to a 3- or 4-inch-diameter (76 or 102 mm) fitting with a vertical vent pipe installed through the sheeting. Not less than 10 feet (254 cm) of perforated pipe or geotextile matting shall be connected to each of the horizontal openings of the tee fitting or the two horizontal openings shall be connected to the interior drain tile system. The vent pipe shall be extended up through the building floors, and terminate not less than 12 inches (305 mm) above the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the building that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent buildings. Above ground pipe material shall comply with Section P3002.1.

Reason: It is a common field problem where the horizontal openings of the "tee" fitting will be closed off by suction on the membrane. This makes the suction point non-functional. The proposal further clarifies the piping material consistent with the IRC plumbing section.

Cost Impact: The code change proposal will increase the cost of construction (2)10 foot stick of perforated pipe are additionally required for the system. This will cost \$20-\$25.

RB292-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: This proposal to the appendix for Radon Control Methods was disapproved the issue described in the reason is not a common reason for failure of the system - the typical pipe is buried in the gravel with a plastic membrane on top. What is the reason for the difference of requirements with an additional 4 feet of pipe in proposal RB290-22 and and addition 10 feet in this proposal? The cost impact statement is about half of what this woule cost. There was concern that "connection to an interior drain tile" system is and EPA violation. (Vote: 7-3)

RB292-22

Individual Consideration Agenda

Public Comment 1:

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Submitted

Commenter's Reason: There is no detail in Appendix F to bury the submembrane "Tee Fitting" in a gravel trench. That is the reason for the 10 foot extension on each side of the "Tee Fitting". Connecting the riser pipe to an interior drain tile system is part of the EPA guidance and does not violate the EPA.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction (2)10 foot stick of perforated pipe are additionally required for the system. This will cost \$20-\$25.

Public Comment# 3374

RB294-22

Proposed Change as Submitted

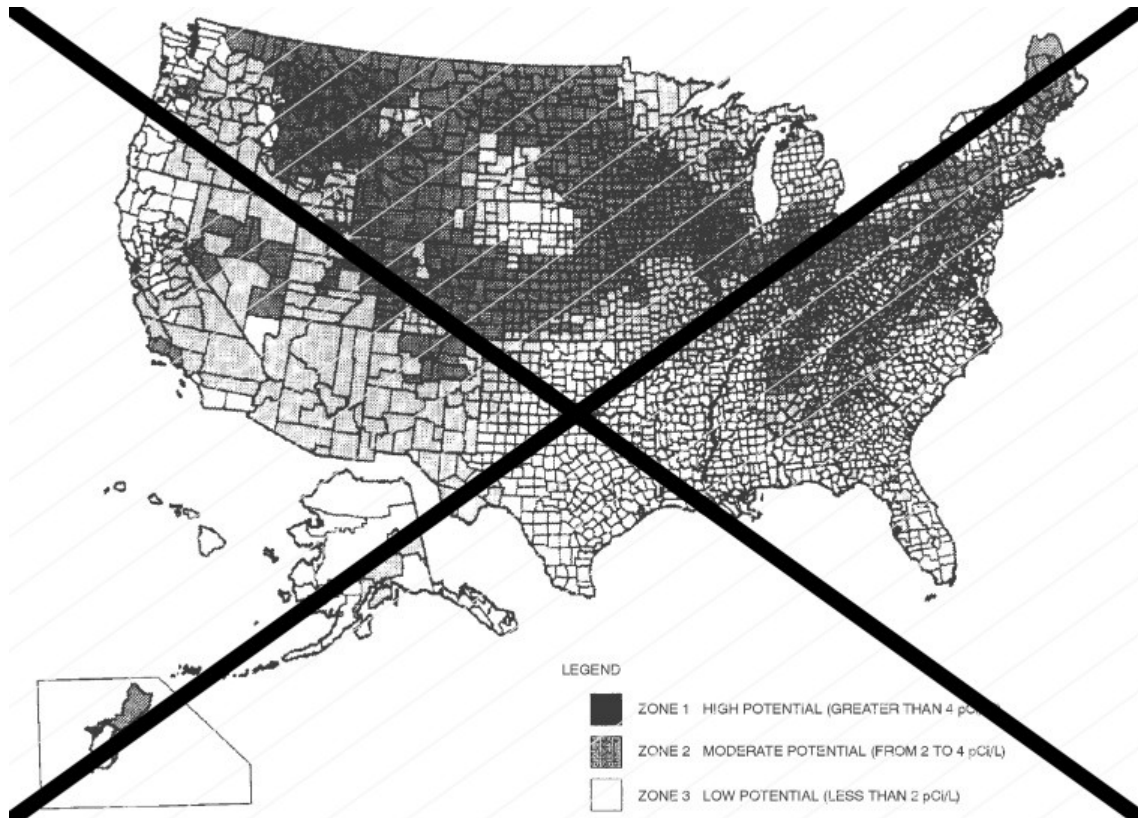
Proponents: Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors

2021 International Residential Code

Revise as follows:

AF101.1 General. This appendix contains requirements for new construction ~~in jurisdictions~~ where radon-resistant construction is required. ~~Inclusion of this appendix by jurisdictions shall be determined through the use of locally available data or determination of Zone 1 designation in Figure AF101.1 and Table AF101.1.~~

Delete without substitution:



1. a.pCi/L stands for picocuries per liter of radon gas. The US Environmental Protection Agency (EPA) recommends that homes that measure 4 pCi/L and greater be mitigated.

The EPA and the US Geological Survey have evaluated the radon potential in the United States and have developed a map of radon zones designed to assist building officials in deciding whether radon resistant features are applicable in new construction.

The map assigns each of the 3,141 counties in the United States to one of three zones based on radon potential. Each zone designation reflects the average short term radon measurement that can be expected to be measured in a building without the implementation of radon control methods. The radon zone designation of highest priority is Zone 1. Table AF101.1 lists the Zone 1 counties illustrated on the map. More detailed information can be obtained from state specific booklets (EPA 401-R-93-021 through 070) available through the State Radon Offices or from the EPA Regional Offices.

FIGURE AF101.1 EPA MAP OF RADON ZONES

~~TABLE AF101.1 HIGH RADON POTENTIAL (ZONE 1) COUNTIES*~~

Reason: The EPA map and Zone 1 county list are based in part on a 1993 survey that measured radon in 5694 homes, less than two per each of the 3141 counties in the US. As more recent data have been compiled by states and the US Centers for Disease Control and Prevention, it is evident that more counties' average radon test results equal or exceed the EPA action level.

Radon Zone 1 counties are defined as having a predicted year-round average indoor radon screening level in the lowest livable area of a structure greater than or equal to four picocuries per liter of air (pCi/L). Relying on an average radon level does not address the full range of risk within a given county. Levels greater than 4 have been found in 85% of US counties tested.

Restricting localities as to when or how they may include the appendix ("shall be determined through") can cause this appendix to conflict with local authority.

While opponents may suggest otherwise, deleting the county information does not impose a requirement for adoption in Zones 2 and 3. Appendix F will remain an optional appendix that is only in effect where the jurisdiction has adopted it.

In response to stakeholder feedback EPA has been deemphasizing the use of the EPA zone map as a reference for building codes and specifications. The purpose of the EPA radon zone map, since its inception, has been to show potential of risk not ACTUAL risk. While it is still a useful tool, it unintentionally creates a false sense of security for those in Zone 2 and Zone 3 that risk in those areas is non-existent. With this in mind, the EPA Indoor airPLUS program (a voluntary partnership and labeling program that helps new home builders improve the Indoor Air Quality) plans to include testing in ALL ZONES in its upcoming Version 2 update. The fact remains that radon is found in all zones and to truly protect against radon you need to test regardless of zone.

It is suggested that the following information be added to the Commentary for the IRC: Code officials seeking radon risk information may consult with the state radon programs listed at <https://www.crcpd.org/page/Radon> or information listed at <https://www.epa.gov/radon/epa-map-radon-zones-and-supplemental-information#datainfo>.

Cost Impact: The code change proposal will increase the cost of construction

Adoption of the Appendix adds to the cost of construction. According to results from the Home Innovations Research Lab's survey of homebuilders, the average installation cost for a passive system in 2019 for a single-family detached home was approximately \$463, up from the \$377 reported for 2018 and \$367 reported for 2017.

RB294-22

Public Hearing Results

Committee Action:

Disapproved

Committee Reason: The proposal for the appendix for Radon Control Methods was disapproved. Some of the committee members felt that by taking the map for EPA Radon Zones out of the code, no guidance is left for the local building officials to make a determination of how close they are to higher prone areas. Removing "in jurisdictions" may not be appropriate because some things may be done at a state or jurisdictional level and a distinction is needed there. Other committee members did not have a problem with removing the map at the request of the EPA based on the age of the map. This proposal allows the policymakers at the jurisdictional level decide whether this can be required. Requiring radon detection systems should be based on a test, not based on assumed average risk levels. (Vote: 6-4)

RB294-22

Individual Consideration Agenda

Public Comment 1:

IRC: AF101.1

Proponents: Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crccd.org); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org) requests As Modified by Public Comment

Further modify as follows:

2021 International Residential Code

AF101.1 General. This appendix contains requirements for new construction in jurisdictions where radon-resistant construction is required.

Commenter's Reason: This public comment re-inserts the phrase "in jurisdictions" in response to an IRC committee stated concern in disapproving this code change.

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction. Adoption of the Appendix adds to the cost of construction. According to results from the Home Innovations Research Lab's survey of homebuilders, the average installation cost for a passive system in 2019 for a single-family detached home was approximately \$463, up from the \$377 reported for 2018 and \$367 reported for 2017.

Public Comment# 3265

RB295-22

Proposed Change as Submitted

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org)

2021 International Residential Code

Revise as follows:

AF103.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a subslab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

1. A uniform layer of clean aggregate, not less than 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a $\frac{1}{4}$ -inch (6.4 mm) sieve.
2. A uniform layer of sand (native or fill), not less than 4 inches (102 mm) thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.

Exception: A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1

3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

Reason: Well drained soils do not require a sand layer and the matting can be laid right on the native soils, where applicable.

Cost Impact: The code change proposal will decrease the cost of construction
This will eliminate the requirement for a sand base layer where appropriate soils exist.

RB295-22

Public Hearing Results

Committee Action:

As Submitted

Committee Reason: This proposal for the appendix on Radon Control Methods allows for additional options for subfloor preparation, however the new exception should be applied to the entire section and not just option 2. (Vote: 10-0)

RB295-22

Individual Consideration Agenda

Public Comment 1:

IRC: AF103.2

Proponents: David Kapturowski, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Modified by Public Comment

Modify as follows:

2021 International Residential Code

AF103.2 Subfloor preparation. A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a subslab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

Exception: A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1

1. A uniform layer of clean aggregate, not less than 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a $\frac{1}{4}$ -inch (6.4 mm) sieve.
2. A uniform layer of sand (native or fill), not less than 4 inches (102 mm) thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.

~~**Exception:** A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1~~

3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

Commenter's Reason: The Exception was relocated as the committee requested.

Cost Impact: The net effect of the public comment and code change proposal will decrease the cost of construction. This will eliminate the requirement for a sand base layer where appropriate soils exist.