IRC — Plumbing

2015 GROUP A PUBLIC COMMENT AGENDA

SEPTEMBER 30 – OCTOBER 5, 2015
LONG BEACH CONVENTION CENTER
LONG BEACH, CA

ICC
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RP1-15

P2503.4

Proposed Change as Submitted

Proponent : Gary Kozan, CPD, representing Florida Association of Plumbing Heating Cooling Contractors (garyk@ridgewayplumbing.com)

2015 International Residential Code

Revise as follows:

P2503.4 Building sewer testing. The *building sewer* shall be tested by insertion of a test plug at the point of connection with the public sewer~~,~~ and completely filling the *building sewer* with water ~~and pressurizing~~ from the lowest to the ~~sewer to not less than 10-foot (3048 mm) head of water~~ highest point thereof. The test pressure shall not decrease during a period of not less than 15 minutes. The *building sewer* shall be watertight at all points.

A forced sewer test shall consist of pressurizing the piping to a pressure of not less than 5 psi (34.5 kPa) greater than the pump rating and maintaining such pressure for not less than 15 minutes. The forced sewer shall be water tight at all points.

Reason: Subjecting a gravity house sewer to a 10-foot head test is outdated and impractical. By the time the building sewer is connected, fixtures have usually been installed, so both ends have to be plugged off before testing in order to protect the building from flooding. Leaks on gravity house sewers are rare, considering that most today are constructed with plastic pipe and contain few fittings and joints. Simply filling the sewer with water is sufficient to identify any leaks. It should be noted that public sewer mains and branch laterals downstream of the building sewer are not water tested at all.
This testing method is identical to that found in the other model plumbing code (UPC), used in many states. Florida adopted similar testing requirements in 2000. It is time that the IPC recognizes this proven practice and bring the codes closer together.

Bibliography:
2012 Uniform Plumbing Code:

723.0 Building Sewer Test

723.1 General. Building sewers shall be tested by plugging the end of the building sewer at its points of connection with the public sewer or private sewage disposal system and ***completely filling the building sewer with water from the lowest to the highest point thereof***(emphasis added), or approved equivalent low-pressure air test. Plastic DWV piping systems shall not be tested by the air test method. The building sewer shall be watertight.

2010 Florida Building Code - Plumbing

312.6 Gravity sewer test. Gravity sewer tests shall consist of plugging the end of the building sewer with water at the point of connection with the public sewer, ***completely filling the building sewer with water from the lowest to the highest point thereof***(emphasis added), and maintaining such pressure for 15 minutes. The building sewer shall be watertight at all points.

2010 Florida Building Code - Residential:

2503.4 Gravity sewer test. Gravity sewer tests shall consist of plugging the end of the building sewer with water at the point of connection with the public sewer, ***completely filling the building sewer with water from the lowest to the highest point thereof***(emphasis added), and maintaining such pressure for 15 minutes. The building sewer shall be watertight at all points.

Cost Impact: Will not increase the cost of construction
Reducing the head test for gravity sewers will shorten the length of the fill stack, and eliminate the need for additional test fittings, test balls, and labor to plug off the upper end of the sewer. This should translate to a modest reduction in cost of approx. $20 - $40 per sewer test.

RP1-15 : P2503.4-KOZAN3454

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The phrase "highest point thereof" seems ambiguous. The committee would like to see consistency with the 5 feet of water head test for building drains.

Assembly Motion: As Submitted
Online Vote Results: Failed
Support: 21.77% (32) Oppose: 78.23% (115)
Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Gary Kozan, representing FAPHCC (garyk@ridgewayplumbing.com) requests Approve as Modified by this Public Comment.

Modify as Follows:

2015 International Residential Code

P2503.4 Building sewer testing. The *building sewer* shall be tested by insertion of a test plug at the point of connection with the public sewer ~~and completely~~ , filling the *building sewer* with water ~~from~~ and pressurizing the ~~lowest~~ sewer to ~~the highest point thereof~~ not less than 5-foot (1524 mm) head of water. The test pressure shall not decrease during a period of not less than 15 minutes. The *building sewer* shall be watertight at all points.

A forced sewer test shall consist of pressurizing the piping to a pressure of not less than 5 psi (34.5 kPa) greater than the pump rating and maintaining such pressure for not less than 15 minutes. The forced sewer shall be water tight at all points.

Commenter's Reason: The disapproval of RP 1-15 means the code reverts back to a 10-foot head test for exterior building sewers, while requiring only a 5-foot head test for interior DWV testing. By approving this modification, the testing of interior and exterior DWV piping will be in sync once again.

RP1-15

RP2-15
P2503.5.1

Proposed Change as Submitted

Proponent : Janine Snyder, City of Thornton, Colorado, representing Colorado Association of Plumbing & Mechanical Officials (CAPMO) (Janine.Snyder@cityofthornton.net)

2015 International Residential Code

Revise as follows:

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or, for piping systems other than plastic, by air, without evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough-in piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than ~~5~~ 10 feet (~~1524~~ 3048 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes.

Reason: Historically the codes required a 10 foot head on DWV systems. With the change in the 2015 to only 5 feet head the DWV system can have leaks that are undetectable therefore placing the property owner at risk for damage over the life of the structure. The 10 foot head not only elliminates that risk it ensures that the system is in fact water tight which is the purpose of the test in the first place.

Cost Impact: Will increase the cost of construction
The 10 foot head requirement has been in place and is the standard for testing. The cost of replacing or repairing portions of the DWV system that have leaks that have gone undetected due to the relaxed testing pressures overrules the cost of the additional 5 foot head of water.

RP2-15 : P2503.5.1-SNYDER4419

Public Hearing Results

Committee Action: Disapproved

Committee Reason: A 5 foot of water head test is safer to perform and many contractors have never had a problem when using this test pressure. There is no need to change the test pressure back to 10 feet of water head.

Assembly Action : None

Individual Consideration Agenda

Public Comment 1:

Proponent : Janine Snyder, representing Colorado Association of Plumbing Mechanical Officials, CAPMO (Janine.Snyder@cityofthornton.net) requests Approve as Submitted.

Commenter's Reason: Historically the codes required a 10 foot head on DWV systems. With the change in the 2015 to only 5 feet head the DWV system can have leaks that are undetectable therefore placing the property owner at risk for damage over the life of the structure. The 10 foot head not only eliminates that risk it ensures that the system is in fact watertight which is the purpose of the test in the first place. The plastic pipe manufacturer's don't designate residential pipe vs. commercial pipe so why should the test be different if the pipe is not. Furthermore, the change to the 2015 IPC and 2018 IPC to go to a 5 foot head test was disapproved by the committee and the subsequent assembly action also failed further reiterating the validity and necessity of the 10 foot head test requirement.

RP2-15

RP6-15

P2802 (New), P2802.1 (New), P2802.2 (New), Table P2802.2 (New), P2802.3 (New)

Proposed Change as Submitted

Proponent : Ed Osann, representing Natural Resources Defense Council (eosann@nrdc.org)

2015 International Residential Code

Add new text as follows:

SECTION P2802
RADIAL DISTANCE TO CERTAIN PLUMBING FIXTURES

P2802.1 Scope. The distance limitation in Section P2802.2 shall apply to the following plumbing fixtures:

1. lavatories.
2. kitchen sinks.
3. showers.
4. tub-shower combinations.

Exception: Plumbing fixtures connected to a hot water recirculation system.

P2802.2 Maximum distance to certain plumbing fixtures For hot water distribution systems serving individual dwelling units, the maximum radial distance in plan view between the location of a water heater and a plumbing fixture receiving hot water from it shall be no more than the length shown in Table P2802.2. For purposes of this determination, the location of a water heater shall be translated vertically to each floor on which a fixture served by such water heater is located.

TABLE P2802.2
MAXIMUM RADIAL DISTANCE BETWEEN A WATER HEATER AND CERTAIN PLUMBING FIXTURES

Dwelling Unit Floor Area (ft^2)	Maximum Plan View distance (ft)	
	Two or More Story Structures	One-Story Structures
≤1000	20 ft.	30 ft.
>1000 to ≤1600	30 ft.	40 ft.
>1600 to ≤2200	40 ft.	50 ft.
>2200 to ≤2800	45 ft.	55.ft.
>2800	50 ft.	65 ft.

P2802.3 Points of Measurement Radial distance shall be measured in plan view betwee the center point of the water heater and the hot water outlet serving a plumbing fixture indicated in Section P2802.1.

Reason: Cold or tepid water in the initial draw from a hot water outlet is often unusable for its intended purpose and is frequently purged, resulting in a waste of water, energy, and time for residents. Pipe insulation significantly reduces heat loss and helps to ensure that hot water gets to users sooner. However, a complementary strategy is to reduce the volume of water contained in the hot water distribution system subject to cool-down. This proposal seeks to reduce entrained hot water volume by setting generous but clear limits on the distance between a hot water heater and the furthest bathroom or kitchen fixture it serves.

Providing greater proximity between the hot water source and the fixtures using hot water will reduce the need for purging. This proposal is similar in intent and effect to Section 607.2 of the International Plumbing Code, which sets a maximum developed length of 50 feet for hot water supply piping between a heat source and any hot water fixture. While not a limitation on pipe length or internal volume *per se*, this proposal will have similar results and has the avantage of requiring no special drawings nor any measurements or calculations at the job site. Rather, its simple provisions can be easily applied during project design and confirmed at plan check, and its graduated distance limits meet the need for a flexible approach that respects the diversity of types and sizes of single-family homes covered by the IRC.

Plans for most two-story production homes should comply with this provision with little or no adjustment. Most home designs where the principal length-to-width ratio of the building footprint is 2 to 1 or less should face few compliance isues. The concept may be more challenging for single-story homes, and for that reason an additinal distance allowance is provided for single-story buildings. Plans for homes with long and narrow configuration may require adjustment, largely to avoid positioning the hot water heater and its furthest fixture outlet at diagonally opposite corners of the building. Avoiding such inherently inefficient designs is the primary intent of this proposal.

The specific limitations in this proposal have their origin in a review of data collected from a diverse group of 55 single-family homes under construction in California in 2010-11. A plot of house floor area and maximum length of pipe between the hot water heater and the furthest hot water fixture was developed. Based upon these plotted data, in 2011 the California Utilities Statewide Codes and Standards team devloped a draft proposal setting a grauated limit on the maximum length of hot water pipe between a water heater and the furthest fixture. The proposal was estimated to save over 2500 gallons of water and over 24 therms of natural gas annually when applied to prototype homes. However, these initial pipe length criteria would have been met by just 10 out of the 55 homes surveyed. Subsequent workshops raised concerns about the challenges of field verification of pipe length subject to the limit. As a result, the concept was modified to measure radial distance in plan view, in lieu of field verification of pipe length. In its second iteration, limits were expressed as radial distances instead of pipe length, but the proposal was intended to be equally stringent. In this proposal for the IRC 2018 model code, these stringent distant limits have been increased by 50%; we estimate that over 75% of the surveyed homes in the 2010-11 data set would meet these proposed limits.

Plans not meeting the radial length limitation can come into compliance using several strategies, including fixture repositioning or hot water repositioning. The latter can often be accomplished by repositioning the proposed water heater location from an exterior garage wall to an interior garage wall; moving a basement water heater from a corner toward a more central location; or rearranging fixture locations in a bathroom to move hot water outlets closer to the water heater. Installation of a second water heater is also an option, as is a recirculation loop. Design flexibility is maintained, and architects and builders can easily identify any compliance issues at an early stage.

The IRC, as a minimum code, has a crucial role to play in curbing excessive waste of water and energy in future years by means of improved design and construction of new homes. An inefficient hot water distribution system is likely to remain in place for the life of the building, leaving owners without access to options that would have only been practical at the time of construction.

Reducing the waste of energy and water is an integral part of the stated purpose of the IRC:

> R101.3 Intent.
>
> The purpose of this code is to establish minimum requirements to safeguard the public safety, health and general welfare through affodability, structural strength, means of egress facilities, stability, sanitation, light and ventilation, energy conservation and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

This proposal, by reducing demands on energy and water systems in new homes, clarly advances the "public safety, health and general welfare" through cost-effective designs and energy conservation. Water-saving building designs reduce unnecessary water use, helping to ensure that water supplies are maintained at safe and reliable levels, protecting human health and firefighting capability as well as environmental resources. Energy- and water-saving designs, such as those meeting the criteria of this proposal, also enhance housing affordability and general welfare through reduced energy, water and sewer bills of building owners and occupants.

Additional Technical Background

A 2009 paper by Robert Hendron of the National Renewable Energy Laboratory and others quantified the waste of hot water in initial draws waiting for water to reach 105ºF. Modeling the plumbing typical of a 3-bedroom, 2-bath, single-story home with a hot water distrubutiuon simulation tool found that an estimated 12% of all hot water used on an annual basis is wasted. When viewed by fixture, the results are as follows:

- Showers -- over 10% wastage.
- Kitchen sinks -- 18% wastage.
- Lavatories -- over 30% wastage.

Purging at these fixtures is responsible for 95% of the estimated total of nearly 3,000 gallons of hot water wastage annually. Of course, many new homes are built with more hot water outlets than this model's base case and with hot water distribution systems that are far less efficient. Nevertheless, this proposal will direct the attention of designers and code officials to the proximity between water heaters and those fixtures that are responsible for the great majority of hot water waste.

Bibliography: Hendron, Robert, et al, "Potential for Energy Savings through Residential Hot Water Distribution System Improvements", Proceedings of the 3rd International Conference on Energy Sustainability, San Francisco, CA July 2009.

Single Family Water Heating Distribution System Improvements, Codes and Standards Enhancement Initiative (CASE), California Utilities Statewide Codes and Standards Team, draft May 2011.

Single Family Water Heating Distribution System Improvements, Codes and Standards Enhancement Initiative (CASE), California Utilities

Statewide Codes and Standards Team, final September 2011.

Cost Impact: Will not increase the cost of construction
This proposal is a design requirement that can be met without increasing the cost of construction. Plans that may be initially out of conformance can most commonly be adjusted with strategies that need not carry a cost penalty, such as repositioning the proposed hot water heater location from an exterior garage wall to an interior garage wall, or by rearranging fixture locations in a bathroom to move hot water outlets closer to the water heater. Such changes typically result in shorter lengths of both cold and hot water piping, thereby reducing costs. The CASE report referenced in the bibliography evaluated the cost-effectiveness of radial distance limits that were significantly more stringent than proposed here, and found them to be cost-effective in all cases. (See final report, pp. 20-21.) The report's estimate even assumed an initial cost of $390 for additional lengths of natural gas piping and water heater vent piping, even though repositioning a water heater from an outer garage wall to an inner garage wall need not increase gas service line length. Cost savings averageing $73 from reduced length of PEX hot water piping were estimated. Natural gas savings of 24 therms per year more than ofset these costs on a life-cycle basis. What's more, no savings were calculated or credited for reduced water and sewer charges over the life of the building, which would further improve the cost-effctiveness of this measure.

RP6-15 : P2802 (New)-OSANN5261

Public Hearing Results

Committee Action: Disapproved

Committee Reason: The distances chosen are arbitrary and dose not take into account the volume of the piping between the water heater and the point of delivery. These requirements might cause multiple water heaters to need to be installed. There are hot water circulation systems available that can be used to reduce the time to obtain hot water and to reduce water waste when waiting for hot water to arrive.

Assembly Action: None

Individual Consideration Agenda

Public Comment 1:

Proponent : **Ed Osann, Natural Resources Defense Council, representing Natural Resources Defense Council (eosann@nrdc.org) requests Approve as Submitted.**

Commenter's Reason: This proposal offers an easy-to-use and easy-to-verify design guide to help prevent excessive waiting time for hot water to arrive at sinks and showers. Compliance is based upon the straight-line distance between a hot water heater and a hot water fixture outlet, a distance easily confirmed at plan check. Distance limits are graduated based on the size of the house. There is no measurement of pipe volume or pipe length required.
(The straight-line distance is referred to in the proposal as "radial distance" because an equidistant limit extending from the hot water heater takes the form of an arc or circle overlaid on a house plan.)

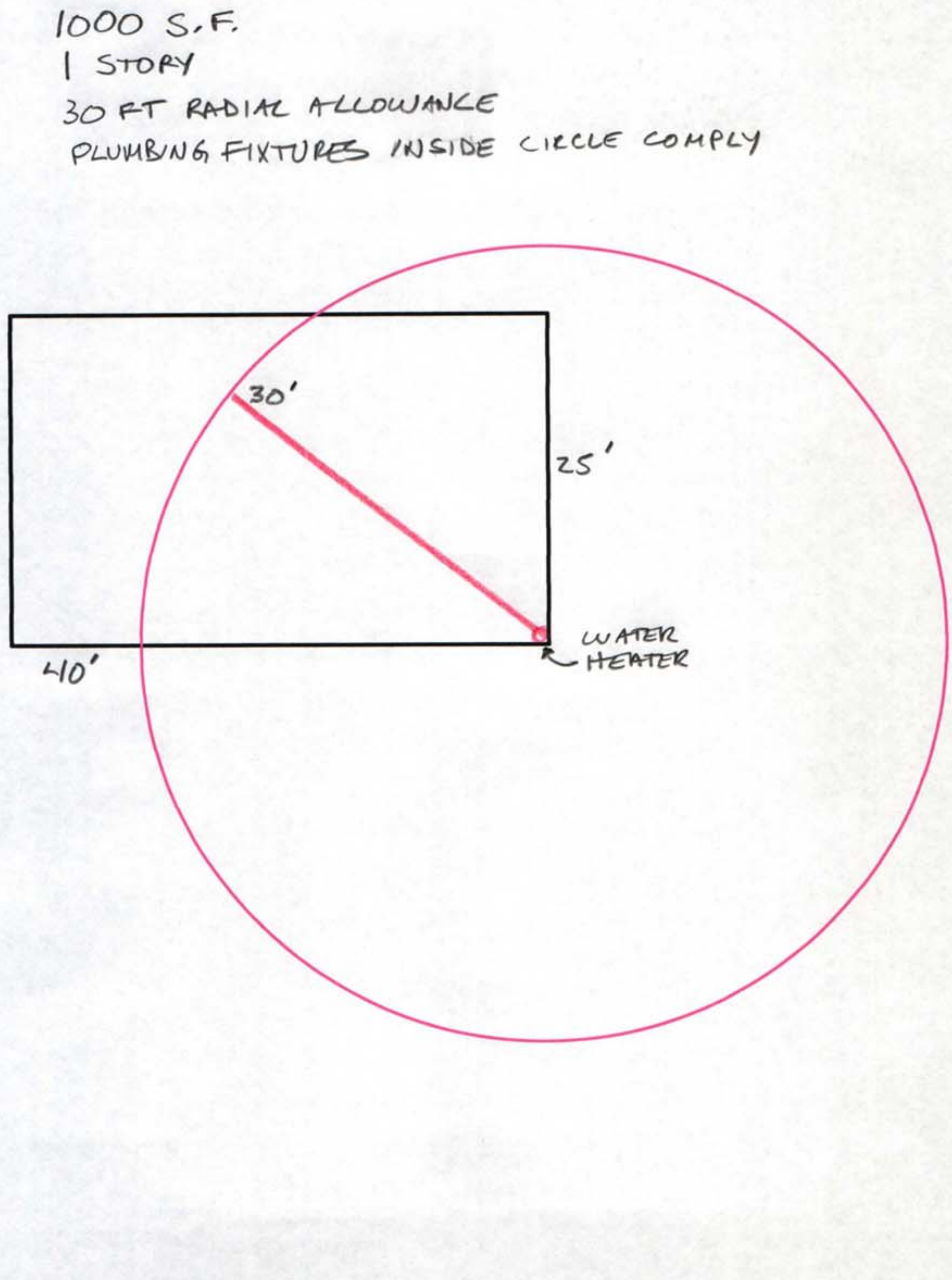
As shown in the accompanying illustrations, the house plans of most production homes will comfortably meet the distance limits in this proposal. The proposal does not seek to optimize all home designs to produce the shortest possible wait times for hot water. Rather, as is appropriate for a base code, the proposal is intended to flag those plans with the most inherently inefficient positioning of the water heater and the fixtures it serves. House plans with long and narrow configurations and plans for very large homes may require some adjustments, most likely the repositioning of either the hot water heater or the furthest fixture outlet. A recirculation loop is another compliance option, as the distance limits do not apply to any fixture connected to a recirculation system.

Long waiting time for hot water is a well-known source of customer complaint. Excessive distances between water heaters and hot water outlets are inherently wasteful of water, energy, and time, but are easily avoided with proper attention to fixture and water heater placement.

Illustrative Examples

The following illustrations offer a demonstration of the simplicity of applying this proposal in practice. **Figure 1** is the most basic schematic of a very small single-story home of 1,000 square feet. As per the values in the proposed table, the straight-line distance allowed between the water heater and the outlet of a hot water fixture is 30 feet. In this example, the water heater is positioned in the corner of this house plan. If all hot water fixtures are within the 30' arc, the plan is compliant. However, if the outlet of a hot water fixture listed in the first paragraph of the proposal is located outside the 30' arc, the plan does not comply.

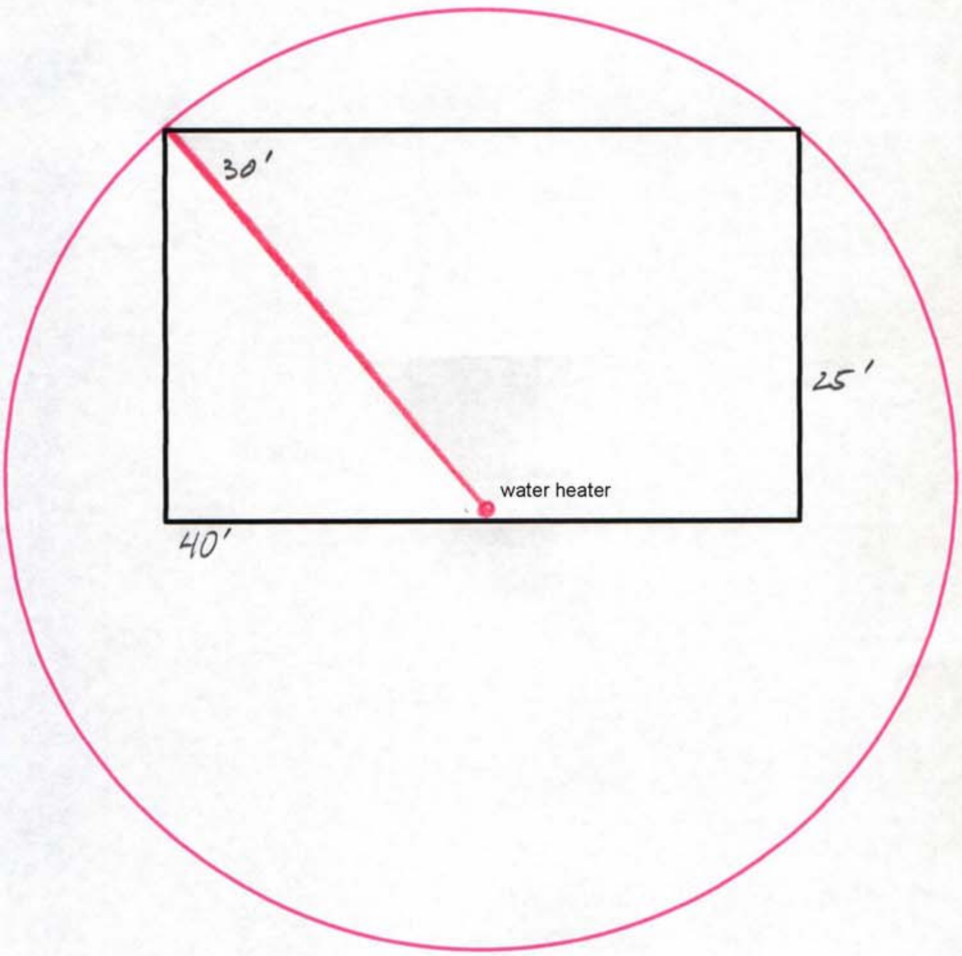
Figure 1.



A second illustration of the same sized small home shows the effect of moving the hot water heater to a more central location. In **Figure 2**, the position of the hot water heater is at a more central point along an exterior wall. This entire home falls within the 30' arc, and the plan would be compliant for all possible locations of the hot water outlets within this home.

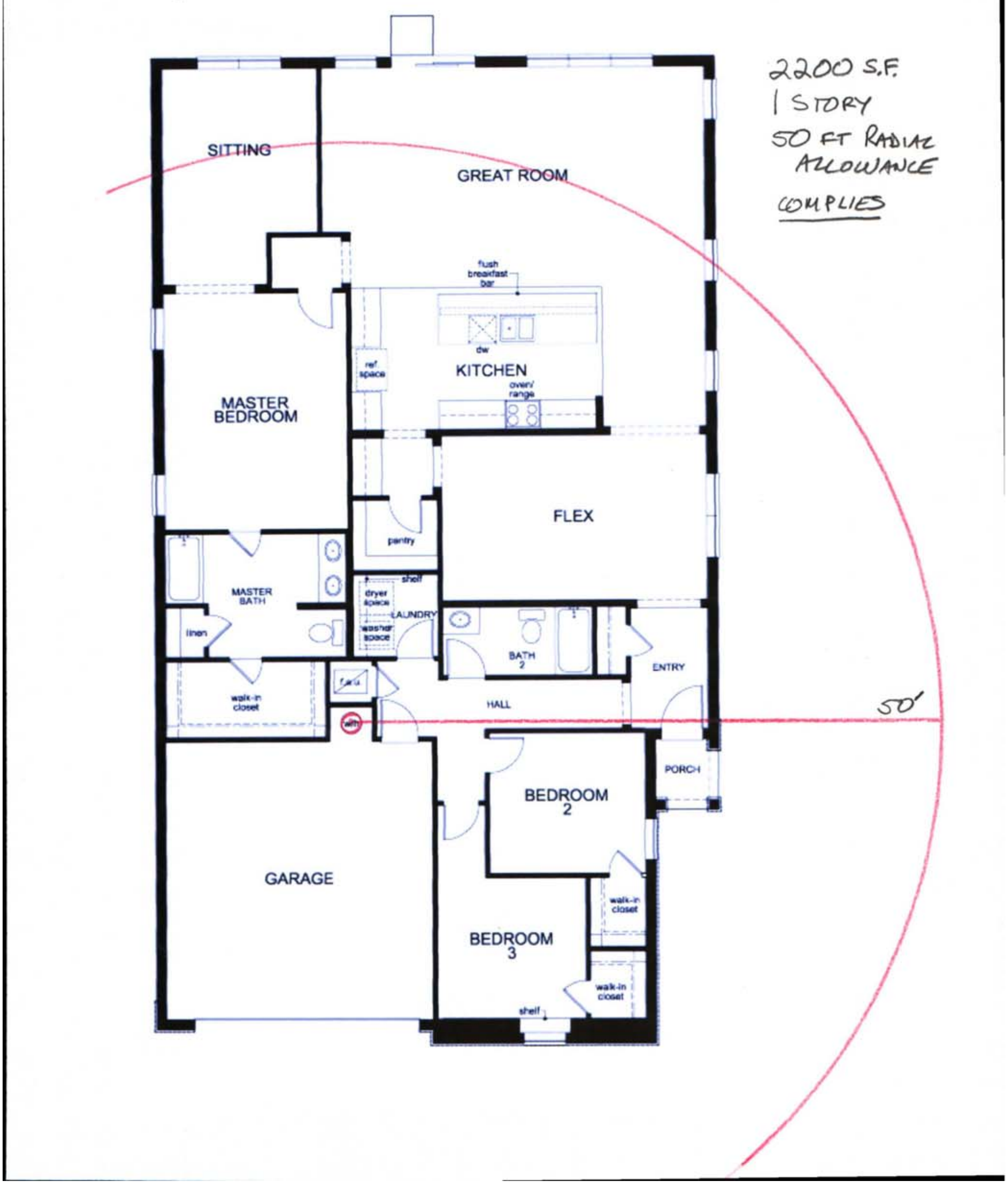
Figure 2.

1000 S.F.
1 STORY
30 FT RADIAL ALLOWANCE
ALL PLUMBING FIXTURES IN DWELLING COMPLY

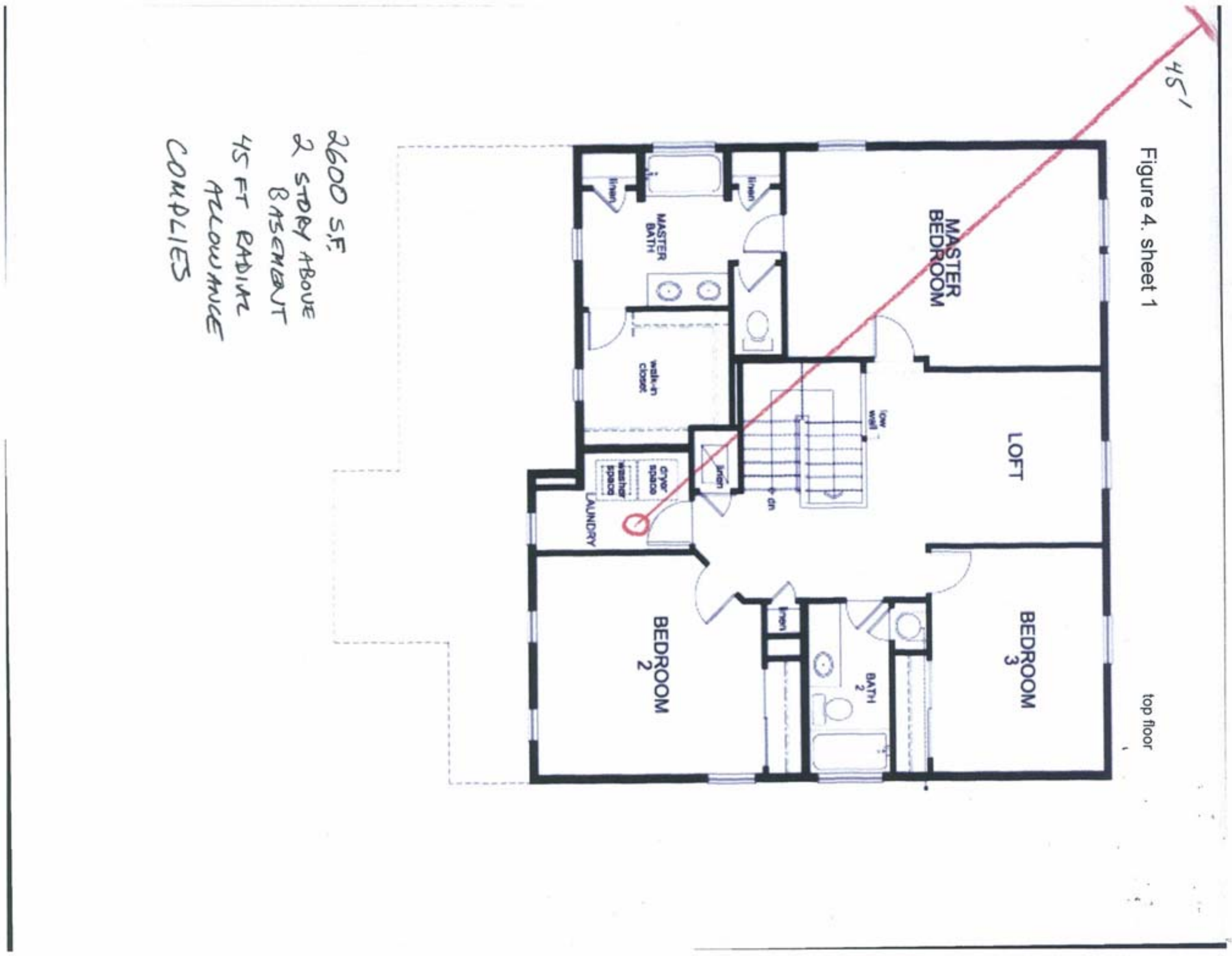


A third illustration shows the plan for a somewhat larger one-story home, with 2,200 square feet. In **Figure 3**, as per the values in the proposed table, the straight-line distance allowed between the water heater and the outlet of a hot water fixture listed in the first paragraph of the proposal is 50 feet. Here, all hot water outlets fall within the 50' arc, so the plan complies. Note, however, that *if* the master bath had been placed in the location of the sitting room, it is possible that one or more hot water outlets would have fallen outside the 50' arc, and such a plan would not comply. But some adjustment of fixture locations within the master bath by the designer would likely have brought the design into compliance.

Figure 3.



A fourth illustration demonstrates the application of the proposal to multi-story homes, in this case, a home of 2,600 square feet and a maximum straight-line distance allowance of 45 feet. In **Figure 4**, the hot water heater is located in the basement, as shown on Figure 4, Sheet 3. Section P2802.2 of the proposal specifies that the location of the hot water heater "shall be translated vertically to each floor on which a fixture served by such water heater is located." In other words, the maximum straight-line distance is applied separately on each floor, measured from a point on each floor that is directly above the location of the hot water heater in the basement. In Figure 4, one can see that the point of measurement on both the first and second floors is the same position in the plane of these floors as the position of the hot water in the plane of the basement. In this example, this relatively compact house design easily complies with the 45' maximum distance for a home of its square footage.



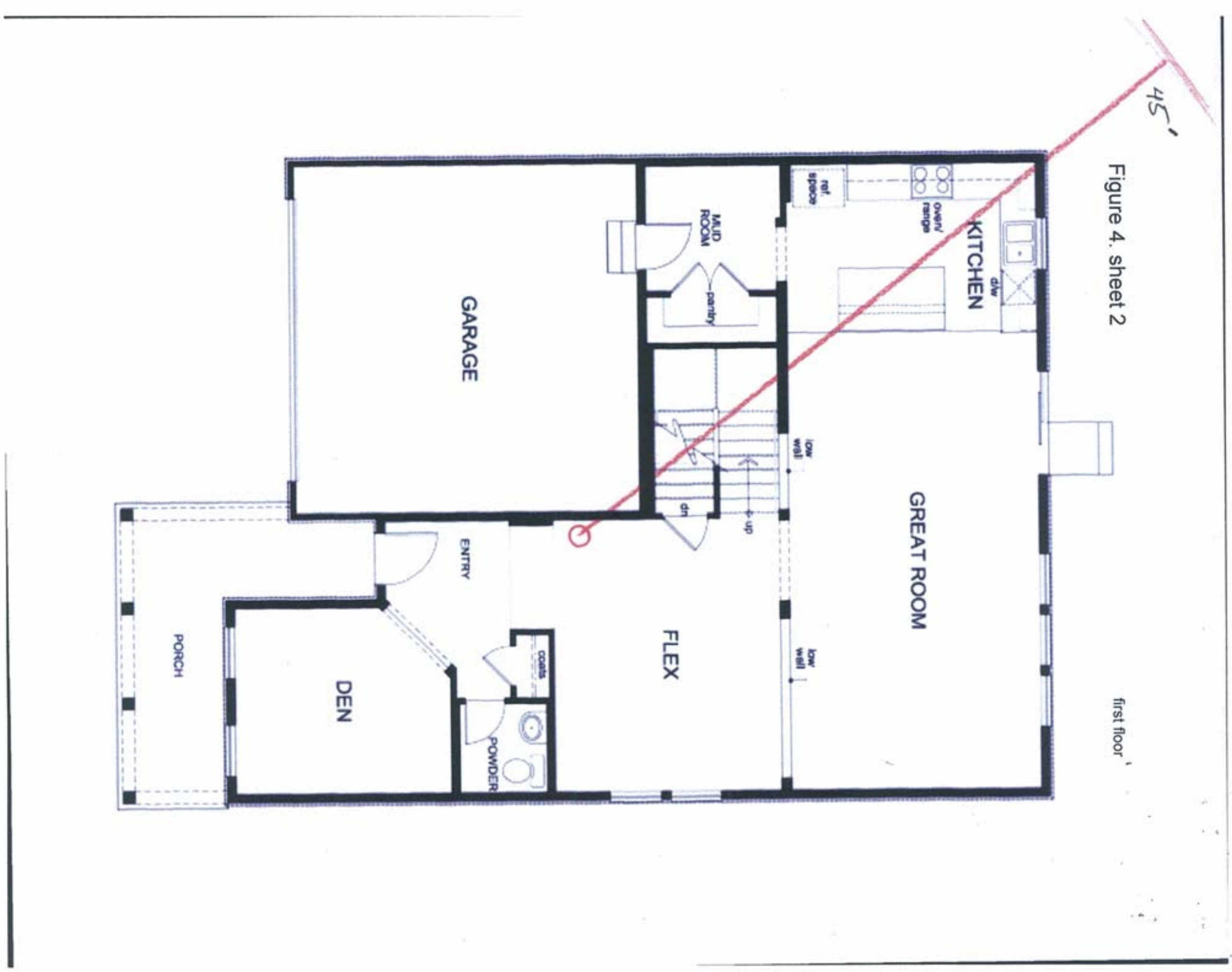


Figure 4. sheet 2

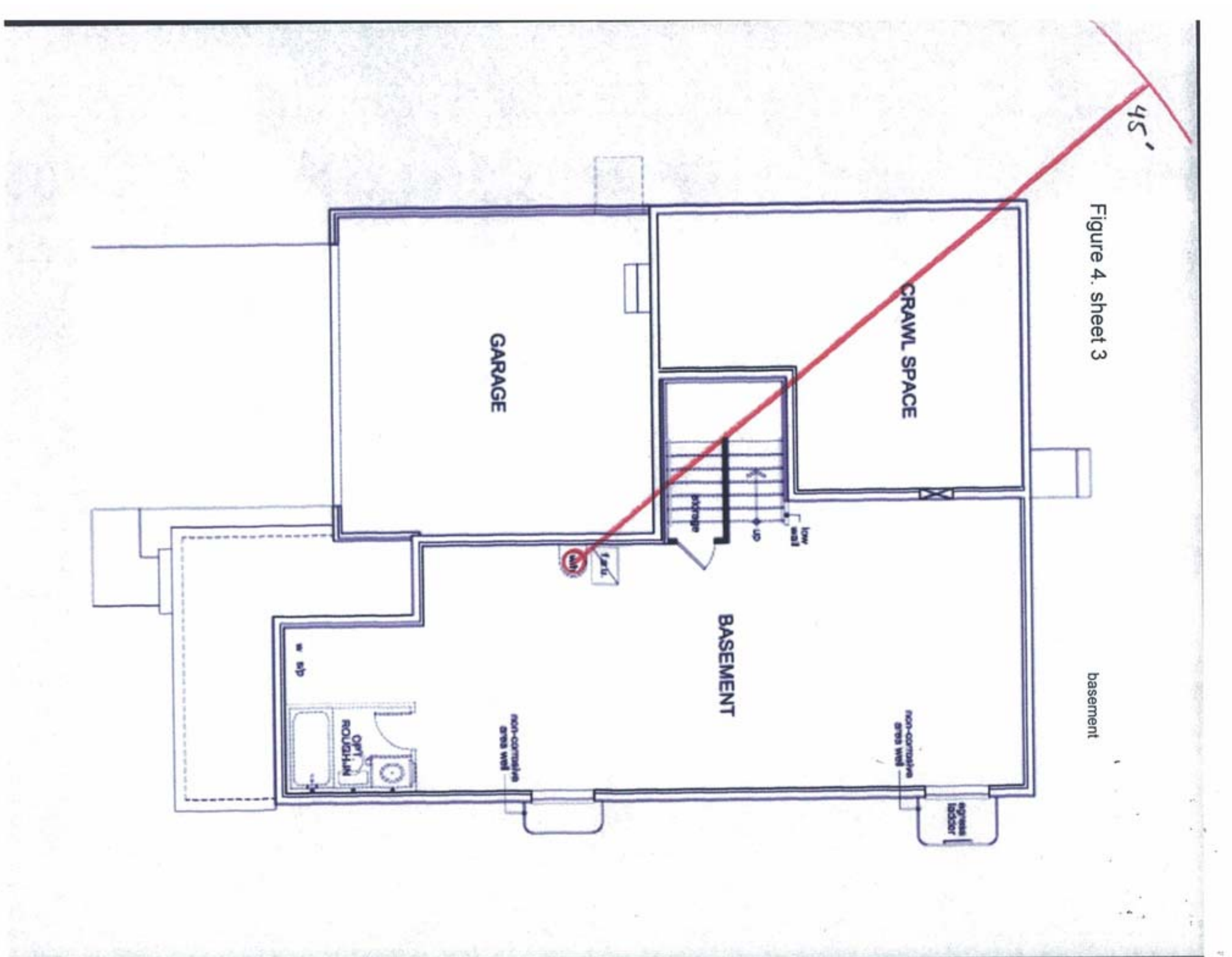


Figure 4. sheet 3

RP6-15

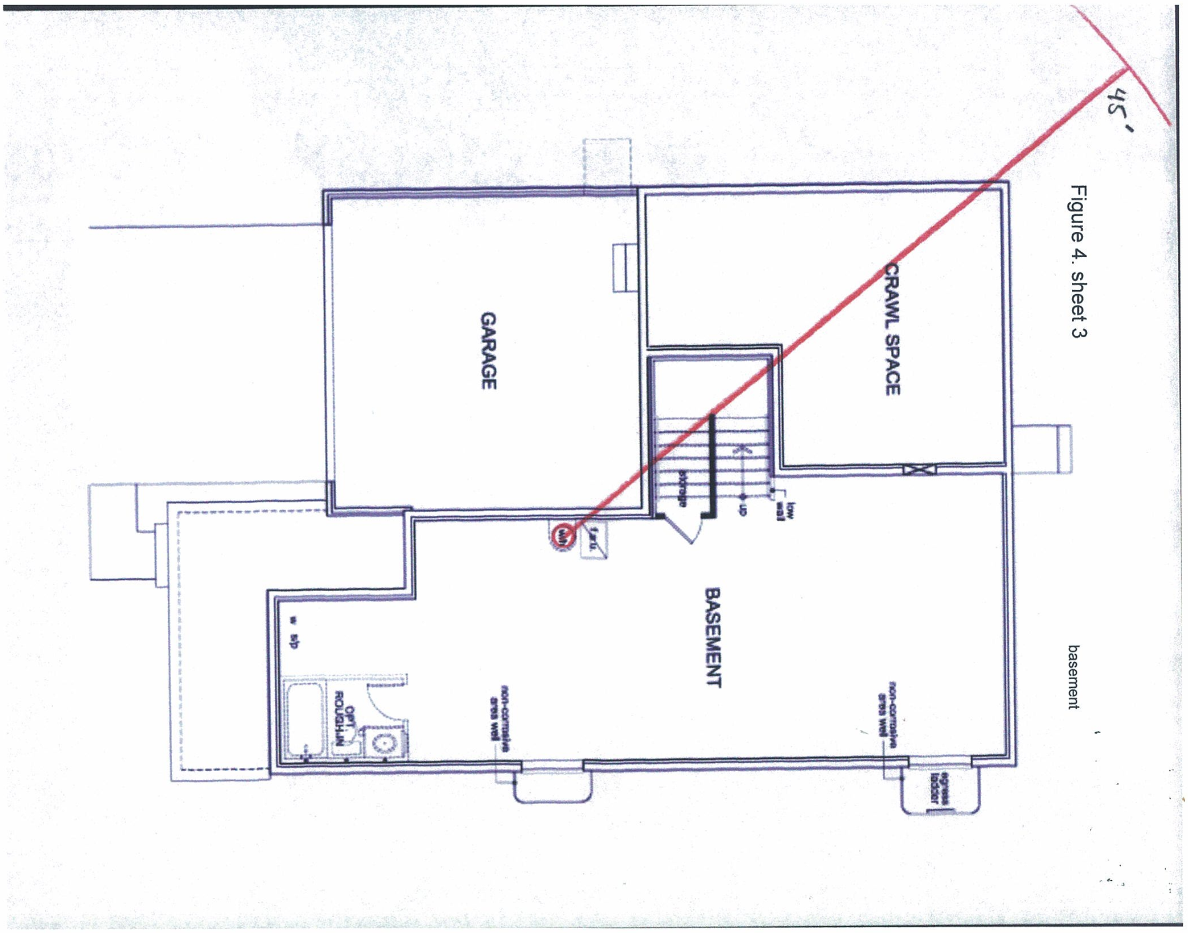


Figure 4. sheet 3
45'
GARAGE
CRAWL SPACE
BASEMENT
basement
storage
up
low wall
non-corrosive area well
OPT. ROUGH-IN
egress ladder

RP6-15

RP19-15

P3201.1, P3201.2, P3201.2.1.1, P3201.2.1.2, P3201.2.1.3, P3201.2.1.4, P3201.3, P3201.5, P3201.6, Chapter 44

Proposed Change as Submitted

Proponent : Ronald George, Plumb-Tech Design & Consulting LLC on belhalf of Hepworth Bldg Prods (A Trading Div. of Wavin UK Holdings) Ltd., representing Hepworth Building Products (A trading Division of Wavin UK Holdings) Ltd./HepVO

2015 International Residential Code

Revise as follows:

P3201.1 Design of traps. Traps shall be of standard design, shall have smooth uniform internal waterways, shall be self-cleaning and shall not have interior partitions except where integral with the fixture. Traps shall be constructed of lead, cast iron, copper or copper alloy or *approved* plastic. Copper or copper alloy traps shall be not less than No. 20 gage (0.8 mm) thickness. Solid connections, slip joints and couplings shall be permitted to be used on the trap inlet, trap outlet, or within the trap seal. Slip joints shall be accessible.

> **Exception:** Sanitary waste valve devices complying with ASME A112.18.8 shall be an alternative to the traps required by this section where such devices are installed in accordance with the manufacturer's instructions.

P3201.2 Trap seals. Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm).

> **Exception:** Sanitary waste valve devices complying with ASME A112.18.8 shall not be required to have a liquid seal.

P3201.2.1.1 Potable water-supplied trap seal primer valve. A potable water-supplied trap seal primer valve shall supply water to the trap. Water-supplied trap seal primer valves shall conform to ASSE 1018. The devices shall be installed in accordance with the manufacturer's instructions. The discharge pipe from the trap seal primer valve shall connect to the trap above the trap seal on the inlet side of the trap.

P3201.2.1.2 Reclaimed or gray-water-supplied trap seal primer valve. A reclaimed or gray-water-supplied trap seal primer valve shall supply water to the trap. Water-supplied trap seal primer valves shall conform to ASSE 1018. The devices shall be installed in accordance with the manufacturer's instructions. The quality of reclaimed or gray water supplied to trap seal primer valves shall be in accordance with the requirements of the manufacturer of the trap seal primer valve. The discharge pipe from the trap seal primer valve shall connect to the trap above the trap seal on the inlet side of the trap.

P3201.2.1.3 Waste-water-supplied trap primer device. A waste-water-supplied trap primer device shall supply water to the trap. Waste-water-supplied trap primer devices shall conform to ASSE 1044. The devices shall be installed in accordance with the manufacturer's instructions. The discharge pipe from the trap seal primer device shall connect to the trap above the trap seal on the inlet side of the trap.

P3201.2.1.4 Barrier-type trap seal protection device. A barrier-type trap seal protection device ~~shall protect the floor drain trap seal from evaporation. Barrier-type floor drain trap seal protection devices~~ shall conform to ASSE 1072. The devices shall be installed in accordance with the manufacturer's instructions.

P3201.3 Trap setting and protection. Traps shall be set level with respect to their water seals and shall be protected from freezing. Trap seals shall be protected from siphonage, aspiration or back pressure by an *approved* system of venting (see Section P3101). The devices shall be installed in accordance with the manufacturer's instructions.

P3201.5 Prohibited trap designs. The following types of traps are prohibited:

1. Bell traps.
2. Separate fixture traps with interior partitions, except those lavatory traps made of plastic, stainless steel or other corrosion-resistant material.
3. "S" traps.
4. Drum traps.
5. Trap designs with moving parts.

Exception: Sanitary waste valve devices complying with ASME A112.18.8 shall be permitted provided that the devices are installed in accordance with the manufacturer's instructions.

P3201.6 Number of fixtures per trap. Each plumbing fixture shall be separately trapped by a water seal trap. The vertical distance from the fixture outlet to the trap weir shall not exceed 24 inches (610 mm) and the horizontal distance shall not exceed 30 inches (762 mm) measured from the center line of the fixture outlet to the centerline of the inlet of the trap. The height of a clothes washer standpipe above a trap shall conform to Section P2706.1.2. Fixtures shall not be double trapped.

Exceptions:

1. Fixtures that have integral traps.
2. A single trap shall be permitted to serve two or three like fixtures limited to kitchen sinks, laundry tubs and lavatories. Such fixtures shall be adjacent to each other and located in the same room with a continuous waste arrangement. The trap shall be installed at the center fixture where three fixtures are installed. Common trapped fixture outlets shall be not more than 30 inches (762 mm) apart.
3. Connection of a laundry tray waste line into a standpipe for the automatic clothes-washer drain shall be permitted in accordance with Section P2706.1.2.1.

4. <u>A water seal trap shall not be required where a sanitary waste valve device complying with ASME A112.18.8 is installed in accordance with the manufacturer's instructions.</u>

Add new standard(s) as follows:

<u>ASME A112.18.8 -2009 (Reaffirmed 2014) In-Line Sanitary Waste Valves for Plumbing Drainage Systems</u>

Reason: This code change proposal is for a new plumbing product that outperforms a p-trap, but it is not a p-trap. A p-trap is based on trapping water in the drain to provide a seal between the interior of a building and the sewer gasses and odors in the public sewer. This product is called an In-Line Sanitary Waste valve. It is designed to prevent sewer odors from the building drain and public sewers from entering the building but it does not "Trap water" it uses a flexible membrane and therefore it needs to be identified separately with an exception. In-line sanitary waste valves perform better than a P-trap. P-traps will often plug when solids are put into the drain, where in-line waste valve easily pass solids. P-traps often crack and leak when exposed to freezing temperatures and P-traps will dry up an allow sewer odors to escape into the building when the fixture has not been used for a period of time. (A couple of weeks) In-line sanitary waste valves perform very well in freezing conditions and they still prevent sewer gasses from entering a building when the fixture has not been used for an extended period. Long periods of non-use is common for many seasonal type hotel, school and state park types of buildings. Sanitary waste valves have been used extensively in many other parts of the world very successfully. (Europe, South Africa, and Asia) (See attached testimonial letters) This proposal is seeking to allow the use of in-line sanitary waste valves that conform to the requirements of the attached standard to be used in lieu of p-traps, but not replace p-traps. These devices cost more than a p-trap, so they will not take over the market. They are intended to only be used on sinks, lavatories, and bathtubs where freezing conditions may exist (in overhangs) or in seasonal buildings like cabins, vacation homes or large hotels where some wings or building may not be used for long periods, They may also be used in State Park facilities, National Park Facilities, seasonal resorts, schools, and stadiums during off-seasons or in buildings where traps can freeze or dry up. This option is currently not available and this code change is intended to give consumers a choice for a better product if they choose to purchase it.

The manufacturer went to the American Society of Mechanical Engineers to develop a Standard for this product. The standard is ASME A112.18.8, the standard was titled: "In-Line Sanitary Waste Valves for Plumbing Drainage Systems". This standard includes a "Scope" that states these devices are intended "for use as an alternate to tubular p-traps" (1-1/4 inch and 1-1/2 inch at sinks, lavatories and bathtubs only) The standard also covers the material and performance requirements for the product. It also states that these devices are not intended for use with water closets and urinals.

The Standard includes Material Requirements for the device to comply with the Seal material requirements in ASTM F409 Standard Specification for Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings. It also addresses the Seal material to comply with or exceed the following material requirements from ASTM D2000: M3BA507, A14, B13, C12 and F17 or M2BG714, B14, EO14, and EO34. The ASTM D2000 standard is an industry standard for rubber and polymer products. The material requirements have been confirmed with a 3rd party laboratory test report. (Attached)

The Standard also has material requirements for the bladder/checking member material to comply with or exceed the following material requirements from ASTM D2000: M3FC607, EA14, EO16 and G11. The bladder/checking member material requirements have been confirmed with a 3rd party laboratory test report. (Attached)

Other material requirements address valve inlet dimensions, valve outlet dimensions and threaded connections.

The Standard includes performance testing requirements which includes the following tests: 1. Waterway Flow test; 2. One-Way Sealing Performance Test; 3. Airway Flow Rate; 4. Recovery from an Excess Back Pressure Test; 5. Leak Tightness Test; 6. Thermal Cycling; 7. Resistance to Household Substances: rice, diced vegetables, resistance to cleaning product, soaps, solids, kiln dried sand, and the lard test from the grease interceptor and trap seal protection device standards; 9. Resistance to Chemicals and Solvents; 10. Drop Test; and 11. Life Cycle Operation Test.

The Standard also has requirements for marking, Identification and installation Instructions.

In-Line sanitary waste valves are an innovative, hygienic, Self Sealing, Waste Valve.

In-Line sanitary waste valves can be installed vertically or horizontally (with an adaptor) and are available in 1-1/4 inch (32mm) and 1-1/2 inch (40mm) sizes.

The Recreational Vehicle industry in North America has embraced this technology because it out performs P-traps in freezing conditions and when there are periods of non-use. Another advantagee over p-traps is it prevents sewage from backing up into bathtubs when there is movement and it could help prevent backflow of sewage.

Bibliography: Link to website for additional information:
http://overseas.wavin.com/overseas/HepVo_waste_valve.html

Cost Impact: Will not increase the cost of construction
There will be no addditional cost associated with this code change, because it is not mandating the use of products meeting this Standard, it is simply listing it as an alternate to a p-trap as an alternate method for a better performing installation. It is not a mandatory code change, If someone chooses to install an in-line Sanitary Waste Valve, Then it must conform to the industry Standard.

Analysis: A review of the standard proposed for inclusion in the code, ASME A112.18.8 -2009 (Reaffirmed 2014), with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2015.

RP19-15 : P3201-GEORGE5005

Public Hearing Results

Committee Action: Approved as Submitted

Committee Reason: The committee agreed with the proponent's reason statement in that this device is a viable option to use.

Assembly Motion: Disapprove
Online Vote Results: Successful
Support: 62.5% (95) Oppose: 37.5% (57)
Assembly Action : Disapproved

Analysis. For staff analysis of the content of ASME A112.18.8-2009 (R2014) with regard to the ICC criteria for referenced standards (Section 3.6 of CP #28), please visit: http://www.iccsafe.org/wp-content/uploads/2015-Proposed-Standards-Group-A-Final.pdf

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Individual Consideration Agenda

Public Comment 1:

Proponent : Ronald George, Plumb-Tech Design and Consulting LLC, representing Hepworth Building Products (A trading Division of Wavin UK Holdings) Ltd./HepVO requests Approve as Submitted.

Commenter's Reason: This proposal was accepted by the Residential Plumbing Code committee because they obviously saw the merit in allowing this device for special conditions in which this device outperforms a P-trap in long periods of non-use and in conditions where occasional freezing may occur. Freezing conditions will cause a P-trap to fail because ice in the trap will expand and crack a P-trap. When the trap cracks, the water leaks out causing water damage and future leaks from water use in fixtures where water flows down the drain and leaks out the P-trap which can lead to mold issues if not discovered quickly. A cracked trap also eliminates the water seal and allows sewer gas to enter the building. In both of these examples a P-trap will allow sewer gas to escape into the building, where an in-line sanitary waste valve that conforms to ASME A112.18.8 with work fine in these extreme conditions. Other advantages of the device are it can prevent sewage backups from emanating from the fixture to a degree. The device will also prevent insects and vermin from entering a fixture through a dried out p-trap.
During the Code hearings, there was opposition testimony that erroneously testified that these devices were intended for urinals. These devices are only manufactured for 1-1/4 inch and 1-1/2 inch tubing Not 2 inch tubing which is the outlet size for urinals. There is language in the Standard stating these devices are not intended for urinals. Finally one opponent stated the packaging calls for use on urinals. There is no such language on the U.S.A. packaging that allows them to be used on urinals. The proponent may have obtained packaging from a European model where they are used on urinals in Europe where they have smaller outlet piping. There is no such language on the U.S.A. packaging.

There was also erroneous testimony that stated this was the same code change was submitted to the IPC and turned down. That is not a true statement, the manufacturer did not submit this to the IPC they only submitted this code change to the IRC. A member of ASME committee (in an attempt to submit all ASME standards that are not currently referenced in the codes) inadvertently submitted a code change to accept the Sanitary Waste Valve Standard (ASME A112.18.8) to the wrong code. They submitted it to the Chapter 14 of the IPC without any accompanying code language in the body of the code and without the necessary exceptions related to the code sections similar to what was done in this residential code change proposal. The manufacturer intended it to be submitted to the IRC.

The Standard was incorrectly submitted to the IPC without the accompanying code language in the body of the code. So the testimony that this same code change was submitted to the IPC and denied is inaccurate. This inaccurate testimony may have swayed some votes in the on-line voting.

This code change proposal is for a new plumbing product that currently does not exist in construction codes in the USA. The device outperforms p-traps in testing with solids flushed down the pipe and when there are long periods of non-use p-traps evaporate, but the sanitary waste valve device continues to protect the building from sewer gas. The sanitary waste valve serves the same function as a trap, but it is not a water seal p-trap. A water seal p-trap is based on a dip in the tubing to catch or trap water in the drain to provide a liquid seal between the interior of a building and the sewer gasses and odors in the public sewer system.

This product is called an "In-Line Sanitary Waste Valve" because it has an elastomeric bladder that seals very efficiently and easily opens to allow liquids and solids to pass. Its primary design application is to work in buildings that may be occasionally subjected to long periods of non-use. It does not rely on a water seal so it can sit for very long periods without water or liquids and it will still prevent sewer odors from entering the building from the public sewers.

P-traps will dry up and allow sewer odors to escape into the building when the fixture has not been used for a period of time. (Most p-traps lose their seal in a couple of weeks) Another function the Sanitary Waste valve performs beter than a P-trap is it prevents freezing and cracking of a water sealed trap. As ice expands in a P-trap and it will expand and crack the trap allowing the water to drain out and cause water damage and the trap loses its seal. It does not "Trap water" it uses a flexible membrane and therefore it needs to be identified separately from a p-trap with an exception. P-traps will often plug when dirt and heavy solids are washed into the sink, lavatory or bathtub drain and they settle in the bottom of the trap. In-line sanitary waste valves easily pass these solids. P-traps often crack and leak when exposed to freezing temperatures and the ice expands and cracks the p-trap. In-line sanitary waste valves perform very well in freezing conditions and they still prevent sewer gasses from entering a building when the fixture has not been used for an extended period. Long periods of non-use is common for many seasonal type hotel, school and state park types of buildings. Sanitary waste valves have been used extensively in many other parts of the world very successfully. (Europe, South Africa, and Asia)

This proposal is seeking to allow the use of in-line sanitary waste valves that conform to the requirements of the attached ASME A112.18.8 Standard to be used as an alternate to p-traps in special conditions where freezing and evaporation are concerns. This proposal is not intended to replace p-traps. These devices cost more than a p-trap, so they will not take over the market. They are intended to only be used on sinks, lavatories, and bathtubs where freezing conditions may exist. One builder said he would like to be able to use these devices in townhomes where the second story has a cantilevered overhang where traps from the fixtures above often freeze and crack. Others have said these devices would be ideal for seasonal buildings like cabins, vacation homes, guest bathrooms, bar sinks, homes that are empty and for sale for long periods or any other building that has long periods of non-use or in any building where traps can freeze or dry up. This option is currently not available in the code and this code change is intended to give consumers a choice for a better product if they choose to purchase it.

The code addresses a few requirements for P-Traps, but there is not standard for P-traps. The manufacturer of the sanitary waste valve device realized that you cannot expect a Sanitary waste valve to fit the description of a trap and there was not standard for a trap to test the device to for equivalency. Because there is no performance standard for a P-trap, the manufacturer had to develop a standaard for this new type of product. The manufacturer went to the American Society of Mechanical Engineers to develop a Standard for th product. The Standard is ASME A112.18.8, the standard was titled: "In-Line Sanitary Waste Valves for Plumbing Drainage Systems". This standard includes a "Scope" that states these devices are intended "for use as an alternate to tubular p-traps" (1-1/4 inch and 1-1/2 inch at sinks, lavatories and bathtubs only) The standard also covers the material and performance requirements for the product. It also states that "these devices are not intended for use with water closets and urinals".

The Standard includes "material requirements" for the device to comply with the seal material requirements in "ASTM F409 Standard Specification for Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings". It also addresses the "Seal material to comply with or exceed the following material requirements from ASTM D2000: M3BA507, A14, B13, C12 and F17 or M2BG714, B14, EO14, and EO34. The ASTM D2000 standard is an industry standard for testing rubber and polymer products. These material requirements have been confirmed with a 3rd party laboratory test report.

Test Requirements

The test requirements in the standard titled "ASME A112.18.8-2014 In-Line Sanitary Waste Valves for Plumbing Drainage Systems" are as follows:

Waterway Flow Rate Test: Flow rates not less than 1-1/4 in.: 9.5 gpm, valve alone on wash basin, bidet, 1-1/2 in.: 13.5 gpm, valve alone on bath, and 1-1/2 in.: 11.1 gpm , valve alone on kitchen sink.

One-Way Sealing Performance of the Valve Test: Apply air pressure to end of the tubing until a pressure of 2 in. (51 mm) of water, gage, is registered on the u-tube manometer. Maintain pressure for 10 sec.

Airway Flow Rate Test: Must flow 1 cfm minimum.

Recovery From an Excess Back Pressure (Inversion) Condition Test: The sink must completely drain after valve bladder is inverted and water flows into the sink.

Leak Tightness Test: The valve must be tested using an internal pressure of 25 psi (172 kPa) for 1 hr.

Thermal Cycling Test: Thermal cycling test procedure for 5 cycles and allow 5 sec of draining time between cycles:
7.9 gpm of water at a temperature of 203°F ± 4°F (95°C ± 2°C) over a period of 15 min at a constant flow rate
7.9 gpm of water at a temperature of 68°F ± 10°F (20°C ± 5°C) over a period of 10 min at a constant flow rate

Cyclic Fatigue Test: The valve shall allow 60 sec for draining between cycles: 1,500 cycles of 60 sec
± 2 sec duration, at a temperature of 200°F ± 4°F followed by 60 sec at a temperature of 59°F ± 10°F, flow rate 7.9 gpm ± 0.1 gpm.

Resistance to Household Substances Test: The material shall be placed on or around the sink outlet. Four pints of water will then be poured onto the item to flush the material from the sink. The system will then be left for 24 hr. Substances tested are uncooked long-grain rice, diced vegetable of size 1/4 in, liquid soaps, kiln-dried sand and lard—95% water, 5% melted lard, each at 150°F.

Resistance to Chemicals and Solvents Test: The material shall be poured into the sink outlet. After one minute, pour 4 pt of cold water into the sink outlet to flush the solvent from the sink. The system will then be left for 24 hr. Solvents were liquid drain cleaner containing sulfuric acid, mineral spirits and kerosene.

Drop Test: The test shall be conducted over a clean concrete surface. Hold the valve with the lowest point upside down, 3 ft above the surface and release the valve, repeat twice, changing the orientation of the valve each time.

Life Cycle Test: The valve under test shall undergo 20,000 cycles. A cycle comprises 10 sec exposure to the solution, followed by 10 sec of draining.

It should be noted there is no standard for a P-trap and P-traps are not subjected to any tests. This proposal is not to eliminate P-traps it is to offer an alternative to P-traps for installations where evaporation or freezing are concerns.

Public Comment 2:

Proponent : Assembly Action requests Disapprove.

Commenter's Reason: This code change proposal is on the agenda for individual consideration because the proposal received a successful assembly action. The assembly action for Disapprove was successful by a vote of 62.5% (95) to 37.5% (57) by eligible members online during the period of May 14 - May 28, 2015.

Public Comment 3:

Proponent : Pennie L Feehan, representing Copper Development Association (penniefeehan@me.com) requests Disapprove.

Commenter's Reason: This proposal removes the use of traps, which would eliminate the requirement for vents. Section P3101.2 requires that any plumbing fixture's trap be protected from pressure differentials by a system of vents and section P3101.2.1 requires that every trap and trapped fixture shall be vented. Remove the trap and you remove the vent requirement. These devices may be allowed now on a case by case basis by the use of Section R104.11 Alternative materials, design and methods.

Public Comment 4:

Proponent : Shawn Strausbaugh, representing VA Plumbing and Mechanical Inspectors Association (VPMIA), VA Building Code Officials Association (VBCOA) (sstrausbaugh@arlingtonva.us) requests Disapprove.

Commenter's Reason: Based upon the outcome of the assembly motion vote for disapproval of this proposed change, 63% in favor of disapproval and 38% against disapproval, and the IPC committees action to disapprove this change it is clear that these mechanical devices in lieu of a water seal trap are not proper way to protect the occupants of a building or structure from sewer gases entering a structure. This type of device appears to violate the provisions prohibited trap design and by placing an exception for such a device does not solve the problem of traps with movable parts or interior partitions.

Basing the use of these devices on previous use in the recreational vehicle industry or comparing these devices to trap seal protection devices in not a fair comparison as trap seal protection devices are a secondary protection method and not a primary protection method for keeping sewer gases from entering a structure or building. The RV plumbing system and the IRC one and two family plumbing systems differ greatly and again this is type of comparison was not substantiated in the original proposal.

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