DESCRIPTION:
917.2 Prohibited location. Cooking appliances designed tested, listed, and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.

Exception:
Listed and labeled commercial cooking appliances may be installed in dwelling units and domestic kitchens when provided with commercial listed range hood exhaust system, makeup air system, and fire protection system designed and accepted by a Georgia licensed Professional Engineer.

REASON/INTENT:
Clarify language to more precisely state the exception and to be compliant with State law and regulations regarding the practice of engineering.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
None.
GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: ____________________ (DCA USE ONLY) PAGE 1 OF 1

CODE: 2012 IRC-1 SECTION: G2447.2

PROPONENT: Stan Everett DATE: 05 December 2014

ADDRESS: 1255 Collier Road NW, Atlanta, GA 30318

TELEPHONE NUMBER: (678)777-4491 FACSIMILE NUMBER: Stan.everett@he

CHECK ONE:

XX Revise section to read as follows:

Add new section to read as follows:

Delete section and substitute the following:

Delete without substitution:

LINE THROUGH MATERIAL TO BE DELETED: UNDERLINE MATERIAL TO BE ADDED

☐ Approve ☐ Approve as amended (DCA STAFF ONLY) ☐ Disapprove ☐ Withdrawn

DESCRIPTION:

Section G2447.2 (632.2) Prohibited location. Cooking appliances designed tested, listed, and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.

Exception:
Listed and labeled commercial cooking appliances may be installed in dwelling units and domestic kitchens when provided with commercial listed range hood exhaust system, makeup air system, and fire protection system designed and accepted by a Georgia licensed Professional Engineer.

REASON/intent:
Clarify language to more precisely state the exception and to be compliant with State law and regulations regarding the practice of engineering.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
None.
DESCRIPTION:
See attached sheet.
Additional supporting material is attached
1. ASME 112.18.8 Standard
3. IAPMO Research and Testing Certificate
4. Long-term Cycling Test
5. Toni Guy Hair Salon Testimonial
6. United Kingdom Home Builder Testimonial
7. Recreational Vehicle Manufacturer Testimonial
8. Soccer City Stadium Testimonial

REASON/INTENT:
The reason for this Amendment is to allow the products conforming to a new consensus plumbing industry standard. These devices can be utilized as an alternate to liquid sealed P-traps for drains 1½ inches and smaller. These devices are a better option in cabins, vacation homes and other buildings that are subject to freezing or evaporation from long periods of non-use. These devices outperform a P-trap.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
There is no additional cost associated with this amendment since it is only intended to be used as an alternative to tubular P-traps.
1002.1 **Fixture traps.** Each plumbing fixture shall be separately trapped by a water-seal trap, except as otherwise permitted by this Code. The trap shall be placed as close as possible to the fixture outlet. The vertical distance from the fixture outlet to the trap weir shall not exceed 24 inches (610 mm). The distance of a clothes washer standpipe above a trap shall conform to Section 802.4. A fixture shall not be double trapped.

**Exceptions:**

1. This section shall not apply to fixtures with integral traps.
2. A combination plumbing fixture is permitted to be installed on one trap, provided that one compartment is not more than 6 inches (152 mm) deeper than the other compartment and the waste outlets are not more than 30 inches (762 mm) apart.
3. A grease interceptor intended to serve as a fixture trap in accordance with the manufacturer’s installation instructions shall be permitted to serve as the trap for a single fixture or a combination sink of not more than three compartments where the vertical distance from the fixture outlet to the inlet of the interceptor does not exceed 30 inches (762 mm) and the developed length of the waste pipe from the most upstream fixture outlet to the inlet of the interceptor does not exceed 60 inches (1524 mm).
4. Where floor drains in multilevel parking structures are required to discharge to a combined building sewer system, the floor drains shall not be required to be individually trapped provided that they are connected to a main trap in accordance with Section 1103.1.
1002.3 Prohibited traps.
The following types of traps are prohibited:

1. Traps that depend on moving parts to maintain the seal.
2. Bell traps.
4. Traps not integral with a fixture and that depend on interior partitions for the seal, except those traps constructed of an approved material that is resistant to corrosion and degradation.
5. "S" traps.
6. Drum traps.

Exception:

1. Drum traps used as solids interceptors and drum traps serving chemical waste systems shall not be prohibited.
2. Devices that comply with ASME A112.18.8-2009 “In-Line Sanitary Waste Valves for Plumbing Drainage Systems” shall be permitted.
1002.4 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), or deeper for special designs relating to accessible fixtures. Where a trap seal is subject to loss by evaporation, the trap seal shall be protected by a trap seal primer or other approved method. A trap seal primer valve shall conform to ASSE 1018 or ASSE 1044.

Exceptions: Devices conforming to ASME A112.18.8

Devices that comply with ASME A112.18.8-2009 “In-Line Sanitary Waste Valves for Plumbing Drainage Systems” shall not be required to have a liquid seal.
The following underlined items are proposed Amendment to the Georgia State Plumbing Codes. Existing Text (Not subject to change):

Amendments to Chapter 14: Referenced Standards of International Plumbing Code
(1) In the International Plumbing Code, Chapter 14, the following referenced standard is added under ASME:

<table>
<thead>
<tr>
<th>Standard Reference Number</th>
<th>Title</th>
<th>Referenced in Code Section Number</th>
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<tbody>
<tr>
<td>A112.19.2-2008/CSA B45.1-08</td>
<td>Ceramic Plumbing Fixtures</td>
<td>420.1 (GA)</td>
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<tr>
<td>A112.19.14-2006</td>
<td>Six-Liter Water Closets Equipped with Dual Flushing Device</td>
<td>420.1 (GA)</td>
</tr>
<tr>
<td>A112.19.19-2006</td>
<td>Vitreous China Nonwater Urinals</td>
<td>419.1 (GA)</td>
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</table>

Please add the following underlined text to Chapter 14:

<table>
<thead>
<tr>
<th>Standard Reference Number</th>
<th>Title</th>
<th>Referenced in Code Section Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASME A112.18.8</td>
<td>In-Line Sanitary Waste Valves for Plumbing Drainage Systems</td>
<td>1002.1</td>
</tr>
</tbody>
</table>
DESCRIPTION:
See attached sheet.
Additional supporting material is attached
1. ASME 112.18.8 Standard
3. IAPMO Research and Testing Certificate
4. Long-term Cycling Test
5. Toni Guy Hair Salon Testimonial
6. United Kingdom Home Builder Testimonial
7. Recreational Vehicle Manufacturer Testimonial
8. Soccer City Stadium Testimonial

REASON/INTENT:
The reason for this Amendment is to allow the products conforming to a new consensus plumbing industry standard. These devices can be utilized as an alternate to liquid sealed P-traps for drains 1 1/2 inches and smaller. These devices are a better option in cabins, vacation homes and other buildings that are subject to freezing or evaporation from long periods of non-use. These devices outperform a P-trap.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
There is no additional cost associated with this amendment since it is only intended to be used as an alternative to tubular P-traps.
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, cast or drawn brass or approved plastic. Tubular brass 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:
Devices that comply with ASME A112.18.8 “In-Line Sanitary Waste Valves for Plumbing Drainage Systems” shall be permitted.
P3201.2 Trap seals and trap seal protection.
Traps shall have a liquid seal not less than 2 inches (51 mm) and not more than 4 inches (102 mm). Traps for floor drains shall be fitted with a trap primer or shall be of the deep seal design. Trap seal primer valves shall connect to the trap at a point above the level of the trap seal.

Exception:
1. Devices that comply with ASME A112.18.98 “In-Line Sanitary Waste Valves for Plumbing Drainage Systems” shall not be required to have a liquid seal.
2. Devices conforming to ASME A112.18.8 shall be used on fixture drains 1 ½ inches in diameter and smaller.
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).

Exception:
Devices that comply with ASME A112.18.8 “In-Line Sanitary Waste Valves for Plumbing Drainage Systems” shall be permitted.
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:
1. Devices that comply with ASME A112.18.8 “In-Line Sanitary Waste Valves for Plumbing Drainage Systems” shall be permitted.
The following underlined items are proposed Amendment to the Utah State Construction and Fire Codes Act which is an Amendment to Chapter 44: Referenced Standards in the Utah Residential Code.

Existing text (Not subject to change):

**Amendments to Chapter 44 of International Residential Code**

<table>
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<td>NonSewered Waste Disposal Systems</td>
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<tr>
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<td>Standard Guide for Use of Joint Sealants</td>
<td>Table R703.4, GA Amendments</td>
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<tr>
<td>ASTM C 1397-09</td>
<td>Standard Practice for Application of Class PB Exterior Insulation and Finish Systems</td>
<td>R703.9.4, GA Amendments</td>
</tr>
<tr>
<td>ASTM C 1535-05</td>
<td>Standard Practice for Application of Exterior Insulation Finish Systems Class PI</td>
<td>R703.9.4, GA Amendments</td>
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</tbody>
</table>

**Please add the following underlined text to Chapter 44:**

<table>
<thead>
<tr>
<th>Standard Reference Number</th>
<th>Title</th>
<th>Referenced in Code Section Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASME A112.18.8</td>
<td>In-Line Sanitary Waste Valves for Plumbing Drainage Systems</td>
<td>P3201.1, P3201.2, P3201.3, P3201.5</td>
</tr>
</tbody>
</table>
In-Line Sanitary Waste Valves for Plumbing Drainage Systems
In-Line Sanitary Waste Valves for Plumbing Drainage Systems

AN AMERICAN NATIONAL STANDARD

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FOREWORD

The initial work on a standard for "Self-Sealing Waterless Waste Valves" was undertaken by a Committee of the International Association of Plumbing and Mechanical Officials (IAPMO). The results of their activity resulted in their Interim Guide Criteria IGC 203-2004, which was used as a benchmark for performance of such devices, which are now known as “Sanitary Waste Valves.” IGC 203-2004 was submitted to the ASME Standards Committee A112, Plumbing Materials and Equipment, for conversion into an American National Standard. A112 Project Team 18.8 was established for the purpose of undertaking this task.

The purpose of this Standard is to establish a generally acceptable standard for sanitary waste valves for installation on tubing. Its purpose is to serve as a guide for producers, distributors, architects, engineers, contractors, installers, inspectors, and users; to promote understanding regarding materials, manufacture, and installation; and to provide for identifying fittings for installation on the valve complying with this Standard.

Sanitary waste valves are intended for use as an alternative to tubular p-traps. Sanitary waste valves provide a waterless barrier between the waste system and the fixture.

Suggestions for improvement of this Standard will be welcomed. They should be sent to The American Society of Mechanical Engineers, Attn: Secretary, A112 Standards Committee, Three Park Avenue, New York, NY 10016-5990.

This Standard was approved by the American National Standards Institute on June 2, 2009.
ASME A112 COMMITTEE
Standardization of Plumbing Materials and Equipment

(The following is the roster of the Committee at the time of approval of this Standard.

STANDARDS COMMITTEE OFFICERS
D. W. Viola, Chair
S. A. Remedios, Vice Chair
C. J. Gomez, Secretary

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R. H. Ackroyd, Rand Engineering
S. R. Aridi, NSF International
J. A. Ballanco, JB Engineering & Code Consulting
J. Bouwer, SFA Sanilfo, Inc.
M. N. Burgess, Burgess Group, Inc.
M. Campos, Alternate, International Association of Plumbing and Mechanical Officials
S. L. Cavanaugh, Consultant
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P. V. DeMarco, International Association of Plumbing and Mechanical Officials
G. S. Duren, Code Compliance, Inc.
R. Emmerson, Consultant
K. Fromme, Contributing Member, Bradley Corp.
L. S. Galowin, Consultant
C. J. Gomez, The American Society of Mechanical Engineers
R. I. Greenwald, Consultant
G. W. Harrison, Corresponding Member, Consultant
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L. A. Mercer, Alternate, Moen, Inc.
J. W. Lauer, Sloan Valve Co.
J. C. Watson, Alternate, Sloan Valve Co.
R. M. Martin, California Energy Commission
T. C. Pitcherello, New Jersey Department of Community Affairs
S. Rawalpindiwala, Kohler Co.
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W. M. Smith, Jay R. Smith Manufacturing Co.
M. Weiss, Alternate, Weiss Research
D. W. Viola, Plumbing Manufacturers Institute
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A112 PROJECT TEAM 18.8 — SANITARY WASTE VALVES

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W. M. Smith, Jay R. Smith Manufacturing Co.
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M. Weiss, Weiss Research

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CORRESPONDENCE WITH THE A112 COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, A112 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

Proposing Revisions. Revisions are made periodically to this Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the edition, the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal including any pertinent documentation. When appropriate, proposals should be submitted using the A112 Project Initiation Request Form.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the standard to which the proposed Case applies.

Interpretations. Upon request, the Committee will render an interpretation of any requirement of their Standards. Interpretations can only be rendered in response to a written request sent to the Secretary of the A112 Standards Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject: Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition: Cite the applicable edition of the Standard for which the interpretation is being requested.
Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The A112 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the A112 Standards Committee.

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IN-LINE SANITARY WASTE VALVES FOR PLUMBING DRAINAGE SYSTEMS

1 GENERAL

1.1 Scope

This Standard establishes minimum requirements for materials in the construction of sanitary waste valves (hereinafter referred to as "the valve") for use as an alternate to tubular p-traps, and prescribes minimum test requirements for the performance of the valve, together with methods of marking and identification. This Standard does not define the requirements for products to be used in urinals or water closets. It is not intended that products meeting this Standard will be used in a urinal or water closet.

The provisions of this Standard are not intended to prevent the use of any alternate material or method of construction provided any such alternate meets the intent of this Standard.

1.2 Units of Measurement

Values are stated in U.S. Customary units and in the International System of Units (SI). The U.S. Customary units shall be considered as the standard.

In this Standard, gallons (U.S. liquid) per minute is abbreviated gpm and liters (metric liquid) per minute is abbreviated L/min.

1.3 References

The following documents form a part of this Standard to the extent specified herein. Unless otherwise specified, the latest edition shall apply.

ANSI/ASSE 1051, Air Admittance Valves for Plumbing Drainage Systems

Publisher: American Society of Sanitary Engineering (ASSE), 901 Canterbury Road, Westlake, OH 44145

ASME A112.18.2/CSA B125.2, Plumbing Waste Fittings

ASME B1.20.1, Pipe Threads, General Purpose (Inch)

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300

ASTM D 2000, Rubber Products for Automotive Applications

ASTM F 409, Thermoplastic Accessible and Replaceable Plastic Tubing and Tubular Fittings

Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959

1.4 Definitions

bladder/checking member: the component of the sanitary waste valve that provides the sealing function.

sanitary waste valve: a product used as an alternate to a water-filled tubular waste trap which provides protection for the property from foul air in the sewer.

2 GENERAL REQUIREMENTS

2.1 Material

The valve shall meet the material requirements of ASTM F 409. The valve shall be installed in accessible locations.

2.2 Seal Material

Seal materials shall comply with or exceed classification M3BA507 A14 B13 C12 F17 or M2BG714 B14 EO14 EO34 of ASTM D 2000.

2.3 Bladder/Checking Member Material

Bladder/checking member material comply with or exceed classification M3FC607 EA14 EO16 G11 of ASTM D 2000.

2.4 Valve Inlet

2.4.1 The valve inlets shall be 1¼ in. (31.8 mm) or 1½ in. (38.1 mm), nominal straight or with an 87½-deg elbow or be standard pipe size straight inlet (see Fig. 1).

2.4.2 The base of the thread may be sealed by a sealing washer (inlet set) at the base of the thread. The useful thread length shall be between ⅜ in. (9.5 mm) and ½ in. (12.7 mm). All threaded fixture outlets shall have a minimum three-thread engagement for fittings and plastic nuts to correctly engage/energize the inlet seal in accordance with ASTM F 409.

2.4.3 If required for horizontal installations, an 87½-deg knuckle adapter shall be available to allow the valve to be connected in a horizontal position. The device and connected piping, when installed in a horizontal position, shall have a minimum slope of 1:48 [i.e., ¼ in./ft (21 mm/m)].
2.4.4 If required, a straight-running adapter shall be available to allow the valve to be connected to pipe rather than the fixture outlet.

2.5 Valve Outlet

The valve outlet shall have a connection that is compatible with tubing manufactured to ASTM F 409 or threaded connections complying with ASME A112.18.2/CSA B125.2.

2.6 Threaded Connections

All threads that connect to external fixtures shall comply with ASME B1.20.1.

3 TESTING

3.1 Waterway Flow Rate

3.1.1 Test Method. Connect the valve to the waste outlet hole of the tank in accordance with Fig. 2 and the manufacturer’s installation instructions. Fill the test tank with water up to the test level. Stabilize the test level by adjusting the water inflow by means of the regulating valve. The flow rate of the valve is indicated by the flow meter, when the test water level is stabilized.

3.1.2 Performance Requirements. The valve shall demonstrate flow rates not less than

(a) 1 1/4 in. (31.8 mm): 9.5 gpm (36 L/min), valve alone on wash basin, bidet
(b) 1 1/2 in. (38.1 mm): 16.5 gpm (62 L/min), valve alone on bath
(c) 1 1/2 in. (38.1 mm): 11.1 gpm (42 L/min), valve alone on kitchen sink

3.2 One-Way Sealing Performance of the Valve

3.2.1 Test Apparatus. The test apparatus is as follows:

(a) length of 1/4 in. (6 mm) bore rubber tubing
(b) tee-junction suitable for use with the rubber tubing
(c) u-tube manometer with a range of 0 in. (0 mm) to 4 in. (102 mm) of water, gage
(d) reducer to enable the rubber tube to be connected to the outlet of the valve
3.2.2 Test Method. Prime the valve by running a gallon of water through the valve to waste. Connect the rubber tubing through the reducer to the outlet of the valve. Connect the other end of the tube to the tee-junction, one leg of which is connected to the u-tube manometer and the remaining leg to another length of tubing. Apply air pressure to the free end of the tubing until a pressure of 2 in. (51 mm) of water gage, is registered on the u-tube manometer. Clamp the end of the tube and maintain pressure for 10 sec.

3.2.3 Performance Requirements. The valve shall retain a seal under a back pressure, equivalent to 2 in. (51 mm) of water gage, for 10 sec.

3.3 Airway Flow Rate

The airway flow rate test shall be performed in accordance with paras. 3.3.2 through 3.3.4 of ANSI/ASSE 1051.

3.4 Recovery From an Excess Back Pressure (Inversion) Condition

3.4.1 Test Method. Fit the valve to be tested to a standard sink and connect the arrangement of pipe work shown in Fig. 3 to the outlet of the valve. Close valve at point B. Slowly open valve C until the bladder inverts and water flows into the sink. Record the pressure at the point of inversion. Close valve C, open valve B. Fit the sink plug and fill with water to level A.

3.4.2 Performance Requirements. When the sink plug is removed, the sink must completely drain. At the completion of the test, the valve shall be tested in accordance with paras. 3.1 and 3.2. Failure to achieve the performance parameters prescribed in paras. 3.1 and 3.2 shall be cause for rejection.
3.5 Leak Tightness

3.5.1 Test Method. The valve must be tested in accordance with the hydrostatic pressure test in ASTM F 409 using an internal pressure of 25 psi (172 kPa) for 1 hr.

3.5.2 Performance Requirements. The valve shall show no evidence of leakage and demonstrate air tightness.

3.6 Thermal Cycling

3.6.1 Test Requirement. The valve shall complete the following thermal cycling test procedure for 5 cycles and allow 5 sec of draining time between cycles:
   (a) 7.9 gpm (30 L/min) 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
   (b) 7.9 gpm (30 L/min) 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

3.6.2 Performance Requirements. At the completion of the above test, the valve shall be tested in accordance with para. 3.2 and meet the requirements of para. 3.2.3.

3.7 Cyclic Fatigue

3.7.1 Test Requirement. The valve shall complete the following cyclic fatigue test procedure allowing 60 sec for draining between cycles: 1,500 cycles of 60 sec ± 2 sec duration, at a temperature of 200°F ± 4°F (93°C ± 2°C) followed by 60 sec at a temperature of 59°F ± 10°F (15°C ± 5°C), flow rate 7.9 gpm ± 0.1 gpm (30 L/min ± 0.5 L/min).

3.7.2 Performance Requirements. At the completion of the above test, the valve shall be tested in accordance with para. 3.2 and meet the requirements of para. 3.2.3.

3.8 Resistance to Household Substances

3.8.1 Test Apparatus. The valve shall be attached to a sink fitted with a standard crosspiece outlet.

3.8.2 Substances to Be Tested. Each test shall be carried out separately using a quantity of 1.5 oz (43 g) or 1.5 fl oz (44 mL) of one of the following materials:
   (a) material 1: food — uncooked long-grain rice
   (b) material 2: food — diced vegetable of size $\frac{1}{4}$ in. $\times \frac{1}{4}$ in. $\times \frac{1}{4}$ in. (6 mm $\times$ 6 mm $\times$ 6 mm)
   (c) material 3: cleaners — liquid soaps
   (d) material 4: solids — kiln-dried sand
   (e) material 5: lard — 95% water, 5% melted lard, each at 150°F (65.6°C)

3.8.3 Test Method. The material shall be placed on or around the sink outlet. Four pints (64 fl oz or 1.9 L) of water will then be poured onto the item to flush the material from the sink. For Materials 1 through 4, cold water shall be used; for Material 5, warm water at 150°F (65.6°C) shall be used. The system will then be left for 24 hr.

3.8.4 Performance Requirements. At the completion of the above test, the valve shall be tested in accordance with para. 3.2 and meet the requirements of para. 3.2.3.

3.9 Resistance to Chemicals and Solvents

3.9.1 Test Requirement. The valve shall be attached to a sink fitted with a standard crosspiece outlet.

3.9.2 Substances to Be Tested. Each test shall be carried out separately using a quantity of $\frac{1}{2}$ pt (12 fl oz or 0.35 L) of one of the following solvents:
   (a) solvent 1: liquid drain cleaner containing sulfuric acid
   (b) solvent 2: mineral spirits
   (c) solvent 3: kerosene

3.9.3 Test Method. The material shall be poured into the sink outlet. After one minute, pour 4 pt (64 fl oz or 1.9 L) of cold water into the sink outlet to flush the solvent from the sink. The system will then be left for 24 hr.

3.9.4 Performance Requirements. At the completion of the above test, the valve shall be tested in accordance with para. 3.2 and meet the requirements of para. 3.2.3.

3.10 Drop

3.10.1 Test Method. The test shall be conducted over a clean concrete surface. Hold the valve with the lowest point upside down, 3 ft (0.91 m) above the surface and release the valve. Pick up the valve and change orientation (top uppermost) and release onto concrete again. Pick up the valve one final time and change orientation (sideways) and release onto concrete. Observe the valve for any changes.

3.10.2 Performance Requirements. The valve shall show no signs of deformation or breakage that may affect its function.

3.11 Life Cycle

3.11.1 Test Requirement. Resistance of the valve to cyclic fatigue under ambient conditions shall be tested using the apparatus shown in Fig. 4.

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

3.11.3 Performance Requirements. At the completion of the above test, the valve shall be tested in accordance with para. 3.2.
4 MARKING, IDENTIFICATION, AND INSTRUCTIONS

4.1 Marking and Identification

The valve shall be permanently and legibly marked with the following:
(a) manufacturer’s name
(b) product name/brand name
(c) nominal size of inlet and outlet
(d) date of manufacture
(e) predominant material

(f) direction of flow indicator
(g) indication of the orientation of the installation of the device

4.2 Instructions

The manufacturer shall provide instructions on packaging or accompanying literature indicating, where appropriate, both of the following:
(a) the orientation of the installation of the device
(b) limitations on the use and type of drain-cleaning chemicals and tools
Hepworth Plumbing Products offers a hygienic self-sealing waste valve that provides an alternative to traditional water seal traps or 'U' bends. It provides simplified installation and greater freedom in room layout.

**Case Study**

**Specification**


**HepvO® Self-sealing Waste Valves**
HepvO® Case Study

Toni & Guy Add Style And Performance To Salon Wash Basins

The Toni & Guy hairdressing salon in Sheffield has become the latest 'convert' to the advanced pipe systems manufactured by Hepworth Plumbing Products, part of Hepworth Building Products which has its headquarters in the city. Innovations from Hepworth, including the HepvO® waste valve, have proved the ideal solution to dealing with the colorants, perming solutions and other chemicals used, whilst avoiding wash basin blockages.

700 Customers A Week

The salon washes, cuts and styles some 700 customers in an average week. With around 40 per cent of UK women using hair colorants, the basin waste systems have to handle not only shampoo and conditioner but a variety of strong and viscous chemicals, some of which have high alkaline or acid contents.

The basins were previously fitted with standard 'U' bends or water seal traps. However, they had to be unblocked every month as hair and treatments accumulated in the traps, hindering the free flow of waste water. By contrast, the HepvO® valve makes use of a special membrane which opens to allow water to flow through it but closes to create an air tight seal when the flow ceases. In the open position it is, in effect, a straight tube which, therefore, assists free passage of waste.

Blockages Eliminated

Fitted neatly under each of the salon's basins, the valves have eliminated blockages, contributing not only to reduced maintenance costs but also to the high standards of hygiene demanded by Toni & Guy.

At the salon, the HepvO® valves are used in conjunction with another Hepworth system - HepFlex® Waste. This flexible pipe system simplifies installation where access is limited or wherever using rigid pipe and bends would be unnecessarily complex.

Says Chris Story, Toni & Guy franchisee in Sheffield: "There are probably few applications which demand so much of the wash basin systems but HepvO® seems to handle the challenge with ease, leaving us to get on with looking after our clients."

Edlington Lane Edlington Doncaster DN12 1BY UK Telephone +44 (0)1709 856300 Fax +44 (0)1709 856301 Email info@hepworthplumbing.co.uk Visit www.hepworthplumbing.co.uk
IAPMO RESEARCH AND TESTING, INC.
5001 East Philadelphia Street, Ontario, California 91761-2816 • (909) 472-4100 Fax (909) 472-4244 • www.iapmo.org

CERTIFICATE OF LISTING

IAPMO Research and Testing, Inc. is a product certification body which tests and inspects samples taken from the supplier's stock or from the market or a combination of both to verify compliance to the requirements of applicable codes and standards. This activity is coupled with periodic surveillance of the supplier's factory and warehouses as well as the assessment of the supplier's Quality Assurance System. This listing is subject to the conditions set forth in the characteristics below and is not to be construed as any recommendation, assurance or guarantee by IAPMO Research and Testing, Inc. of the product acceptance by Authorities Having Jurisdiction.

Effective Date: February 2014

Product: Sanitary Waste Valves

Issued To: Hepworth Building Products (a Trading Division Of Wavin Jk Holdings) Ltd.
Edlington Lane
Edlington, DN SOUTH YORKSHIRE DN12 1BY
United Kingdom

Identification: The product shall be permanently and legibly marked with the following: manufacturer's name, product name (brand), normal size of inlet and outlet, date of manufacture/traceability information, predominant material, direction of flow indicator, and indication of the orientation installation of the device. Product shall also bear the C/IAPMO® triangular certification mark.

Characteristics: Self sealing waterless waste valves to be installed per the manufacturer's installation instructions.

Products listed on this certificate have been tested by an IAPMO R&T recognized laboratory. This recognition has been granted based upon the laboratory's compliance to the applicable requirements of ISO/IEC 17025.

Products are in compliance with the following standard(s):
ASME A112.18.8-2009

David McSherry
Chairman, Product Certification Committee

Runz Chaney
CEO, The IAPMO Group

This listing period is based upon the last date of the month indicated on the Effective Date and Void After Date shown above. Any change in material, manufacturing process, marking or design without having first obtained the approval of the Product Certification Committee, or any evidence of non-compliance with applicable codes and standards or of inferior workmanship, may be deemed sufficient cause for revocation of this listing. Production of or reference to this form for advertising purposes may be made only by specific written permission of IAPMO Research and Testing, Inc.. Any alteration of this certificate could be grounds for revocation of the listing.
Product: Sanitary Waste Valves

Issued To: Hepworth Building Products (a Trading Division Of Wavin Uk Holdings) Ltd.

MODEL(S):

BV1B/U with adapters CV7A/U, CV7B/U, CV11/U
The test rig completes 36 cycles per day and has run for a total of 3533 days. Total complete cycles is **127,188**

A cycle comprises:
- Flushing water of varying durations – This opens the valve
- Negative air of varying pressures – This opens the valve
- Positive air pressure – This tightly closes the valve.

There are 4 valves 2 x 32mm(1 ¼") and 2 x 40mm(1 ½") installed horizontally and vertically. The rig runs 24 hours per day and has periods of high/medium/low/no activity to simulate typical operating conditions in a 3 storey building. It has been running continuously for more than 8 years.

1. **SUBJECT TO FLUSHING WATER**

32mm(1 ¼") Horizontal & Vertical - 15 times per cycle - 1,907,820 openings to date
40mm(1 ½") Horizontal & Vertical - 9 times per cycle - 1,144,692 openings to date

2. **SUBJECT TO AIR PRESSURE ( both + and - )**

**Negative Pressure - Opens Valve**
All Valves - 15 per cycle – 1,907,820 times to date

**Positive Pressure - Closes Valve**
All Valves – 15 per cycle – 1,907,820 times to date

3. **EACH VALVE HAS OPENED IN TOTAL (BY WATER OR AIR)**

32mm(1 ¼") Horizontal & Vertical – 3,815,640 times to date
40mm(1 ½") Horizontal & Vertical – 3,052,512 times to date

HepV O Waste Valve Long-term cycling tests

Status Report – September 5th, 2014
December 15, 2014

The Department of Community Affairs
Codes and Industrialized Buildings Section
60 Executive Park South, NE
Atlanta, Georgia 30329-2231

Board Members,

Hello, my name is Ron George and my company was hired to assist a Dutch company named Wavin Overseas BV with product approvals for a new plumbing product in various states. Wavin is Europe’s largest producer of plastic plumbing products and the product under consideration here has an extensive international track record dating back to 1997.

We are also helping them with product standard consulting and model code approvals in the US. Wavin manufactures the HepvO device that can be used in place of tubular P-traps for sinks, lavatories and bathtubs. Before I was a consultant for Wavin, I assisted in the development of the consensus standard with the American Society of Mechanical Engineers titled: ASME A112.18.8-2009 Sanitary Waste Valves For Plumbing Drainage Systems. The scope of the standard establishes the minimum requirements for the device which is intended to be used as an alternative to tubular P-traps for sinks, lavatories and bathtubs because of problems associated with P-traps. Unlike P-traps these devices are not affected by freezing and evaporation, continuing to provide a reliable seal under all operating conditions. The Standard includes tests for: waterway flow rate, one-way sealing performance of the valve, airway flow rate, and recovery from an excess back pressure (inversion) condition, leak tightness, thermal cycling, cyclic fatigue, resistance to household substances, resistance to chemicals and solvents, drop test, and a life cycle test. This device is not intended for use on traps larger than 1½ inches and not intended for urinals, water closets or floor drains, so their application is limited to tubular traps for sinks, lavatories and bathtubs. These products have been widely used in the RV industry and marine industry throughout the United States for many years. The RV represents a more challenging environment for a trap than a residential installation due to seasonal use and the effect of vehicle motion. The same factor of seasonal use makes it a great application for vacation homes to protect against water freezing in p-traps and p-trap evaporation.

As per your conversation with my assistant, Moriah Fryer, I would like to request that you review the HepvO sanitary waste valve and the included materials add the HepvO valve in preparation for your plumbing board meeting. The IAPMO labs tested this device in accordance with the consensus standard ASME A112.18.8-2009 and they issued a test certificate showing listing to the ASME standard. A copy of the listing certificate is included with this letter along with: the ASME standard, the manufacturer’s product literature and a sample of the product. We are also sending you copies of testimonial letters from a RV manufacturer, a United Kingdom Home Builder, a manager of a Soccer Stadium in South Africa and a hair salon operator. Please feel free to call me or my assistant, Moriah Fryer, if you have any questions.

Attachments included are:

1. ASME A112. 18.8-2009 Standard for Sanitary Waste Valves For Plumbing Drainage Systems
2. IAPMO Listing Test certificate showing listing to the ASME standard
3. The Manufacturer’s Product Literature
4. Toni Guy Hair Salon Case Study
5. United Kingdom Home Builder Testimonial Letter
6. RV Manufacturer’s Testimonial Letter
7. Soccer City Testimonial Letter

Sincerely,

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Plumb-Tech Design & Consulting Services, LLC
P.O. Box 47, Newport, MI 48166
Ph: 734-322-3226, Fax: 734-322-2949
Cell Ph: 734-755-1908 E-mail: Ron@Plumb-techllc.com

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HepvO is a self-sealing valve designed to close the waste connection below a sanitary fixture to prevent the escape of foul sewer air into the dwelling.

HepvO unlike conventional waste traps, does not rely on trapped water to create a seal. Instead, HepvO uses a self-sealing membrane which performs the same function as a water seal trap but without the risk of evaporation, siphonage, or cracking under freezing conditions.

The HepvO Sanitary Waste Valve means enhanced plumbing design and system efficiency, without compromising performance or risking the escape of foul air into the living space from the drain or sewer.

HepvO – Operation

HepvO a Barrier between Living Space and the Drainage System.

Foul sewer gas must be prevented from entering the building. The loss of the water seal in a conventional trap can cause gurgling noises, objectionable smells, allow insect ingress, and has the potential to allow the spread of health hazards (such as SARS).

The HepvO Sanitary Waste Valve opens under the water pressure of a fixture emptying and closes to form a tight seal after the fixture has discharged.
**HepO - Design and Performance**

The **PROBLEM**: Conventional waste traps work by having a water seal to prevent foul odors entering buildings. However, a water trap can fail under a number of conditions. The following diagrams show several problems that result in loss of water seal, gurgling and foul smells.

<table>
<thead>
<tr>
<th>Self Siphonage</th>
<th>Induced Siphonage</th>
<th>Compression</th>
<th>Evaporation</th>
</tr>
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<tbody>
<tr>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
<td><img src="image3.png" alt="Diagram" /></td>
<td><img src="image4.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Self Siphonage</strong>: water flowing down the discharge pipe draws the water from the trap.</td>
<td><strong>Induced Siphonage</strong>: the water seal is drawn out of the trap by water discharging from a fixture downstream (e.g., washing machine).</td>
<td><strong>Compression</strong>: water is pushed out of the trap by a positive pressure caused by discharging of fixtures located above (e.g., WC).</td>
<td><strong>Evaporation</strong>: water in the trap evaporates during periods of non-use (e.g., during vacation or when fixtures are not being used).</td>
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</table>

<table>
<thead>
<tr>
<th>Wind Effect (waving out)</th>
<th>Foaming</th>
<th>Momentum</th>
<th>Capillary Action</th>
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<tr>
<td><img src="image5.png" alt="Diagram" /></td>
<td><img src="image6.png" alt="Diagram" /></td>
<td><img src="image7.png" alt="Diagram" /></td>
<td><img src="image8.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Wind Effect</strong>: air movement across the top of the Soil &amp; Vent Pipe causes reciprocation of water in the trap and potential for loss of seal depth.</td>
<td><strong>Foaming</strong>: agitation of waste water containing detergents in the Soil and Vent pipe creates foaming which pushes water out of the trap.</td>
<td><strong>Momentum</strong>: waste water from a bowl or pail poured directly in to the waste outlet carries water out of the trap due to speed of discharge. This is also common with modern, funnel-shaped basin designs.</td>
<td><strong>Capillary Action</strong>: fibrous material retained in the trap and hanging over the weir draws water out of the trap.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Leakage</th>
<th>Movement</th>
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<tr>
<td><img src="image9.png" alt="Diagram" /></td>
<td><img src="image10.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Leakage</strong>: badly fitting or loose components and/or damaged seals can allow water to leak causing loss of seal depth.</td>
<td><strong>Movement</strong>: In mobile facilities such as RV’s and boats movement can cause potential for loss of water in the trap.</td>
</tr>
</tbody>
</table>

**HepO - The SOLUTION**

When installed in accordance with manufacturer's instructions the unique HepO Sanitary Waste Valve is the solution to all these problems.

HepO provides a constant seal against sewer gas ingress, which is maintained under all normal operating conditions.

HepO Sanitary Waste Valve actively eliminates negative pressure within the waste system by opening and allowing in fresh air until a state of equilibrium with atmosphere is reached.

HepO Sanitary Waste Valve resists blockages, prevents nasty smells, gurgling sounds and stagnant water under all circumstances.
**Hepo - Installation Benefits**

**Hepo** is a new concept in the prevention of foul air escaping into the building while actively eliminating negative pressure in soil and waste installations. It allows the designer greater flexibility on fixture and venting installation without compromising the performance of their sanitary seals.

**System Simplification - Design Freedom and Economic Benefits**

Regulations for waste system design set limits on length and slope of pipes and the number of fixtures which can be connected to a waste pipe in order to keep pressure fluctuations to a minimum. This may be rectified by the incorporation of vent pipes at appropriate design locations.

The incorporation of Hepo provides a good sanitary system offering minimum resistance to flow.

1. Compact design, flexibility of location and ability to actively eliminate negative pressure improves system performance.

2. A typical fixture will drain more quickly when a Hepo is installed compared to a p-trap installation. This helps keep downstream piping cleaner and reduces maintenance requirements.

3. There is no trap to vent distance limitations based on the slope of the pipe and the elevation of the vent connection.

4. Where necessary tight radius bends can be used, without fear of siphonage or compression.

**Sink Cupboard with Hepo Installed horizontally**

**Sink Cupboard with water seal trap**

**Hepo Installation in a typical bathroom**

1 1/8" Hepo within pedestal, mounted vertically

1 1/8" Hepo (with Knuckle Adaptor) mounted horizontally to route pipe back to wall

**Hepo - Installation & Maintenance**

**INSTALLATION**

1. Cut the tube to length, allowing for the full compression socket depth, (preferably using an appropriate tube cutter).

2. If using plastic tube remove any loose material from the inside and the outside of the end of the tube. If using metallic tube remove any burrs or sharp edges from the inside or the outside of the tube and file if necessary. Mark the socket depth on the tube, and check that the tube section to be joined is free of any damage which may affect the joint seal.

3. Unscrew the slip-nut from the Hepo outlet/inlet adaptor and slide the slip-nut, slip washer and rubber seal onto the tube.

4. Insert the tube end fully into the socket.

5. Slide the rubber seal, slip washer and screw slip-nut against the face of the socket, and tighten the slip-nut by hand, (check that the slip-nut is square to the body and does not 'cross-thread'), hand tight should be adequate to form a proper seal.

6. Threaded connections can be made to the inlet or outlet of the Hepo valve. At the outlet it is first necessary to remove the slip-nut and rubber seal. If making connections to threaded components that do not have an integral seal (for example connection to DWV adaptors) PTFE/TEFLON tape should be applied to the thread prior to assembly.

**MAINTENANCE**

If mechanical devices such as spiral cables, rippers or water jetters are required to clear blockages in the waste system, the Hepo valve must be removed first.

It is good practice to rinse the Hepo valve with a little clean water before replacing it in the system.
**HepO Valve Components**

- 1¼" or 1½" in Line or Angled Adapter with slip joint connection.
- 1½" Threaded Connection to Fixture or Adaptors supplied with Kit.
- Prevents the escape of foul sewer air from waste discharge systems.
- Actively maintains a pressure equilibrium in soil and waste installations.
- Prevents waste water back-up into appliance.
- Silent Operation – No Gurgling.
- Eliminates need for water seal.
- Thermostatic no evaporation or run-onage of trap.
- Compact design makes HepO ideal for installation in confined areas.
- UK Patent Nos. 232010 - 2324885 - 2352857
- US Patent No. 7509976
- RV
- UNIDO

**HepO Outlet**

The outlet is provided with a universal slip joint connection which is designed for use with 1½" plastic or metallic tube.

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**Frequently Asked Questions**

1. Is HepO used in addition to a conventional trap?
   - NO, unlike other products which prevent foul odors entering the living space, HepO is used instead of a conventional water-seal trap.

2. Will I still need to install auxiliary venting on waste pipe branches?
   - NO, HepO acts as a highly effective local air admittance device, removing the need for secondary venting.

3. Can I use acidic drain cleaning chemicals?
   - YES, the HepO valve is manufactured from a highly inert material and has passed extensive testing with a very wide range of chemicals including both acid and alkaline products.

4. Do I still need to connect each fixture on its own dedicated waste branch?
   - NO, HepO prevents induced siphonage between adjacent fixture traps so it is now possible to make multiple connections on the same branch. This can save yards of tubing or piping and gives great flexibility for locating fixtures and designing waste systems.

5. HepO is a new product to me - how can I be confident that it will give a good installed performance?
   - HepO is now to the North American market but it is not a new product. It has been in volume production in the UK since 1997 and it is widely used in Europe, Australia and the Far East. It has attained numerous international approvals against very demanding standards and has achieved an enviable track record of trouble-free performance.

6. Will HepO promote better hygiene by stopping the escape of foul sewer air into habitable spaces?
   - YES - The valve has been proven to perform under conditions in which traditional water seal traps are vulnerable to failure. It will continue to perform under back pressures 10 times greater than those experienced in correctly designed soil and waste systems.

7. Does the air tight seal break down if a strand of cloth or hair collects in the strainer and falls down between the faces of the valve?
   - NO - HepO has undergone extensive foreign body testing (ASME A112.16.6). Tests show that the valve will maintain an air tight seal around an obstruction such as hair, fabric strands or spaghetti.

8. What is the life expectancy of HepO?
   - Installed correctly HepO can be expected to have a life expectancy at least equivalent to current water sealed traps. In addition HepO is guaranteed against defects in materials or manufacturing for a period of 3 years.

9. Will HepO block easily for example if fat is discharged through it?
   - NO - Extensive testing has shown that HepO is less prone to blockage than traditional water seal traps. Note: because the 'straight through' design of HepO does not trap debris discharged through the waste fixture care should be taken with jewelry and other valuables.

10. Will the seal be maintained even when the fixture hasn't been used for some time?
    - YES - HepO does not depend on a water seal and so it will continue to maintain a seal whether a fixture never gets used or is used very infrequently.

11. Does the valve make a noise?
    - Under normal conditions HepO operates silently, unlike normal traps that are prone to 'gurgle'

12. Will HepO support microbiological growth?
    - NO - The materials used to manufacture HepO will not support microbiological growth for example mold and mildew.

For further information on HepO and other Hepworth products visit: www.hepworth.co.uk

For all HepO enquiries email: sales@a-s-m.com

---

Hepworth PLASTICS

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Our policy is one of constant development. Whilst this publication is accurate at the date of printing, specification/approvals may be changed in the interest of continuous improvement.

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TOLL FREE HELPLINE
800-241-5236

HepO USA/7/13/3732
Report on HepVo waterless waste valves

HepVo Waste Valves were selected for the wastewater, condensate and urinal installations during the rebuild of the Soccer City Stadium in Johannesburg, South Africa, ahead of the 2010 Soccer World Cup Final and for ongoing usage of the stadium.

The products had to meet the requirements of sporadic usage between match days, high peak demands and product longevity.

HepVo was used on all urinals and basins in the public bathrooms. Due to the nature of the installation, all sanitary fittings are vandal proof with the valves installed in a duct directly behind the fitting allowing for service access but keeping them away from the public. Flushing of the urinals is controlled with a solenoid system during matches to ensure clean facilities but saving water, as there is not excessive flushing by the public. On the basins demand taps are installed to prevent water wastage.

HepVo was used on the sinks and washrooms in the catering areas and suites as the sporadic usage of these facilities meant that a traditional trap would dry out between matches. HepVo was also used on the air con condensate lines in the suites to enable the discharge to be connected into the sewer line without risk of odour ingress from dried out p-traps.

The HepVo valve was selected for all of the listed applications for the following reasons. It cannot dry out between usages. It can cope with large flow rates and will prevent any chance of odours been released into the public and catering areas.
The stadium has now been operational for four years having hosted the soccer world cup final, numerous soccer games, rock concerts and several large rugby internationals. To date we have had no reported problems with the valves and all are still working perfectly.

I have also since then specified them on a shopping centre’s retrofit to prevent odours on a traditional installation and in a hotel where we also used them with a tundish to collect geyser/boilercondensate discharges. Based on my experience I would have no hesitation to recommend the use of HepvO in all waste and condensate applications.

Yours faithfully,

Ivan Goldsmith
HepvO In-Line Sanitary Waste Valve
August 5, 2013

I'm drafting this letter based on over 5 years' experience using the HepvO in-line sanitary waste valve in high volume RV production with industry-leading manufacturers. It has clearly brought multiple values to our industry and enhanced our plumbing systems for our customers.

The first value the HepvO valve brings is the design and quality. The valve itself is made very durable with thick material and appears very much like a device that is constructed to endure the constant movement of the RV while traveling down the road.

The next value is the permanent odor protection the HepvO valve allows the RV owner due to holding tank odor. Commonly, RV's are stored for periods of time which may allow the normal water seal P-trap to evaporate the water, losing its seal, and allowing tank odors into the RV. Often times, even fulltime RV'ers complain of tank odors with water seal P-traps due to the negative pressure that can exist along with sloshing around again pulling water from the traps while traveling down the road and allowing the odors to be very much present. The HepvO valve does not count on a water seal and therefore, does not allow the tank odor back into the RV.

Another value of the HepvO valve is the ability to free up room during installs due to the design as it can be used either vertically or horizontally. Current P-traps due to design take much more room under showers, inside lav cabinets, under the kitchen sink and within general storage areas with plumbing needed to maintain slope for trap arm plumbing. The HepvO allows installs that can allow the piping to be in the very corner of a storage area giving much more space and is very unnoticeable to the consumer when first opening a cabinet door under a sink.

The HepvO valve is very widely used and continues to grow as more and more installs are incorporating the flexibility into their product during design. The HepvO valve meets the required listing approvals for the RV industry from ASME-ANSI, CSA, and NFPA. I have had five years of experience with the HepvO valve and would certainly recommend the use during plumbing installations.

The HepvO valve can also save the consumer money while considering it does not have water and will not need to be anti-freeze protected while in storage during winter months.
With all the advantages the HepvO valve gives to the consumer and design engineers along with meeting all of our performance expectations including the "no odor," during infrequent and/or frequent use, RV motion while in use, and overall drainage abilities, I have no problems or hesitation recommending HepvO in-line sanitary waste valve in all areas of the plumbing system.

The operating conditions of an RV plumbing system can be even more demanding than in residential housing so, I would be equally happy to recommend its use on all regular plumbing installations in the home.

Jeff Christner
Compliance Manager
Ref: SN/Team7795

To Whom it may concern:

On behalf of Redrow Homes plc I am pleased to confirm that we have been using the HepVo Sanitary Waste Valve in our properties for more than seven years and have been happy with the performance of this high quality plumbing fitting. It provides a reliable long term solution and its proven benefits of permanent sewer odour protection and space saving are appreciated by ourselves and our customers. I would have no hesitation in recommending its use in all residential housing waste systems.

Regards,

Roy

Roy Jones
Group Technical Manager
**DESCRIPTION:**

917.2 **Prohibited location.** Cooking appliances designed tested, listed, and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.

**Exception:**

Listed and labeled commercial cooking appliances may be installed in dwelling units and domestic kitchens when provided with commercial listed range hood exhaust system, makeup air system, and fire protection system designed and accepted by a Georgia licensed Professional Engineer.

**REASON/INTENT:**

Clarify language to more precisely state the exception and to be compliant with State law and regulations regarding the practice of engineering.

**FINANCIAL IMPACT OF PROPOSED AMENDMENT:**

None.
DESCRIPTION:

Section IFGC 632.2 **Prohibited location**. Cooking appliances designed tested, listed, and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.

**Exception:**

Listed and labeled commercial cooking appliances may be installed in dwelling units and domestic kitchens when provided with commercial listed range hood exhaust system, makeup air system, and fire protection system designed and accepted by a Georgia licensed Professional Engineer.

REASON/INTENT:

Clarify language to more precisely state the exception and to be compliant with State law and regulations regarding the practice of engineering.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:

None.
GEORGIA DEPARTMENT OF COMMUNITY AFFAIRS

CODE AMENDMENT FORM

ITEM NO: ___________________ (DCA USE ONLY)


SECTION: 210.12 A

PROPOONENT: Home Builders Assn of Georgia, Bettie Sleeth/Stanley Richardson

DATE: 12-15-2014

EMAIL: bsleeth@hbag.org

ADDRESS: 3015 Camp Creek Pkwy, Atlanta, GA 30344

TELEPHONE NUMBER: (678) 468-9900

FAX NUMBER: ( ) -

CHECK ONE:
☐ Revise section to read as follows:
☐ Add new section to read as follows:
☐ Delete section and substitute the following:
☐ Delete without substitution:

LINE THROUGH MATERIAL TO BE DELETED:

UNDERLINE MATERIAL TO BE ADDED:

☐ Approve ☐ Approve as amended (DCA STAFF ONLY) ☐ Disapprove ☐ Withdrawn

DESCRIPTION:

Add an Exception to exclude required AFCI protected outlet behind the refrigerator

Section 210.12 A …supplying outlets or device installed in….. Kitchens….. shall be protected by AFCI by means described in 201.12 (A) (1) through (6),

REASON/INTENT:
Concerned that testing data is not sufficient. No guarantees from manufacturers that nuisance will not occur. Trips may concur with the refrigerator filled with food. This could cause significant loss and costs to consumer. Builder will be blamed and bear the liability.

More testing and guarantees are needed before implementing this requirement.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:

Cost savings to consumer and builder potentially range from $100 - $1000. Liability could range to several thousand dollars if not implemented.
CODE AMENDMENT FORM

ITEM NO: __________________ (DCA USE ONLY)  PAGE _____ OF _____


EMAIL: rtaylor@ryantaylorarchitects.com

ADDRESS: PO Box 724786; Atlanta, GA 31139

TELEPHONE NUMBER: (770)436-9902  FAX NUMBER: ( ) -

CHECK ONE:
☐ Revise section to read as follows:
☐ Add new section to read as follows:
☐ Delete section and substitute the following:
☐ Delete without substitution:

LINE THROUGH MATERIAL TO BE DELETED: UNDERLINE MATERIAL TO BE ADDED

☐ Approve  ☐ Approve as amended  (DCA STAFF ONLY)  ☐ Disapprove  ☐ Withdrawn

DESCRIPTION:

SECTION 401
GENERAL

401.2 Compliance. Projects shall comply with Sections 401, 402.4, 402.5, and 403.1, 403.2.2, 403.2.3, and 403.3 through 403.9 (referred to as the mandatory provisions) and either:

1. Sections 402.1 through 402.3, 403.2.1 and 404.1 (prescriptive); or
2. Section 405 (performance); or
3. Section 406 (HERS Index Compliance Path).

SECTION 406
HERS Index Compliance Path

406.1 Scope. This section establishes criteria for compliance using the Home Energy Rating System (HERS) Index developed by the Residential Energy Services Network (RESNET). Such analysis shall include heating, cooling, and service water heating only.

406.2 Mandatory requirements. Compliance with this section requires that the mandatory provisions identified in Table 406.6.1 be met. Where steel framing members are used, substitute references to Table 402.1.4 in Table 406.6.1 with references to Table 402.2.5.

406.3 HERS Index compliance. Compliance based on simulated energy performance requires that the
HERS Index Score of a *proposed design* is equal to or less than the Georgia Energy Code HERS Index Score Equivalent (as defined in Section 406.7.2) for its *standard reference design*.

**406.4 Software.** Only software listed in RESNET’s “National Registry of Accredited Rating Software Programs” may be used to calculate the HERS Index Scores and demonstrate compliance with the Georgia energy code under the requirements of this section.

**406.5 Documentation.** Documentation of the software used to calculate a HERS Index Score shall include the following:

1. Address or other identification of the *proposed design*;
2. An inspection checklist documenting the building component characteristics of the *proposed design* as listed in Table 406.6.1;
3. Name of individual completing the compliance report; and
4. Name and version of compliance software tool.

**406.6 Home specifications.** The *standard reference design* and *proposed design* shall be configured and analyzed according to the requirements in Table 406.6.1.

**TABLE 406.6.1 SPECIFICATION FOR THE STANDARD REFERENCE DESIGN AND PROPOSED DESIGN**

<table>
<thead>
<tr>
<th>Building Component</th>
<th>Standard Reference Design</th>
<th>Proposed Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls (Stud)</td>
<td>Gross area: same as proposed. Minimum R-Value from Table 402.1.4</td>
<td>As proposed</td>
</tr>
<tr>
<td>Mass Walls</td>
<td>Gross area: same as proposed. Minimum R-Value from Table 402.1.4</td>
<td>As proposed</td>
</tr>
<tr>
<td>Basement Walls</td>
<td>Gross area: same as proposed. Minimum R-Value from Table 402.1.4</td>
<td>As proposed</td>
</tr>
<tr>
<td>Attic Knee Walls</td>
<td>Gross area: same as proposed. Minimum R-Value from Table 402.1.4</td>
<td>As proposed</td>
</tr>
<tr>
<td>Ceilings with Attic Spaces</td>
<td>Gross area: same as proposed. Minimum R-Value from Table 402.1.4</td>
<td>As proposed</td>
</tr>
<tr>
<td>Air-Permeable Roofline Installed Insulation</td>
<td>Gross area: same as proposed. Minimum R-Value from Table 402.1.4</td>
<td>As proposed</td>
</tr>
<tr>
<td>Air-Impermeable Roofline Installed Insulation</td>
<td>Gross area: same as proposed. Minimum R-Value from Table 402.1.4</td>
<td>As proposed</td>
</tr>
<tr>
<td>Floor Over Unheated Space</td>
<td>Gross area: same as proposed. Minimum R-Value from Table 402.1.4</td>
<td>As proposed</td>
</tr>
<tr>
<td>Attics</td>
<td>Type: vented with ventilation opening = 1 sf per 300 sf</td>
<td>As proposed</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
<td>As proposed</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>Foundations</strong></td>
<td>Type: same as proposed, with additional items below met:</td>
<td>As proposed</td>
</tr>
<tr>
<td></td>
<td>1. Crawlspace shall be modeled as vented with net free vent aperture = 1sq. ft. per 150 sq. ft. of crawlspace floor area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. For masonry floor slabs, modeled with 80% of floor area covered by carpet and 20% of floor directly exposed to room air</td>
<td></td>
</tr>
<tr>
<td><strong>Exterior Doors</strong></td>
<td>Area: same as proposed</td>
<td>As proposed</td>
</tr>
<tr>
<td></td>
<td>Orientation: same as proposed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum U-Factor from Table 402.1.1</td>
<td></td>
</tr>
<tr>
<td><strong>Glazing</strong></td>
<td>Total area&lt;sup&gt;2&lt;/sup&gt; =</td>
<td>As proposed, with interior shade coefficient same as HERS Reference Home, as defined by RESNET’s standard&lt;sup&gt;II&lt;/sup&gt;.</td>
</tr>
<tr>
<td></td>
<td>(a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) 15% of the conditioned floor area; where the proposed glazing area is 15% or more of the conditioned floor area.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orientation: equally distributed to the four cardinal compass orientations (N, E, S &amp; W)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U-factor: from Table 402.1.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHGC: from Table 402.1.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interior shade coefficient: Same as HERS Reference Home, as defined by RESNET’s standard&lt;sup&gt;II&lt;/sup&gt;.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>External shading: none</td>
<td></td>
</tr>
<tr>
<td><strong>Skylights</strong></td>
<td>None</td>
<td>As proposed</td>
</tr>
<tr>
<td><strong>Thermally Isolated Sunrooms</strong></td>
<td>None</td>
<td>As proposed</td>
</tr>
<tr>
<td><strong>Air Exchange Rate</strong></td>
<td>Maximum air leakage rate of 7 air changes per hour (ACH&lt;sub&gt;50&lt;/sub&gt;) as required by Section 402.4.2.1.</td>
<td>As proposed, must satisfy testing requirements of Section 402.</td>
</tr>
<tr>
<td><strong>Mechanical Ventilation</strong></td>
<td>None, except where mechanical ventilation is specified in the proposed home, in which case: Annual vent fan energy use (per dwelling unit): kWh/yr = 0.03942 x CFA + 29.565 x (N&lt;sub&gt;m&lt;/sub&gt;+1)</td>
<td>As proposed</td>
</tr>
<tr>
<td>Internal Gains</td>
<td>Internal Gains: Defined by Section 305.5.1.1 of RESNET’s standard and adjusted for internal gains from high-efficiency lighting and appliances listed below, as provided by Section 303.4.1.7. Locations of fluorescent lighting: 80% Refrigerator: 423 kWh per year Dishwasher: 0.66 EF Ceiling fan: 122 CFM per Watt</td>
<td>Same as standard reference design</td>
</tr>
<tr>
<td>Internal Mass</td>
<td>Same as HERS Reference Home, as defined by RESNET’s standard.</td>
<td>Same as standard reference design. Additional mass specifically designed as a thermal storage element for the proposed design shall be excluded.</td>
</tr>
<tr>
<td>Heating Systems</td>
<td>As proposed. Capacity: sized in accordance with requirements of current Georgia building code.</td>
<td>As proposed, must satisfy the sizing, design and testing requirements the current Georgia building code.</td>
</tr>
<tr>
<td>Cooling Systems</td>
<td>As proposed. Capacity: sized in accordance with requirements of current Georgia building code.</td>
<td>As proposed, must satisfy the sizing, design and testing requirements the current Georgia building code.</td>
</tr>
<tr>
<td>Service Water Heating Systems</td>
<td>Use (Gallons per Day): Same as HERS Reference Home, as defined by RESNET’s standard. Tank Temperature: Same as HERS Reference Home, as defined by RESNET’s standard. Fuel Type: As proposed.</td>
<td>As proposed</td>
</tr>
<tr>
<td>Thermal Distribution Systems</td>
<td>As proposed, in accordance with Section 403. Capacity: sized in accordance with requirements of current Georgia building code.</td>
<td>As proposed, must satisfy the sizing, design and testing requirements the current Georgia building code.</td>
</tr>
</tbody>
</table>
Thermostat

| Type: Manual, cooling temperature setpoint = 75°F; heating temperature setpoint = 72°F |

| As proposed, with temperature setpoints the same as HERS Reference Home, with offsets designed by RESNET’s standard, Section 303.5.1.2 |

Lighting Equipment

| A minimum of 50% of the permanently installed lighting fixtures shall contain only high-efficacy lamps or be controlled with an occupancy/vacancy sensor or automated lighting control system as required by Section 404.1. |

| Same as standard reference design |

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**406.7 Size Adjustment Factor.**

**406.7.1 Size adjustment factor calculation.** For all single-family detached homes, townhomes, rowhomes, duplexes, triplexes, and quadplexes, calculate the Size Adjustment Factor (SAF) using the following equation:

\[
SAF = \left[ \frac{CFA \text{ Standard Reference Design}}{CFA \text{ Proposed Design}} \right] 0.25, \text{ not to exceed 1.0}
\]

Where:

\[
CFA \text{ Standard Reference Design} = \text{Conditioned Floor Area of Standard Reference Design, using Table 406.7.1}
\]

\[
CFA \text{ Proposed Design} = \text{Conditioned Floor Area of Proposed Design}
\]

For the purposes of this step, calculate the number of bedrooms and the CFA of the proposed design using RESNET standards with the following exceptions: bedrooms and floor area in basements with at least half of gross surface area of the basement’s exterior walls below grade shall not be counted. If the CFA of the proposed design exceeds the CFA of the standard reference design, then the Performance Path shall be used. Because the SAF cannot exceed 1.0, it only modifies the HERS Index Score for homes with conditioned floor area greater than the standard reference design. For condos and apartments in multi-family buildings the SAF shall always equal 1.0. (CFA is conditioned floor area.)
### 406.7.2 Size Adjustment Factor Calculation.

Calculate the Georgia energy code HERS Index Score equivalent of the Reference Home, rounded to the nearest whole number:

\[
\text{Georgia Energy Code HERS Index Score Equivalent} = \text{Reference Home HERS Index Score} \times \text{SAF}
\]

**REASON/INTENT:**

An “Ad Hoc Energy Code Amendment Group” of interested parties gathered multiple times in 2014 to discuss the possibility of a Georgia energy code compliance path that uses the well-known and widely-accepted HERS Index. The proposed “HERS Index Compliance Path” amendment that resulted from the discussions is intended to determine the current Georgia energy code equivalent HERS Index Score for a proposed house. A home that earns a lower HERS Index Score than the measured equivalent AND complies with the mandatory requirements of Table 402.1.4 in the existing Georgia energy code shall be recognized as satisfying the Georgia energy code. The mandatory requirements in Table 402.1.4 of the existing Georgia energy code were included to keep people from using the HERS Index compliance path to trade elements of the building envelope to zero in exchange for more efficient appliances and other building components measured by the HERS Index.

This proposed amendment offers the following key benefits:

1) **This proposed amendment could save money** by reducing the amount of paperwork for those parties already using the HERS Index to measure building performance, participate in voluntary sustainable building programs and earn energy-efficient mortgages. Parties currently using the HERS Index Score have to complete energy code affidavits, compliance certificates and other building permit paperwork. This amendment would allow the HERS Index Score documentation to satisfy the Georgia energy code requirements so additional paperwork would not be necessary.

2) Even though this proposed amendment creates an additional compliance path, **components of the building envelope cannot be traded to zero** because the requirements of Table 402.1.4 of the 2011 Georgia amendments to the Georgia energy code are included.

3) This proposed amendment **includes a tool to determine the current Georgia energy code equivalent for each house**. For this reason, Georgia’s State Codes Advisory Committee does not need to determine the current Georgia energy code HERS index score equivalent for each climate zone.

4) The 2015 IECC includes provisions for an Energy Rating Index (ERI) – a non-proprietary compliance path that accepts the HERS Index Score as a way to demonstrate compliance with the energy code. **This proposed amendment avoids the confusion of introducing another term** by directly referencing the well-known and widely-accepted HERS Index.

5) The compliance path created by **this proposed amendment can be easily updated to remain current**. The language is written in two parts. The first part outlines the mechanism while the second part contains the minimum requirements from the Georgia energy code. If the Georgia energy code requirements change, only...
values in the second part of this proposed amendment need to be updated.

The intent of this proposed amendment is to offer an additional path to code compliance – it is not intended to be a mandatory path.

The “Mortgage Industry National Home Energy Rating Systems Standards” which describe the Home Energy Rating System (HERS) Index can be found online free of charge:


The “Ad Hoc Energy Code Amendment Group” of interested parties included Mike Barcik, Jim Chapman, Tony Donald, Amy Dzura, David Ellis, Tara Mincey, Stanley Richardson, Robert Ross, Brian Shanks, Bettie Sleeth, Ryan Taylor, Lauren Westmoreland and Tim Williams.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:

This proposed amendment could save money by reducing the amount of paperwork for those parties already using the HERS Index to measure building performance, participate in voluntary sustainable building programs and earn energy-efficient mortgages. Parties currently using the HERS Index Score have to complete energy code affidavits and other building permit paperwork. This amendment would allow the HERS Index Score documentation to satisfy the Georgia energy code requirements so additional paperwork would not be necessary.
2009 IECC – GA Supplements & Amendments

SECTION: 402.4.2.1 & 402.4.2.2

PROPOSED: David Goulding, Ensign Building Solutions and Mike Barcik, Southface

DATE: Dec 15, 2014

EMAIL: David Goulding david@ensignbuildingsolutions.com and Mike Barcik mikeb@southface.org

ADDRESS: Ensign Building Solutions 1479 Ventura Dr. Suite A Cumming, GA 30040 phone 770-205-99891

Southface 241 Pine Street NE Atlanta GA 30318 phone 404-603-3620

TELEPHONE NUMBER: (678) 640-6936 FAX NUMBER: (770) 205-9345

CHECK ONE:

☐ Approve
☐ Approve as amended (DCA STAFF ONLY)
☐ Disapprove
☐ Withdrawn

DESCRIPTION:

Revise 2011 GA Supplements and Amendments to the 2009 IECC section 402.4.2.1 as follows:

**402.4.2.1 Testing required.** Building envelope tightness and insulation installation shall be considered acceptable when tested air leakage is less than seven five air changes per hour (ACH50) when tested with a blower door at a pressure of 50 Pascals…(remaining section left unchanged).

After a proposed delay of one year, delete 2011 GA Supplements and Amendments to the 2009 IECC section 402.4.2.2 as follows:

**Exception:** Building envelope tightness and insulation installation shall be considered acceptable when the items listed in Table 402.4.2 applicable to the method of construction, are field verified, for all dwelling units, by a third party ICC Certified Residential Energy Inspector/Plans Examiner or equivalent qualifications as approved by the code official.

REASON/INTENT:

Air sealing is both required to be performed and required to be proven in the 2009 IECC with 2011 GA Supplements & Amendments. Sealing is required by a prescribed list of 12 items as per section 402.4.1 of the 2009 IECC and further reinforced by the 2011 GA Supplements & Amendments Appendix A, “Air Sealing Key Points”. In addition, to “prove” air sealing was properly completed, the visual inspection option was deleted and the requirement for blower door testing to a tightness of <7 ACH50 was mandated.

Air tightness of <3 ACH50 is generally accepted as the target that achieves significant energy savings while still being attainable by standard practice. Generally, to go significantly tighter than <3 ACH50 becomes cost
prohibitive while the savings generated hits a point of diminished return. For this reason, the 2012 and 2015 IECC codes target <3 ACH50 for the majority of the country and <5 ACH50 for CZ 1&2.

In January 2014, Georgia adopted the 2012 IRC but did not include the energy provisions of this code (which are identical to the 2012 IECC). This has created an unfortunate mixed message for builders due to a provision in section R303.4 which states “Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c. (50 Pa) in accordance with Section N1102.4.1.2, the dwelling unit shall be provided with house-house mechanical ventilation in accordance with Section M1507.3.”

The mixed and confusing message being sent to builders is that the building must be “somewhat tight” in order to pass the energy code’s <7 ACH50 threshold but if it is “too tight”, they will be retroactively forced to install a whole-house mechanical ventilation system. This places builders in an undesirable limbo that, in essence, encourages them to not comply with the energy code’s mandatory air sealing provisions so that they won’t be forced to comply with the IRC’s mandatory whole-house ventilation requirements for houses <5 ACH50.

Because it is clear that future energy codes (e.g., 2012 and 2015) are pushing towards tighter ACH50 thresholds, amending the current GA energy code from <7 ACH50 to <5 ACH50 statewide will accomplish several desirable outcomes. First, it will remove the ambiguity and unintended mixed message resulting from the two out of synch codes in terms of desired tightness. Second, it will provide clear direction that tight envelopes with intentional whole-house mechanical ventilation are the required standard for homes built in Georgia. Third, it will help segue the housing industry into future codes where tightness beyond <5 ACH50 will one day be required.

Multi-family units in Georgia currently have an option to sample blower door test or to perform detailed visual inspections. By eliminating the visual inspection option and requiring blower door testing for multi-family, these types of dwellings will now align with single family and these units will also require whole house ventilation as per similar <5ACH50 tightness language in the IMC section 401.2.

With the exception of projects participating in a beyond-code program, the multi-family industry has potentially not been performing blower door testing. Therefore, a one-year delay for deletion of the visual inspection exception is appropriate to ease the transition into envelope leakage testing for this sector.

FINANCIAL IMPACT OF PROPOSED AMENDMENT:
Air sealing:
There are no additional financial impacts associated with meeting the air sealing requirements. Air sealing as per the current 2009 IECC with 2011 GA Supplements and amendments is already required and, if followed correctly, will result in house air leakage < 5 ACH50 without any additional cost. See Addendum 1.

Envelope Testing:
There is no financial impact to require testing < 5 ACH50. The requirement for blower door testing is already mandated for single family homes in Georgia.

Currently, low-rise (3 stories and under) multi-family dwelling units are offered the option of either visually inspecting each dwelling unit (multiple times) during construction or sample testing 1 unit in 4 per floor with a blower door test. If the sampled unit passes, the (up to 3) remaining units in the sample are deemed to pass. Likewise, if the unit fails, the (up to 3) remaining units must be tested individually and the original non-compliant unit must be corrected and retested.

Assuming compliance with the air sealing provisions of the code, the sampling blower door option will likely cost less than the multi-family visual inspection option. As an example, a common multifamily structure is a “twelve-plex” wherein an individual 3-story multi-family building contains four units per floor. Because it is impossible to perform a complete visual inspection at any one point in time, a minimum of 24 visual inspections would be required at multiple times during construction. As an alternative, the three blower door tests required for the entire building at final would likely be much less expensive.

Ventilation System:
Airtightness of <5 ACH50 activates the 2012 IRC requirement for whole-house mechanical ventilation. Nationally, the cost of a whole-house mechanical ventilation ranges greatly depending on the type of ventilation system installed and the capability of the system. Ventilation systems fall into three main strategies: negative pressure, positive pressure and balanced systems.

Generally, negative pressure exhaust only systems are the least expensive to install and lowest cost to operate. A simple ENERGY STAR bath fan that is quiet and efficient and is set to run continuously can technically satisfy this requirement. But, while this system is cheap to install and operate, there are drawbacks that make it less desirable, mainly that the house air being exhausted requires outside air to enter from unknown, unfiltered locations and the concern that continuous negative pressure all the time in a humid, southern climate could lead to moisture problems. This strategy could add as little as zero to $50 to the cost of the home, depending on the type of bath fan the builder originally specified.

Positive pressure systems typically involve an Outside Air (OA) duct that is connected to the return side of an air handling unit; this is a commonly installed technique for light commercial projects. Besides the additional duct (usually 4-6” diameter), the components include an intake, balancing and motorized dampers and ventilation controller, and possibly a filter. The simple balancing damper can adjust the amount of OA while the controller and motorized damper assure regular controlled operation and prevent the system from over ventilating during extreme temperatures and under ventilating during mild weather. Positive pressure ventilation provides regular introduction of outside air from a known location that is filtered and conditioned, mixed with house air, and distributed throughout the home. At time of HVAC rough-in, this system can be installed for as little as $300.

Balanced systems appropriate for the southeastern climate are Energy Recovery Ventilators (ERV’s). Designed to operate independently from the home’s HVAC system, ERV’s usually feature a box containing a fan and heat exchanger with four ducts that connect to and from the house and to and from the outside. ERV’s pre-condition the fresh, outside air with the energy of the stale air pulled from the house. Simple ERV’s can cost as little as $300 (estimated at ~$6-700 installed) to thousands of dollars installed for high-end larger units. An internet search yielded ERV’s that could satisfy a 3,000 s.f. home for under $500.
Addendum 1


Company data provided / geographic region / housing type / code vs. beyond code

Company A tested envelope and/or ductwork for over 1,200 single-family homes in the greater metro Atlanta area in 2012 (Climate Zones 3A and 4A). Data was made available for 944 homes of which 595 were for minimum code compliance while 349 participated in a beyond code program (EarthCraft or other).

Company B focused mainly on leakage testing measurements for multifamily developments in the southern and eastern parts of the state (Climate zones 2A and 3A). Data was provided for 77 units in three different multifamily developments in three different cities. The buildings were all certified under a beyond code program (EarthCraft) and dwelling unit floor areas ranged from 774 square feet to 1320 square feet.

Company C provided testing data for 22 single family homes in the southern portion of the state (Climate Zone 2A), with 19 of these homes tested for minimum code compliance and three for ENERGY STAR v2.5.

Company D provided data for 55 single family homes in some of the northernmost counties of the state (Climate Zone 4A). All homes were tested only for simple code compliance.

Envelope Testing Results

Company A released data for 936 homes that were blower door tested (587 minimum code and 349 beyond code). The average building envelope leakage for code compliant homes was 4.42 $\text{ACH}_{50}$ while the average for homes in beyond code programs was 3.41 $\text{ACH}_{50}$.

Company B showed that for 77 units in three different multifamily developments in three different cities under a beyond code program (EarthCraft), the overall average $\text{ACH}_{50}$ was 4.26. The data shows that, in spite of an $\text{ACH}_{50}$ bias that favors large volume homes and works against small volume homes, multifamily units can still successfully pass leakage criteria, particularly when participating in a beyond code program.

Company C provided blower door results for twenty homes with an average $\text{ACH}_{50}$ of 3.76. Seventeen of the homes featured spray foam rooflines and easily passed the blower door test on the first attempt. The three remaining homes were conventional vented attic-style construction; two of these required retesting after not passing their initial envelope tightness test.

Company D provided simple code compliance data for 55 single family homes in north Georgia (Climate Zone 4A). Of the 45 homes that passed, the average blower door test score was 4.7 $\text{ACH}_{50}$. For the 10 homes that did not pass the blower door test, the results ranged from 7.5 to 12 $\text{ACH}_{50}$. Only two homes chose to retest since the county code officials chose to grant the Certificate of Occupancy without enforcing energy code performance requirements.