

Group 2 International Mechanical Code Change Proposals – 2019 (with IRC Mechanical included)

Date Received	Proponent	Code	Section	Subject	Log Number
4/15/2019	Eric Vander Mey	IMC	202	Relief air	19-IMC20
4/15/2019	Eric Vander Mey	IMC	202	Replacement air	19-IMC21
4/10/2019	Mike Moore/Broan	IMC	Ch. 4	Ventilation simplification	19-IMC14
4/10/2019	Mike Moore/Broan	IMC	401.4/501.3.1	Air intake/exhaust outlets	19-IMC06
4/15/2019	Eric Vander Mey	IMC	401.4	Intake openings	19-IMC22
4/15/2019	Eric Vander Mey	IMC	403.1.1.1	Outdoor air distribution	19-IMC25
4/5/2019	Bellevue/Valerie Graber	IMC	T 403.3.1.1	Kitchenettes	19-IMC15
4/15/2019	Eric Vander Mey	IMC	T 403.3.1.1	Kitchenettes	19-IMC24
4/6/2019	Robby Oylear	IMC	403.1.1.2.3	Multi-zone recirc systems	19-IMC04
4/6/2019	Robby Oylear	IMC	403.2.1	Recirculation of air	19-IMC05
4/15/2019	Eric Vander Mey	IMC	403.2.1	Recirculation of air	19-IMC23
4/15/2019	Eric Vander Mey	IMC	403.3	Airflow rates	19-IMC26
4/10/2019	Mike Moore/Broan	IMC	403.3	Ventilation rate test	19-IMC12
4/15/2019	Eric Vander Mey	IMC	403.8	Whole house ventilation	19-IMC27
4/15/2019	Commerce/Chuck Murray	IMC	403.8	Whole house ventilation	19-IMC32
4/15/2019	Mike Moore/Broan	IMC	403.8.2	Control & operation	19-IMC19
4/10/2019	Mike Moore/Broan	IMC	501.3	Exhaust discharge	19-IMC13
4/15/2019	Eric Vander Mey	IMC	501.3.1	Exhaust outlet	19-IMC28
4/15/2019	Eric Vander Mey	IMC	501.4	Pressure equalization	19-IMC29
4/15/2019	Eric Vander Mey	IMC	506.3.2.4	Vibration Isolation	19-IMC33
4/15/2019	Eric Vander Mey	IMC	510	Waste chute vent	19-IMC30
4/15/2019	Eric Vander Mey	IMC	601.2	Air movement in corridors	19-IMC34
4/15/2019	Eric Vander Mey	IMC	605.1	Air filters	19-IMC31
2/19/2019	City of Cheney/Shane Nilles	IMC	1209.5	Snow melt systems	19-IMC03
5/18/2018	WABO/Lee Kranz	IMC	1402.8.1.2	Rooftop solar collectors	19-IMC01
5/22/2018	WABO/James Tumelson	IMC	1402.8.1.2	Rooftop solar collectors	19-IMC02

Date Received	Proponent	Code	Section	Subject	Log Number
4/10/2019	Mike Moore/Broan	IRC/M	M1501.1/M1505.4.3	Mech ventilation rate	19-IMC09
4/10/2019	Mike Moore/Broan	IRC/M	M1503.3	Exhaust discharge	19-IMC08
4/10/2019	Mike Moore/Broan	IRC/M	M1504.3	Exhaust openings	19-IMC07
4/10/2019	Mike Moore/Broan	IRC/M	M1507.3.2	Control & operation	19-IMC10
4/10/2019	Mike Moore/Broan	IRC/M	M1507.3.3.1	Ventilation rate test	19-IMC11
4/5/2019	Jonathan Sargeant/Omegaflex	IRC/IFGC	Reference Stds.	Updated standard	19-IMC16
4/15/2019	Chemours/Andrew Klein	IRC-M/IMC/ IFC	Reference Stds.	Updated standard	19-IMC17
4/15/2019	ASHRAE/Stephanie Reiniche	IRC-M/IMC/ IFC	Reference Stds.	Updated standard	19-IMC18



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC20

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): Chapter 2: Definitions

Title: General Definitions

2. Proponent Name (Specific local government, organization or individual):

Proponent: Eric Vander Mey, PE

Title: Engineer

Date: 2019-04-15

3. Designated Contact Person:

Name: Eric Vander Mey, PE

Title: Engineer

Office Phone: (206) 285-7114

Cell: (206) 321-1677

E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC **Section(s)** Section 202

Amend section to read as follows:

[Add new definition below:](#)

RELIEF AIR. Exhausted return air from a system that provides ventilation for human usage.

[F] **606.3 Installation.** Smoke detectors required by this section shall be installed in accordance with NFPA 72. The required smoke detectors shall be installed to monitor the entire airflow conveyed by the system including return air and exhaust or relief air. Access shall be provided to smoke detectors for inspection and maintenance.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Add definition to clarify what relief air is defined as. Definition is per 2015 Seattle Mechanical Code.](#)

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: [No impact. Just clarifies code requirements.](#)

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC21

1. State Building Code to be Amended:

- International Building Code
- ICC ANSI A117.1 Accessibility Code
- International Existing Building Code
- International Residential Code
- International Fire Code
- Uniform Plumbing Code

- International Mechanical Code
- International Fuel Gas Code
- NFPA 54 National Fuel Gas Code
- NFPA 58 Liquefied Petroleum Gas Code
- Wildland Urban Interface Code

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): Chapter 2: Definitions

Title: Definitions

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC **Section(s)** Section 202

Amend section to read as follows:

Add definition below:

Replacement air: Outdoor air that is used to replace air removed from a building through an exhaust system. Replacement air may be derived from one or more of the following: makeup air, supply air, transfer air, and infiltration. However, the ultimate source of all replacement air is outdoor air. When replacement air exceeds exhaust, the result is exfiltration.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Definition if from ASHRAE 90.1 and clarifies what replacement air is to correlate with Energy Code Requirements and Section 508 for kitchen makeup air.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: No impact. Just clarifies code requirements.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal?

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. IMC14 Rev

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

IMC 401.2.1, 403.1, 403.3, 403.8.5

Title:

IMC Group R ventilation simplification and coordination

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of Broan

Title: Consulting Engineer

Date: February 1, 2019

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment.

Code(s) 2018 International Mechanical Code with WA State amendments

Section(s) 401.2.1, 403.1, 403.3, 403.8.5

Amend the 2018 IMC with WA State amendments to read as follows:

401.2.1 Group R occupancies. Ventilation in Group R occupancies shall be provided in accordance with Section 403.8.

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or exhaust air. The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing negative or positive pressure. The system to convey ventilation air shall be designed and installed in accordance with Chapter 6.

403.3 Outdoor air and local exhaust airflow rates. Group R-2, R-3 and R-4 occupancies ~~three stories and less in height above grade plane~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.8. All other buildings intended to be occupied shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

403.8.5 Whole house ventilation requirements. Dwelling units in Group R-2 occupancies having more than three stories above grade plane shall be provided with a heat or energy recovery ventilation system (see Sections 403.8.9 and 403.8.5.2). In other occupancies, Each dwelling unit or sleeping unit shall be equipped with one of the following four types of mechanical whole house ventilation systems: A system using exhaust fans (see Section 403.8.6); a system integrated with forced-air systems (see Section 403.8.7); a system using supply fans (see Section 403.8.8); or a heat or energy recovery ventilation system (see Sections 403.8.9 and 403.8.5.2). The whole house exhaust system is permitted to be one of the local exhaust systems required by Section 403.8.4 as long as the requirements of this section, in addition to the requirement of Section 403.8.5, are met.

Exception: Additions, alterations, renovations or repairs to a mechanical system that is part of a building addition with less than 500 square feet of conditioned floor are are exempt from the requirements for whole house ventilation systems, Section 403.8.5.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

403.1: This modification is necessary to align 401.2.1 with 403.3, which requires that all Group R occupancies be ventilated in accordance with Section 403.8.

403.8.5: The WA State Energy Code TAG approved proposal 046-2018, which will require energy recovery ventilation (i.e., balanced) for high-rise Group R-2 dwelling units. So, to coordinate, Group R-2 dwelling units in buildings greater than 3 stories should be required to provide balanced ventilation in the WA IMC as well.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: There is an economic impact associated with the requirement for balanced ventilation for R-2 dwelling units in buildings greater than 3 stories. However, this economic impact was demonstrated to be cost effective in proposal 046-2018, which has been recommended for approval by the WA State Energy Code TAG. Please see proposal 046-2018 for more information.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal?
(See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. IMC06 Rev

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

2018 IMC 401.4, 501.3.1

Title:

Intake opening location, location of exhaust outlets

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of Broan

Title: Consulting Engineer

Date: February 6, 2019

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment.

Code(s) 2018 International Mechanical Code Section(s) 401.4, 501.3.1

Amend to read as follows:

401.4 Intake opening location. Air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening. Separation is not required between intake air openings and living space exhaust air openings of an individual dwelling unit or sleeping unit where a factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the manufacturer's instructions.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment.

501.3.1 Location of exhaust outlets. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property lines; 10 feet (3048 mm) from operable openings into buildings; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into buildings that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) above adjoining grade.
3. For all environmental air exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings into buildings for all occupancies other than Group U, and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Separation is not required between intake air openings and living space exhaust air openings of an individual dwelling unit or sleeping unit where a factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the manufacturer's instructions.
4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment.
5. For specific systems, see the following sections:
 - 5.1. Clothes dryer exhaust, Section 504.4.
 - 5.2. Kitchen hoods and other kitchen exhaust equipment, Sections 506.3.13, 506.4 and 506.5.
 - 5.3. Dust, stock and refuse conveying systems, Section 511.2.
 - 5.4. Subslab soil exhaust systems, Section 512.4.
 - 5.5. Smoke control systems, Section 513.10.3.
 - 5.6. Refrigerant discharge, Section 1105.7.
 - 5.7. Machinery room discharge, Section 1105.6.1.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

Intake/exhaust combination terminations are regularly installed with heating and energy recovery ventilators (H/ERVs) used for dwelling units. Their use reduces building penetrations, labor, and associated system costs. By reducing the number of penetrations, air leakage can also be reduced, resulting in space conditioning energy savings. Further, the durability of the structure can be improved through reducing entry pathways for bulk water. These devices have been provided by manufacturers for installation with dwelling unit ventilation systems for about 2 decades with no known failures reported. Despite being provided by manufacturers of H/ERVs, addressed in manufacturer installation instructions, and approved by ASHRAE 62.2, these fittings are not technically approved by the IMC based on the language in Sections 401.4 and 501.3.1.

Manufacturer tests conducted by Natural Resources Canada (NRC) have demonstrated that use of factory-built intake/exhaust combination terminations results in minimum cross-contamination of airflows (i.e., not exceeding 4%; see NRC report A1-007793). These results are aligned with ASHRAE 62.2 approval of such devices which limits cross-contamination to 10%, as verified by the manufacturer. If approved, this proposed modification to the IMC would limit application of intake/exhaust combination terminations to “factory-built” units. Approval of this proposed modification is expected to result in more affordable and architecturally-flexible terminations.

Note: The IRC defines living space as, “space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes”. The use of the term “environmental air” was also considered, but was abandoned because “environmental air” can also include exhaust air from parking garages and clothes dryers, which we want to exclude from this exception.

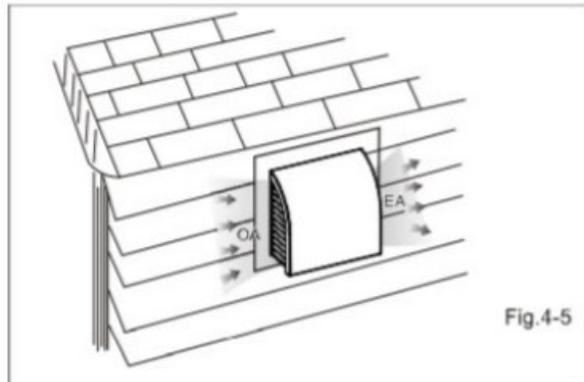
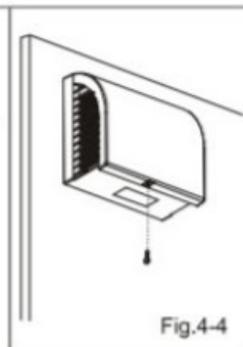
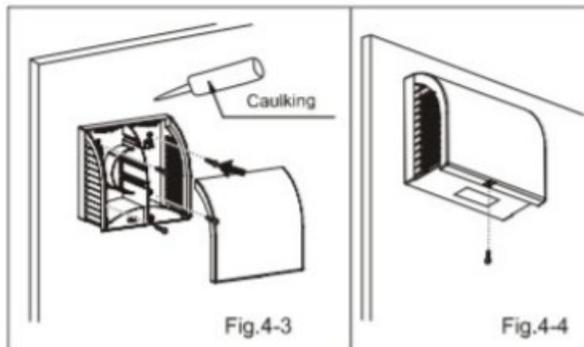
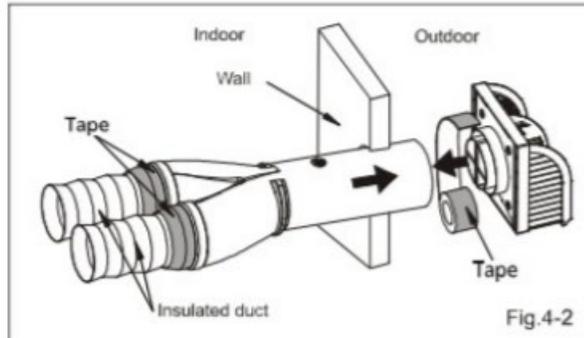
Following are examples of factory-built intake/exhaust combination termination fittings from manufacturer literature:

INSTALLATION I (JOIST MOUNTING-I) CONTINUED

10. Install outdoor hood and connect with insulated ducts.

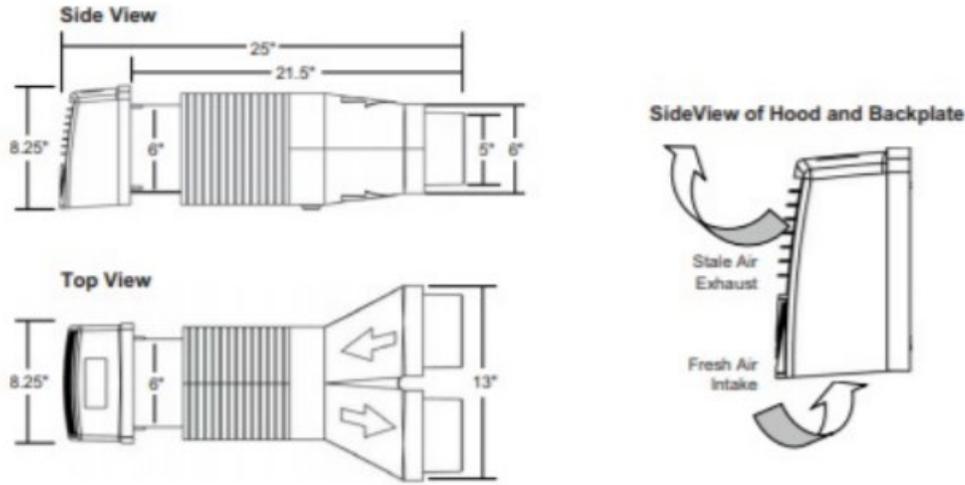
(1) Panasonic recommends the use of the optional Wall Cap (Model: FV-WC04VE1) which is easy to install with one wall penetration and keeps the airstreams separate to minimize short-circuiting. (Fig.4-2~5)

For more details, please check the INSTALLATION INSTRUCTIONS of Wall Cap.



Dual Hood Part 99-190

With the Lifebreath Dual Hood, only one 6 in hole is required in the exterior wall to complete two connections: fresh air intake and stale air exhaust.

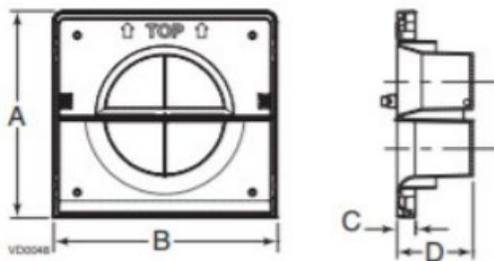


Note

- Tested by: National Research Council Canada
- Program: Building Regulations for Market Access Report Number: A1-007793
- Report Date: 15 February 2016
- Found to comply with requirement as set in the NBC

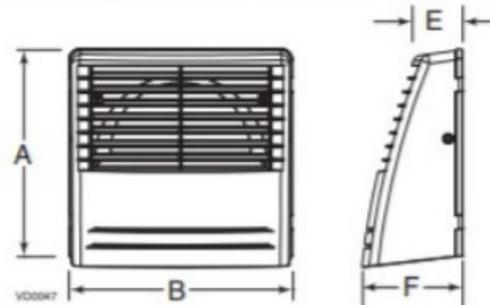
Dimensions of the Dual Outdoor Port Backplate

A	B	C	D
8 ⁷ / ₈ " (214 mm)	9" (231 mm)	3/4" (19 mm)	3" (76 mm)

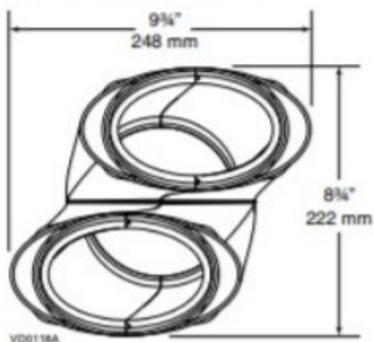


Dimensions of the Dual Outdoor Port

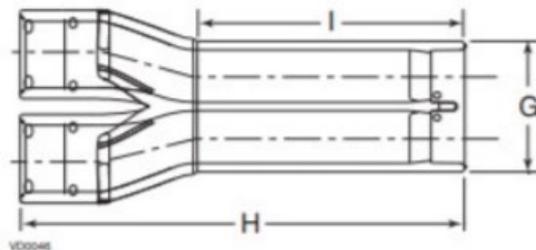
A	B	E	F
8 ⁷ / ₈ " (214 mm)	9" (231 mm)	1 ⁷ / ₈ " (48 mm)	3 ³ / ₈ " (92 mm)



Dimensions of the Transition

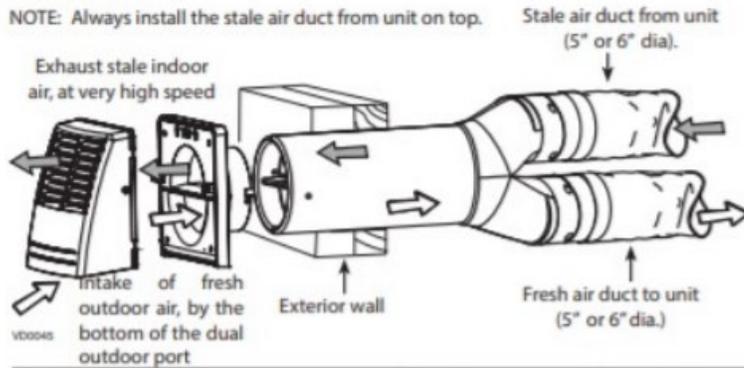


G	H	I
6" (152 mm)	20" (508 mm)	11 ¹ / ₈ " (289 mm)



Installation

NOTE: Always install the stale air duct from unit on top.



Specifications and ratings

- Part number: VTYIK1
- Material for transition: Expanded polystyrene, Grade 54 (building material)
- Material for dual outdoor port: White polypropylene
- Contamination rate: 3.2% between stale air to outdoors and fresh air from outdoors

Submitted by:		Date:	Project:
Quantity:	Model number:	Remarks:	Location:
			Architect:
			Engineer:
			Contractor:



Broan-NuTone LLC, 926 West State Street, Hartford, WI 53027 (1-877-862-7626)

VTYIK1d180118

Bibliography:

Ouazia, B. 2016. Evaluation of a dual hood performance in term of contaminant re-entrainment from exhaust to supply. A1-007793. National Research Council Canada. For a copy of the report, please contact the proponent at the email address provided. Additional reports are available from the proponent upon request.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: The code change proposal can decrease first costs associated with balanced ventilation systems, where such systems are specified.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application: No additional time is required for enforcement.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC22

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [2018 IMC 401.4](#)

Title: [Outdoor air intake opening locations](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC **Section(s)** 401.4

Enforceable code language must be used; see an example [by clicking here](#).
Amend section to read as follows:

401.4 Intake opening location. Air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet (3048 mm) from **lot lines** or buildings on the same lot. [Lot lines shall not be defined as a separation from a street or public way.](#)
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment.

[Exception: Enclosed parking garage and repair garage ventilation air intakes are permitted to be located less than 10 feet horizontally from or 25 feet vertically above a street, alley, parking lot and loading dock.](#)

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Clarifies that intake ventilation air can come through the garage entry door or other locations that are adjacent to surfaces that vehicles can drive on.](#)

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: [No economic impact. Just clarify code requirements.](#)

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC25

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [403.3.1.1](#)

Title: [Outdoor Air Distribution to Occupied Space](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC **Section(s)** 403.3.1.1

Amend section to read as follows:

BREATHING ZONE. The region within an occupied space between planes 3 and 72 inches (76 and 1829 mm) above the floor and more than 2 feet (610 mm) from the walls of the space or from fixed air-conditioning equipment.

403.3.1.1 Outdoor airflow rate. Ventilation systems shall be designed to have the capacity to supply the minimum outdoor airflow rate, determined in accordance with this section. In each occupiable space, the ventilation system shall be designed to deliver the required rate of outdoor airflow to the breathing zone. Outdoor air shall be supplied directly to each occupiable space from an air handling unit through a fully ducted path or ducted to within 12” of the return air opening of a fan-powered terminal unit used to transfer the outdoor air to the occupiable space.

The occupant load utilized for design of the ventilation system shall be not less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3.1.1. Ventilation rates for occupancies not represented in Table 403.3.1.1 shall be those for a listed occupancy classification that is most similar in terms of occupant density, activities and building construction; or shall be determined by an approved engineering analysis. The ventilation system, including transfer fan-powered terminal units shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Clarifies parallel and series ventilation requirements to correspond to DOAS ventilation requirements in WSEC. Clarifies that transfer fan-powered terminal units need to operation continuously during occupied period to distribute ventilation air.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: **No impact. Just clarifies code requirements.**

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC15

1. State Building Code to be Amended:

- International Building Code
- ICC ANSI A117.1 Accessibility Code
- International Existing Building Code
- International Residential Code
- International Fire Code
- Uniform Plumbing Code

- International Mechanical Code
- International Fuel Gas Code
- NFPA 54 National Fuel Gas Code
- NFPA 58 Liquefied Petroleum Gas Code
- Wildland Urban Interface Code

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

IMC Table 403.3.1.1

Title:

Office Kitchenettes

2. Proponent Name (Specific local government, organization or individual):

Proponent: City of Bellevue

Title: Mechanical Plan Reviewer

Date: 4/5/2019

3. Designated Contact Person:

Name: Valerie Graber

Title: Mechanical Plan Reviewer

Address: 450 110th ave NE, Bellevue, WA.

Office Phone: (425)452-4576

Cell: () None

E-Mail address: vgraber@bellevuewa.gov

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) IMC Section(s) Table 403.3.1.1 Office – Kitchenettes Foot note k.

Current with strike out.

k. ~~Kitchenettes require exhaust when they contain a domestic cooking appliance range or oven that is installed in accordance with Table 507.2.2. Kitchenettes that only contain a microwave oven are not required to have mechanical exhaust. A kitchenette may not contain commercial cooking appliances that require Type I or Type II exhaust as these occupancies are required to be exhausted to the kitchen category in Table 403.3.1.1.~~

Enforceable code language must be used; see an example [by clicking here](#).

Amend section to read as follows:

New underlined.

k. Kitchenettes require exhaust when they contain a domestic cooking appliance range or oven that is installed in accordance with Table 507.1.2. Kitchenettes that only contain a microwave oven are not required to have exhaust. A kitchenette may not contain commercial cooking appliances that require Type I or Type II exhaust as these occupancies are required to be exhausted to the kitchen category in Table 403.3.1.1.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Under the ventilation tables, the current code language requires an exhaust airflow rate of 0.3 CFM/sqft. The exhaust can be recirculated, so it can be provided by mechanical, natural or increased outside air. This is like other spaces such as Barber shops, Copy and Dark rooms. By removing the word “mechanical” no exhaust is required but the need for extra outside air remains. The word “mechanical” has caused confusion on whether a form of exhaust is required.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain:

A cost reduction for eliminating the need for a mechanical exhaust system for a microwave.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal?
(See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC24

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [Table 403.3.1.1](#)

Title: [Minimum Ventilation Rates](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. **Proposed Code Amendment.** Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC Section(s) Table 403.3.1.1

Amend section to read as follows:

Amend ventilation rate to kitchenette as a break room per ASHRAE 62.1-2016, remove incorrect references to footnote k and clarify footnote k of 2015 WSMC

TABLE 403.3.1.1—continued
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/100FT ^{2a}	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE R _a CFM/FT ^{2a}	EXHAUST AIRFLOW RATE CFM/FT ²
Office				
Conference rooms	50	5	0.06	--
Kitchenettes ^k	-- 25	-- 5	-- 0.06	0.30
Office spaces	5	5	0.06	--
Reception areas	30	5	0.06	--
Telephone/data entry	60	5	0.06	--
Main entry lobbies	10	5	0.06	--
Public spaces				
Corridors serving other than Group R occupancies	--	--	0.06	--
Corridors serving Group R dwelling or sleeping units with whole house exhaust system	--	--	0.12	--
Corridors serving Group R dwelling or sleeping units with other than whole house exhaust system	--	--	0.06	--
Courtrooms	70	5	0.06	--
Elevator car	--	--	--	1
Elevator lobbies in parking garage	--	--	1.0	--
Legislative chambers	50	5	0.06	--
Libraries	10	5	0.12	--
Museums (children's)	40	7.5	0.12	--
Museums/galleries	40	7.5	0.06	--
Places of religious worship	120	5	0.06	--
Shower room (per showerheat) ^g / k	--	--	--	50/20 ^f
Smoking lounges ^b	70	60	--	--
Toilet rooms—Public ^g / k	--	--	--	50/70 ^e

**TABLE 403.3.1.1—continued
MINIMUM VENTILATION RATES**

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/100FT ^{2a}	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE R _a CFM/FT ^{2a}	EXHAUST AIRFLOW RATE CFM/FT ²
Workrooms				
Bank vaults/safe deposit	5	5	0.06	--
Computer (without printing)	4	5	0.06	--
Copy, printing rooms	4	5	0.06	0.5
Darkrooms	--	--	--	1.0
Freezer and refrigerated spaces (<50°F)	0	10	0	0
Meat processing ^c	10	15	--	--
Pharmacy (prep area)	10	5	0.18	--
Photo studios	10	5	0.12	--

- a. Based upon net occupiable floor area.
- b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).
- c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.
- d. Ventilation systems in enclosed parking garages shall comply with Section 404.
- e. Rates are per water closet or urinal. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.
- f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.
- g. Mechanical exhaust is required and recirculation is prohibited.
- h. For nail salons, manicure and pedicure stations shall be provided with a *source capture system* capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20. Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.
- i. A laundry area within a kitchen or bathroom is not required to have local exhaust. For the laundry area to qualify as being within the kitchen, the laundry room door must open directly into the kitchen and not into an adjacent corridor. Where there are doors that separate the laundry area from the kitchen or bathroom, the door shall be louvered.
- j. When combustion equipment is intended to be used on the playing surface, additional dilution ventilation and/or source control shall be provided.
- k. Kitchenettes require exhaust when they contain a domestic cooking appliance range or oven that is installed in accordance with Table 507.2.21. Kitchenettes that only contain a microwave ~~cooking appliances~~ ~~oven~~ are not required to have mechanical exhaust. A kitchenette may not contain commercial cooking appliances that require Type I or Type II exhaust as these occupancies are required to be exhausted to the kitchen category in Table 403.3.1.1.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Clarifies that break room and/or kitchenettes require ventilation as required by ASHRAE 62.1-2016 for break rooms. No cost impact as this just clarifies national ventilation standards.

Clarifies microwave oven exception k. No cost impact as this just clarifies intent.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. **Is there an economic impact:** Yes No

Explain:

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$[Click here to enter text.](#)/square foot (For residential projects, also provide \$[Click here to enter text.](#)/dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC04

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

Section 403.3.1.1.2.3, Section 202

Title:

Multiple zone recirculating systems, General Definitions

2. Proponent Name (Specific local government, organization or individual):

Proponent: Robby Oylear

Title: Mechanical Engineer

Date: 4/6/2019

3. Designated Contact Person:

Name: Robby Oylear

Title: Mechanical Engineer

Address: 602 195th St SE Bothell, WA 98012

Office Phone: (206) 829-7329

Cell: ()

E-Mail address: robbyoylear@gmail.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC **Section(s)** 403.3.1.1.2.3

Enforceable code language must be used; see an example [by clicking here](#).

Amend section to read as follows:

New definition per ASHRAE 62.1:

VENTILATION ZONE. Any indoor area that requires ventilation and comprises one or more spaces with the same occupancy category (see Table 403.3.1.1), occupant density, zone air distribution effectiveness (see Section 403.3.1.1.1.2), and design zone primary airflow per unit area.

[Strike section 403.3.1.1.2.3 in its entirety (including all sub sections and equations) (Multiple-Zone Recirculating Systems, Primary outdoor air fraction, System ventilation efficiency, Uncorrected outdoor air intake, and outdoor air intake flow rate.). The following new language replaces those stricken sections with revised wording from ASHRAE 62.1-2019 and a new section on determining System Ventilation Efficiency. No underline is used as all language is intended to be new (though shares similarities with existing).]

403.3.1.1.2.3 Multiple zone recirculating systems.

For ventilation systems wherein one or more air handlers supply a mixture of outdoor air and recirculated air to more than one ventilation zone, the outdoor air intake flow (V_{ot}) shall be determined in accordance with Sections 403.3.1.1.2.3.1 through 403.3.1.1.2.3.4.

403.3.1.1.2.3.1 Uncorrected Outdoor Air Intake. The uncorrected outdoor air intake (V_{ou}) flow shall be determined in accordance with Equation 4-5.

$$V_{ou} = D \sum_{all\ zones} (R_p \times P_z) + \sum_{all\ zones} (R_a \times A_z) \quad (\text{Equation 4-5})$$

403.3.1.1.2.3.1.1 Occupant Diversity. The occupant diversity ratio (D) shall be determined in accordance with Equation 4-6 to account for variations in population within the ventilation zones served by the system.

$$D = P_s / \sum_{all\ zones} P_z \quad (\text{Equation 4-6})$$

where the system population (P_s) is the total population in the area served by the system.

Exception: Alternative methods to account for occupant diversity shall be permitted, provided the resulting V_{ou} value is no less than that determined using Equation 4-5.

403.3.1.1.2.3.1.2 Design System Population. Design system population (P_s) shall equal the largest (peak) number of people expected to occupy all ventilation zones served by the ventilation system during use.

Informative Note: Design system population is always equal to or less than the sum of design zone population for all zones in the area served by the system because all zones may or may not be simultaneously occupied at design population.

403.3.1.1.2.3.2 System Ventilation Efficiency. The system ventilation efficiency (E_v) shall be determined in accordance with Section 403.3.1.1.2.3.3 for the Simplified Procedure or Appendix A of ASHRAE 62.1 for the Alternative Procedure.

Informative Note: These procedures also establish zone minimum primary airflow rates for VAV systems.

403.3.1.1.2.3.3 Simplified Procedure

403.3.1.1.2.3.3.1 System Ventilation Efficiency. System ventilation efficiency (E_v) shall be determined in accordance with Equation 4-6a or 4-6b.

$$E_v = 0.88 \times D + 0.22 \quad \text{for } D < 0.60 \quad (\text{Equation 4-6a})$$

$$E_v = 0.75 \quad \text{for } D \geq 0.60 \quad (4-6b)$$

403.3.1.1.2.3.3.2 Zone Minimum Primary Airflow. For each zone, the minimum primary airflow (V_{pz-min}) shall be determined in accordance with Equation 4-7.

$$V_{pz-min} = V_{oz} \times 1.5 \text{ (Equation 4-7)}$$

403.3.1.1.2.3.4 Outdoor Air Intake. The design outdoor air intake flow (V_{ot}) shall be determined in accordance with Equation 4-8.

$$V_{ot} = V_{ou}/E_v \text{ (Equation 4-8)}$$

- 5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.** Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

The proposed amendment copies directly from ASHRAE 62.1 Addendum f to Standard 62.1-2016 (approved for incorporation into ASHRAE 62.1-2019). The only edits made by the proponent is to correct references using IMC section numbers and refer directly to ASHRAE 62.1 for the alternate Appendix A approach (which our current Code already does). The purpose of the amendment is to clean up the “multiple-spaces equation” by providing an alternate simplified method which produces more reliable results from engineer to engineer as the existing Code language requires several iterations and engineering judgement to identify the “worst case” scenario for ventilation. Attached is the full amendment to ASHRAE 62.1-2016, which includes a Forward summarizing the rationale ASHRAE used in proposing their change.

- 6. Specify what criteria this proposal meets.** You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

- 7. Is there an economic impact:** Yes No

Explain: Simplifies code language and enforcement.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). [Webinars on the tool can be found Here and Here](#))

\$0/square foot (For residential projects, also provide \$[Click here to enter text.](#)/ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

n/a

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Should simplify code enforcement and maintain consistency with national standards.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



ADDENDA

**ANSI/ASHRAE Addendum f to
ANSI/ASHRAE Standard 62.1-2016**

Ventilation for Acceptable Indoor Air Quality

Approved by the ASHRAE Standards Committee on June 23, 2018; by the ASHRAE Technology Council on June 27, 2018; and by the American National Standards Institute on June 28, 2018.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website (www.ashrae.org) or in paper form from the Senior Manager of Standards.

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Roger L. Hedrick
Rick M. Heiden
Jonathan Humble
Srinivas Katipamula
Kwang Woo Kim
Larry Kouma
Arsen K. Melikov
R. Lee Millies, Jr.
Karl L. Peterman
Erick A. Phelps

David Robin
Peter Simmonds
Dennis A. Stanke
Wayne H. Stoppelmoor, Jr.
Richard T. Swierczyna
Jack H. Zarour
Lawrence C. Markel, *BOD ExO*
M. Ginger Scoggins, *CO*

Steven C. Ferguson, *Senior Manager of Standards*

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus Standard developed under the auspices of ASHRAE. *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this Standard as an ANS, as “substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution.” Compliance with this Standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Senior Manager of Standards of ASHRAE should be contacted for

- interpretation of the contents of this Standard,
- participation in the next review of the Standard,
- offering constructive criticism for improving the Standard, or
- permission to reprint portions of the Standard.

DISCLAIMER

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE's Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objections on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

The so-called “Multiple-Spaces Equation” (Normative Appendix A, Equations A1.2.1 for single-supply systems and A1.2.2-1 for systems with multiple recirculation paths) is very difficult to use, especially for variable-volume systems, for which there are an infinite number of scenarios with varying airflow, occupancy, supply air temperature, etc., all of which affect system ventilation efficiency. Accordingly, Standard 62.1 includes two options for calculating system ventilation efficiency, a prescriptive approach using Table 6.2.5.2 and a more fundamental (and complex) approach described in Normative Appendix A. The Table 6.2.5.2 approach is intended to apply to single-supply systems in a fairly conservative manner. The procedure has several disadvantages:

- It is seldom used because the Z_{pz} values are so high. Few VAV systems fall under this table, in part because of caps in Standard 90.1 on minimum airflow limits. So designers are forced to use the very complex Normative Appendix A approach.
- It implies that it addresses VAV systems under all conditions, but it does not directly address how low VAV box minimums can be.

To address these issues, addendum g replaces the Table 6.2.5.2 approach with two formulas, one to determine system ventilation efficiency (E_v) and one to determine the minimum primary airflow set point intended for use in VAV systems. These equations were developed from actual projects that had single-duct VAV systems with ventilation rates calculated using the Normative Appendix A approach with guidance in accordance with the Standard 62.1 User’s Manual. The projects, summarized below, addressed various occupancy types, including densely occupied spaces. The equations for system ventilation efficiency and minimum primary airflow set point were developed to try to meet or exceed the Normative Appendix A rates.

Building	Appendix A OA Rate	Addendum F OA Rate	Ratio
Office/assembly	2283	2598	114%
Residential	2066	2662	129%
Classroom/office	24922	25703	103%
Classroom/office	5213	5320	102%
User’s Manual Office	1938	1955	101%

There is always the possibility with some occupancy types and ventilation system designs that the equations will result in under-ventilation as compared to Normative Appendix A, but this possibility also exists with the Table 6.2.5.2 approach.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strike through~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum f to Standard 62.1-2016

Modify the definition of “ventilation zone” in Section 3.

ventilation zone: any indoor area that requires ventilation and comprises one or more spaces with the same occupancy category (see Table 6.2.2.1), occupant density, zone air distribution effectiveness (see Section 6.2.2.2), and design zone primary airflow (see Section ~~6.2.5.1~~ 6.2.5.3.2 and Normative Appendix A) per unit area.

Modify Section 6.2.5 as shown.

6.2.5 Multiple-Zone Recirculating Systems. For ventilation systems wherein one or more air handlers supply a mixture of outdoor air and recirculated air to more than one ventilation zone, the outdoor air intake flow (V_{oi}) shall be determined in accordance with Sections 6.2.5.1 through 6.2.5.4.

~~**6.2.5.1 Primary Outdoor Air Fraction.** Primary outdoor air fraction (Z_{pz}) shall be determined for ventilation zones in accordance with Equation 6.2.5.1.~~

$$Z_{pz} = V_{oz} / V_{pz} \quad (6.2.5.1)$$

where V_{pz} is the zone primary airflow to the ventilation zone, including outdoor air and recirculated air.

- ~~For VAV system design purposes, V_{pz} is the lowest zone primary airflow value expected at the design condition analyzed.~~
- ~~In some cases, it is permitted to determine these parameters for only selected zones as outlined in Normative Appendix A.~~

TABLE 6.2.5.2 System Ventilation Efficiency

Max (Z_{pz})	E_v
≤0.15	1.0
≤0.25	0.9
≤0.35	0.8
≤0.45	0.7
≤0.55	0.6
≥0.55	Use Normative Appendix A

NOTES:

1. “Max (Z_{pz})” refers to the largest value of Z_{pz} , calculated using Equation 6.2.5.1, among all the ventilation zones served by the system.
2. For values of Max (Z_{pz}) between 0.15 and 0.55, the corresponding value of E_v may be determined by interpolating the values in the table.
3. The values of E_v in this table are based on a 0.15 average outdoor air fraction for the system. For systems with higher values of the average outdoor air fraction, this table may result in unrealistically low values of E_v , and the use of Normative Appendix A may yield more practical results.

~~**6.2.5.2 System Ventilation Efficiency.** The system ventilation efficiency (E_v) shall be determined in accordance with Table 6.2.5.2 or Normative Appendix A.~~

6.2.5.31 Uncorrected Outdoor Air Intake. The uncorrected outdoor air intake (V_{ou}) flow shall be determined in accordance with Equation 6.2.5.31.

$$V_{ou} = D \sum_{all\ zones} (R_p \times P_z) + \sum_{all\ zones} (R_a \times A_z) \quad (6.2.5.31)$$

6.2.5.31.1 Occupant Diversity. The occupant diversity ratio (D) shall be determined in accordance with Equation 6.2.5.31.1 to account for variations in population within the ventilation zones served by the system.

$$D = P_s / \sum_{all\ zones} P_z \quad (6.2.5.31.1)$$

where the system population (P_s) is the total population in the area served by the system.

Exception: Alternative methods to account for occupant diversity shall be permitted, provided the resulting V_{ou} value is no less than that determined using Equation 6.2.5.31.

Informative Note: The uncorrected outdoor air intake (V_{ou}) is adjusted for occupant diversity, but it is not corrected for system ventilation efficiency.

6.2.5.31.2 Design System Population. Design system population (P_s) shall equal the largest (peak) number of people expected to occupy all ventilation zones served by the ventilation system during use.

Informative Note: Design system population is always equal to or less than the sum of design zone population for all zones in the area served by the system because all zones may or may not be simultaneously occupied at design population.

6.2.5.2 System Ventilation Efficiency. The system ventilation efficiency (E_v) shall be determined in accordance with Section 6.2.5.3 for the Simplified Procedure or Normative Appendix A for the Alternative Procedure.

Informative Note: These procedures also establish zone minimum primary airflow rates for VAV systems.

6.2.5.3 Simplified Procedure

6.2.5.3.1 System Ventilation Efficiency. System ventilation efficiency (E_v) shall be determined in accordance with Equation 6.2.5.3.1a or 6.2.5.3.1b.

$$E_v = 0.88 \times D + 0.22 \quad \text{for } D < 0.60 \quad (6.2.5.3.1a)$$

$$E_v = 0.75 \quad \text{for } D \geq 0.60 \quad (6.2.5.3.1b)$$

6.2.5.3.2 Zone Minimum Primary Airflow. For each zone, the minimum primary airflow (V_{pz-min}) shall be determined in accordance with Equation 6.2.5.3.2.

$$V_{pz-min} = V_{oz} \times 1.5 \quad (6.2.5.3.2)$$

6.2.5.4 Outdoor Air Intake. The design outdoor air intake flow (V_{oi}) shall be determined in accordance with Equation 6.2.5.4.

$$V_{oi} = V_{ou} / E_v \quad (6.2.5.4)$$

Modify Normative Appendix A introduction as shown.

NORMATIVE APPENDIX A MULTIPLE-ZONE SYSTEMS VENTILATION EFFICIENCY— ALTERNATIVE PROCEDURE

This appendix presents an alternative procedure for calculating the system ventilation efficiency (E_v) for multiple zone recirculating systems that must be used when Table 6.2.5.2 values are Section 6.2.5.3 is not used. In this alternative procedure, E_v is equal to the lowest calculated value of the zone ventilation efficiency (E_{vz}) (see Equation A1.2.1-1 below).

Informative Note: Figure A-1 contains a ventilation system schematic depicting most of the quantities used in this appendix.

Modify Section A1.1 as shown.

A1.1 Average Outdoor Air Fraction. The average outdoor air fraction (X_s) for the ventilation system shall be determined in accordance with Equation A1.1.

$$X_s = V_{ou} / V_{ps} \quad (A1.1)$$

where the uncorrected outdoor air intake (V_{ou}) is found in accordance with Section 6.2.5.31, and the system primary airflow (V_{ps}) is found at the condition analyzed.

Informative Note: For VAV-system design purposes, V_{ps} is the highest expected system primary airflow at the design condition analyzed. System primary airflow at design is usually less than the sum of design zone primary airflow values because primary airflow seldom peaks simultaneously in all VAV zones.

Modify Section A1.2.1 as shown.

A1.2.1 Single Supply Systems. For single supply systems, wherein all of the air supplied to each ventilation zone is a mixture of outdoor air and system-level recirculated air, zone ventilation efficiency (E_{vz}) shall be determined in accordance with Equation A1.2.1-1. Examples of single supply systems include constant-volume reheat, single-duct VAV, single-fan dual-duct, and multizone systems.

$$E_{vz} = 1 + X_s - Z_{pz} \quad (A1.2.1-1)$$

where the average outdoor air fraction for the system (X_s) is determined in accordance with Equation A1.1, and the primary outdoor air fraction for the zone (Z_{pz}) is determined in accordance with Section 6.2.5.1 Equation A1.2.1-2.

$$Z_{pz} = V_{oz} / V_{pz} \quad (A1.2.1-2)$$

For VAV systems, V_{pz} is the lowest zone primary airflow value expected at the design condition analyzed.

Modify Section A3 as shown. The remainder of Section A3 is unchanged.

A3. SYMBOLS

[. . .]

E_v system ventilation efficiency: the efficiency with

which the system distributes air from the outdoor air intake to the breathing zone in the ventilation-critical zone, which requires the largest fraction of outdoor air in the primary airstream. ~~E_p shall be determined in accordance with Section 6.2.5.2 or Section A1.~~

[. . .]

V_{ou} ***uncorrected outdoor air intake:*** see Section 6.2.5.3~~1~~.

[. . .]

V_{pz} ***zone primary airflow:*** see Section 6.2.5.1 the zone primary airflow to the ventilation zone, including outdoor air and recirculated air.

[. . .]

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

About ASHRAE

ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment. The Society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration, and sustainability. Through research, Standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today.

For more information or to become a member of ASHRAE, visit www.ashrae.org.

To stay current with this and other ASHRAE Standards and Guidelines, visit www.ashrae.org/standards.

Visit the ASHRAE Bookstore

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, on CD-ROM, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous version. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at www.ashrae.org/bookstore.

IMPORTANT NOTICES ABOUT THIS STANDARD

To ensure that you have all of the approved addenda, errata, and interpretations for this Standard, visit www.ashrae.org/standards to download them free of charge.

Addenda, errata, and interpretations for ASHRAE Standards and Guidelines are no longer distributed with copies of the Standards and Guidelines. ASHRAE provides these addenda, errata, and interpretations only in electronic form to promote more sustainable use of resources.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC05_____

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

Section 403.2.1

Title:

Recirculation of air

2. Proponent Name (Specific local government, organization or individual):

Proponent: Robby Oylear

Title: Mechanical Engineer

Date: 4/6/2019

3. Designated Contact Person:

Name: Robby Oylear

Title: Mechanical Engineer

Address: 602 195th St SE Bothell, WA 98012

Office Phone: (206) 829-7329

Cell: ()

E-Mail address: robbyoylear@gmail.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC **Section(s)** 403.2.1

Enforceable code language must be used; see an example [by clicking here](#).

Amend section to read as follows:

403.2.1 Recirculation of air. The air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling to another or to dissimilar occupancies.
2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces where 10 percent or more of the resulting supply air-stream consists of air recirculated from these spaces.
3. Where mechanical exhaust is required by Note b in Table 403.3.1.1, recirculation of air from such spaces shall be prohibited. All air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.1.1.

Exception: Air recirculated as part of an energy recovery ventilation system that complies with Section 514.4.

[Section 514.4 copied below for reference.]

SECTION 514

ENERGY RECOVERY VENTILATION SYSTEMS

514.4 Recirculated air. Air conveyed within energy recovery systems shall not be considered as recirculated air where the energy recovery ventilation system is constructed to limit cross-leakage between air streams to less than 10 percent of the total airflow design capacity.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

The proposed amendment clarifies requirements in Section 403.2.1 for recirculation of air from mechanically exhausted spaces when used as part of an energy recovery ventilation system. It is my understanding that this is already the way the Code works, but this Exception just adds clarity by pointing to the section that would allow recirculation with an energy recovery ventilation system.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: Simplifies code language and enforcement.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$0/square foot (For residential projects, also provide \$[Click here to enter text.](#)/ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

n/a

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Clarifies Code, no actual impact to enforcement. May reduce questions to building departments.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC23

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [403.2.1 Item #4](#)

Title: [Definitions](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC **Section(s)** 403.2.1 Item #4

Amend section to read as follows:

Adopt 2018 IMC Item #4 of 403.2.1 with modifications below that was removed from 2015 WSMC. This is needed to correlate to section 514.4 that allows up to 10% cross leakage in energy recovery ventilation systems.

403.2.1 Recirculation of air. The outdoor air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling to another or to dissimilar occupancies.
2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces.
3. Where mechanical exhaust is required by Note b in Table 403.3.1.1, recirculation of air from such spaces shall be prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited. Where recirculation of air is prohibited, all air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.1.1.
4. Where mechanical exhaust is required by Note g in Table 403.3.1.1, mechanical exhaust is required and recirculation from such spaces is prohibited where more than 10 percent of the resulting supply airstream consists of air recirculated from these spaces. Return air from such spaces only be permitted to be recirculated when returned to an energy recovery ventilation system complying with Section 514. Recirculation of air that is contained completely within such spaces shall not be prohibited.

**TABLE 403.3.1.1—continued
MINIMUM VENTILATION RATES**

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/100FT ^{2a}	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE R _a CFM/FT ^{2a}	EXHAUST AIRFLOW RATE CFM/FT ²
Workrooms				
Bank vaults/safe deposit	5	5	0.06	--
Computer (without printing)	4	5	0.06	--
Copy, printing rooms	4	5	0.06	0.5
Darkrooms	--	--	--	1.0
Freezer and refrigerated spaces (<50°F)	0	10	0	0
Meat processing ^e	10	15	--	--
Pharmacy (prep area)	10	5	0.18	--
Photo studios	10	5	0.12	--

- a. Based upon net occupiable floor area.
- b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).
- c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.
- d. Ventilation systems in enclosed parking garages shall comply with Section 404.
- e. Rates are per water closet or urinal. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.
- f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.
- ~~g. Mechanical exhaust is required and recirculation is prohibited.~~
- g. Mechanical exhaust is required and recirculation from such spaces is prohibited except that recirculation shall be permitted where the resulting supply airstream consists of not more than 10 percent air recirculated from these spaces. Return air from such spaces only be permitted to be recirculated when returned to an energy recovery ventilation system complying with Section 514. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Items 2 and 4).

514.4 Recirculated air. Air conveyed within energy recovery systems shall not be considered as recirculated air where the energy recovery ventilation system is constructed to limit cross-leakage between air streams to less than 10 percent of the total airflow design capacity.

- 5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.** Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Removes conflict with 514.4 that SBCC keeps getting questions about.

- 6. Specify what criteria this proposal meets.** You may select more than one.
- The amendment is needed to address a critical life/safety need.
 - The amendment clarifies the intent or application of the code.
 - The amendment is needed to address a specific state policy or statute.
 - The amendment is needed for consistency with state or federal regulations.
 - The amendment is needed to address a unique character of the state.
 - The amendment corrects errors and omissions.

- 7. Is there an economic impact:** Yes No

Explain: No cost impact. Just clarifies the intent of model IMC.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC26

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [403.3](#)

Title: [Outdoor air and local exhaust airflow rates](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) [2018 IMC](#) **Section(s)** [403.3](#)

Enforceable code language must be used; see an example [by clicking here](#).
Amend section to read as follows:

403.3 Outdoor air and local exhaust airflow rates. Group R-2, R-3 and R-4 occupancies ~~three stories and less in height above grade plane~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.8. Other buildings intended to be occupied shall be provided with out-door air and local exhaust in accordance with Section 403.3.1.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Clarifies intent of code that residential ventilation provisions are the same for all R occupancies covered under WSMC regardless of height which was the intent of the 2015 WSMC.](#)

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: [No cost impact. Just clarifies intent of 2015 WSMC.](#)

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. IMC12 Rev

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

403.8.2, 403.8.6.4

Title:

Mechanical Ventilation Rate Verification; Certificate

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of Broan

Title: Consulting Engineer

Date: February 1, 2019

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment.

M1507.3.3 Mechanical ventilation rate; N1101.14 (R401.3) Certificate (Mandatory)

Code(s) 2018 IMC with WA amendments

Section(s) 403.8.2, 403.8.6.4

Amend IMC with WA amendments, Sections 403.8.2 and 403.8.6.4 to read as follows:

403.8.1 Minimum ventilation performance. Ventilation systems shall be designed and installed to satisfy the ventilation requirements of Table 403.3.1.1 or Table 403.8.1. Breathing zone ventilation rates from Table 403.3.1.1 shall be calculated per Section 403.3.1.1 and corrected per zone air distribution effectiveness requirements per Section 403.3.1.2.

403.8.2 Certificate. A permanent certificate shall be completed by the builder or other approved party and posted on a wall in the space where the furnace is located, a utility room, or an approved location inside the building. When located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label, or other required labels. The certificate shall list the flow rate determined from the delivered airflow of the mechanical whole house ventilation system as installed and the type of mechanical whole house ventilation system used to comply with Section 403.8.5.

[Renumber rest of section as necessary]

403.8.6.4 Whole house exhaust and transfer fans. Exhaust fan construction and sizing shall meet the following criteria.

1. Exhaust and transfer fans shall be tested and rated in accordance with the airflow and sound rating procedures of the Home Ventilating Institute (HVI 915, HVI Loudness Testing and Rating Procedure, HVI 916, HVI Airflow Test Procedure, and HVI 920, HVI Product Performance Certification Procedure).

2. Installation of system or equipment shall be carried out in accordance with manufacturers' design requirements and installation instructions.

3. Fan airflow rating and duct system shall be designed and installed to deliver at least the outdoor airflow required by Table 403.3.1.1 or Table 403.8.1. The airflows required refer to the delivered airflow of the system as installed and tested using a flow hood, flow grid, or other airflow measurement device.

Exception: ~~An airflow rating at a pressure of 0.25 in. w.g. may be used, provided the duct sizing meets the prescriptive requirements of Table 403.8.5.2.~~

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

If installed incorrectly, outdoor air ventilation systems can fail to deliver the minimum outdoor air needed to provide acceptable indoor air quality. A recent study in Florida* found that only three of 21 outdoor air ventilation systems had a flow rate near the design level. Because these systems perform a vital function in supporting building durability and occupant health, these systems should be verified for flow when installed. This requirement and text are aligned with ASHRAE 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings. Finally, because the outdoor air mechanical ventilation system is a critical component of the build-tight/ventilate-right approach to energy efficient, durable, and healthy construction, the verified ventilation rate should be listed on the dwelling unit's permanent certificate, alongside other performance metrics and values for critical appliances and assemblies, as required by IECC Section R401.3.

* Sonne et al. (2015). Investigation of the Effectiveness and Failure Rates of Whole-House Mechanical Ventilation Systems in Florida. FSEC-CR-2002-15. <http://www.fsec.ucf.edu/en/publications/pdf/FSECCR-2002-15.pdf>.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: Flow rate testing is currently required for supply systems and heat or energy recovery systems within Section 403.8.5.2.5. However, no such requirement exists for exhaust systems, which are able to be prescriptively sized. Arguably, the mechanical whole-house ventilation system serves a more critical function than local bathroom exhaust fans, so at a minimum, its flow rate should be field verified – especially when the FSEC study showed that the lion’s share of mechanical whole-house ventilation systems have flow rates below the targeted level. The cost associated with flow rate verification can be estimated as \$9-\$12, assuming a time requirement of 15-20 minutes for a skilled laborer with a labor rate of \$35/hour. The test can be completed by the same technician performing the blower door test required by the IECC, so there are no additional trip costs. Also, there is no requirement for a third party to conduct the test, which can help moderate costs.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

Typical life of a ventilation fan is 15 years. A \$9-\$12 investment to verify that the ventilation system is working according to specifications could return significant dividends, especially when research suggests that the costs associated with poor indoor air quality in the U.S. is around \$500 annually per person.^{1,2,3,4,5}

< \$0-0.006/square foot (\$9-\$12/ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

$\$35/\text{hour} * (1/3 \text{ hour}) = \$11.67/2000 \text{ ft}^2 = \$0.006/\text{ft}^2$

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application: ~5-10 minutes to verify the flow rate on the certificate during inspection.

References:

1. Logue JM, Price PN, Sherman MH, & Singer BC. 2012. A Method to Estimate the Chronic Health Impact of Air Pollutants in U.S. Residences. *Environmental Health Perspectives* 120(2): 216-222.
2. Turner WJN, Logue JM, and Wray CP. 2012. Commissioning Residential Ventilation Systems: A Combined Assessment of Energy and Air Quality Potential Values. LBNL969E.
3. Brown DW. 2008. Economic value of disability-adjusted life years lost to violence: estimates for WHO Member States. *Rev. Panam Salud Publica*, 24, 203-209.
4. Lvovsky K, Huges G, Maddison D, Ostro B, and Pearce D. 2000. Environmental costs of fossil fuels: a rapid assessment method with application to six cities. Washington, D.C.: The World Bank Environment Department.
5. Highfill T and Bernstein E. 2014. Using Disability Adjusted Life Years to Value the Treatment of Thirty Chronic Conditions in the U.S. from 1987 to 2010. U.S. Department of Commerce Bureau of Economic Analysis WP 2014-9.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC27

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): **403.8**

Title: **Residential Ventilation**

2. Proponent Name (Specific local government, organization or individual):

Proponent: **Eric Vander Mey, PE**
Title: **Engineer**
Date: **2019-04-15**

3. Designated Contact Person:

Name: **Eric Vander Mey, PE**
Title: **Engineer**

Office Phone: **(206) 285-7114**
Cell: **(206) 321-1677**
E-Mail address: **ericv@rushingco.com**

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 WSMC **Section(s)** 403.8

Enforceable code language must be used; see an example [by clicking here](#).
Amend section to read as follows:

403.8 Ventilation systems for Group R occupancies. Each dwelling unit or sleeping unit shall be equipped with local exhaust and whole house ventilation systems and shall comply with Sections 403.8.1 through 403.8.11. All occupied spaces, including public corridors, other than the Group R dwelling and sleeping unit, that support the Group R occupancy shall meet the ventilation requirements of Section 402 or Sections 403.1 to 403.7.

403.8.1 Minimum ventilation performance. Ventilation systems shall be designed and installed to satisfy the ventilation requirements of Table 403.3.1.1 or Table 403.8.1. Breathing zone ventilation rates from Table 403.3.1.1 shall be calculated per Section 403.3.1.1 and corrected per zone air distribution effectiveness requirements per Section 403.3.1.2.

TABLE 403.8.1
VENTILATION RATES FOR ALL GROUP R
PRIVATE DWELLINGS, SINGLE AND MULTIPLE
(Continuously Operating Systems)

Floor Area (ft ²)	Bedrooms ^a				
	0-1	2-3	4-5	6-7	>7
<500	30	40	45	55	60
500 - 1000	45	55	60	70	75
1001 - 1500	60	70	75	85	90
1501 - 2000	75	85	90	100	105
2001 - 2500	90	100	105	115	120
2501 - 3000	105	115	120	130	135
3001 - 3500	120	130	135	145	150
>3500	135	145	150	160	165

a. Ventilation rates in table are minimum outdoor airflow rates ~~measured in~~(cfm).

403.8.1.1 Airflow Measurement. The airflow required by Section 403.8.1 is the quantity of outdoor ventilation air supplied and/or exhausted by the mechanical ventilation system as installed and shall be measured according to the ventilation equipment manufacturer’s instructions, or by using a flow hood, flow grid, or other airflow measuring device at the mechanical ventilation fan’s inlet terminals/grilles, outlet terminals/grilles, or the connected ventilation ducts. Ventilation airflow of system with multiple operating modes shall be tested in all modes design to meet Section 403.8.

403.8.2 Control and operation.

1. Location of controls. Controls for all ventilation systems shall be readily accessible by the occupant.
2. Instructions. Operating instructions for whole house ventilation systems shall be provided to the occupant by the installer of the system.

3. Local ventilation systems. Local ventilation systems shall be controlled by manual switches, dehumidistats, timers, or other approved means.
4. Continuous whole house ventilation systems. Continuous whole house ventilation systems shall operate continuously and be equipped with an override control. A “fan on” switch shall be ~~permitted~~required as an override control to allow residential unit occupants to shut off the ventilation system during periods of severe outdoor contamination. Controls shall be capable of operating the ventilation system without energizing other energy-consuming appliances. A clearly visible label shall be affixed to the controls that reads "Whole House Ventilation Switch (see operating instructions). Leave on except for severe outdoor contamination".
5. Intermittent whole house ventilation systems. Intermittent whole house ventilation systems shall comply with the following:
 - 5.1. They shall be capable of operating intermittently and continuously.
 - 5.2. They shall have controls capable of operating the exhaust fans, forced-air system fans, or supply fans without energizing other energy-consuming appliances.
 - 5.3. The ventilation rate shall be adjusted according to the exception in Section 403.8.5.1.
 - 5.4. The system shall be designed so that it can operate automatically based on the type of control timer installed.
 - 5.5. The intermittent mechanical ventilation system shall operate at least one hour out of every four.
 - 5.6. The system shall have a manual control and automatic control, such as a 24-hour clock timer.
 - 5.7. At the time of final inspection, the automatic control shall be set to operate the whole house fan according to the schedule used to calculate the whole house fan sizing.
 - 5.8. A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)."
6. Exception: Engineered central ventilation systems serving dwelling units or sleeping units are not required to have individual controls for each dwelling unit or sleeping unit when designed for continuous operation and approved by the code official.

403.8.3 Outdoor air intake locations. Outdoor air intakes shall be classified as either operable openings or mechanical air intakes and shall be located per the following criteria. The intake locations for operable openings and mechanical air intakes shall comply with the following:

1. Openings for mechanical air intakes shall comply with Section 401.4. Operable openings shall comply with Section 401.4 items 2 and 4 only.

Exception: Operable openings may be less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks when located a minimum of 15 feet (4572 mm) vertically above such locations.
2. Intake openings shall be separated from exhaust outlets in accordance with Section 501.3.1.
3. Intake openings shall not be located closer than 10 feet from an appliance vent outlet unless such vent outlet is 3 feet above the outdoor air inlet. The vent shall be permitted to be closer if specifically allowed by Chapter 8 or by the International Fuel Gas Code.
34. Intake openings shall be located where they will not pick up objectionable odors, fumes, or flammable vapors.
45. Intake openings shall be located where they will not take air from a hazardous or unsanitary location.
56. Intake openings shall be located where they will not take air from a room or space having a fuel-burning appliance.
67. Intake openings shall not be located closer than 10 feet from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet above the air inlet.
78. Intake openings shall not be located where they will take air from an attic, crawl space, or garage.
89. Intake openings shall not be located on asphalt roofs unless it is shown that no other location is permissible. In such cases, the inlet opening shall be located a minimum of 2 feet from the nearest surface of the asphalt roofing, measured from the intake opening.

403.8.4 Local ventilation requirements. Local exhaust ventilation systems shall exhaust at least the volume of air required for exhaust in Table 403.3.1.1. Exhaust shall be provided in each kitchen, bathroom, water closet, laundry area, indoor swimming pool, spa, and other room where water vapor or cooking odor is produced.

403.8.4.1 Local exhaust systems. Exhaust systems shall be designed and installed to meet all of the criteria below:

1. Local exhaust shall be discharged outdoors.
2. Exhaust outlets shall comply with Section 501.3.
3. Pressure equalization shall comply with Section 501.4.
4. Exhaust ducts in systems which are designed to operate intermittently shall be equipped with back-draft dampers.
5. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4.
6. Terminal outlet elements shall have at least the equivalent net free area of the ductwork.
7. Terminal outlet elements shall be screened or otherwise protected as required by Section 501.3.2.
8. Exhaust fans in separate dwelling units or sleeping units shall not share common exhaust ducts unless the system is engineered for this operation.
9. Where permitted by Chapter 5, multiple local exhaust ducts may be combined. If more than one of the exhaust fans in a dwelling unit or sleeping unit shares a common exhaust duct then each exhaust fan shall be equipped with a back-draft damper to prevent the recirculation of exhaust air from one room to another room via the exhaust ducting system.

403.8.4.2 Local exhaust fans. Exhaust fan construction and sizing shall meet the following criteria.

1. Exhaust fans shall be tested and rated in accordance with the airflow and sound rating procedures of the Home Ventilating Institute (HVI 915, HVI Loudness Testing and Rating Procedure, HVI 916, HVI Airflow Test Procedure, and HVI 920, HVI Product Performance Certification Procedure).

Exception: Where a range hood or down draft exhaust fan is used for local exhaust for a kitchen, the device is not required to be rated per these standards.

2. Installation of the system or equipment shall be carried out in accordance with manufacturers' installation instructions.
3. Fan airflow rating and duct system shall be designed and installed to deliver at least the exhaust airflow required by Table 403.3.1.1. The airflows required refer to the delivered airflow of the system as installed and tested using a flow hood, flow grid, or other airflow measurement device.

Exceptions:

1. An exhaust airflow rating at a pressure of 0.25 in. w.g. may be used, provided the duct sizing meets the prescriptive requirements of Table 403.8.4.2.
2. Where a range hood or down draft exhaust fan is used to satisfy the local ventilation requirements for kitchens, the range hood or down draft exhaust shall not be less than 100 cfm at 0.10 in. w.g.

403.8.5 Whole house ventilation requirements. Each dwelling unit or sleeping unit shall be equipped with one of the following four types of mechanical whole house ventilation systems: A system using exhaust fans (see Section 403.8.6); a system integrated with forced-air systems (see Section 403.8.7); a system using supply fans (see Section 403.8.8); or a heat or energy recovery ventilation system (see Section 403.8.9). The whole house exhaust system is permitted to be one of the local exhaust systems required by Section 403.8.4 as long as the requirements of this section, in addition to the requirement of Section 403.8.5, are met.

Exception: Additions, alterations, renovations or repairs to a mechanical system that is part of a building addition with less than 500 square feet of conditioned floor are exempt from the requirements for whole house ventilation systems, Section 403.8.5.

403.8.5.1 Outdoor air. Outdoor air shall be distributed to each habitable space. Where outdoor air supply intakes are separated from exhaust vents by doors, means shall be provided to ensure airflow to all separated habitable spaces by installing distribution ducts, installed grilles, transoms, doors undercut to a minimum of 1/2-

inch above the surface of the finish floor covering, or other similar means where permitted by the International Building Code.

The mechanical system shall operate continuously to supply at least the volume of outdoor air required in Table 403.3.1.1 or Table 403.8.1.

Exception: Intermittently operating ventilation systems: The whole house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table 403.3.1.1 or Table 403.8.1 is multiplied by the factor determined in accordance with Table 403.8.5.1.

**TABLE 403.8.5.1
INTERMITTENT WHOLE HOUSE MECHANICAL
VENTILATION RATE FACTORS^{a,b}**

Run-Time % in Each 4-hour Segment	25%	33%	50%	66%	75%	100%
Factor ^a	4	3	2	1.5	1.3	1.0

- a. For ventilation system run-time values between those given, the factors are permitted to be determined by interpolation.
- b. Extrapolation beyond the table is prohibited.

- a. For ventilation system run-time values between those given, the factors are permitted to be determined by interpolation.
- b. Extrapolation beyond the table is prohibited.

[Whole house ventilation system shall comply with the pressure equalization requirements of Section 501.4.](#)

403.8.5.2 Whole house supply system general requirements. Whole house ventilation systems integrated with a forced-air system, systems using supply fans and systems using a heat or energy recovery ventilation system shall comply with the following.

1. Outdoor air louvers shall be adequately sized for the required airflow and shall comply with Section 401.5. Outdoor air intake locations shall comply with mechanical air intakes requirements of Section 403.8.3.
2. Outdoor air ducts for dedicated or central supply systems and exhaust ducts for heat or energy recovery systems shall be provided with a means for balancing the system to the required airflow via balance dampers or other devices.
3. Outdoor air ducts, for dedicated or central systems shall be provided with motorized dampers.

Exceptions:

1. Outdoor air ducts at heat or energy ventilation systems are not required to have motorized dampers.
2. Outdoor air ducts at continuous ventilation systems are not required to have motorized dampers.
4. Outdoor air ducts in the conditioned space shall be insulated to a minimum of R-4. In heat or energy recovery ventilation systems, ducts upstream of the heat exchanger shall also be insulated to at least R-4.
5. All outdoor air ducts shall be designed and installed to deliver at least the outdoor airflow required by Section 403.8.5.1. The airflows required refer to the delivered airflow of the system as installed and tested using a flow hood, flow grid, or other airflow measurement device.

Exception: The outdoor air duct for supply fan systems and heat or energy recovery systems may be prescriptively sized per Table 403.8.5.2 for dedicated outdoor air ducts upstream of the supply fan. Supply fans shall have the capacity to provide the amount of outdoor air required by Section 403.8.5.1 at 0.40 in. w.g. as per HVI 916 (April 1995). When prescriptively sized the system shall be tested and balanced using a flow hood, flow-grid, or other airflow measurement device.

6. Whole house ventilation controls for intermittent operation shall allow concurrent operation of the forced-air fan and the associated outdoor air motorized damper.
7. Whole house ventilation controls for continuous operation shall be provided at the forced-air fan.

Exception: Engineered central ventilation systems serving dwelling units or sleeping units are not required to have individual controls for each dwelling unit or sleeping unit when designed for continuous operation and approved by the code official.

**TABLE 403.8.5.2
PRESCRIPTIVE SUPPLY FAN DUCT SIZING**

Supply Fan Tested CFM at 0.40" w.g.		
Specified Volume from Table 408.1	Minimum Smooth Duct Diameter	Minimum Flexible Duct Diameter
50-90 cfm	4 inch	5 inch
90-150 cfm	5 inch	6 inch
150-120 cfm	6 inch	7 inch
250-400 cfm	7 inch	8 inch

403.8.6 Whole house ventilation with exhaust fan systems. This section establishes minimum requirements for mechanical whole house ventilation systems using exhaust fans.

403.8.6.1 Outdoor air. Exhaust fan only ventilation systems shall provide outdoor air to each occupiable space through one of the following methods:

1. Outdoor air may be drawn through air inlets installed in exterior walls or windows. The air inlets shall comply with all of the following:
 - 1.1. Inlets shall have controllable, secure openings and shall be designed to not compromise the thermal properties of the building envelope.
 - 1.2. Inlets shall be accessible to occupants, including compliance with Section 1109.13 of the International Building Code for designated accessible units, Type A units and Type B units.
 - 1.3. Inlets shall be screened or otherwise protected from entry by insects, leaves, or other material.
 - 1.4. Inlets shall provide not less than 4 square inches of net free area of opening for each 10 cfm of outdoor air required in Table 403.3.1.1 or Table 403.8.1.
 - 1.5. Any inlet or combination of inlets which provide 10 cfm at 10 Pascals as determined by the Home Ventilation Institute Air Flow Test Standard (HVI 901 (November 1996)) are deemed equivalent to 4 square inches of net free area.
 - 1.6. Each occupiable space shall have a minimum of one air inlet that has a minimum of 4 square inches of net free area.
2. Outdoor air may be drawn in through operable openings to the outdoors. Each habitable space shall be provided with operable openings with an openable area of not less than 4 square inches of net free area of opening for each 10 cfm of outdoor air required by Table 403.3.1.1 or Table 403.8.1. Doors exiting to a corridor, court or public way shall not be used to provide outdoor air. The operable openings shall comply with the following:
 - 2.1. Openings shall be controllable, ~~and~~ securable at the minimum open position for ventilation, and shall be designed to not compromise the thermal properties of the building envelope.
 - 2.2. Openings shall be accessible to occupants, including compliance with Section 1109.13 of the International Building Code for designated accessible units, Type A units and Type B units.
 - 2.3. Openings shall be screened or otherwise protected from entry by leaves or other material.
3. For interior adjoining spaces without outdoor air openings, one of the following two options shall be used to ventilate the interior adjoining space:
 - 3.1. Provide a whole house transfer fan at the interior adjoining space sized to provide a minimum of the ventilation rate not less than the greater of 0.06 cfm/sf or 30 cfm required per Section 403.8.5.1. The transfer fan shall circulate air between the interior room or space and the adjacent habitable space. The transfer fan may operate continuously or intermittently using controls per Section 403.8.2.
 - 3.2. Provide a permanent opening to the interior adjoining space. Opening shall be unobstructed and shall have an area of not less than 8 percent of the floor area of the interior adjoining space, but not less than 25 square feet.

403.8.6.2 Outdoorside air intake locations. All outdoorside air intake opening types described in Section 403.8.6.1 shall be classified operable openings and shall not be classified as mechanical air intakes. The intake locations shall comply with Section 403.8.3.

403.8.6.3 Whole house exhaust system. Whole house exhaust system shall be designed and installed to meet all of the applicable criteria below:

1. Whole house ventilation exhaust shall be discharged outdoors.
2. Exhaust outlets shall comply with Section 501.2.
3. Exhaust ducts in systems which are designed to operate intermittently shall be equipped with back-draft dampers.
4. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4.5. Terminal outlet elements shall have at least the equivalent net free area of the ductwork.
5. Terminal outlet elements shall be screened or otherwise protected as required by Section 501.2.2.
6. One of the required local exhaust fans for the laundry room or bathroom may be designated as the whole house exhaust fan.
7. Exhaust fans in separate dwelling units or sleeping units shall not share common exhaust ducts unless the system is engineered for this operation.
8. Where permitted by Chapter 5 whole house exhaust ducts may be combined with other local exhaust ducts. If more than one of the exhaust fans in a dwelling unit or sleeping unit shares a common exhaust duct then each exhaust fan shall be equipped with a back-draft damper to prevent the recirculation of exhaust air from one room to another room via the exhaust ducting system.

403.8.6.4 Whole house exhaust and transfer fans. Exhaust fan construction and sizing shall meet the following criteria.

1. Exhaust and transfer fans shall be tested and rated in accordance with the airflow and sound rating procedures of the Home Ventilating Institute (HVI 915, HVI Loudness Testing and Rating Procedure, HVI 916, HVI Airflow Test Procedure, and HVI 920, HVI Product Performance Certification Procedure).
2. Installation of system or equipment shall be carried out in accordance with manufacturers' design requirements and installation instructions.
3. Fan airflow rating and duct system shall be designed and installed to deliver at least the outdoor airflow required by Table 403.3.1.1 or Table 403.8.1. The airflows required refer to the delivered airflow of the system as installed and tested using a flow hood, flow grid, or other airflow measurement device.
Exception: An airflow rating at a pressure of 0.25 in. w.g. may be used, provided the duct sizing meets the prescriptive requirements of Table 403.8.5.2.

403.8.6.5 Fan noise. Whole house exhaust and transfer fans located 4 feet or less from the interior grille shall have a sone rating of 1.0 or less measured at 0.10 inches water gauge. Manufacturer's noise ratings shall be determined as per HVI 915. Remotely mounted fans shall be acoustically isolated from the structural elements of the building and from attached ductwork using insulated flexible duct or other approved material.

403.8.7 Whole house ventilation integrated with forced-air systems. This section establishes minimum requirements for mechanical whole house ventilation systems using forced-air system fans.

403.8.7.1 Outdoor air. Forced-air system fan ventilation systems shall provide outdoor air through one of the following methods:

1. A dedicated outdoor air louver and outdoor air duct for each dwelling unit or sleeping unit shall supply outdoor air to the return side of the forced-air system fan; or
2. A central outdoor air delivery system that supplies multiple dwelling units or sleeping units shall supply outdoor air to the return side of the forced air system fan.
3. For interior adjoining spaces without supply air diffusers from the forced air system ~~outdoor air openings~~, one of the following two options shall be used to ventilate the interior adjoining space:

- 3.1. Provide a whole house transfer fan at the interior adjoining space sized to provide a minimum of the ventilation rate not less than the greater of 0.06 cfm/sf or 30 cfm required per Section 403.8.5.1. The transfer fan shall circulate air between the interior room or space and the adjacent habitable space. The transfer fan may operate continuously or intermittently using controls per Section 403.8.2.
- 3.2. Provide a permanent opening to the interior adjoining space. Opening shall be unobstructed and shall have an area of not less than 8 percent of the floor area of the interior adjoining space, but not less than 25 square feet.

403.8.7.2 Whole house forced-air system. Where outdoor air is provided to each habitable dwelling unit or sleeping unit by a forced-air system, the outdoor air duct shall be connected to the return air stream at a point within 4 feet upstream of the forced-air unit. It shall not be connected directly to the forced-air unit cabinet in order to prevent thermal shock to the heat exchanger. At a minimum, filtration of the outdoor air shall be provided at the forced-air unit. The filter shall be accessible for regular maintenance and replacement. The filter shall have a Minimum Efficiency Rating Value (MERV) of at least 6.

Each habitable space in the dwelling or sleeping unit shall be served by a forced-air system with outdoor air connection.

403.8.8 Whole house ventilation with supply fan systems. This section establishes minimum requirements for mechanical whole house ventilation systems using supply fan systems.

403.8.8.1 Outdoor air. Supply fan ventilation systems shall provide outdoor air through one of the following methods:

1. A dedicated outdoor air louver and outdoor air duct for each dwelling unit or sleeping unit shall supply outdoor air to a supply fan; or
2. A central outdoor air supply fan system shall distribute unconditioned or conditioned air to multiple dwelling units or sleeping units.
3. For interior adjoining spaces without supply air diffusers from the supply fan system outdoor air openings, one of the following two options shall be used to ventilate the interior adjoining space:
 - 3.1. Provide a whole house transfer fan at the interior adjoining space sized to provide a minimum of the ventilation rate not less than the greater of 0.06 cfm/sf or 30 cfm required per Section 403.8.5.1. The transfer fan shall circulate air between the interior room or space and the adjacent habitable space. The transfer fan may operate continuously or intermittently using controls per Section 403.8.2.
 - 3.2. Provide a permanent opening to the interior adjoining space. Opening shall be unobstructed and shall have an area of not less than 8 percent of the floor area of the interior adjoining space, but not less than 25 square feet.

403.8.8.2 Whole house supply system. Where outdoor air is provided to each habitable dwelling unit or sleeping unit by supply fan systems the outdoor air shall be filtered.

The system filter may be located at the intake device or inline with the fan. The filter shall be accessible for regular maintenance and replacement. The filter shall have a Minimum Efficiency Rating Value (MERV) of at least 6.

403.8.9 Whole house ventilation with heat recovery or energy recovery ventilation systems. This section establishes minimum requirements for mechanical whole house ventilation systems using heat recovery or energy recovery ventilation systems.

403.8.9.1 Outdoor air. Heat recovery or energy recovery ventilation systems shall provide outdoor air through one of the following methods:

1. A dedicated outdoor air louver and outdoor air duct for each dwelling unit or sleeping unit shall supply outdoor air to the heat recovery or energy recovery ventilator; or
2. A central outdoor air heat recovery or energy recovery unit shall distribute conditioned air to multiple dwelling units or sleeping units.

3. For interior adjoining spaces without ~~outdoor air openings~~ [supply air diffusers from heat recovery or energy recovery ventilation system](#), one of the following two options shall be used to ventilate the interior adjoining space:
 - 3.1. Provide a whole house transfer fan at the interior adjoining space sized to provide a minimum of the ventilation rate [not less than the greater of 0.06 cfm/sf or 30 cfm required per Section 403.8.5.1](#). The transfer fan shall circulate air between the interior room or space and the adjacent habitable space. The transfer fan may operate continuously or intermittently using controls per Section 403.8.2.
 - 3.2. Provide a permanent opening to the interior adjoining space. Opening shall be unobstructed and shall have an area of not less than 8 percent of the floor area of the interior adjoining space, but not less than 25 square feet.

403.8.9.2 Whole house heat recovery ventilator system. Where outdoor air is provided to each habitable dwelling unit or sleeping unit by heat recovery or energy recovery ventilator the outdoor air shall be filtered. The filter shall be located on the upstream side of the heat exchanger in both the intake and exhaust airstreams with a Minimum Efficiency Rating Value (MERV) of at least 6. The system filter may be located at the intake device or inline with the fan. The filter shall be accessible for regular maintenance and replacement.

Each habitable space in the dwelling or sleeping unit shall be served by a heat recovery ventilator system with outdoor air connection.

403.8.10 Local exhaust ventilation and whole house ventilation alternate performance or design requirements. In lieu of complying with Sections 403.8.4 or 403.8.5 compliance with the section shall be demonstrated through engineering calculations by an engineer licensed to practice in the state of Washington or by performance testing. Documentation of calculations or performance test results shall be submitted to and approved by the building official. Performance testing shall be conducted in accordance with approved test methods.

403.8.11 Alternate systems. When approved by the code official, systems designed in accordance with ASHRAE Standard 62.2 shall be permitted.

5. **Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.** Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Corrects errors and omissions in the residential ventilation section to clarify code.](#)

[See reference below for 62.2 requirements for the fan on switch.](#)

B3.1 Mechanical Ventilation System Design, Installation, Maintenance, and Operation. The concentration of indoor contaminants can increase if ventilation systems are inadequately designed, installed, maintained, or operated or if strong local contaminant sources are not isolated, spot-ventilated, or controlled. Manual switches associated with a continuous ventilation system should have a clear label such as, "This controls the ventilation system of the home. Leave on except for severe outdoor contamination." Appendix A contains guidelines on operations and maintenance procedures and documentation.

6. **Specify what criteria this proposal meets.** You may select more than one.
 The amendment is needed to address a critical life/safety need.

- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. **Is there an economic impact:** Yes No

Explain: **No significant economic impact.** Depending on how code is interpreted there could be a cost impact for additional balancing scope.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. _19-IMC32

1. State Building Code to be Amended:

- International Building Code
- ICC ANSI A117.1 Accessibility Code
- International Existing Building Code
- International Residential Code
- International Fire Code
- Uniform Plumbing Code

- International Mechanical Code
- International Fuel Gas Code
- NFPA 54 National Fuel Gas Code
- NFPA 58 Liquefied Petroleum Gas Code
- Wildland Urban Interface Code

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): 403.8

Title: Ventilation systems for residential occupancies

2. Proponent Name (Specific local government, organization or individual):

Proponent: Chuck Murray, Department of Commerce

Title:

Phone: 360-725-3113

Email: chuck.murray@commerce.wa.gov

3. Designated Contact Person:

Name: David Baylon

Title: Consultant

Address: 922 34th Ave

Seattle WA 98122

Office Phone: (206)596-4706

Cell: (206) 719-5772

E-Mail address: david@ecotope.com

4. **Proposed Code Amendment.** Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) WA-IMC Section(s) 403.8

Additions to Chapter 2, Section 202 General Definitions

Balanced Ventilation. Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10% of the total mechanical supply airflow rate.

Distributed Ventilation System. A whole house ventilation system shall be considered distributed when it supplies ventilation air directly (not transfer air) to each common area and bedroom, and/or exhausts air directly to outdoors from all kitchens and bathrooms.

Mixed Ventilation Zone. A whole house ventilation system shall be considered *mixed* if a circulation system recirculates at least 50% of the dwelling air volume each hour.

~~403.8 Ventilation systems for Group R occupancies.~~ Each dwelling unit or sleeping unit shall be equipped with local exhaust and whole house ventilation systems and shall comply with Sections 403.8.1 through 403.8.11. All occupied spaces, including public corridors, other than the Group R dwelling and sleeping unit, that support the Group R occupancy shall meet the ventilation requirements of Section 402 or Sections 403.1 to 403.7.

~~403.8.1 Minimum ventilation performance.~~ Ventilation systems shall be designed and installed to satisfy the ventilation requirements of Table 403.3.1.1 or Table 403.8.1. Breathing zone ventilation rates from Table 403.3.1.1 shall be calculated per Section 403.3.1.1 and corrected per zone air distribution effectiveness requirements per Section 403.3.1.2.

TABLE 403.8.1 VENTILATION RATES FOR ALL GROUP R PRIVATE DWELLINGS, SINGLE AND MULTIPLE (Continuously Operating Systems)

Floor Area (ft ²)	Bedrooms ^a				
	0-1	2-3	4-5	6-7	>7
<500	30	40	45	55	60
500—1000	45	55	60	70	75
1001—1500	60	70	75	85	90
1501—2000	75	85	90	100	105
2001—2500	90	100	105	115	120
2501—3000	105	115	120	130	135
3001—3500	120	130	135	145	150
>3500	135	145	150	160	165

a. Ventilation rates in table are minimum outdoor airflow rates measured in cfm.

403.8.2 Control and operation.

1. ~~Location of controls.~~ Controls for all ventilation systems shall be readily accessible by the occupant.
2. ~~Instructions.~~ Operating instructions for whole house ventilation systems shall be provided to the occupant by the installer of the system.
3. ~~Local ventilation systems.~~ Local ventilation systems shall be controlled by manual switches,

dehumidistats, timers, or other approved means.

4. ~~Continuous whole house ventilation systems. Continuous whole house ventilation systems shall operate continuously and be equipped with an override control. A "fan on" switch shall be permitted as an override control. Controls shall be capable of operating the ventilation system without energizing other energy-consuming appliances. A clearly visible label shall be affixed to the controls that reads "Whole House Ventilation (see operating instructions)."~~
5. ~~Intermittent whole house ventilation systems. Intermittent whole house ventilation systems shall comply with the following:~~
 - 5.1 ~~They shall be capable of operating intermittently and continuously.~~
 - 5.2 ~~They shall have controls capable of operating the exhaust fans, forced-air system fans, or supply fans without energizing other energy-consuming appliances.~~
 - 5.3 ~~The ventilation rate shall be adjusted according to the exception in Section 403.8.5.1.~~
 - 5.4 ~~The system shall be designed so that it can operate automatically based on the type of control timer installed.~~
 - 5.5 ~~The intermittent mechanical ventilation system shall operate at least one hour out of every four.~~
 - 5.6 ~~The system shall have a manual control and automatic control, such as a 24-hour clock timer.~~
 - 5.7 ~~At the time of final inspection, the automatic control shall be set to operate the whole house fan according to the schedule used to calculate the whole house fan sizing.~~
 - 5.8 ~~A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)."~~

Exception: Engineered central ventilation systems serving dwelling units or sleeping units are not required to have individual controls for each dwelling unit or sleeping unit when designed for continuous operation and approved by the code official.

403.8.3 Outdoor air intake locations. ~~Outdoor air intakes shall be classified as either operable openings or mechanical air intakes and shall be located per the following criteria. The intake locations for operable openings and mechanical air intakes shall comply with the following:~~

1. ~~Openings for mechanical air intakes shall comply with Section 401.4. Operable openings shall comply with Section 401.4 items 2 and 4 only.~~
2. ~~Intake openings shall not be located closer than 10 feet from an appliance vent outlet unless such vent outlet is 3 feet above the outdoor air inlet. The vent shall be permitted to be closer if specifically allowed by Chapter 8 or by the International Fuel Gas Code.~~
3. ~~Intake openings shall be located where they will not pick up objectionable odors, fumes, or flammable vapors.~~
4. ~~Intake openings shall be located where they will not take air from a hazardous or unsanitary location.~~
5. ~~Intake openings shall be located where they will not take air from a room or space having a fuel-burning appliance.~~
6. ~~Intake openings shall not be located closer than 10 feet from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet above the air inlet.~~
7. ~~Intake openings shall not be located where they will take air from an attic, crawl space, or garage.~~
8. ~~Intake openings shall not be located on asphalt roofs unless it is shown that no other location is permissible. In such cases, the inlet opening shall be located a minimum of 2 feet from the nearest surface of the asphalt roofing, measured from the intake opening.~~

403.8.4 Local ventilation requirements. ~~Local exhaust ventilation systems shall exhaust at least the volume of air required for exhaust in Table 403.3.1.1. Exhaust shall be provided in each kitchen, bathroom, water closet, laundry area, indoor swimming pool, spa, and other room where water vapor or cooking odor~~

is produced.

403.8.4.1 Local exhaust systems. Exhaust systems shall be designed and installed to meet all of the criteria below:

1. Local exhaust shall be discharged outdoors.
 2. Exhaust outlets shall comply with Section 501.3.
 3. Pressure equalization shall comply with Section 501.4.
 4. Exhaust ducts in systems which are designed to operate intermittently shall be equipped with back-draft dampers.
 5. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4.
 6. Terminal outlet elements shall have at least the equivalent net free area of the ductwork.
 7. Terminal outlet elements shall be screened or otherwise protected as required by Section 501.3.2.
- Exhaust fans in separate dwelling units or sleeping units shall not share common exhaust ducts unless the system is engineered for this operation. Where permitted by Chapter 5, multiple local exhaust ducts may be combined. If more than one of the exhaust fans in a dwelling unit or sleeping unit shares a common exhaust duct then each exhaust fan shall be equipped with a back-draft damper to prevent the recirculation of exhaust air from one room to another room via the exhaust ducting system.

403.8 Whole-house mechanical ventilation system, R occupancies. Each dwelling unit or sleeping unit shall be equipped with a whole-house mechanical ventilation system complying with Sections 403.8.1 through 403.8.6. Each dwelling unit or sleeping shall be equipped with local exhaust complying with Section 403.8.6. Where a dwelling unit shares demising walls, floors, ceilings, or common corridors with another dwelling unit it shall be considered an attached dwelling unit and shall be ventilated in accordance with section 403.8.4.2. All occupied spaces, including public corridors, other than the Group R dwelling units and/or sleeping units, that support the Group R occupancy shall meet the ventilation requirements of Section 402 and Sections 403.1 to 403.7.

403.8.1 System design. The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such a system.

403.8.2 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at an average rate-not less than that determined-by Equation 4-9 or Table 403.8.1.

$Q_r = 0.01 * A_{\text{floor}} + 7.5 * (N_{\text{br}} + 1)$ (Equation 4-9)

where:

Q_r = ventilation airflow rate, cubic feet per minute (cfm)

A_{floor} = Conditioned floor area, square feet (ft²)

N_{br} = number of bedrooms, not less than one.

**TABLE 403.8.1
WHOLE-HOUSE MECHANICAL VENTILATION
AIRFLOW RATE**

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	1	2	3	4	5
≤ 500	30	30	35	45	50
501 – 1,000	30	35	40	50	55
1,001-1,500	30	40	45	55	60

<u>1,501 – 2,000</u>	<u>35</u>	<u>45</u>	<u>50</u>	<u>60</u>	<u>65</u>
<u>2,001 – 2,500</u>	<u>40</u>	<u>50</u>	<u>55</u>	<u>65</u>	<u>70</u>
<u>2,501 – 3,000</u>	<u>45</u>	<u>55</u>	<u>60</u>	<u>70</u>	<u>75</u>
<u>3,001 – 3,500</u>	<u>50</u>	<u>60</u>	<u>65</u>	<u>75</u>	<u>80</u>
<u>3,501 – 4,000</u>	<u>55</u>	<u>65</u>	<u>70</u>	<u>80</u>	<u>85</u>
<u>4,001 – 4,500</u>	<u>60</u>	<u>70</u>	<u>75</u>	<u>85</u>	<u>90</u>
<u>4,501 – 5,000</u>	<u>65</u>	<u>75</u>	<u>80</u>	<u>90</u>	<u>95</u>

a. Minimum airflow set at 30 CFM for all dwelling units.

403.8.3 Ventilation quality adjustment. The minimum whole-house ventilation rate from Section 403.8.7 shall be adjusted by the system coefficient in Table 403.8.2 based on the system type.

$$Q_v = Q_r * C_{\text{system}} \quad \text{(Equation 4-10)}$$

where:

Q_v = quality-adjusted ventilation airflow rate in cubic feet per minute (cfm)

Q_r = ventilation airflow rate, cubic feet per minute (cfm) from Equation 4-9 or

Table 403.8.1

C_{system} = system coefficient from Table 403.8.2

TABLE 403.8.2
SYSTEM COEFFICIENT (C_{system})

<u>System Type</u>	<u>Distributed</u>	<u>Not distributed</u>
<u>Balanced</u>	<u>1.0</u>	<u>1.25</u>
<u>Not balanced</u>	<u>1.25</u>	<u>1.5</u>

403.8.4 Ventilation residential occupancies: Ventilation systems shall meet the requirements of this section.

Sizing and distribution shall be in accordance with sections 403.8.7 and 403.8.8. Ventilation systems serving dwelling units or sleeping units are not required to have individual controls for each dwelling unit or sleeping unit when designed for continuous operation and approved by the code official.

403.8.4.1. Ventilation in R-2 occupancies: The mechanical ventilation system shall be a balanced system sized in accordance with Equation 4-9. Balanced systems shall have a sensible heat recovery capability as prescribed in section C402.5.1.2 of the WSEC. The ventilation system shall operate continuously.

403.8.4.2. Other attached dwelling units: The dwelling unit mechanical ventilation system shall be a sized in accordance with Section 403.8.2 without adjustments. Such systems shall operate continuously at this rate.

403.8.4.3. Detached dwelling units¹. The dwelling unit mechanical ventilation system shall be a sized in accordance with Section 403.8.2 and 403.8.3. The system shall be controlled in accordance with Section 403.8.6.

403.8.5 System controls:

- 1) The whole house ventilation system shall be controlled with timers or other means that provide for automatic operation of the ventilation system;
- 2) The whole-house mechanical ventilation system shall be provided with controls that enable manual override except as provided in section 403.8.4;
- 3) Whole house ventilation systems shall be capable of operating continuously except as provided in Section in 403.8.6.

403.8.6 System Component Requirements. Ventilation fans specified in this section shall have a minimum efficacy of .65 Watts/cfm and shall be rated for sound at a maximum of 1.0 sone.

403.8.6.1. Exhaust Fans: Exhaust fans required shall be ducted directly to the outside. Exhaust fans shall be tested and rated in accordance with the airflow and sound rating procedures of the Home Ventilating Institute (HVI 915, HVI Loudness Testing and Rating Procedure, HVI 916, HVI Airflow Test Procedure,

¹ For detached dwelling units only, ASHRAE Standard 62.2 may be used to show compliance with this standard.

and HVI 920, HVI Product Performance Certification Procedure). Exhaust fans required in this section may be used to provide local ventilation. Such fans will provide occupant controlled high speed operation to meet the requirements of Section 403.8.7.

403.8.6.2 Supply Fans. Supply fans used in meeting the requirements of this section shall draw outside air in accordance with section 403.3. Where outdoor air is provided to each habitable dwelling unit or sleeping unit by supply fan systems the outdoor air shall be filtered. The filter shall be accessible for regular maintenance and replacement. The filter shall have a Minimum Efficiency Rating Value (MERV) of at least 13.

403.8.6.3 Furnace Integrated Supply. Systems using space condition air handler fans for supply air distribution are not permitted.

Exception: Air handler fans which have multi-speed capacity where the low speed is not greater than 25% of the rated air flow capacity. The low speed shall be used for ventilation or a variable speed capacity that can be set to comply with the requirements of this section may be used. To allowed air intake must meet the provisions of section 403 and that air intake must include a motorized damper that is activated by the ventilation system controller. The flow rate for the air intake must be verified and the results of the test in accordance with section 403.8.6.6.

403.8.6.5 Intermittent operation. Systems controlled to operate intermittently shall operate for a least two hours in each four occupied hours. The ventilation airflow rate shall be computed as the average rate including both times of operation and non-operation. Fans installed in accordance with this section shall be sized using equation 4-10 as modified in this section.

403.8.6.6. Testing. Whole-house mechanical ventilation systems shall be tested and verified to provide a flow rate not less than the minimum required by Section 403.8.2 and 403.8.3. Testing shall be performed according to the ventilation equipment manufacturer's instructions, or by using a flow hood, flow grid, or other airflow measuring device at the mechanical ventilation fan's inlet terminals, outlet terminals or grilles or in the connected ventilation ducts. Where required by the building official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the building official.

403.8.4-403.8.7 Local exhaust. Bathrooms, toilet rooms, and kitchens shall include a local exhaust system. Such local exhaust systems shall have the capacity to exhaust the minimum airflow rate in accordance with Table 403.8.3 and Table 403.3.1.1 (including notes). Fans required by this section shall be provided with controls that enable manual override. An “on/off” switch shall meet this requirement. Fan controls shall be readily accessible in the room served by the fan.

403.8.7.1 Whole house exhaust controls. If the local exhaust fan is included in an exhaust only ventilation system, in accordance with section 403.8.6, then the exhaust fan shall be controlled to operate as specified in section 403.8.5

**TABLE 403.8.3
MINIMUM LOCAL EXHAUST RATES**

<u>AREA TO BE EXHAUSTED</u>	<u>EXHAUST RATES</u>	
	<u>Intermittent</u>	<u>Continuous</u>
<u>Kitchens</u>	<u>150 cfm</u>	<u>50 cfm</u>
<u>Bathrooms-Toilet Rooms</u>	<u>50 cfm</u>	<u>20 cfm</u>

403.8.4.2 403.8.7.2 Local exhaust fans. Exhaust fan shall meet the following criteria.

1. Exhaust fans shall be tested and rated in accordance with the airflow and sound rating procedures of the Home Ventilating Institute (HVI 915, HVI Loudness Testing and Rating Procedure, HVI 916, HVI Airflow Test Procedure, and HVI 920, HVI Product Performance Certification Procedure).
2. Fan airflow rating and duct system shall be designed and installed to deliver at least the exhaust airflow required by Table 403.8.3. The airflows required refer to the delivered airflow of the

- system as installed and tested using a flow hood, flow grid, or other airflow measurement device.
3. Design and installation of the system or equipment shall be carried out in accordance with manufacturers' installation instructions.
 4. Fan airflow rating and duct system shall be designed and installed to deliver at least the exhaust airflow required by Table 403.3.1.1. The airflows required refer to the delivered airflow of the system as installed and tested using a flow hood, flow grid, or other airflow measurement device.

Exceptions:

1. An exhaust airflow rating at a pressure of 0.25 in.w.g. may be used, provided the duct sizing meets the prescriptive requirements of Table 403.8.4.2.
2. Where a range hood or down draft exhaust fan is used to satisfy the local ventilation requirements for kitchens, the range hood or down draft exhaust shall not be less than 100 cfm at 0.10 in. w.g.

**TABLE 403.8.4.2
PRESCRIPTIVE EXHAUST DUCT SIZING**

Fan Tested cfm at 0.25 inches w.g.	Minimum Flex Diameter	Maximum Length in Feet	Minimum Smooth Diameter	Maximum Length in Feet	Maximum Elbows ^a
50	4 inches	25	4 inches	70	3
50	5 inches	90	5 inches	100	3
50	6 inches	No Limit	6 inches	No Limit	3
80	4 inches ^b	NA	4 inches	20	3
80	5 inches	15	5 inches	100	3
80	6 inches	90	6 inches	No Limit	3
100	5 inches ^b	NA	5 inches	50	3
100	6 inches	45	6 inches	No Limit	3
125	6 inches	15	6 inches	No Limit	3
125	7 inches	70	7 inches	No Limit	3

- a. For each additional elbow, subtract 10 feet from length.
- b. Flex ducts of this diameter are not permitted with fans of this size

5. **Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.** Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

The code proposal is aimed at the residential occupancies that are covered in the IMC. The Washington State IMC has a unique feature of a specific section that specifies requirements for the ventilation system in residences separate from the table 403.3.1 requirements. This section has been constructed over time and includes the old VIAQ code that was part of the Washington code package since 1991. In 2015 the requirements were expanded using language from the IRC and language from the ASHRAE Standard 62.2-2016. As these disparate codes were merged, inconsistencies IMC resulted in contradictory requirements with the IRC and with the previous versions of the VIAQ. Specifically, the central table (from Standard 62.2) has resulted in a increase in the ventilation requirements without the attending offsets in that standard. The IRC remains at the previous level that was drawn from ASHRAE 62.2-2010. This combination of standards has led to a confusing set of requirements that demand high air flows without any guidance on the types of systems and the types of designs.

The proposed amendment removes the bulk of section 403.8 and replaces with a simplified (and enforceable) standard that is based on two tables. The first table (403.8.1) expands the IRC table and provides a more granular set of standards. In additions the table set a minimum ventilation rate of 30 CFM regardless of dwelling size. The second table provides design guidance (table 403.8.2) that is meant to increase ventilation flow when the system installed is

providing only point source ventilation and relying on convection or other incidental mixing to distribute the ventilation air. These two tables together result in a ventilation flow similar to the existing standard if an exhaust only system is installed.

The second major change is a requirement for balanced flow ventilation in multi-family dwelling units. The impetus for this change is the observation from the Department of Health that cross contamination (odors, smoke, cooking fumes) between units are the leading cause of complaints to the DOH from multifamily units of all vintages. This proposal provides a continuous operation coupled with balanced flow to minimize pressure differential between units and thus reduce or eliminate the cross flow between adjacent units.

For single family attached units there is no restriction on ventilation system design but continuous operation is required. For single family dwellings there are no restriction on system design or control beyond the tables that set the ventilation CFM.

The local exhaust requirements in the current code are largely unchanged except that minimal continuous flow has been removed from the current language.

The proposed code amendment is substantially simplified from the current language and allows the building officials to check two significant table to establish compliance. The controls which are now unclear and allow many options that would otherwise confuse or degrade the ventilation provided is now limited at least for multifamily construction which would allow a very much simplified and enforceable standard for these systems.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain:

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$1.20/square foot (\$950/ dwelling unit- Multi-family only)
[This change does not imply a system change for other residential units.]

Assumptions:

- 10 units @ 800 sf/unit. Double loaded corridor
- 50 CFM/unit ventilation requirement
- Two penetration in each unit (supply and return) with 4" round metal duct (fire damper not required) [26 sq.in. per unit, 180 sq.ft. unit common wall to the corridor]
- Remove one bath fan and duct penetration in each unit, \$200/unit credit.

Cost calculations:

- 500 CFM Lossnay ERV or equivalent \$3000 (bid price at \$6/CFM)
- Exterior penetrations, ducts, terminations 1500 (bids estimate)
- Interior duct at Corridor 2 @100 ft. 2000
- Unit transitions, ducts, ducts grills @ \$500/unit 5000
- Unit credit (one penetration, bath fan and duct) @200/unit (2000)

- Total system cost (balanced system with ERV core) \$9500

- Cost per unit (10 units) \$950
- Cost per sq.ft. (8000 sq.ft.) \$1.20/sf (units only)

Benefit calculations:

- Energy savings: .65 Sensible heat recovery (heating only) 940kWh/unit
- Annualized system benefit @ 0.09/kWh \$85
- Annualized system cost (4%, 15 year life) \$55
- Benefit/cost 1.5
- Payback (full system) 11.2 years

IAQ benefit not quantified-- but significant health benefits and reduced occupant complaints are anticipated.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

The change proposal will require less interaction with the proposer. The Building official can establish compliance with the review of two prescriptive tables.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC19

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

403.8.2

Title:

Control and Operation

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of the Home Ventilating Institute (HVI)

Title: Consulting Engineer

Date: December 6, 2018

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment.

403.8.2 Control and operation.

Code(s) International Mechanical Code with WA Amendments

Section(s) 403.8.2

Amend section to read as follows:

403.8.2 Control and operation.

1. Location of controls. Controls for all ventilation systems shall be readily accessible by the occupant.
2. Instructions. Operating instructions for whole-house ventilation systems shall be provided to the occupant by the installer of the system.
3. Local exhaust systems. Local exhaust systems shall be controlled by manual switches, dehumidistats, timers, or other approved means
4. Continuous whole-house ventilation systems. Continuous whole-house ventilation systems shall operate continuously and be equipped with an override control. A "fan on" switch shall be permitted as an override control. Controls shall be capable of operating the ventilation system without energizing other energy-consuming appliances. Controls shall include text or a symbol indicating their function.~~A clearly visible label shall be affixed to the controls that reads "Whole House Ventilation (see operating instructions)."~~

[Rest of Section Unchanged]

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

The International Mechanical Code with Washington Amendments currently requires a whole-house mechanical ventilation (WHMV) system in Group R dwelling and sleeping units. Often, these systems are simply bathroom exhaust fans that run continuously or on a programmed intermittent basis. In many cases, occupants have no understanding of the purpose of these systems and turn them off – thereby increasing the rate of accumulation of indoor pollutants. The labeling requirements put forth by this proposal will serve to educate and inform occupants regarding the proper maintenance and operation of these systems.

This language is similar to that in the 2018 IMC, Section 403.3.2.4, which states, "...controls for outdoor air ventilation systems shall include text or a symbol indicating the system's function." By approving this proposal, Washington's 2018 IRC labeling requirements will be consistent with the 2018 IMC as well as ASHRAE 62.2. A companion proposal has been proposed to the 2018 IRC with WA State amendments to apply the same requirements for controls of whole-house ventilation systems serving one- and two-family dwelling units and townhomes.

Further, the Home Ventilating Institute (HVI) (an industry association representing nearly 90% of the manufacturers of residential ventilating products in the U.S) will soon launch a label that can be used for identifying whole-house mechanical ventilation fans. The label references a website where users will be able to find information about WHMV systems, their purpose, and proper operation and maintenance. If WA does not align its code with this language, then technically, the logo would not be permitted for use in Washington State for compliance with M1507.3.2, since M1507.3.2 technically requires the phrase "see operating instructions".

This code language will make enforcement of WHMV code requirements easier because the control and the whole house mechanical ventilation system will be more readily identifiable on a national basis, across builders, installers, and manufacturers. Following is an example of what the label is expected to look like when installed on a switch:



Additionally, following is the draft Q&A that is intended to be accessible to consumers from HVI's website. Launch of this website and availability of the labels is expected by July, 2019.

- **What does the *Fresh Air System* label mean?**
It means that you have a whole house ventilation system installed to provide you with fresh air throughout the year.
- **Why do I need this system?**
Tight, durable, and energy-efficient homes need mechanical ventilation to provide enough fresh air to maintain acceptable indoor air quality; such systems are now required by code; the associated energy costs of operating are minimal compared to the overall health benefits.
- **How should I operate this system?**
In most cases, whole house ventilation systems are designed to operate continuously and should only be turned off in the case of severe outdoor air contamination. This guidance is from American Society of Heating Refrigerating & Air Conditioning Engineers (ASHRAE) Guideline 24.
- **How should I maintain my whole house ventilation system?**
Check with the manufacturer for recommended maintenance of your ventilation system, which, depending on the system, may include cleaning air inlets and outlets and replacing filters.
- **Who can I contact with additional questions?**
Please contact the manufacturer of your individual ventilation system for additional information. For questions on HVI or the *Fresh Air System* label program please email info@hvi.org.

6. **Specify what criteria this proposal meets.** You may select more than one.

- The amendment is needed to address a critical life/safety need.
- X The amendment clarifies the intent or application of the code and aligns WA's code with the 2018 IMC.
- The amendment is needed to address a specific state policy or statute.

- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. **Is there an economic impact:** Yes No

Explain: The code change proposal will not increase or decrease the cost of construction since a label is already required.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

This proposal will expedite inspections by clearly labeling the WHMV controls and system.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. IMC13 Rev

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

2018 IRC 501.3

Title:

Exhaust discharge

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of the Broan

Title: Consulting Engineer

Date: February 6, 2019

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment. M1503.3 Exhaust discharge.

Code(s) 2018 International Mechanical Code Section(s) 501.3

Amend section to read as follows:

501.3 Exhaust discharge. The air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a public nuisance and not less than the distances specified in Section 501.3.1. The air shall be discharged to a location from which it cannot again be readily drawn in by a ventilating system. Air shall not be exhausted into an attic, crawl space, or be directed onto walkways.

Exceptions:

1. Whole-house ventilation-type attic fans shall be permitted to discharge into the attic space of *dwelling units* having private attics.
2. Commercial cooking recirculating systems.
3. Where installed in accordance with the manufacturer's Instructions, ~~and~~ where mechanical or *natural ventilation* is otherwise provided in accordance with Chapter 4, and where serving as a replacement for an existing ductless range hood, listed and labeled domestic ductless range hoods shall not be required to discharge to the outdoors.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

Cooking is typically the largest source of indoor air pollution in homes, with concentrations of key pollutants frequently exceeding U.S. National Ambient Air Quality Standards. Over time, exposure to these pollutants has been shown to reduce length and quality of life. Clearly, kitchen ventilation is needed to comply with the purpose of the IRC to "safeguard public safety, health, and general welfare through...ventilation" (among other means). Unless captured and exhausted at the source, cooking pollutants spread rapidly through a home and deposit themselves on surfaces, only to be released again into the breathing zone when disturbed at a later time. For new construction, requiring that the range hood be ducted is a very low-cost item with high returns in terms of occupant health. For reasons of constructability and cost sensitivity (not health), this proposal would only permit ductless range hoods when they are installed as a replacement for an existing ductless range hood.

Bibliography:

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6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: The code change proposal will increase the cost of construction where a kitchen range hood exhaust duct is not already being installed.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Estimated costs: \$0.01/square foot, or \$24.85/ dwelling unit)

Costs are based on the assumption of one foot of 3.25”x10” duct and one exterior damper. Installed duct costs can be estimated at ~ \$9.85 per linear foot for 3.25"x10" galvanized sheet metal (RS Means, 2015, Section 23 31 13.13.0500), and a damper would cost about \$15 retail. The total cost is \$24.85/dwelling

unit, or \$0.01/sqft for a typical single-family home (assume 2400 ft²). Where the range hood is not located on an exterior wall, costs will increase at a rate of \$9.85 per linear foot of duct needed to reach the exterior. In many cases, where builders are already providing range hood ducts, there will be no additional cost.

The additional cost can be recovered from the monetization of health benefits associated with exhausting kitchen pollutants to the exterior. Generated during cooking events, PM_{2.5}, which is particulate matter with a diameter of 2.5 microns or less, has been identified as being responsible for the lion's share of negative health effects (i.e., "disability adjusted life years" or "DALYs") associated with poor indoor air quality in U.S. residences, accounting for ~1,000 DALYs lost annually per 100,000 persons.¹ The monetary value of a DALY has been estimated at \$100-\$200k.^{1,2,3,4} Taking the low end of this range, if this proposal results in range hood ducts being installed in 25,000 new low-rise dwelling units in Washington State annually (assume 2.5 people/dwelling unit), and the DALYs lost in these homes could be reduced by just 5%, the monetized value of improving residential IAQ could be over \$3 million annually:

$$5\% \text{ DALY reduction} \cdot \frac{1,000 \text{ DALYs}}{100,000 \text{ people}} \cdot 25,000 \text{ homes} \cdot 2.5 \text{ people/home} \cdot \frac{\$100,000}{\text{DALY}} = \$3.125 \text{ million annually}$$

The simple payback on this proposal would thus be less than one year: $\frac{(25,000 \text{ homes} \cdot \frac{\$24.85}{\text{home}})}{\$3.125 \text{ million}} = 2.4 \text{ months}$

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application: ~1-2 minutes to confirm existence of a range hood exhaust duct.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.

¹ Turner WJN, Logue JM, and Wray CP. 2012. Commissioning Residential Ventilation Systems: A Combined Assessment of Energy and Air Quality Potential Values. LBNL-5969E.

² Brown DW. 2008. Economic value of disability-adjusted life years lost to violence: estimates for WHO Member States. Rev. Panam Salud Publica, 24, 203-209.

³ Lvovsky K, Huges G, Maddison D, Ostro B, and Pearce D. 2000. Environmental costs of fossil fuels: a rapid assessment method with application to six cities. Washington, D.C.: The World Bank Environment Department.

⁴ Highfill T and Bernstein E. 2014. Using Disability Adjusted Life Years to Value the Treatment of Thirty Chronic Conditions in the U.S. from 1987-2010. U.S. Department of Commerce Bureau of Economic Analysis WP 2014-9.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC28u

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): **501.3.1**

Title: **Location of Exhaust Outlet**

2. Proponent Name (Specific local government, organization or individual):

Proponent: **Eric Vander Mey, PE**
Title: **Engineer**
Date: **2019-04-15**

3. Designated Contact Person:

Name: **Eric Vander Mey, PE**
Title: **Engineer**

Office Phone: **(206) 285-7114**
Cell: **(206) 321-1677**
E-Mail address: **ericv@rushingco.com**

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 IMC **Section(s)** 501.3.1

Amend section to read as follows:

501.3.1 Location of Exhaust Outlet. The termination point of exhaust outlets and ducts discharging to the outdoors shall be located with the following minimum distances:

5. For enclosed parking garage exhaust system outlets and transformer vault exhaust system outlets: 10 feet (3048 mm) from property lines which separate one lot from another; 10 feet (3048 mm) from operable openings into buildings; 10 feet (3048 mm) horizontally from, above or below adjoining finished sidewalk.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Clarifies intent for distances for garage exhaust outlets to sidewalks](#)

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: [No significant cost impact. Clarifies intent for distances.](#)

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. _19-IMC29

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [501.4](#)

Title: [Pressure Equalization](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) [2018 IMC](#) **Section(s)** [501.4](#)

Enforceable code language must be used; see an example [by clicking here](#).
Amend section to read as follows:

501.4 Pressure equalization. Mechanical exhaust systems shall be sized to remove the quantity of air required by this chapter to be exhausted. The system shall operate when air is required to be exhausted. Where mechanical exhaust is required in a room or space, such space shall be maintained with a neutral or negative pressure. If a greater quantity of air is supplied by a mechanical ventilating supply system than is removed by a mechanical exhaust for a room, adequate means shall be provided for the natural or mechanical exhaust of the excess air supplied. If only a mechanical exhaust system is installed for a room or if a greater quantity of air is removed by a mechanical exhaust system than is supplied by a mechanical ventilating supply system for a room, adequate makeup air consisting of supply air, transfer air or outdoor air shall be provided to satisfy the deficiency. The calculated building infiltration rate shall not be used to satisfy the requirements of this section.

Exception: [Domestic range exhaust, domestic dryer exhaust, and local exhaust systems in R-3 occupancies and dwelling units in R-2 occupancies are excluded from the pressure equalization requirement unless required by Section 504.5 or Section 505.2.](#)

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Clarifies that whole house ventilation systems are not exempt from pressure equalization requirements.](#)

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: [No signification change. Just clarification of code requirements.](#)

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). [Webinars on the tool can be found \[Here\]\(#\) and \[Here\]\(#\)](#))

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC33 u

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [506.3.2.4](#)

Title: [Vibration Isolation](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) **2018 IMC** Section(s) **506.3.2.4**

Amend section to read as follows:

506.3.2.3 Duct-to-exhaust fan connections. Duct-to-exhaust fan connections shall be flanged and gasketed at the base of the fan for vertical discharge fans; shall be flanged, gasketed and bolted to the inlet of the fan for side-inlet utility fans; and shall be flanged, gasketed and bolted to the inlet and outlet of the fan for in-line fans. Gasket and sealing materials shall be rated for continuous duty at a temperature of not less than 1500°F (816°C).

506.3.2.4 Vibration isolation. A vibration isolation connector for connecting a duct to a fan shall consist of noncombustible packing in a metal sleeve joint of approved design or shall be a coated-fabric flexible duct connector ~~listed and labeled for the application rated for continuous duty at temperature of not less than 1500° F (816° C)~~. Vibration isolation connectors shall be installed only at the connection of a duct to a fan inlet or outlet.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Correlate the requirements of 506.3.2.3 to 506.3.2.4.](#)

[Need viable options for fan flexible connectors. Don't know of any specifically listed and labeled for grease exhaust. There are flexible connectors that are rated for the temperature requirements of 506.3.2.3.](#)

[Flex connectors are required for seismic isolation and vibration isolation for acoustics.](#)

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: [No increase costs as this allows flexibility for products available.](#)

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. _19-IMC30u

1. State Building Code to be Amended:

- International Building Code
- ICC ANSI A117.1 Accessibility Code
- International Existing Building Code
- International Residential Code
- International Fire Code
- Uniform Plumbing Code

- International Mechanical Code
- International Fuel Gas Code
- NFPA 54 National Fuel Gas Code
- NFPA 58 Liquefied Petroleum Gas Code
- Wildland Urban Interface Code

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [Section 510](#)

Title: [Waste or Linen Chute Venting](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 WSMC **Section(s)** 510

Amend section to read as follows:

SECTION 515

WASTE OR LINEN CHUTE VENTING

515.1 General. Waste or linen chutes shall be gravity vented per NFPA 82.

Exception: Waste or linen chutes may be mechanically ventilated by an exhaust fan in accordance with International Building Code Section 713.13.7. ~~The exhaust fan shall be located outside the building at the top of the chute.~~

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Correlates code requirements to 2018 Washington State amendments to 713.13.7](#)

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: [No significant cost impact.](#)

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC34u

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [601.2](#)

Title: [Air Movement in Egress Corridors](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 WSMC **Section(s)** 601.2

Amend section to read as follows:

601.2 Air movement in egress elements. Corridors shall not serve as supply, return, exhaust, relief or ventilation air ducts.

Exceptions:

1. Use of a corridor as a source of makeup air for exhaust systems in rooms that open directly onto such corridors, including toilet rooms, bathrooms, dressing rooms, smoking lounges and janitor closets, shall be permitted provided that each such corridor is directly supplied with outdoor air at a rate greater than the rate of makeup air taken from the corridor.
2. Where located within a dwelling unit, the use of corridors for conveying return air shall not be prohibited.
3. Where located within tenant spaces of 1,000 square feet (93 m²) or less in area, utilization of corridors for conveying return air is permitted.
4. Incidental air movement from pressurized rooms within health care facilities, provided that the corridor is not the primary source of supply or return to the room.
5. Where such air is part of an engineered smoke control system.
6. Air supplied to corridors serving residential occupancies shall not be considered as providing ventilation air to the dwelling units and sleeping units subject to the following:
 - 6.1. The air supplied to the corridor is 100% outside air, and
 - 6.2. The units served by the corridor have conforming ventilation air independent of the air supplied to the corridor, and
 - 6.3. For other than high-rise buildings, the supply fan will automatically shut off upon activation of corridor smoke detectors installed in accordance with Section 606.2.4 ~~which shall be spaced at no more than 30 feet (9144 mm) on center along the corridor~~, or
 - 6.4. For high-rise buildings, the supply fan will automatically shut off upon activation of the smoke detectors required by International Fire Code Section 907.2.12.1 or upon receipt of another approved fire alarm signal. The supply fan is not required to be automatically shut off when used as part of an approved building stairwell or elevator hoistway pressurization system. Corridor smoke detectors shall be installed in accordance with Section 606.2.5. ~~corridor smoke detector activation will close required smoke/fire dampers at the supply inlet to the corridor at the floor receiving the alarm.~~

606.2.4 Corridors Serving Group R Occupancies in other than high-rise buildings. Corridors that serve Group R occupancies in other than high-rise buildings and that are mechanically ventilated with supply air shall be equipped with smoke detectors spaced in accordance with NFPA 72. The supply fan shall automatically shut off upon activation of the corridor smoke detectors.

Exception: Corridor smoke detection is not required when air is returned back to the supply fan from the corridor and return air smoke detectors are installed in the return air duct or plenum upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment and appliances designed to automatically shut off the supply fan.

606.2.5 Corridors Serving Group R Occupancies in high-rise buildings. Corridors that serve Group R occupancies in high-rise buildings and that are mechanically ventilated with supply air shall be equipped with smoke detectors that are spaced in accordance with NFPA 72 and air supply inlets to the corridor shall be provided with smoke/fire dampers. The supply inlet smoke/fire dampers shall automatically close upon activation of the corridor smoke detectors.

Exceptions:

1. Corridor smoke detection is not required to close the supply inlet smoke/fire dampers when the smoke/fire dampers are used as part of an approved building stairwell or elevator hoistway pressurization smoke control system.
2. Corridor smoke detection is not required when air is returned back to the supply fan from the corridor and return air smoke detectors are installed in the return air duct or plenum upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment and appliances designed to automatically shut off the supply fan.

- 5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.** Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Reorganize residential corridor smoke detection requirements to describe the base as requiring the smoke detectors and the exception to remove them if return air smoke detection is utilized.

- 6. Specify what criteria this proposal meets.** You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

- 7. Is there an economic impact:** Yes No

Explain: No economizer impact as this is just a reorganization of the code.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC31u

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s): [Section 605.1](#)

Title: [General](#)

2. Proponent Name (Specific local government, organization or individual):

Proponent: [Eric Vander Mey, PE](#)
Title: [Engineer](#)
Date: [2019-04-15](#)

3. Designated Contact Person:

Name: [Eric Vander Mey, PE](#)
Title: [Engineer](#)

Office Phone: [\(206\) 285-7114](#)
Cell: [\(206\) 321-1677](#)
E-Mail address: ericv@rushingco.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) **2018 WSMC** Section(s) **605.1**

Amend section to read as follows:

605.1 General. Heating and air-conditioning systems shall be provided with approved air filters. Filters shall be installed such that all return air, outdoor air and makeup air is filtered upstream from any heat exchanger or coil. Filters shall be installed in an approved convenient location. Liquid adhesive coatings used on filters shall have a flash point not lower than 325°F (163°C).

Exception: ~~Chilled beams that are designed to operate above the space dew point temperature~~ Cooling coils that are designed, controlled and operated to provide sensible cooling only do not require filtration at the terminal device.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

[Update language to 62.1-2016 standard language.](#)

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: [No impact just a change to 2015 WSMC code language to match 62.1.](#)

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. _____

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

1209.5

Title:

Clarification - Thermal barrier requirements for snow melt systems using embedded piping

2. Proponent Name (Specific local government, organization or individual):

Proponent: Shane Nilles – City of Cheney

Title: Building Official / Public Works Manager

Date:

3. Designated Contact Person:

Name: Shane Nilles

Title: Building Official / Public Works Manager

Address: 112 Anderson Rd., Cheney, WA 99004

Office Phone: (509) 498-9229

Cell: ()

E-Mail address: snilles@cityofcheney.org

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) International Mechanical Code Section(s) 1209.5

Radiant floor heating and snow melt systems shall be provided with a thermal barrier in accordance with Sections 1209.5.1 through 1209.5.4.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

The purpose of the amendment is to clarify that snow melt systems that are designed to elevate the temperature of concrete, asphalt, pavers, or other exterior walking surfaces, are required to be isolated from the adjacent areas by a thermal barrier. The thermal barrier is necessary to prevent heat loss to the ground below or to the adjacent conductive surfaces so that the snow melt system can work more efficiently and as intended. Currently, the language may mislead the reader to believe that the provisions of 1209.5 should only apply radiant space-heating systems located within interior spaces, but by making this amendment, the provisions will more clearly apply to snow melt systems that perform the same function (raising the temperature of the surface area) while affecting the building's energy and therefore should be regulated to assure that the system will operate as intended and in an efficient manner.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: *This amendment is clarification in nature only. No calculations regarding the costs for installation, nor the savings in use during the life of the installation, should be necessary.*

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). [Webinars on the tool can be found Here and Here](#))

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

As the proposed amendment is to clarify a requirement that is currently miss understood by designer, contractors, and inspectors, the amount of time needed for plan review and inspections should be reduced as there will be less time needed for corrections.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

1. State Building Code to be Amended:

- | | |
|---|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

IMC 1402.8.1.2

Title:

Rooftop mounted solar collectors

2. Proponent Name (Specific local government, organization or individual):

Proponent: Lee Kranz

Title: WABO Technical Code Development Committee Chair

Date: May 15, 2018

3. Designated Contact Person:

Name: Lee Kranz

Title: WABO Technical Code Development Committee Chair

Address: 450 110th Ave. NE, Bellevue, WA 98004

Office Phone: (425)-452-2732

Cell: (206)-915-5835

E-Mail address: lkranz@bellevuewa.gov

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

See attached code change proposals M172 + Modification

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

See attached code change proposals

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

See attached code change proposals

7. Is there an economic impact: Yes No

See attached code change proposals

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.

M127-18**IMC: 1402.8.1.2**

Proponent: Lee Kranz, representing Washington Association of Building Officials Technical Code Development Committee (lkranz@bellevuewa.gov); Angela Haupt (AHaupt@kirklandwa.gov)

2018 International Mechanical Code**Revise as follows:**

1402.8.1.2 Rooftop-mounted solar thermal collectors and systems. The roof shall be constructed to support the loads imposed by roof-mounted solar collectors. Where mounted on or above the roof covering, the collector array ~~and supporting construction, stanchions and their attachments to the roof~~ shall be constructed of noncombustible materials or fire-retardant-treated wood conforming to the International Building Code to the extent required for the type of roof construction of the building to which the collectors are accessory.

Reason:

This code change clarifies that roof mounted solar collectors, the supports between the collectors and the roof (for example, sleepers, curbs and stanchions), and the attachments to the roof are required to be of non-combustible materials or FRT wood. The current text could be misinterpreted to mean that the entire roof assembly supporting the collectors and associated equipment, even if allowed to be of combustible materials by other provisions of the code, needs to be noncombustible materials or FRT which is not the case.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

Clarrification only.

Internal ID:

FLOOR MODIFICATION

M127-18-CAIN-1

Proponent of Floor Modification: Joseph Cain, representing Solar Energy Industries Association

2018 International Mechanical Code

Modify proposal as follows:

1402.8.1.2 Rooftop-mounted solar thermal collectors and systems. The roof shall be constructed to support the loads imposed by roof-mounted solar collectors. Where mounted on or above the roof covering, the collector array, ~~stanchions~~ mounting systems and their attachments to the roof shall be constructed of noncombustible materials or fire-retardant-treated wood conforming to the International Building Code to the extent required for the type of roof construction of the building to which the collectors are accessory.

**FLOOR MODIFICATION
M127-18-CAIN-1**

Internal ID:



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log # 19-IMC02

1. State Building Code to be Amended:

- International Building Code
- ICC ANSI A117.1 Accessibility Code
- International Existing Building Code
- International Residential Code
- International Fire Code
- Uniform Plumbing Code

- International Mechanical Code
- International Fuel Gas Code
- NFPA 54 National Fuel Gas Code
- NFPA 58 Liquefied Petroleum Gas Code
- Wildland Urban Interface Code

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

1402.8.1.2

Title:

Rooftop-mounted solar thermal collectors and systems

2. Proponent Name (Specific local government, organization or individual):

Proponent: Washington Association of Building Officials

Title: Plans Examiner

Date: 5/22/2018

3. Designated Contact Person:

Name: James Tumelson

Title: Plans Examiner

Address: 123 5th Ave Kirkland WA 98033

Office Phone: (425)587-3617

E-Mail address: Jtumelson@kirklandwa.gov

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) 2018 International Mechanical Code **Section(s)** 1402.8.1.2

1402.8.1.2 Rooftop-mounted solar thermal collectors and systems. The roof shall be constructed to support the loads imposed by roof-mounted solar collectors. Where mounted on or above the roof covering, the collector array, ~~and supporting construction~~ mounting systems and their attachments to the roof shall be constructed of noncombustible materials or fire-retardant-treated wood conforming to the International Building Code to the extent required for the type of roof construction of the building to which the collectors are accessory.

Enforceable code language must be used; see an example [by clicking here](#).

Amend section to read as follows:

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

Reason:

This code change clarifies that roof mounted solar collectors, the supports between the collectors and the roof (for example, sleepers, curbs and stanchions), and the attachments to the roof are required to be of non-combustible materials or FRT wood. The current text could be misinterpreted to mean that the entire roof assembly supporting the collectors and associated equipment, even if allowed to be of combustible materials by other provisions of the code, needs to be noncombustible materials or FRT which is not the case.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain:

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$[Click here to enter text](#)./square foot (For residential projects, also provide \$[Click here to enter text](#)./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC09 Rev

1. State Building Code to be Amended:

- | | |
|--|---|
| <input type="checkbox"/> International Building Code | <input type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input checked="" type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

Chapter 2 (definitions), Chapter 2, M1507.3.3

Title:

Definitions; Mechanical ventilation rate

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of Broan

Title: Consulting Engineer

Date: February 6, 2019

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment.

Code(s) 2018 IRC with WA State amendments Section(s) Chapter 2, M1507.3.3

Chapter 2 definitions: Add new definition as follows

BALANCED VENTILATION. Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate and is within 10% of the total mechanical supply airflow rate. The balanced ventilation system airflow is the average of the supply and exhaust airflows.

Amend Section M1507.3.3 to read as follows:

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Table M1507.3.3(1) or not less than that determined by Equation 15-1.

Ventilation rate in cubic feet per minute = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)] Equation 15-1

Exceptions:

1. Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1507.3.3(1) or Equation 15-1 shall be reduced by 30%, provided that both of the following conditions apply:

1.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

1.1.1. Living room

1.1.2. Dining room

1.1.3. Kitchen.

1.2. The whole-house ventilation system is a balanced ventilation system.

2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1), by Equation 15-1, or by Exception 1 is multiplied by the factor determined in accordance with Table M1507.3.3(2).

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

This proposal establishes a ventilation rate credit for balanced systems that is similar to a credit provided within ASHRAE 62.2 and is aligned with recent action taken by the ICC in 2018 Group A on proposals RM22 and RM24, which modified the IRC to provide such a rate credit. Balanced mechanical ventilation systems provide superior ventilation to unbalanced systems, and should not be required to provide the same rate as less effective, unbalanced systems to provide equivalent ventilation. This proposed credit for balanced ventilation is a simplified version that was derived from ASHRAE 62.2-2016 Equation 4.2 (published in addendum s). The ASHRAE equation adjusts the balanced whole house ventilation flow rate as a function of building air leakage, building height, and weather and shielding factor (which approximates climate zone). The ASHRAE equation can be simplified by developing a one-size-fits-all balanced system factor using the following methodology:

1. Define a typical new, single-family detached home. The home characteristics were as follows: 2600 ft²; 3-bedroom; heights of 8, 17, and 26 feet above grade for one-, two- and three-story versions of the typical home; and leakage rate of 4.5 ACH₅₀ in CZ 1-2 and 2.5 ACH₅₀ in CZ 3-8. Note: Higher values for air leakage provide larger credits for balanced ventilation systems. To be conservative, assume that the average home was slightly tighter than the 2018 IECC maximum leakage rates of 5 ACH₅₀ in CZ 1-2 and 3 ACH₅₀ in CZ 3-8 (i.e., 4.5 ACH₅₀ instead of 5 ACH₅₀ in CZ 1-2 and 2.5 ACH₅₀ instead of 3 ACH₅₀ in CZ 3-8).

2. Calculate the average weather and shielding factor across each climate zone using over 1000 weather stations catalogued in Appendix B of ASHRAE 62.2.
3. Calculate the ASHRAE 62.2-2016 flow rates for balanced and unbalanced systems in the one-, two-, and three-story versions of the typical home across all IECC climate zones using Equation 4.2 and the average weather and shielding factors calculated in step 2.
4. Calculate the percent reduction in the balanced system ventilation rate versus the unbalanced systems' ventilation rate for each case. Apply weightings to the percent reductions for one-, two-, and three-story cases in each climate zone based on average U.S. Census Data (i.e., 44% are assumed to be one-story; 52% are assumed to be two-story; 4% are assumed to be 3-story in each climate zone). Sum the weighted percent reductions for the various stories to develop an estimated percent reduction for each climate zone.

Following is a table that summarizes interim and aggregate results of these steps used to calculate the balanced ventilation system rate credit of 30%. The weighted average percent reduction in flow rate for balanced systems across each climate zone varied from 22% to 41%. The average percent reduction in flow rate for balanced systems across all scenarios for the typical home is ~30%.

Percent Reduction Possible in Ventilation Fan Flow Rate When Specifying Balanced vs. Unbalanced: 4.5 ACH50 in CZ 1-2 & 2.5 ACH50 in CZ 3-8				
CZ	Stories and Distribution			Weighted Average Across All Stories
	44%	52%	4%	
	1-story	2-story	3-story	
1A	31%	42%	50%	38%
2A	30%	41%	49%	37%
2B	34%	46%	55%	41%
3A	18%	25%	29%	22%
3B	20%	27%	32%	24%
3C	21%	28%	34%	25%
4A	20%	27%	32%	24%
4B	24%	33%	39%	29%
4C	23%	31%	36%	27%
5A	23%	31%	37%	28%
5B	24%	33%	39%	29%
6A	25%	34%	40%	30%
6B	27%	37%	44%	33%
7	29%	39%	46%	35%
8	34%	46%	54%	41%
Average of weighted averages				31%

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- X The amendment clarifies the intent or application of the code (and aligns with 2021 IRC).
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. **Is there an economic impact:** Yes No

Explain: The code change proposal can decrease first costs and energy costs associated with balanced ventilation systems.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application: No additional time is required for enforcement.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. IMC08 Rev

1. State Building Code to be Amended:

- | | |
|--|---|
| <input type="checkbox"/> International Building Code | <input type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input checked="" type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

2018 IRC M1503.3

Title:

Exhaust discharge

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of the Broan

Title: Consulting Engineer

Date: February 6, 2019

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment. M1503.3 Exhaust discharge.

Code(s) 2018 International Residential Code Section(s) M1503.3

Amend section to read as follows:

M1503.3 Exhaust discharge. Domestic cooking exhaust equipment shall discharge to the outdoors through a duct. The duct shall have a smooth interior surface, shall be air tight, shall be equipped with a backdraft damper and shall be independent of all other exhaust systems. Ducts serving domestic cooking exhaust equipment shall not terminate in an attic or crawl space or areas inside the building.

Exception: Where installed in accordance with the manufacturer's instructions, ~~and~~ where mechanical or natural ventilation is otherwise provided, and where serving as a replacement for an existing ductless range hood, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

Cooking is typically the largest source of indoor air pollution in homes, with concentrations of key pollutants frequently exceeding U.S. National Ambient Air Quality Standards. Over time, exposure to these pollutants has been shown to reduce length and quality of life. Clearly, kitchen ventilation is needed to comply with the purpose of the IRC to "safeguard public safety, health, and general welfare through...ventilation" (among other means). Unless captured and exhausted at the source, cooking pollutants spread rapidly through a home and deposit themselves on surfaces, only to be released again into the breathing zone when disturbed at a later time. For new construction, requiring that the range hood be ducted is a very low-cost item with high returns in terms of occupant health. For reasons of constructability and cost sensitivity (not health), this proposal would only permit ductless range hoods when they are installed as a replacement for an existing ductless range hood.

Bibliography:

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6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: The code change proposal will increase the cost of construction where a kitchen range hood exhaust duct is not already being installed.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Estimated costs: \$0.01/square foot, or \$24.85/ dwelling unit)

Costs are based on the assumption of one foot of 3.25”x10” duct and one exterior damper. Installed duct costs can be estimated at ~ \$9.85 per linear foot for 3.25"x10" galvanized sheet metal (RS Means, 2015, Section 23 31 13.13.0500), and a damper would cost about \$15 retail. The total cost is \$24.85/dwelling

unit, or \$0.01/sqft for a typical single-family home (assume 2400 ft²). Where the range hood is not located on an exterior wall, costs will increase at a rate of \$9.85 per linear foot of duct needed to reach the exterior. In many cases, where builders are already providing range hood ducts, there will be no additional cost.

The additional cost can be recovered from the monetization of health benefits associated with exhausting kitchen pollutants to the exterior. Generated during cooking events, PM_{2.5}, which is particulate matter with a diameter of 2.5 microns or less, has been identified as being responsible for the lion's share of negative health effects (i.e., "disability adjusted life years" or "DALYs") associated with poor indoor air quality in U.S. residences, accounting for ~1,000 DALYs lost annually per 100,000 persons.¹ The monetary value of a DALY has been estimated at \$100-\$200k.^{1,2,3,4} Taking the low end of this range, if this proposal results in range hood ducts being installed in 25,000 new low-rise dwelling units in Washington State annually (assume 2.5 people/dwelling unit), and the DALYs lost in these homes could be reduced by just 5%, the monetized value of improving residential IAQ could be over \$3 million annually:

$$5\% \text{ DALY reduction} \cdot \frac{1,000 \text{ DALYs}}{100,000 \text{ people}} \cdot 25,000 \text{ homes} \cdot 2.5 \text{ people/home} \cdot \frac{\$100,000}{\text{DALY}} = \$3.125 \text{ million annually}$$

The simple payback on this proposal would thus be less than one year: $\frac{(25,000 \text{ homes} \cdot \frac{\$24.85}{\text{home}})}{\$3.125 \text{ million}} = 2.4 \text{ months}$

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application: ~1-2 minutes to confirm existence of a range hood exhaust duct.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.

¹ Turner WJN, Logue JM, and Wray CP. 2012. Commissioning Residential Ventilation Systems: A Combined Assessment of Energy and Air Quality Potential Values. LBNL-5969E.

² Brown DW. 2008. Economic value of disability-adjusted life years lost to violence: estimates for WHO Member States. Rev. Panam Salud Publica, 24, 203-209.

³ Lvovsky K, Huges G, Maddison D, Ostro B, and Pearce D. 2000. Environmental costs of fossil fuels: a rapid assessment method with application to six cities. Washington, D.C.: The World Bank Environment Department.

⁴ Highfill T and Bernstein E. 2014. Using Disability Adjusted Life Years to Value the Treatment of Thirty Chronic Conditions in the U.S. from 1987-2010. U.S. Department of Commerce Bureau of Economic Analysis WP 2014-9.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. IMC07 Rev

1. State Building Code to be Amended:

- | | |
|--|---|
| <input type="checkbox"/> International Building Code | <input type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input checked="" type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

2018 IRC M1504.3

Title:

Exhaust openings

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of Broan

Title: Consulting Engineer

Date: February 6, 2019

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment.

Code(s) 2018 International Residential Code Section(s) M1504.3

Amend Section M1504.3 to read as follows:

M1504.3 Exhaust openings. Air exhaust openings shall terminate as follows:

1. Not less than 3 feet (914 mm) from property lines.
2. Not less than 3 feet (914 mm) from gravity air intake openings, operable windows and doors.
3. Not less than 10 feet (3048 mm) from mechanical air intake openings except where either of the following apply:
 - 3.1. The exhaust opening is located not less than 3 feet (914 mm) above the air intake opening.
 - 3.2. The exhaust opening is part of a factory-built intake/exhaust combination termination fitting installed in accordance with the manufacturer's instructions, and the exhaust air is drawn from a living space.
4. Openings shall comply with Sections R303.5.2 and R303.6.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

Intake/exhaust combination terminations are regularly installed with heating and energy recovery ventilators (H/ERVs) used for dwelling units. Their use reduces building penetrations, labor, and associated system costs. By reducing the number of penetrations, air leakage can also be reduced, resulting in space conditioning energy savings. Further, the durability of the structure can be improved through reducing entry pathways for bulk water. These devices have been provided by manufacturers for installation with dwelling unit ventilation systems for about 2 decades with no known failures reported. Despite being provided by manufacturers of H/ERVs, addressed in manufacturer installation instructions, and approved by ASHRAE 62.2, these fittings are not technically approved by the IRC based on the language in Section M1504.3.

Manufacturer tests conducted by Natural Resources Canada (NRC) have demonstrated that use of factory-built intake/exhaust combination terminations results in minimum cross-contamination of airflows (i.e., not exceeding 4%; see NRC report A1-007793). These results are aligned with ASHRAE 62.2 approval of such devices which limits cross-contamination to 10%, as verified by the manufacturer. If approved, this proposed modification to the IRC would limit application of intake/exhaust combination terminations to “factory-built” units. Approval of this proposed modification is expected to result in more affordable and architecturally-flexible terminations.

Note: The IRC defines living space as, “space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes”. The use of the term “environmental air” was also considered, but was abandoned because “environmental air” can also include exhaust air from parking garages and clothes dryers, which we want to exclude from this exception.

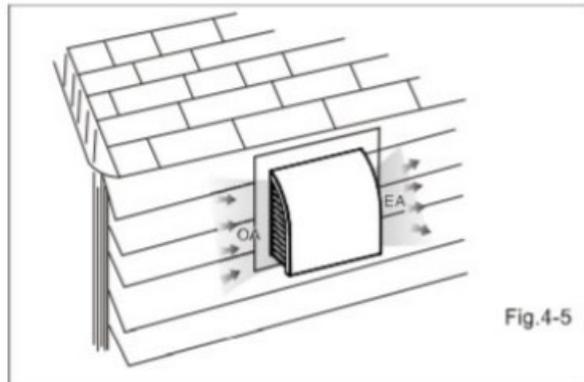
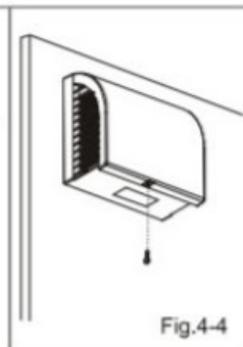
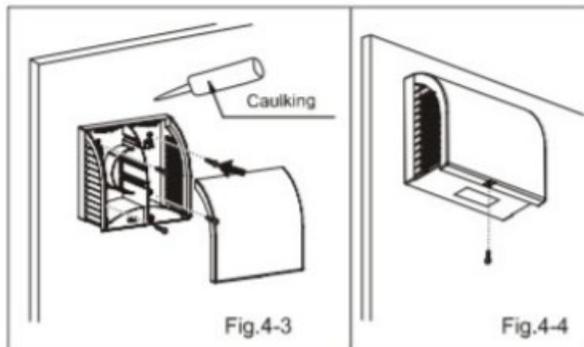
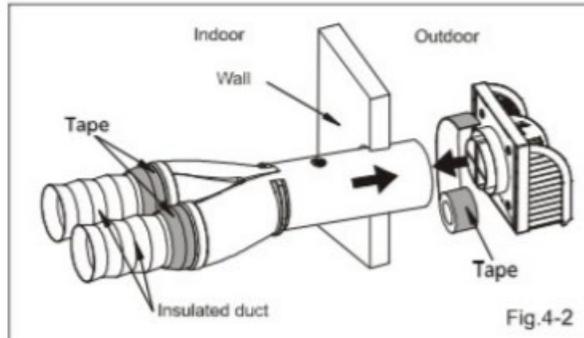
Following are examples of factory-built intake/exhaust combination termination fittings from manufacturer literature:

INSTALLATION I (JOIST MOUNTING-I) CONTINUED

10. Install outdoor hood and connect with insulated ducts.

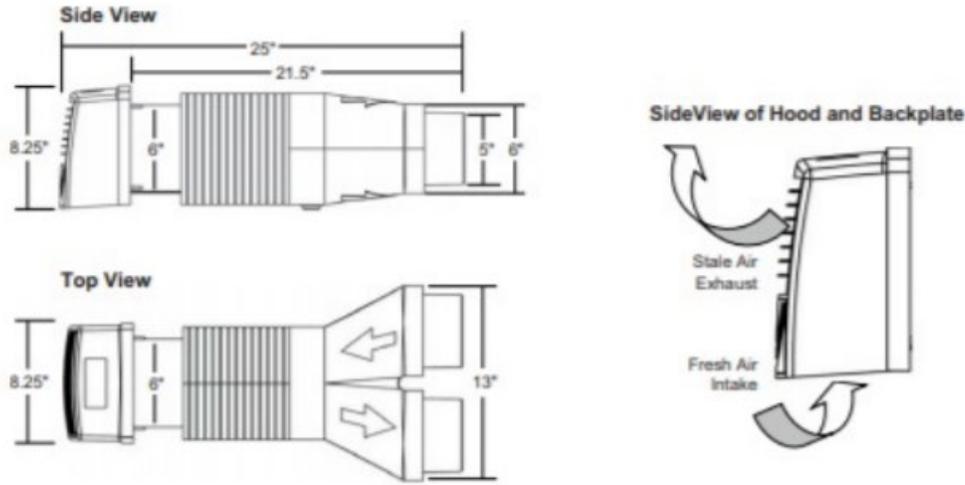
(1) Panasonic recommends the use of the optional Wall Cap (Model: FV-WC04VE1) which is easy to install with one wall penetration and keeps the airstreams separate to minimize short-circuiting. (Fig.4-2~5)

For more details, please check the INSTALLATION INSTRUCTIONS of Wall Cap.



Dual Hood Part 99-190

With the Lifebreath Dual Hood, only one 6 in hole is required in the exterior wall to complete two connections: fresh air intake and stale air exhaust.

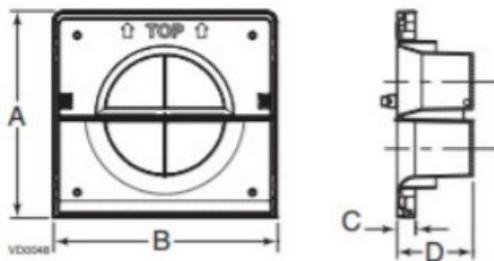


Note

- Tested by: National Research Council Canada
- Program: Building Regulations for Market Access Report Number: A1-007793
- Report Date: 15 February 2016
- Found to comply with requirement as set in the NBC

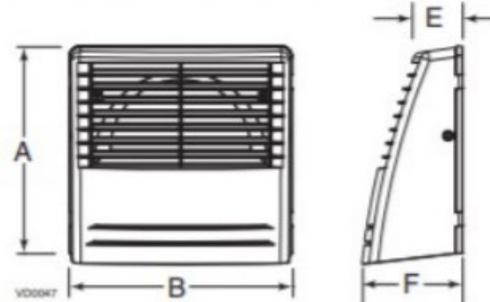
Dimensions of the Dual Outdoor Port Backplate

A	B	C	D
8 ⁷ / ₈ " (214 mm)	9" (231 mm)	3 ⁴ / ₄ " (19 mm)	3" (76 mm)

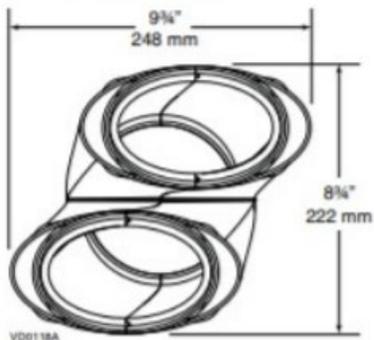


Dimensions of the Dual Outdoor Port

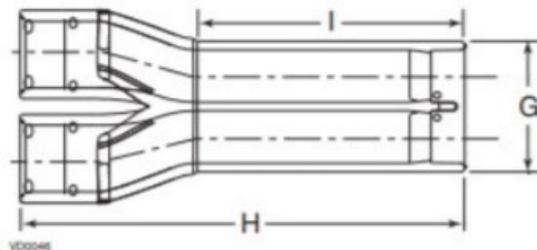
A	B	E	F
8 ⁷ / ₈ " (214 mm)	9" (231 mm)	1 ⁷ / ₈ " (48 mm)	3 ³ / ₈ " (92 mm)



Dimensions of the Transition

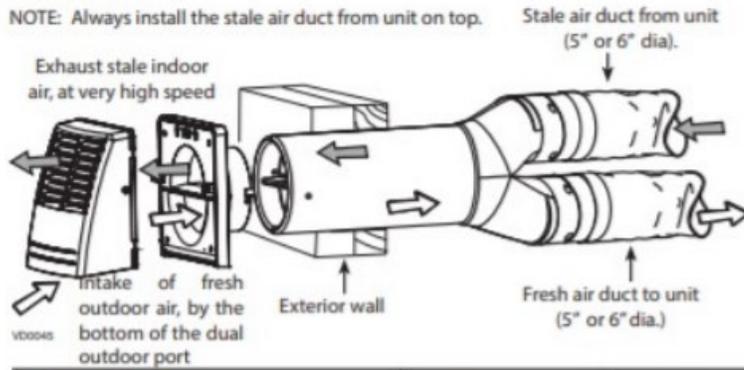


G	H	I
6" (152 mm)	20" (508 mm)	11 ¹ / ₈ " (289 mm)



Installation

NOTE: Always install the stale air duct from unit on top.



Specifications and ratings

- Part number: VTYIK1
- Material for transition: Expanded polystyrene, Grade 54 (building material)
- Material for dual outdoor port: White polypropylene
- Contamination rate: 3.2% between stale air to outdoors and fresh air from outdoors

Submitted by:		Date:	Project:
Quantity:	Model number:	Remarks:	Location:
			Architect:
			Engineer:
			Contractor:



Broan-NuTone LLC, 926 West State Street, Hartford, WI 53027 (1-877-862-7626)

VTYIK1d180118

Bibliography:

Ouazia, B. 2016. Evaluation of a dual hood performance in term of contaminant re-entrainment from exhaust to supply. A1-007793. National Research Council Canada. For a copy of the report, please contact the proponent at the email address provided. Additional reports are available from the proponent upon request.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: The code change proposal can decrease first costs associated with balanced ventilation systems, where such systems are specified.

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application: No additional time is required for enforcement.

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC10 Rev

1. State Building Code to be Amended:

- International Building Code
- ICC ANSI A117.1 Accessibility Code
- International Existing Building Code
- International Residential Code
- International Fire Code
- Uniform Plumbing Code

- International Mechanical Code
- International Fuel Gas Code
- NFPA 54 National Fuel Gas Code
- NFPA 58 Liquefied Petroleum Gas Code
- Wildland Urban Interface Code

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

M1507.3.2

Title:

Control and Operation

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of the Home Ventilating Institute (HVI)

Title: Consulting Engineer

Date: December 6, 2018

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment.

M1507.3.2 System controls.

Code(s) International Residential Code with WA Amendments

Section(s) M1507.3.2

Amend section to read as follows:

M1507.3.2 Control and operation.

1. Location of controls. Controls for all ventilation systems shall be readily accessible by the occupant.
2. Instructions. Operating instructions for whole-house ventilation systems shall be provided to the occupant by the installer of the system.
3. Local exhaust systems. Local exhaust systems shall be controlled by manual switches, dehumidistats, timers, or other approved means
4. Continuous whole-house ventilation systems. Continuous whole-house ventilation systems shall operate continuously and be equipped with an override control. A "fan on" switch shall be permitted as an override control. Controls shall be capable of operating the ventilation system without energizing other energy-consuming appliances. Controls shall include text or a symbol indicating their function.~~A clearly visible label shall be affixed to the controls that reads "Whole House Ventilation (see operating instructions)."~~

[Rest of Section Unchanged]

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

The International Residential Code with Washington Amendments currently requires a whole-house mechanical ventilation (WHMV) system in one- and two-family and low-rise residential buildings and will continue to do so with the adoption of the 2018 codes. Typically, these systems are simply bathroom exhaust fans that run continuously or on a programmed intermittent basis. Often, occupants have no understanding of the purpose of these systems and turn them off – thereby increasing the rate of accumulation of indoor pollutants. The labeling requirements put forth by this proposal will serve to educate and inform occupants regarding the proper maintenance and operation of these systems.

This same language has been adopted during the current ICC Group A 2021 code change cycle as part of the Consent Agenda (proposal RM29) and therefore will be included in the 2021 IRC Chapter 15. By approving this proposal, Washington's 2018 IRC code language will be consistent with the 2021 IRC as well as ASHRAE 62.2.

Further, the Home Ventilating Institute (HVI) (an industry association representing nearly 90% of the manufacturers of residential ventilating products in the U.S) will soon launch a label that can be used for identifying whole-house mechanical ventilation fans. The label references a website where users will be able to find information about WHMV systems, their purpose, and proper operation and maintenance. If WA does not align its code with this language, then technically, the logo would not be permitted for use in Washington State for compliance with M1507.3.2, since M1507.3.2 technically requires the phrase “see operating instructions”.

This code language will make enforcement of WHMV code requirements easier because the control and the whole house mechanical ventilation system will be more readily identifiable on a national basis, across builders, installers, and manufacturers. Following is an example of what the label is expected to look like when installed on a switch:



Additionally, following is the draft Q&A that is intended to be accessible to consumers from HVI's website. Launch of this website and availability of the labels is expected by July, 2019.

- **What does the *Fresh Air System* label mean?**
It means that you have a whole house ventilation system installed to provide you with fresh air throughout the year.
- **Why do I need this system?**
Tight, durable, and energy-efficient homes need mechanical ventilation to provide enough fresh air to maintain acceptable indoor air quality; such systems are now required by code; the associated energy costs of operating are minimal compared to the overall health benefits.
- **How should I operate this system?**
In most cases, whole house ventilation systems are designed to operate continuously and should only be turned off in the case of severe outdoor air contamination. This guidance is from American Society of Heating Refrigerating & Air Conditioning Engineers (ASHRAE) Guideline 24.
- **How should I maintain my whole house ventilation system?**
Check with the manufacturer for recommended maintenance of your ventilation system, which, depending on the system, may include cleaning air inlets and outlets and replacing filters.
- **Who can I contact with additional questions?**
Please contact the manufacturer of your individual ventilation system for additional information. For questions on HVI or the *Fresh Air System* label program please email info@hvi.org.

6. **Specify what criteria this proposal meets.** You may select more than one.

- The amendment is needed to address a critical life/safety need.
- X The amendment clarifies the intent or application of the code and aligns WA's code with the 2021 IRC.
- The amendment is needed to address a specific state policy or statute.

- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. **Is there an economic impact:** Yes No

Explain: The code change proposal will not increase or decrease the cost of construction since a label is already required.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

This proposal will expedite inspections by clearly labeling the WHMV controls and system.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC11 Revised

1. State Building Code to be Amended:

- | | |
|--|---|
| <input type="checkbox"/> International Building Code | <input type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input checked="" type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

M1507.3.3; R401.3 (separate proposal)

Title:

Mechanical Ventilation Rate; Certificate

2. Proponent Name (Specific local government, organization or individual):

Proponent: Mike More, P.E., Newport Partners, on behalf of Broan

Title: Consulting Engineer

Date: February 1, 2019

3. Designated Contact Person:

Name: Mike Moore, P.E.

Title: Consulting Engineer

Address: 3760 Tanglewood Lane, Davidsonville, MD 21035

Office Phone: (301) 889-0017

Cell: (303) 408-7015

E-Mail address: mmoore@newportventures.net

4. Proposed Code Amendment.

M1507.3.3 Mechanical ventilation rate; R401.3 Certificate (Mandatory)

Code(s) International Residential Code with WA Amendments; International Energy Conservation Code with WA Amendments

Section(s) M1507.3.3; R401.3 (separate proposal)

Part I: Amend section M1507.3.3 to read as follows:

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air to each dwelling unit at a continuous rate of not less than that determined in accordance with Table M1507.3.3(1).

Exception: The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

M1507.3.3.1 Testing. Whole-house mechanical ventilation systems shall be tested and verified to provide a flow rate not less than the minimum required by Section M1507.3.3. Testing shall be performed according to the ventilation equipment manufacturer's instructions, or by using a flow hood, flow grid, or other airflow measuring device at the mechanical ventilation fan's inlet terminals or grilles, outlet terminals or grilles or in the connected ventilation ducts. Where required by the building official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the building official.

Informational note: The following text is being submitted to simultaneously amend the residential energy code:

Part II: Amend section R401.3 to read as follows:

R401.3 Certificate (Mandatory). A permanent certificate shall be completed by the builder or other approved party and posted on a wall in the space where the furnace is located, a utility room, or an approved location inside the building. When located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label, or other required labels. The certificate shall list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, below-grade wall, and/or floor) and ducts outside conditioned spaces; U-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration; ~~and the results from any required duct system and building envelope air leakage testing done on the building;~~ and the results from the whole-house mechanical ventilation system flow rate test. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies of heating, cooling, whole-house mechanical ventilation, and service water heating appliances equipment. Where a gas-fired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be listed for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed.

If installed incorrectly, whole-house mechanical ventilation systems can fail to deliver the minimum outdoor air needed to provide acceptable indoor air quality. A recent study in Florida* found that only three of 21 whole house mechanical ventilation systems had a flow rate near the design level. Because these systems perform a vital function in supporting building durability and occupant health, these systems should be verified for flow when installed. This requirement and text are aligned with ASHRAE 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings. Finally, because the whole-house mechanical ventilation system is a critical component of the build-tight/ventilate-right approach to energy efficient, durable, and healthy construction, the verified ventilation rate should be listed on the home's permanent certificate, along side other performance metrics and values for critical appliances and assemblies.

* Sonne et al. (2015). Investigation of the Effectiveness and Failure Rates of Whole-House Mechanical Ventilation Systems in Florida. FSEC-CR-2002-15. <http://www.fsec.ucf.edu/en/publications/pdf/FSECCR-2002-15.pdf>.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain: IECC R104.2.4 requires a mechanical rough-in inspection to verify compliance of whole-house ventilation systems. Presumably, a component of this inspection is flow rate verification. If this is not the case, and IECC R104.2.4 does not trigger a requirement for whole-house flow rate verification, then the cost associated with flow rate verification can be estimated as \$9-\$12, assuming a time requirement of 15-20 minutes for a skilled laborer with a labor rate of \$35/hour to test the airflow of a whole house mechanical ventilation system. The test can be completed by the same technician performing the blower door test. Also, there is no requirement for a third party to conduct the test, which can help moderate costs.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

Typical life of a ventilation fan is 15 years. A \$9-\$12 investment to verify that the ventilation system is working according to specifications could return significant dividends, especially when research suggests that the costs associated with poor indoor air quality in the U.S. is around \$500 annually per person.^{1,2,3,4,5}

\$0-0.006/square foot (\$0-12/ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

$\$35/\text{hour} * (1/3 \text{ hour}) = \$11.67/2000 \text{ ft}^2 = \$0.006/\text{ft}^2$

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

It should take ~5-10 minutes to confirm that the reported flow rate is in compliance with the design.

References:

1. Logue JM, Price PN, Sherman MH, & Singer BC. 2012. A Method to Estimate the Chronic Health Impact of Air Pollutants in U.S. Residences. *Environmental Health Perspectives* 120(2): 216-222.
2. Turner WJN, Logue JM, and Wray CP. 2012. Commissioning Residential Ventilation Systems: A Combined Assessment of Energy and Air Quality Potential Values. LBNL969E.
3. Brown DW. 2008. Economic value of disability-adjusted life years lost to violence: estimates for WHO Member States. *Rev. Panam Salud Publica*, 24, 203-209.
4. Lvovsky K, Huges G, Maddison D, Ostro B, and Pearce D. 2000. Environmental costs of fossil fuels : a rapid assessment method with application to six cities. Washington, D.C.: The World Bank Environment Department.

5. Highfill T and Bernstein E. 2014. Using Disability Adjusted Life Years to Value the Treatment of Thirty Chronic Conditions in the U.S. from 1987 to 2010. U.S. Department of Commerce Bureau of Economic Analysis WP 2014-9.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC16

1. State Building Code to be Amended:

- | | |
|--|--|
| <input type="checkbox"/> International Building Code | <input type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input checked="" type="checkbox"/> International Fuel Gas Codeant |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input checked="" type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

(e.g.: Section: R403.2)

IRC Chapter 44 Referenced Standards

IFGC Chapter 8 Referenced Standards

Title:

LC 1/CSA 6.26

2. Proponent Name (Specific local government, organization or individual):

Proponent: Jonathan D Sargeant - Omegaflex

Title: Manager of Codes and Standards

Date: 4/5/2019

3. Designated Contact Person:

Name: Jonathan D Sargeant - Omegaflex

Title: Manger of Codes and Standards

Address: Omegaflex, 213 Court Street, Suite 1001, Middletown, CT 06457

Office Phone: ()

Cell: (703) 946-5848

E-Mail address: jonathan.sargeant@omegaflex.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) IRC Section(s) Chapter 44 Referenced Standards

LC1/CSA 6.26—~~1318~~: Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)
G2414.5.4, G2411.3, G2415.5

Code(s) IFGC Section(s) Chapter 8 Referenced Standards

LC 1/CSA 6.26—~~2013~~18: Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)
403.5.5

Enforceable code language must be used; see an example [by clicking here](#).

Amend section to read as follows:

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

This is an update to the product standard which was overlooked by ICC staff. The change is necessary because there is a new product, the installation of which is detailed by the 2018 IFGC and IRC, which is not addressed by the 2013 standard.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain:

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$Click here to enter text./square foot (For residential projects, also provide \$Click here to enter text./dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

Log No. 19-IMC17

1. State Building Code to be Amended:

- | | |
|--|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input checked="" type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input checked="" type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

IRC CHAPTER 44 REFERENCED STANDARDS
IFC CHAPTER 80 REFERENCED STANDARDS
IMC CHAPTER 15 REFERENCED STANDARDS

Title:

REFERENCED STANDARDS

2. Proponent Name: The Chemours Company

Proponent: Andrew Klein

Title: Code Consultant

Date: 4/15/2019

3. Designated Contact Person:

Name: Andrew Klein

Title: Consulting Engineer

**Address: 2 Rose Ct.
Pasco, WA 99301**

Office Phone: (509) 380-5995

Cell: (443) 207-2739

E-Mail address: andrew@asklein.com

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) IRC, IFC & IMC Section(s) REFERENCED STANDARDS

Enforceable code language must be used; see an example [by clicking here](#). Amend section to read as follows:

ASHRAE		ASHRAE
Standard Reference Number	Title	Referenced in Code(s):
45—2016 <u>15—2019</u>	Safety Standard for Refrigeration Systems	IFC® IMC®
34—2016 <u>34—2019</u>	Designation and Safety Classification of Refrigerants	IMC® IRC®

ANCE		Association of the Electric Sector
Standard Reference Number	Title	Referenced in Code(s):
NMX-J-521/2-40-ANCE—2014 <u>2-40-ANCE—2019/CAN/CSA-22.2 No. 60335-2-40—12</u> 60335-2-40—19/UL 60335-2-40 <u>60335-2-40-2019</u>	Safety of Household and Similar Electrical Appliances <u>Safety- Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers</u>	IRC®

CSA		CSA Group
Standard Reference Number	Title	Referenced in Code(s):
CAN/CSA/C22.2 No. 60335-2-40—2012 60335-2-40—2019	Safety of Household and Similar Electrical Appliances <u>Safety- Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers</u>	IRC®

UL		UL LLC
Standard Reference Number	Title	Referenced in Code(s):
UL/CSA/ANCE 60335-2-40—2012 <u>60335-2-40—2019</u>	Safety of Household and Similar Electrical Appliances <u>Safety- Part 2-40: Particular Requirements for Motor-compressors Electrical Heat Pumps, Air Conditioners and Dehumidifiers</u>	IRC®

ANCE		Association of the Electric Sector
Standard Reference Number	Title	Referenced in Code(s):
NMX-J-521/2-40-ANCE—2014 <u>2-40-ANCE—2019/CAN/CSA-22.2 No. 60335-2-40—12</u> 60335-2-40—19/UL 60335-2-40 <u>60335-2-40-2019</u>	Safety of Household and Similar Electric Appliances <u>Part 2-40 2-40-Safety: Particular Requirements for <u>Electric</u> Heat Pumps, Air-Conditioners and Dehumidifiers</u>	IRC®

CSA		CSA Group
Standard Reference Number	Title	Referenced in Code(s):
NMX-J-521/2-40-ANCE—2014 <u>2-40-ANCE—2019/CAN/CSA-22.2 No. 60335-2-40—12</u> 60335-2-40—19/UL 60335-2-40 <u>60335-2-40-2019</u>	Safety of Household and Similar Electric Appliances <u>Part 2-40 2-40-Safety: Particular Requirements for <u>Electric</u> Heat Pumps, Air-Conditioners and Dehumidifiers</u>	IRC®

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

The proposed code change updates the referenced standards of ASHRAE Standard 34, ASHRAE Standard 15, and UL 60335 Part 2-40 to the 2019 editions.

There are two new safety group classifications added to ASHRAE 34: A2L and B2L. Previously, 2L was a sub-class of class 2 as an interim measure to implement changes to refrigerant flammability classification into ASHRAE 34 prior to making associated changes to a future edition of ASHRAE 15; but now 2L is a separate class and safety requirements were revised to distinguish between class 2 and class 2L. These ASHRAE standards work in conjunction with the 2019 edition of UL 60335 Part 2-40, which regulates product listings.

A2Ls are low global warming (LGW) refrigerants, and this code change supports House Bill 1112, *Concerning reducing greenhouse gas emissions from hydrofluorocarbons*, which calls for the SBCC to adopt rules allowing appropriate substitutions to hydrofluorocarbons.

6. Specify what criteria this proposal meets. You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. Is there an economic impact: Yes No

Explain:

This code change simply updates the referenced standards of ASHRAE 15, ASHRAE 34, and UL 60335 Part 2-40 to the 2019 editions to permit the use of A2L refrigerants. It does not mandate their use—it simply provides the regulatory framework necessary for their use in HVAC systems.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). [Webinars on the tool can be found Here and Here](#))

\$0/square foot (For residential projects, also provide \$0/ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

n/a

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

n/a

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.



STATE OF WASHINGTON
STATE BUILDING CODE COUNCIL

May 2018
Log No. 19-IMC18

1. State Building Code to be Amended:

- | | |
|--|---|
| <input type="checkbox"/> International Building Code | <input checked="" type="checkbox"/> International Mechanical Code |
| <input type="checkbox"/> ICC ANSI A117.1 Accessibility Code | <input type="checkbox"/> International Fuel Gas Code |
| <input type="checkbox"/> International Existing Building Code | <input type="checkbox"/> NFPA 54 National Fuel Gas Code |
| <input checked="" type="checkbox"/> International Residential Code | <input type="checkbox"/> NFPA 58 Liquefied Petroleum Gas Code |
| <input checked="" type="checkbox"/> International Fire Code | <input type="checkbox"/> Wildland Urban Interface Code |
| <input type="checkbox"/> Uniform Plumbing Code | |

For the Washington State Energy Code, please see specialized [energy code forms](#)

Section(s):

IRC CHAPTER 44 REFERENCED STANDARDS
IFC CHAPTER 80 REFERENCED STANDARDS
IMC CHAPTER 15 REFERENCED STANDARDS

Title:

REFERENCED STANDARDS

2. Proponent Name: ASHRAE

Proponent: Stephanie Reiniche
Title: Director of Technology, ASHRAE
Date: 4/15/2019

3. Designated Contact Person:

Name: Stephanie Reiniche
Title: Director of Technology, ASHRAE
Address: 1791 Tullie Circle, N.E.
Atlanta, GA 30329

Office Phone: (678) 539-1143
E-Mail address: sreiniche@ashrae.org

4. Proposed Code Amendment. Reproduce the section to be amended by underlining all added language, striking through all deleted language. Insert new sections in the appropriate place in the code in order to continue the established numbering system of the code. If more than one section is proposed for amendment or more than one page is needed for reproducing the affected section of the code additional pages may be attached. (Examples on the SBCC [website](#))

Code(s) IRC, IFC & IMC Section(s) REFERENCED STANDARDS

Enforceable code language must be used; see an example [by clicking here](#). Amend section to read as follows:

ASHRAE		ASHRAE
Standard Reference Number	Title	Referenced in Code(s):
15—2013 <u>15—2019</u>	Safety Standard for Refrigeration Systems	IFC® IMC®
34—2013 <u>34—2019</u>	Designation and Safety Classification of Refrigerants	IMC® IRC®
62.1-2013- <u>62.1-2016</u>	Ventilation for Acceptable Indoor Air Quality	IMC®
62.2-2013- <u>62.2-2016</u>	Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings	IMC®
170-2008- <u>170-2017</u>	Ventilation of Health Care Facilities	IMC®
180-2012- <u>180-2018</u>	Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems	IMC®

UL		UL LLC
Standard Reference Number	Title	Referenced in Code(s):
UL/CSA/ANCE 60335-2-40—2012 <u>60335-2-40—2019</u>	Safety of Household and Similar Electrical Appliances — Safety- Part 2-40: Particular Requirements for Motor-compressors <u>Electrical Heat Pumps, Air Conditioners and Dehumidifiers</u>	IRC®

5. Briefly explain your proposed amendment, including the purpose, benefits and problems addressed. Specifically note any impacts or benefits to business, and specify construction types, industries and services that would be affected. Finally, please note any potential impact on enforcement such as special reporting requirements or additional inspections required.

The proposed code change updates the referenced standards of ASHRAE Standard 34, ASHRAE Standard 15, and UL 60335 Part 2-40 to the 2019 editions.

There are two new safety group classifications added to ASHRAE 34: A2L and B2L. Previously, 2L was a sub-class of class 2 as an interim measure to implement changes to refrigerant flammability classification into ASHRAE 34 prior to making associated changes to a future edition of ASHRAE 15; but now 2L is a separate class and safety requirements were revised to distinguish between class 2 and class 2L. These ASHRAE standards work in conjunction with the 2019 edition of UL 60335 Part 2-40, which regulates product listings.

A2Ls are low global warming (LGW) refrigerants, and this code change supports House Bill 1112, Concerning reducing greenhouse gas emissions from hydrofluorocarbons, which calls for the SBCC to adopt rules allowing appropriate substitutions to hydrofluorocarbons.

The ASHRAE Ventilation Standards, as well as the ASHRAE HVAC Inspection and Maintenance Standards are also updated to reflect the most up to date science and technology.

6. **Specify what criteria this proposal meets.** You may select more than one.

- The amendment is needed to address a critical life/safety need.
- The amendment clarifies the intent or application of the code.
- The amendment is needed to address a specific state policy or statute.
- The amendment is needed for consistency with state or federal regulations.
- The amendment is needed to address a unique character of the state.
- The amendment corrects errors and omissions.

7. **Is there an economic impact:** Yes No

Explain:

This code change simply updates the referenced standards of ASHRAE 15, 34, 62.1, 62.2, 170, and 180, as well as UL 60335 Part 2-40 to the 2019 editions. The updated editions of ASHRAE Standard 15 and 34, as well as UL 60335 Part 2-40 would permit the use of A2L refrigerants. It does not mandate their use—it simply provides the regulatory framework necessary for their use in HVAC systems.

If there is an economic impact, use the tool below to estimate the costs and savings of the proposal on construction practices, users and/or the public, the enforcement community, and operation and maintenance. If preferred, you may submit an alternate cost benefit analysis.

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost [Analysis tool](#) and [Instructions](#); use these [Inputs](#). **Webinars on the tool can be found [Here](#) and [Here](#)**)

\$0/square foot (For residential projects, also provide \$0/ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

n/a

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

n/a

Please send your completed proposal to: sbcc@des.wa.gov

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.