PROPOSED RULE MAKING

CR-102 (July 2022)
(Implements RCW 34.05.320)
Do **NOT** use for expedited rule making

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STATE OF WASHINGTON
FILED

DATE: August 23, 2022
TIME: 3:57 PM

WSR 22-17-147

Agency: State Building Code Council

☒ **Original Notice**

☐ **Supplemental Notice to WSR _____**

☐ **Continuance of WSR _____**

☒ **Preproposal Statement of Inquiry was filed as WSR** 22-03-026 **; or**

☐ **Expedited Rule Making--Proposed notice was filed as WSR _____; or**

☐ **Proposal is exempt under RCW 34.05.310(4) or 34.05.330(1); or**

☐ **Proposal is exempt under RCW _____.**

Title of rule and other identifying information: (describe subject) WAC 51-52: Adoption and Amendment of the 2021 International Mechanical Code and International Fuel Gas Code

Hearing location(s):

Date:	**Time:**	**Location:** (be specific)	**Comment:**
September 30, 2022 October 14, 2022	10:00 am 10:00 am	129 N 2nd St; Yakima, WA 98901 1500 Jefferson St SE; Olympia, WA 98504	Please access the meetings in-person, or via Zoom or Conference call. The Zoom link and phone are provided in the agenda at sbcc.wa.gov

Date of intended adoption: November 4, 2022 (Note: This is **NOT** the **effective** date)

Submit written comments to:	**Assistance for persons with disabilities:**
Name: State Building Code Council	Contact Annette Haworth
Address: PO Box 41449, Olympia WA 98504-1449	Phone: 360-407-9255
Email: sbcc@des.wa.gov	Fax:
Fax:	TTY:
Other:	Email: sbcc@des.wa.gov
By (date) October 14, 2022	Other:
	By (date) September 16, 2022

Purpose of the proposal and its anticipated effects, including any changes in existing rules: The proposed rule adopts the 2021 edition of the International Mechanical Code and International Fuel Gas Code, published by the International Code Council, with state amendments to incorporate proposed changes as adopted by the Washington State Building Code Council. The rules will provide increased clarity and life safety measures for building construction and use in Washington State.

	Proposed Section and Title	**Type of Change**	**Description**
1.	51-52-003 International Mechanical Code	Update Reference	The adopted code edition is changed from the 2018 International Mechanical Code to the 2021 International Mechanical Code.
2.	51-52-008 Implementation	Effective Date	Sets July 1, 2023, as the effective date for the 2021 IMC
3.	101.2 Scope	Update Reference	Updates the adopted code references for NFPA 58 (2020) and NFPA 54 (2021).
4.	113.4 Failure to comply	Editorial	The term “authority having jurisdiction” was changed to “code official” in an effort to remove any ambiguity.

5.	202 “Balanced whole house ventilation”	Code Change / Clarification (21-GP2-076)	The phrase “dwelling or sleeping” was added to the first sentence for clarity. The second sentence was moved to Section 403.4.6.3 since it is more in the nature of a code requirement than part of a definition.
6.	202 “Not balanced whole house ventilation	Code Change / Clarification (21-GP2-076)	A new definition was added to help clarify the whole house ventilation requirements and rate adjustment in Table 403.4.3 and when and where balanced ventilation is required.
7.	202 “Distributed whole house ventilation”	Code Change / Clarification (21-GP2-076)	This definition was revised to separate adjacent rooms from adjoining spaces and help clarify requirements for whole house ventilation.
8.	202 “Not distributed whole house ventilation”	Code Change / Clarification (21-GP2-076)	A new definition was added to help clarify the whole house ventilation requirements and rate adjustment in Table 403.4.3 and when and where balanced ventilation is required.
9.	202 “Enclosed kitchen”	Code Change (21-GP2-063)	This definition was added to coordinate with the proposal requiring additional kitchen hood ventilation and helps clarify the difference between an open kitchen and enclosed kitchen.
10.	202 “Interior adjacent room”	Code Change / Clarification (21-GP2-076)	A new definition was added to help clarify the whole house ventilation requirements and when and where balanced ventilation is required.
11.	202 “Interior adjoining room”	Code Change / Clarification (21-GP2-076)	A new definition was added to help clarify the whole house ventilation requirements and when and where balanced ventilation is required.
12.	306.6 Appliances above ceilings	Code Change / Clarification (21-GP2-087)	This change removes the requirement for appliances above ceilings to have ready access. While the section required ready access, it also specified that the ready access was to a removal panel or tile, contrary to the definition of ready access. This clarifies that a removable panel is allowed. The sizing was changed, going from nominal dimensions to actual opening dimensions.
13.	401.4 Intake opening location	Code Change / 2021 IMC Change (21-GP2-077, 21-GP2-085)	Item 2 of this section was modified to allow residential small system air intakes less than 25 feet above a parking lot, to help alleviate the need to provide “snorkel” type intakes for multi-family building units. The language previously found in the exception as a state amendment was moved into the main body of Item 3 for the 2021 IMC. This was modified to align the IMC requirements for combination terminations with ASHRAE 62.2 requirements.
14.	401.7 Testing and balancing	Editorial	The term “building official” was changed to “code official.”
15.	403.2.1 Recirculation of air	2021 IMC Change	Changes to the model code language were integrated into the existing state amendment. The changes are to portions of the section that were not a part of the existing state amendment.
16.	Table 403.3.1.1 Required outdoor ventilation air	2021 IMC Change, editorial	Previously, the filed rule contained only those sections of the table that were amended by the state. The proposed rule now contains the entire table rather than the six categories amended by the state. Also included is a 2021 IMC change to footnote M for consistency with ASHRAE 62.1. No changes were made to the existing state amendments to the table.
17.	403.4 Group R whole house mechanical	Code Change (21-GP2-009)	An exception was added that allows ASHRAE 62.2 to be used as an alternate compliance path for low-rise residential.

	ventilation system		
18.	403.4.1 System design	Editorial	Edited for consistency with code language format.
19.	403.4.4.1 Whole house ventilation in Group R-2 occupancies	Code Change / Clarification (21-GP2-010, 21-GP2-076)	Language was added that clarifies when heat/energy recovery ventilators are required in multifamily residential buildings. It was previously unclear as to whether an HRV/ERV was required by this section. Exceptions were added to clarify ventilation requirements in adjoining/adjacent spaces.
20.	403.4.4.2 Whole house ventilation for other than Group R-2 occupancies	Code Change / Clarification (21-GP2-076)	The same exceptions were added to this section to clarify how adjoining/adjacent spaces are to be ventilated.
21.	403.4.6.1 Exhaust fans	Code Change (21-GP2-063)	Changes were made to separate kitchen exhaust requirements from other local exhaust to coordinate with the changes for kitchen range hood exhaust.
22.	403.4.6.3 Balanced whole house ventilation system	Code Change / editorial (21-GP2-063)	The text that was a duplicate of the removed language in the balanced whole house ventilation definition was modified for clarity.
23.	403.4.7 Local exhaust	Code Change / Editorial (21-GP2-063)	Timer controls were added to the list of allowable fan controls.
24.	Table 403.4.7 Minimum exhaust rates	Code Change (21-GP2-063)	The exhaust rate for kitchens was divided into Open and Enclosed kitchens and a reference added to the new Section 403.4.7.3 for kitchen range hood exhaust requirements.
25.	403.4.7.2 Local exhaust fans	Code Change (21-GP2-063)	The phrase “or equivalent” was added to the testing standards to include ASTM capture efficiency testing for kitchen hoods, AHAM hood testing and HIV 911 listings. The exception for downdraft hoods was removed as the intent is for all hoods to be able to capture and remove pollutants from cooking. Items 4 and 5 also set maximum sound ratings for kitchen ventilation.
26.	403.4.7.3 Local intermittent kitchen exhaust system / Table 403.4.7.3	Code Change (21-GP2-063)	This new section and table sets minimum airflow rates or capture efficiencies for kitchen range hoods based on the type of kitchen appliance installed. The intent is to reduce the exposure to detrimental health impacts from the pollutants produced by cooking, including nitrogen dioxide which can increase the risk of asthma.
27.	403.4.7.3.1 Field verification and diagnostic testing for local intermittent kitchen exhaust system	Code Change (21-GP2-063)	This new section requires verification for either the capture efficiency or airflow rate as specified in Table 403.4.7.3
28.	501.3.1 Location of exhaust outlets	2021 IMC Change Code Change / Clarification (21-GP2-019)	The 2021 IMC added language to Item 3 allowing combination exhaust termination fittings. This was previously addressed in the state amendment to Section 401.2.

			Additionally, Item 6 was added to provide guidance on the requirements for transformer vault exhaust rather than lumping it in with parking garage exhaust, but there are specific requirements in the NEC for transformer exhaust.
29.	501.4 Pressure equalization	Code Change / Editorial (21-GP2-063)	The phrase “domestic range” is replaced with “kitchen” in the exception to coordinate with the new kitchen exhaust requirements.
30.	504.11 Common exhaust systems for clothes dryers	Editorial	Renumbering/section reference update only to coordinate with IMC changes.
31.	505.3 Domestic exhaust ducts	Code Change (21-GP2-063)	The section title was updated for consistency with the language in the IMC. Exception 1 was revised to allow continuous exhaust systems (where allowed by Table 403.4.7.3) with a MERV 3 grease filter to not terminate to the outdoors.
32.	506.3.9.1 Grease duct horizontal cleanout	2021 IMC Change	The 2021 IMC added Item 7 with separation requirements for horizontal discharge fans.
33.	515.1 General (Waste or linen chute venting)	Editorial	The language edited for consistency with the model code style and the exception language is simplified for clarity.
34.	601.2 Air movement in egress elements	2021 IMC Change	The langue in Exception 4 was clarified and a reference to ASHRAE 170 for health care facilities was added.
35.	603.5.1 Gypsum ducts	2021 IMC Change	The second sentence was revised for clarity and consistency with defined terms.
36.	605 Air filters	Code Change (21-GP2-098, 21-GP2-086)	The Council sent forward two options for requirements for air filters. The first requires MERV 13 filters in most occupancies for filtering particulates and contaminants from outdoor air. The second option retains the current requirement for MERV 6 filters but requires that air handlers have the the ability to install a MERV 13 filter if needed due to air quality and have sufficient fan capacity to provide the required air volume with a MERV 13 filter. Both of these methods were intended to address indoor air quality during periods of poor air quality, but Option 1 also addresses indoor air quality by filtering and preventing the spread of any indoor contaminates such as viruses.
37.	607.5.2 Fire barriers	Code Change / Clarification (21-GP2-075)	This section is amended to allow flexible connections when air-handling equipment is located outdoors (in Exception 3.1) and ducts that connect to a diffuser, grille or register within the same room (Exception 3.2).
38.	607.5.3 Fire partitions	Code Change (21-GP2-075)	Exception 4 is amended to allow flexible connections in similar instances as for fire barriers, above.
39.	915.3 Installation of emergency and legally required power systems	Code Change (21-GP2-074)	This is a new section that brings in language to reference NFPA standards for standby power systems required by the building code.
40.	915.4 Installation of	Code Change (21-GP2-074)	This new section brings in reference standards for standby power that is not required under the building code.

	option standby power systems		
41.	1101.2 Factory-built equipment and appliances	2021 IMC Change	This section previously included a state amendment to reference UL 60335-2-40 for low global warming potential refrigerants. This amendment is no longer necessary as the base model code language now contains the same reference standard.
42.	1101.6 General (Refrigeration systems)	2021 IMC Change	This section was removed from the 2021 IMC and the requirements moved into Section 1101.1.1 and 1101.1.2. The previous state amendment added ASHRAE 15, which is now referenced in 1101.1.1 of the model code, so the state amendment is no longer necessary.
43.	1105.6.3 Ventilation rate	2021 IMC Change	The 2021 IMC removed the sentence that was modified by the state and now the model code just references the IIAR standard for ammonia refrigeration. The state amendment is no longer necessary.
44.	1209.5 Insulation and thermal break	2021 IMC Change Editorial	The model code changed the title of this section to be more descriptive of the requirements in the section, and terminology was updated for clarity and consistency.
45.	1305.7 Vent piping	Code Change / Clarification	This section was amended for clarity and consistency with other code and standards separation requirements.
46.	1402.8.1.2 Rooftop mounted solar thermal collectors and systems	2021 IMC Change	The existing state amendment to this section was included in the model code base language for the 2021 IMC, so the amendment is no longer necessary.
47.	Chapter 15 Referenced standards	Code Changes / 2021 IMC Change (21-GP2-063, 21-GP2-009, 21-GP2-074)	The referenced standards section was updated to include new standards introduced by code change proposals. AHAM HRH-2, ASTM E3087, and HVI 911 were added to support the changes to the kitchen ventilation requirements. ASHRAE 62.2 was updated to the most recent version and is referenced by both the kitchen ventilation proposal and the alternate compliance proposal for low rise ventilation. Two NFPA standards are included as referenced by the standby power proposal. Some standards that were previously included through state amendment are now referenced by the model code and the amendments are no longer necessary. Other standards added by amendment are updated to the most recent version.
48.	IFGC Section 101 General (WAC 51-52-21101)	Updated references	Updates the adopted code references for NFPA 58 (2020) and NFPA 54 (2021).
49.	IFGC Section 116 Failure to comply (WAC 51-52-21116)	Editorial	The term “authority having jurisdiction” was changed to “code official” in an effort to remove any ambiguity.
50.	IFGC Table 409.1.1 Natural gas valve standards (WAC 51-52-21409)	Code Change (21-GP2-001)	The table is amended to add ASME B16.38 for natural gas systems with piping 2-1/2 to 4 inches in diameter to allow for a flanged valve option.

	51.	IFGC Chapter 8 Referenced Standards (WAC 51-52-21800)	Code Change	The standard referenced in Proposal 001 for larger diameter gas piping is added to the referenced standards	

Reasons supporting proposal: RCW 19.27.031, 19.27.074

Statutory authority for adoption: RCW 19.27.031, 19.27.074

Statute being implemented: RCW 19.27.031, 19.27.074

Is rule necessary because of a:

Federal Law? ☐ Yes ☒ No

Federal Court Decision? ☐ Yes ☒ No

State Court Decision? ☐ Yes ☒ No

If yes, CITATION:

Agency comments or recommendations, if any, as to statutory language, implementation, enforcement, and fiscal matters: None

Type of proponent: ☐ Private ☐ Public ☒ Governmental

Name of proponent: (person or organization) Washington State Building Code Council

Name of agency personnel responsible for:

	Name	Office Location	Phone
Drafting:	Krista Braaksma	1500 Jefferson St. SE, Olympia, WA 98504	360-407-9278
Implementation:	Krista Braaksma	1500 Jefferson St. SE, Olympia, WA 98504	360-407-9278
Enforcement:	Local building departments		

Is a school district fiscal impact statement required under RCW 28A.305.135? ☐ Yes ☒ No

If yes, insert statement here:

The public may obtain a copy of the school district fiscal impact statement by contacting:

Name:
Address:
Phone:
Fax:
TTY:
Email:
Other:

Is a cost-benefit analysis required under RCW 34.05.328?

☒ Yes: A preliminary cost-benefit analysis may be obtained by contacting:

Name: Stoyan Bumbalov
Address: PO Box 41449, Olympia WA 98504-1449
Phone: 360-407-9277
Fax:
TTY:
Email: sbcc@des.wa.gov
Other:

☐ No: Please explain:

Regulatory Fairness Act and Small Business Economic Impact Statement

Note: The Governor's Office for Regulatory Innovation and Assistance (ORIA) provides support in completing this part.

(1) Identification of exemptions:

This rule proposal, or portions of the proposal, **may be exempt** from requirements of the Regulatory Fairness Act (see chapter 19.85 RCW). For additional information on exemptions, consult the exemption guide published by ORIA. Please check the box for any applicable exemption(s):

☐ This rule proposal, or portions of the proposal, is exempt under RCW 19.85.061 because this rule making is being adopted solely to conform and/or comply with federal statute or regulations. Please cite the specific federal statute or regulation this rule is being adopted to conform or comply with, and describe the consequences to the state if the rule is not adopted.
Citation and description:

☐ This rule proposal, or portions of the proposal, is exempt because the agency has completed the pilot rule process defined by RCW 34.05.313 before filing the notice of this proposed rule.

☐ This rule proposal, or portions of the proposal, is exempt under the provisions of RCW 15.65.570(2) because it was adopted by a referendum.

☒ This rule proposal, or portions of the proposal, is exempt under RCW 19.85.025(3). Check all that apply:

- ☐ RCW 34.05.310 (4)(b) (Internal government operations)
- ☒ RCW 34.05.310 (4)(c) (Incorporation by reference)
- ☒ RCW 34.05.310 (4)(d) (Correct or clarify language)
- ☐ RCW 34.05.310 (4)(e) (Dictated by statute)
- ☐ RCW 34.05.310 (4)(f) (Set or adjust fees)
- ☐ RCW 34.05.310 (4)(g) ((i) Relating to agency hearings; or (ii) process requirements for applying to an agency for a license or permit)

☐ This rule proposal, or portions of the proposal, is exempt under RCW 19.85.025(4) (does not affect small businesses).

☐ This rule proposal, or portions of the proposal, is exempt under RCW _____.

Explanation of how the above exemption(s) applies to the proposed rule: In addition to the proposed changes, the rule includes adoption by reference of the 2021 International Mechanical Code (IMC), a model code published by the International Code Council. Those portions of the 2021 IMC that are not amended by this proposed rule will be adopted as written. The full text of the 2021 IMC may be viewed here: https://codes.iccsafe.org/content/IMC2021P3

(2) Scope of exemptions: *Check one.*

☐ The rule proposal is fully exempt *(skip section 3)*. Exemptions identified above apply to all portions of the rule proposal.

☒ The rule proposal is partially exempt *(complete section 3)*. The exemptions identified above apply to portions of the rule proposal, but less than the entire rule proposal. Provide details here (consider using this template from ORIA): WAC 51-52-003 adopts by reference the 2021 edition of the International Mechanical Code. WAC 51-52-0101 adopts by reference the 2021 International Fuel Gas Code, the 2020 Edition of NFPA 58 (Liquified Petroleum Gas Code) and the 2021 Edition of NFPA 54 (National Fuel Gas Code).

☐ The rule proposal is not exempt *(complete section 3)*. No exemptions were identified above.

(3) Small business economic impact statement: *Complete this section if any portion is not exempt.*

If any portion of the proposed rule is **not exempt**, does it impose more-than-minor costs (as defined by RCW 19.85.020(2)) on businesses?

☐ No Briefly summarize the agency's minor cost analysis and how the agency determined the proposed rule did not impose more-than-minor costs. _____

☒ Yes Calculations show the rule proposal likely imposes more-than-minor cost to businesses and a small business economic impact statement is required. Insert the required small business economic impact statement here:
There are costs imposed by the proposed rules, but the costs do not fall disproportionately on small businesses. These rules will not affect the distribution of impacted work, whether by small businesses or not, doing the work. The rules do not affect employment, reporting or record keeping.

Small Business Economic Impact Statement (RCW 19.85.040)

Description

The Washington State Building Code Council (SBCC) is filing a proposed rule to adopt the updated 2018 edition of the International Mechanical Code (IMC) (WAC 51-52). Since 1985 the state building code council has been responsible to update to new editions of the building code per RCW 19.27.074. The IMC are updated every three years by the International Code Council (ICC). The code development process conducted by the model code organization is open to all interest groups within the design and construction industry and from governmental organizations. See www.iccsafe.org for more information about the model code development process.

The administrative compliance requirements are under the authority of the local government. RCW19.27.050. Compliance activities including permit issuance, plan review and approval, and inspections occur at the local level. Requirements for construction document submittal and other reporting requirements are determined by the local jurisdiction and are consistent

with previously established policies. The proposed amendments to WAC 51-52 include specific technical requirements for building construction to be consistent with national standards.

Professional Services

Washington has had a statewide building code in effect since 1974. The local enforcement authority having jurisdiction administers the codes through the building and/or fire departments. Administrative procedures for state building code compliance are established and will not be changed by the adoption of the update to the current building codes. Small businesses will employ the same types of professional services for the design and construction of buildings and systems to comply with the state building code.

The proposed rule updates the state building code and does not require additional equipment, supplies, labor or other services. Services needed to comply with the building code are existing within the construction industry as required by the local authority having jurisdiction.

Costs of Compliance for Businesses

The cost of compliance incurred by Washington businesses includes training and educational materials. The 2021 International Mechanical model code costs $90 + tax, shipping and handling. These publications are also available online at https://codes.iccsafe.org/codes. The ICC chapters and local stakeholder groups offer training for continuing education credits at various times throughout the year. Prices vary depending on topic and intensity.

The Mechanical Code technical advisory group (TAG) determined there is a cost for compliance on businesses for the following proposed state amendments.

1. Sections 403.4.7 New Table 403.4.7.3 (21-GP2-063): This new section and table sets minimum airflow rates or capture efficiencies for kitchen range hoods in residential dwellings based on the type of kitchen appliance installed. The intent is to reduce the exposure to detrimental health impacts from the pollutants produced by cooking, including nitrogen dioxide which can increase the risk of asthma. This proposal is solely based on health concerns from poorly ventilated gas appliances A $200 to up to $1000 (if the make-up air requirement is triggered) incremental cost is estimated. There is no additional operation cost.
2. Section 605 Option 1 (21-GP2-098): This change is intended to improve indoor air quality, by filtering out exterior pollutants, such as wildfire smoke, and interior sources such as airborne infectious particles. The change requires improved filters on various air handlers and ventilation systems, up to MERV 13. The anticipated incremental cost is about $5.00 per filter. If replaced every three months, that would be an annual cost of $20 per air handler.
3. Section 605 Option 2 (21-GP2-086): This is similar to the previous proposal but is focused solely on exterior pollutants and the ability for building inhabitants to respond to events with an increase in outdoor air pollution. This proposal requires that the air handler be capable of housing a MERV 13 filter and provide the required fan capacity. This also carries the same costs as the previous proposal, but the incremental cost may not be incurred every time the filter is changed, so the annual cost could be less than the estimated $20 per air handler.

Loss of Sales or Revenue

The proposed rules make the state code for building construction consistent with national standards. Businesses with new products or updated test or design standards are recognized in the updated building code.

The update will result in some cost outlay for some small businesses for specific building projects, for a transition period. Other small businesses would see an increase in revenue. The amendments to the building codes affect over 25,000 small businesses in the state, where construction activity occurs. The primary intent of the amendments is to improve the safety features in buildings and provide consistency and fairness across the state, for a predictable business environment. The amendments should result in enhanced safety and value in buildings.

Cost of Compliance for Small Businesses (Determine whether the proposed rule will have a disproportionate cost impact on small businesses, compare the cost of compliance for small business with the cost of compliance for the ten percent of businesses that are the largest businesses.)

The majority of businesses affected by the updates to the building codes are small businesses; over 95 percent of those listed in the construction and related industries have under 50 employees. The costs per employee are comparable between the largest businesses and the majority of small businesses. The cost to comply with the updated codes is not a disproportionate impact on small business. Where the Council found the cost of compliance for small businesses to be disproportionate, the proposed rule mitigates the cost. The proposed rules include a definition of small business and provide exceptions for compliance with the updated rule.

Reducing the Costs of the Rule on Small Businesses

The SBCC conducted a detailed review process, including participation at the national code development hearings, to document significant economic impacts of the proposed code amendments.

Small Businesses Involved in the Development of the Rule

For the IMC, the SBCC conducted eight open public meetings of the building code technical advisory group, available via telephone conference bridge and over the internet, and allowed comment on every item on every agenda. For the IMC TAG

the SBCC appointed 11 representatives of all segments of the business and construction community to serve on the technical advisory groups.

List of Industries

Below is a list of industries required to comply with the mechanical code:

NAICS Code	NAICS Code Definition	Number in Washington State	TOTAL Annual Payroll	TOTAL Annual Revenue	AVG Annual Payroll	AVG Annual Revenue	1% of Avg Annual Payroll	0.3% of Avg Annual Revenue
236116	New multifamily housing construction (except for-sale builders)	45	$54,622k	---	$1,213,822	---	$12,138	---
236118	Residential remodelers	2777	$318,180k	$1,536,217k	$114,577	$553,193	$1,146	$1,660
236210	Industrial building construction	53	$99,790k	---	---	---	---	---
236220	Commercial and institutional building construction	862	$772,473k	$6,925,925k	$896,140	$8,034,716	$8,961	$24,104
238130	Framing contractors	417	$79,196k	$279,226k	$189,918	$669,607	$1,899	$2,009
238140	Masonry contractors	293	$74,067k	$215,274k	$252,788	$734,724	$2,528	$2,204
238150	Glass and glazing contractors	141	$67,626k	$237,985k	$479,617	$1,687,837	$4,796	$5,064
238160	Roofing contractors	537	$179,942k	$660,911k	$335,088	$1,230,747	$3,351	$3,692
238190	Other foundation, structure, and building exterior contractors	113	$37,585k	$123,771k	$332,611	$1,095,319	$3,326	$3,286
238210	Electrical contractors and other wiring installation contractors	1847	$940,854k	$3,026,762k	$509,396	$1,638,745	$5,094	$4,916
238220	Plumbing, heating, and air-conditioning contractors	1664	$959,976k	$3,169,548k	$576,909	$1,904,776	$5,769	$5,714
238290	Other building equipment contractors	81	$117,696k	---	$1,453,037	---	$14,530	---

238310	Drywall and insulation contractors	653	$282,929k	$723,945k	$433,276	$1,108,644	$4,333	$3,325
238990	All other specialty trade contractors	547	$182,710k	$573,308k	$334,022	$1,048,095	$3,340	$3,144
321213	Engineered wood member (except truss) manufacturing	11	$14,216k	$79,051k	$1,292,364	$7,186,455	$12,924	$21,559
332322	Sheet metal work manufacturing	122	$122,956k	$573,443k	$1,007,836	$4,700,352	$10,078	$14,101
423720	Plumbing and heating equipment and supplies (hydronics) merchant wholesalers	168	$82,225k	$897,748k	$489,435	$5,343,738	$4,894	$16,031
541310	Architectural services	635	$326,798k	$921,033k	$514,643	$1,450,446	$5,146	$4,351
541330	Engineering services	1599	$1,758,825k	$3,946,553k	$1,099,953	$2,468,138	$11,000	$7,404
541350	Building inspection services	154	$9,724k	$28,297k	$63,143	$183,747	$631	$551

Note: Data is blank in some fields to protect data source.

Data Source: Economic Census of the United States

Estimate of the Number of Jobs That Will Be Created or Lost

The adoption of the latest code edition is not expected to significantly impact the number of jobs in the construction industry. These rules are likely to be job neutral overall, i.e., they will not result in any job gains or losses. The scheduled effective date of the new edition is July 1, 2023. Building permits issued prior to that date will be vested under the 2018 building code. Permits issued for projects under the 2021 code edition will generally start with the 2024 construction season.

The public may obtain a copy of the small business economic impact statement or the detailed cost calculations by contacting:

Name: Stoyan Bumbalov
Address: PO Box 41449, Olympia WA 90504-1449
Phone: 360-407-9277
Fax:
TTY:
Email: sbcc@des.wa.gov
Other:

Date: August 23, 2022	**Signature:** 
Name: Tony Doan	
Title: Council Chair	

Chapter 51-52 WAC
STATE BUILDING CODE ADOPTION AND AMENDMENT OF THE ((~~2018~~)) 2021 EDITION OF THE INTERNATIONAL MECHANICAL CODE
Formerly chapter 51-42 WAC

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-003 International Mechanical Code. The ((~~2018~~)) 2021 edition of the *International Mechanical Code* published by the International Code Conference is hereby adopted by reference with the exceptions noted in this chapter of the Washington Administrative Code (WAC).

AMENDATORY SECTION (Amending WSR 21-11-066, filed 5/14/21, effective 6/14/21)

WAC 51-52-008 Implementation. The International Mechanical Code adopted by chapter 51-52 WAC shall become effective in all counties and cities of this state on ((~~February 1, 2021~~)) July 1, 2023.

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0101 Section 101—General.

101.2 Scope. This code shall regulate the design, installation, maintenance, alteration and inspection of mechanical systems that are permanently installed and utilized to provide control of environmental conditions and related processes within buildings. This code shall also regulate those mechanical systems, system components, equipment and appliances specifically addressed herein. The installation of fuel gas distribution piping and equipment, fuel gas-fired appliances and fuel gas-fired appliance venting systems shall be regulated by the *International Fuel Gas Code*. References in this code to Group R shall include Group I-1, Condition 2 assisted living facilities licensed by Washington state under chapter 388-78A WAC and Group I-1, Condition 2 residential treatment facilities licensed by Washington state under chapter 246-337 WAC.

EXCEPTIONS:
1. Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories high with separate means of egress and their accessory structures shall comply with the *International Residential Code*.
2. The standards for liquefied petroleum gas installations shall be the ((~~2017~~)) 2020 Edition of NFPA 58 (Liquefied Petroleum Gas Code) and the ((~~2018~~)) 2021 Edition of ANSI Z223.1/NFPA 54 (National Fuel Gas Code).

NEW SECTION

WAC 51-52-0113 Section 113—Stop work order.

113.4 Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to fines established by the code official.

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0202 Section 202—General definitions.

BALANCED WHOLE HOUSE VENTILATION. Any combination of concurrently operating residential dwelling or sleeping unit mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent or 5 cfm, whichever is greater, of the total mechanical supply airflow rate. ((~~Intermittent dryer exhaust, intermittent range hood exhaust, and intermittent toilet room exhaust airflow rates above the residential dwelling or sleeping unit minimum ventilation rate are exempt from the balanced airflow calculation.~~))

NOT BALANCED WHOLE HOUSE VENTILATION. A whole house ventilation system serving a dwelling or sleeping unit that is not considered balanced in accordance with the definition in this code for *balanced whole house ventilation system*. Only other than Group R-2 dwelling and sleeping units are allowed in accordance with Section 403.4.4.1 to have *not balanced whole house ventilation systems*.

DISTRIBUTED WHOLE HOUSE VENTILATION. A whole house ventilation system shall be considered distributed when it supplies outdoor air directly (not transfer air) to each dwelling or sleeping unit habitable space, (living room, den, office, *interior adjacent room*, interior adjoining spaces or bedroom), and exhausts air from all kitchens and bathrooms directly outside.

NOT DISTRIBUTED WHOLE HOUSE VENTILATION. A whole house ventilation system shall be considered not distributed when either the supply system or the exhaust system is not distributed. Supply systems are not distributed when a habitable space is supplied with outdoor air to ventilate an *interior adjacent room* or an *interior adjoining space*. Exhaust systems are not distributed when all bathrooms and kitchens are not exhausted by the whole house ventilation system. If either the supply system or the exhaust system is not distributed, then the ventilation quality adjustment system coefficient adjustment is required in accordance with Section C403.4.3.

ENCLOSED KITCHEN. A kitchen whose permanent openings to interior adjacent spaces do not exceed a total of 60 square feet (6 m^2).

INTERIOR ADJACENT ROOM. An enclosed room without exterior windows or openings to the outdoors located within a dwelling or sleeping unit that does not have interior unobstructed openings required for an *interior adjoining space*.

INTERIOR ADJOINING SPACE. A room or space without openings to the outdoors that is naturally ventilated from another habitable space by unobstructed fixed openings size in accordance with Section 402.3.

LOCAL EXHAUST. An exhaust system that uses one or more fans to exhaust air from a specific room or rooms within a residential dwelling or sleeping unit.

PERMANENT CONSTRUCTION. Construction that, if removed, would disturb the structural integrity of the building or the fire-resistance rating of a building assembly.

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

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.

WHOLE HOUSE VENTILATION SYSTEM. A mechanical ventilation system, including fans, controls, and ducts, which replaces, by direct means, air from the habitable rooms with *outdoor air*.

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.

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0306 Section 306—Access and service space.

306.5 Equipment and appliances on roofs or elevated structures. Where equipment requiring access or appliances are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet (4877 mm) above grade to access such equipment or appliances, an interior or exterior means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in height or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33 percent slope). Such access shall not require the use of portable ladders. Where access involves climbing over parapet walls, the height shall be measured to the top of the parapet wall.

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. The side railing shall extend above the parapet or roof edge not less than 42 inches (1067 mm).

2. Ladders shall have rung spacing not to exceed 12 inches (305 mm) on center. The uppermost rung shall be a maximum of 24 inches below the upper edge of the roof hatch, roof or parapet, as applicable.

3. Ladders shall have a toe spacing not less than 7 inches (178 mm) deep.

4. There shall be a minimum of 18 inches (457 mm) between rails.

5. Rungs shall have a minimum 0.75-inch (19 mm) diameter and be capable of withstanding a 300-pound (136.1 kg) load.

6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding 100 pounds (488.2 kg/m^2) per square foot. Landing dimensions shall be not less than 18 inches and not less than the width of the ladder served. A guardrail shall be provided on all open sides of the landing.

7. Climbing clearances. The distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be a minimum of 30 inches measured perpendicular to the rungs. This distance shall be maintained from the point of ladder access to the bottom of the roof hatch. A minimum clear width of 15 inches shall be provided on both sides of the ladder measured from the midpoint of and parallel with the rungs except where cages or wells are installed.

8. Landing required. The ladder shall be provided with a clear and unobstructed bottom landing area having a minimum dimension of 30 inches by 30 inches centered in front of the ladder.

9. Ladders shall be protected against corrosion by approved means.

10. Access to ladders shall be provided at all times.

Catwalks installed to provide the required access shall be not less than 24 inches (610 mm) wide and shall have railings as required for service platforms.

EXCEPTION: This section shall not apply to Group R-3 occupancies.

306.6 Appliances above ceilings. Appliances that are located above ((~~the~~)) ceilings shall have ((~~ready~~)) access for inspection, service and repair without removing *permanent construction*. Appliances that are located above a ceiling shall be provided with access to ((~~panel or removable ceiling tile with minimum nominal dimensions of 24 inches by 24 inches (609 mm x 609 mm)~~)) the working space(s) by an opening not smaller than 22 inches by 22 inches (559 mm by 559 mm). All enclosure doors or hinged panels shall be capable of opening a minimum of 90 degrees.

The appliance is not required to be removable or replaceable through the ((~~access panel or removable ceiling tile~~)) enclosure door, hinged panel, removable lay-in ceiling tile, or other removable covers. The appliance may be removed or replaced by removing the ceiling or wall assemblies adjacent to the appliance as long as they *are not permanent construction*.

EXCEPTIONS: 1. This section shall not apply to replacement appliances installed in existing compartments and alcoves where the working space clearances are in accordance with the ((~~equipment or~~)) appliance manufacturer's installation instructions.
2. A smaller ((~~access panel or removable ceiling tile~~)) enclosure door, hinged panel, removable lay-in ceiling tile, or other removable covers shall be permitted when allowed by the ((~~equipment or~~)) appliance manufacturer's installation instructions and electrical access is not required.

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0401 Section 401—General.

401.2 Ventilation required. Every occupied space other than enclosed parking garages and buildings used for repair of automobiles shall be

ventilated in accordance with Section 401.2.1, 401.2.2 or 401.2.3. Enclosed parking garages and buildings used for repair of automobiles shall be ventilated by mechanical means in accordance with Sections 403 and 404.

401.2.1 Group R occupancies. Ventilation in Group R occupancies shall be provided in accordance with Section 403.4.

401.2.2 Ambulatory care facilities and Group I-2 occupancies. Ambulatory care facilities and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407.

401.2.3 All other occupancies. Ventilation in all other occupancies shall be provided by natural means in accordance with Section 402 or by mechanical means in accordance with Sections 403.1 to 403.7.

401.3 When required. Group R occupancies shall be vented continuously or intermittently in accordance with Section 403.4. Ventilation in all other occupancies shall be provided during the periods that the room or space is occupied.

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 garage entries, 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.

EXCEPTIONS:
1. Intake air openings providing less than 500 cfm of outdoor air to Group R occupancies are permitted to be located less than 10 feet (3048 mm) horizontally from parking lots provided that the openings are not less than 15 feet (4572 mm) vertically above the parking lot.
2. Intake air openings providing less than 500 cfm of outdoor air to Group R occupancies are permitted to be located less than 10 feet (3048 mm) horizontally from parking lots provided that the openings are not less than 15 feet (4572 mm) vertically above the clear height for vehicles in the parking garage.

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, operable openings, and living space exhaust air openings of an individual dwelling unit or sleeping unit where an approved factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the manufacturer's instructions. For these combined terminations, the exhaust air concentration within the intake airflow shall not exceed 10 percent as established by the manufacturer, in accordance with ASHRAE 62.2 Section 6.8, Exception 4.

((~~EXCEPTION: Separation is not required between intake air openings and living space environmental air 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. A minimum of 3 feet (914 mm) separation shall be maintained between other environmental air exhaust outlets and other dwelling or sleeping unit factory-built intake/exhaust combination termination fittings.~~))

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.

401.7 Testing and balancing. At the discretion of the building official, flow testing may be required to verify that the mechanical system(s) satisfies the requirements of this chapter. Flow testing may be performed using flow hood measuring at the intake or exhaust points of the system, in-line pitot tube, or pitot-traverse type measurement systems in the duct, short term tracer gas measurements, or other means approved by the ((~~building~~)) code official.

AMENDATORY SECTION (Amending WSR 22-09-009, filed 4/8/22, effective 5/9/22)

WAC 51-52-0403 Section 403—Mechanical ventilation.

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.

403.2 Outdoor air required. The minimum *outdoor airflow rate* shall be determined in accordance with Section 403.3.

EXCEPTIONS: 1. Where the registered design professional demonstrates that an engineered ventilation system design will prevent the maximum concentration of contaminants from exceeding that obtainable by the rate of *outdoor air* ventilation determined in accordance with Section 403.3, the minimum required rate of *outdoor air* shall be reduced in accordance with such engineered system design.
2. Alternate systems designed in accordance with ASHRAE Standard 62.1 Section 6.2, Ventilation Rate Procedure, shall be permitted.

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 airstream consists of air recirculated from these spaces. The design and installation of dehumidification systems shall comply with ANSI/ACCA 10 Manual SPS.

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.

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 shall 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.

403.3 Outdoor air and local exhaust airflow rates. Group R occupancies shall be provided with outdoor air and local exhaust in accordance with Section 403.4. All other buildings intended to be occupied shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

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 inches 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 not be 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.

With the exception of smoking lounges, the ventilation rates in Table 403.3.1.1 are based on the absence of smoking in occupiable spaces. Where smoking is anticipated in a space other than a smoking lounge, the ventilation system serving the space shall be designed to provide ventilation over and above that required by Table 403.3.1.1 in accordance with accepted engineering practice.

EXCEPTION: Where occupancy density is known and documented in the plans, the outside air rate may be based on the design occupant density. Under no circumstance shall the occupancies used result in outside air less than one-half that resulting from application of Table 403.3.1.1 estimated maximum occupancy rates.

Table 403.3.1.1

REQUIRED OUTDOOR VENTILATION AIR

((~~(The following categories in Table 403.3.1.1 have been modified. The remainder remain as printed in the 2018 International Mechanical Code)~~))

Occupancy Classification	Occupant Density #/1000 ft^{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^{2a}
Correctional facilities				
Booking/waiting	50	7.5	0.06	—
Cells				
Without plumbing fixtures	25	5	0.12	—
With plumbing fixtures[g]	25	5	0.12	1.0
Day room	30	5	0.06	—
Dining halls	—	—	—	—
(see "Food and beverage service")	—	—	—	—
Guard stations	15	5	0.06	—
Dry cleaners, laundries				
Coin-operated dry cleaner	20	15	—	—
Coin-operated laundries	20	7.5	0.12	—
Commercial dry cleaner	30	30	—	—

Occupancy Classification	Occupant Density #/1000 ft^{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^{2a}
Commercial laundry	10	5	0.12	—
Storage, pick up	30	7.5	0.12	—
Education				
Art classroom[g]	20	10	0.18	0.7
Auditoriums	150	5	0.06	—
Classrooms (ages 5 through 8)	25	10	0.12	—
Classrooms (age 9 plus)	35	10	0.12	—
Computer lab	25	10	0.12	—
Corridors (see "Public spaces")	—	—	—	—
Day care (through age 4)	25	10	0.18	—
Lecture classroom	65	7.5	0.06	—
Lecture hall (fixed seats)	150	7.5	0.06	—
Locker/dressing rooms[g]	—	—	—	0.25
Media center	25	10	0.12	—
Multiuse assembly	100	7.5	0.06	—
Music/theater/dance	35	10	0.06	—
Science laboratories[g]	25	10	0.18	1.0
Smoking lounges[b]	70	60	—	—
Sports locker rooms[g]	—	—	—	0.5
Wood/metal shops[g]	20	10	0.18	0.5
Food and beverage service				
Bars, cocktail lounges	100	7.5	0.18	—
Cafeteria, fast food	100	7.5	0.18	—
Dining rooms	70	7.5	0.18	—
Kitchens (cooking)[b]	20	7.5	0.12	0.7
Hotels, motels, resorts, and dormitories				
Bathrooms/toilets—private[g]	—	—	—	25/50[f]
Bedroom/living room	10	5	0.06	—
Conference/meeting	50	5	0.06	—
Dormitory sleeping area	20	5	0.06	—
Gambling casinos	120	7.5	0.18	—
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	50	0.06	—
Offices				
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	—
Private dwellings, single and multiple				
Garages, common for multiple units[b]	—	—	—	0.75
Kitchens[b]				See Table 403.4.7
Living areas[c]		See Table 403.4.2	—	—
Toilet rooms and bathrooms[g]	—	—		See Table 403.4.7
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	—

Occupancy Classification	Occupant Density #/1000 ft^{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^{2a}
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 showerhead)[g]	—	—	—	50/20[f]
Smoking lounges[b]	70	60	—	—
Toilet rooms—Public[g]	—	—	—	50/70[e]
Retail stores, sales floors, and showroom floors				
Dressing rooms	—	—	—	0.25
Mall common areas	40	7.5	0.06	—
Sales	15	7.5	0.12	—
Shipping and receiving	2	10	0.12	—
Smoking lounges[b]	70	60	—	—
Storage rooms	—	—	0.12	—
Warehouses (see "Storage")	—	10	0.06	—
Specialty shops				
Automotive motor fuel-dispensing stations[b]	—	—	—	1.5
Barber	25	7.5	0.06	0.5
Beauty salons[b]	25	20	0.12	0.6
Embalming rooms[b]	—	—	—	2.0
Nail salons[b,h]	25	20	0.12	0.6
Pet shops (animal areas)[b]	10	7.5	0.18	0.9
Supermarkets	8	7.5	0.06	—
Sports and amusement				
Disco/dance floors	100	20	0.06	—
Bowling alleys (seating areas)	40	10	0.12	—
Game arcades	20	7.5	0.18	—
Ice arenas, without combustion engines[j]	—	—	0.30	0.5
Gym, stadium, arena (play area)[j]	—	—	0.30	—
Spectator areas	150	7.5	0.06	—
Swimming pools (pool and deck area)	—	—	0.48	—
Health club/aerobics room	40	20	0.06	—
Health club/weight room	10	20	0.06	—
Storage				
Janitor closets, trash rooms, recycling rooms	—	—	—	1.0
Repair garages, enclosed parking garage[b, d]	—	—	—	0.75
Storage rooms, chemical	—	—	—	1.5
Warehouses	—	—	0.06	—
Theaters				
Auditoriums (see "Education")	—	—	—	—
Lobbies	150	5	0.06	—
Stages, studios	70	10	0.06	—
Ticket booths	60	5	0.06	—

Occupancy Classification	Occupant Density #/1000 ft^{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^{2a}
Transportation				
Platforms	100	7.5	0.06	—
Transportation waiting	100	7.5	0.06	—
Workrooms				
Bank vaults/safe deposit	5	5	0.06	—
Darkrooms	—	—	—	1.0
Copy, printing rooms	4	5	0.06	0.5
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	—
Computer (without printing)	4	5	0.06	—

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minutes per square foot = 0.00508 m^3/(s•m^2), °C = [(°F) -32]/1.8, 1 square foot - 0.0929 m^2.

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 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~~)). For occupancies other than science laboratories, where there is a wheel-type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Items 2 and 4).
h. For nail salons, each manicure and pedicure station 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. Reserved.
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 ((~~507.2.1~~)) 507.1.2. Kitchenettes that only contain a microwave cooking appliance 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.

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 flow (V_{ot}) shall be determined in accordance with Equation 4-5.

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

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.

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

where:

P_s = System population: 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.

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.

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.

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

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

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

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

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.

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

403.3.2 Group R-2, R-3 and R-4 occupancies. This section is not adopted. See Section 403.4.

403.3.2.1 Outdoor air for dwelling units. This section is not adopted.

403.3.2.2 Outdoor air for other spaces. This section is not adopted.

403.3.2.3 Local exhaust. This section is not adopted.

403.4 Group R whole house mechanical ventilation system. Each dwelling unit or sleeping unit shall be equipped with a whole house mechanical ventilation system that complies with Sections 403.4.1 through 403.4.6. Each dwelling unit or sleeping unit shall be equipped with local exhaust complying with Section 403.4.7. All occupied spaces, including public corridors, other than the Group R dwelling units and/or sleeping units, that support these Group R occupancies shall meet the ventilation requirement of natural ventilation requirements of Section 402 or the mechanical ventilation requirements of Sections 403.1 through 403.3.

EXCEPTION: Alternate balanced whole house ventilation systems and local exhaust systems subject to the Washington State Energy Code, Residential Provisions serving Group R dwelling units designed and commissioned in accordance with ASHRAE Standard 62.2 are permitted.

403.4.1 System design. The whole house ventilation system shall consist of one or more supply fans, one or more exhaust fans, or an

ERV/HRV with integral fans; and the associated ducts and controls. Local exhaust fans shall be permitted to serve as part of the whole house ventilation system when provided with the proper controls in accordance with Section 403.4.5. The systems shall be designed and installed to supply and exhaust the minimum outdoor airflow rates ((~~per~~)) in accordance with Section 403.4.2 as corrected by the balanced and/or distributed whole house ventilation system coefficients in accordance with Section 403.4.3 where applicable.

Table 403.4.2
WHOLE HOUSE MECHANICAL VENTILATION AIRFLOW RATE (CONTINUOUSLY OPERATING SYSTEMS)

Floor Area (ft^2)	Bedrooms[1]				
	1	2	3	4	>5
<500	30	30	35	45	50
500 - 1000	30	35	40	50	55
1001 - 1500	30	40	45	55	60
1501 - 2000	35	45	50	60	65
2001 - 2500	40	50	55	65	70
2501 - 3000	45	55	60	70	75
3001 - 3500	50	60	65	75	80
3501 - 4000	55	65	70	80	85
4001 - 4500	60	70	75	85	90
4501 - 5000	65	75	80	90	95

[1] Minimum airflow (Q_r) is set at not less than 30 cfm for each dwelling units.

403.4.2 Whole house mechanical ventilation rates. The sleeping unit whole house mechanical ventilation minimum outdoor airflow rate shall be determined in accordance with the breathing zone ventilation rates minimum outdoor airflow rate shall be determined in accordance with the breathing zone ventilation rates requirements of Section 403.3.1.1.1.2 using Equation 4-2. The dwelling unit whole house mechanical ventilation minimum outdoor airflow rate shall be determined in accordance with Equation 4-10 or Table 403.4.2.

$$Q_r = 0.01*A_{floor} + 7.5*(N_{br} + 1) \quad \textbf{(Equation 4-10)}$$

where:

Q_r = Ventilation airflow rate, cubic feet per minute (cfm) but not less than 30 cfm for each dwelling unit.

A_{floor} = Conditioned floor area, square feet (ft^2)

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

Table 403.4.3
SYSTEM COEFFICIENT (C_{system})

System Type	Distributed	Not Distributed
Balanced	1.0	1.25
Not Balanced	1.25	1.5

403.4.3 Ventilation quality adjustment. The minimum whole house ventilation rate from Section 403.4.2 shall be adjusted by the system coefficient in Table 403.4.3 based on the system type not meeting the definition of a *balanced whole house ventilation system* and/or not meeting the definition of a *distributed whole house ventilation system*.

$$Q_v = Q_r* C_{system} \quad \textbf{(Equation 4-11)}$$

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 4-10 or Table 403.4.1

C_{system} = System coefficient from Table 403.4.3

403.4.4 Whole house ventilation residential occupancies. Residential dwelling and sleeping unit whole house ventilation systems shall meet the requirements of Sections 403.4.4.1 or 403.4.4.2 depending on the occupancy of the residential unit.

403.4.4.1 Whole house ventilation in Group R-2 occupancies. Residential dwelling and sleeping units in Group R-2 occupancies system shall include supply and exhaust fans and be a *balanced whole house ventilation system* in accordance with Section 403.4.6.3. The system shall include a heat or energy recovery ventilator with a sensible heat recovery effectiveness as prescribed in Section C403.3.6 or when selected as an option of R406 of the *Washington State Energy Code*. The whole house ventilation system shall operate continuously at the minimum ventilation rate determined in accordance with Section 403.4. The whole house supply fan shall provide ducted outdoor ventilation air to each habitable space within the residential unit.

EXCEPTIONS:

1. *Interior adjoining spaces* that are ventilated from another habitable space are not required to have outdoor air ducted directly to the adjoining space. These systems are considered *not distributed whole house ventilation systems* and shall use the "not distributed" quality adjustment system coefficient in accordance with Section 403.4.3.
2. *Interior adjacent rooms* that are ventilated from another habitable space are not required to have outdoor air ducted directly to the *interior adjacent room*. These systems are considered *not distributed whole house ventilation systems* and shall use the "not distributed" quality adjustment system coefficient in accordance with Section 403.4.3. The interior adjacent room shall be provided with a transfer fan with a minimum airflow rate of 30 cfm or with relief air inlet with a minimum airflow of 20 cfm that is connected to the exhaust/relief air inlet of an ERV/HRV whole house ventilation system. Transfer fans that ventilate *interior adjacent rooms* shall meet the sone rating in Section 403.3.6 and shall have whole house ventilation controls in accordance with Section 403.4.5.

403.4.4.2 Whole house ventilation for other than Group R-2 occupancies. Residential dwelling and sleeping units in other than Group R-2 occupancies, including I-1 condition 2 occupancies, shall have a whole house mechanical ventilation system with supply and exhaust fans in accordance with Section 403.4.6.1, 403.4.6.2, 403.4.6.3, or 403.4.6.4. The whole house ventilation system shall operate continuously at the minimum ventilation rate determined in accordance with Section 403.4.2 unless configured with intermittent off controls in accordance with Section 403.4.6.5. The whole house supply fan shall provide ducted outdoor ventilation air to each habitable space within the residential unit.

EXCEPTIONS:

1. *Interior adjoining spaces* that are ventilated from another habitable space are not required to have outdoor air ducted directly to the adjoining space. These systems are considered *not distributed whole house ventilation systems* and shall use the "not distributed" quality adjustment system coefficient in accordance with Section 403.4.3.
2. *Interior adjacent rooms* that are ventilated from another habitable space are not required to have outdoor air ducted directly to the *interior adjacent room*. These systems are considered *not distributed whole house ventilation systems* and shall use the "not distributed" quality adjustment system coefficient in accordance with Section 403.4.3. The interior adjacent room shall be provided with a transfer fan with a minimum airflow rate of 30 cfm or with relief air inlet with a minimum airflow of 20 cfm that is connected to the exhaust/relief air inlet of an ERV/HRV whole house ventilation system. Transfer fans that ventilate *interior adjacent rooms* shall meet the sone rating in Section 403.4.6 and shall have whole house ventilation controls in accordance with Section 403.4.5.

403.4.5 Whole house ventilation controls.

1. The whole house ventilation system shall be controlled with manual switches, timers or other means that provide for automatic operation of the ventilation system that are readily accessible by the occupant;

2. Whole house mechanical ventilation system shall be provided with controls that enable manual override off of the system by the oc-

cupant during periods of poor outdoor air quality. Controls shall include permanent text or a symbol indicating their function. Recommended control permanent labeling to include text similar to the following: "Leave on unless outdoor air quality is very poor." Manual controls shall be provided with ready access for the occupant.

EXCEPTION: Central whole house mechanical systems with supply air and/or exhaust that serve more than one dwelling or sleep units are not required to have manual override off controls accessible to the occupant.

3. Whole house ventilation systems shall be configured to operating continuously except where intermittent off controls are provided in accordance with Section 403.4.6.5 and allowed by Section 403.4.4.2.

403.4.6 Whole house ventilation system component requirements. Whole house ventilation supply and exhaust fans specified in this section shall have a minimum efficacy as prescribed in the *Washington State Energy Code*. The fans shall be rated for sound at a maximum of 1.0 sone at design airflow and static pressure conditions. Design and installation of the system or equipment shall be carried out in accordance with manufacturer's installation instructions.

EXCEPTIONS: 1. Central supply or exhaust fans serving multiple residential units do not need to comply with the maximum fan sone requirements.
2. Interior joining spaces provided with a 30 cfm transfer fan or a 25 square foot permanent opening do not require supply ventilation air directly to the space. Transfer fans shall meet the sone rating above and have whole house ventilation controls in accordance with Section 403.4.5.

403.4.6.1 Exhaust fans. Exhaust fans required shall be ducted directly to the outside in accordance with Section 501.3. Exhaust air outlets shall be designed to limit the pressure difference to the outside to limiting the outlet free area maximum velocity to 500 feet per minute and equipped with backdraft dampers or motorized dampers in accordance with *Washington State Energy Code*. Exhaust fans shall be tested and rated in accordance with HVI 915, HVI 916, and HVI 920. Exhaust fans required in this section may be used to provide local ventilation. Exhaust fans serving spaces other than kitchens that are designed for intermittent exhaust ((~~airflow rates higher than the continuous exhaust airflow~~)) rates in Table ((~~403.4.2~~)) 403.4.7 shall be provided with occupancy sensors ((~~or~~)), humidity sensors, timer controls, or pollutant sensor controls to automatically override the fan to the high speed airflow rate. The exhaust fans shall be tested and the testing results shall be submitted and posted in accordance with Section 403.4.6.7.

EXCEPTIONS: 1. Central exhaust fans serving multiple residential units do not need to comply with the HVI testing requirements.
2. Inlet free area maximum velocity may exceed 500 feet per minute when a factory-built combined exhaust/intake termination fitting is used.

403.4.6.2 Supply fans. Supply fans used in meeting the requirements of this section shall supply outdoor air from intake openings in accordance with Sections 401.4 and 401.5. Intake air openings shall be designed to limit the pressure difference to the outside to limiting the inlet free area maximum velocity to 500 feet per minute and when designed for intermittent off operation shall be equipped with motorized dampers in accordance with the *Washington State Energy Code*. Supply fans shall be tested and rated in accordance with HVI 915, HVI 916, and HVI 920. 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 provided with access for regular maintenance and replacement. The filter shall have a Minimum Efficiency Rating Value (MERV) of at least 8.

EXCEPTION: Central supply fans serving multiple residential units do not need to comply with the HVI testing requirements.

403.4.6.3 Balanced whole house ventilation system. A balanced whole house ventilation system shall include both supply and exhaust fans. The supply and exhaust fans shall have airflow that is within 10 percent of each other. The tested and balanced total mechanical exhaust airflow rate is within 10 percent or 5 cfm, whichever is greater, of the total mechanical supply airflow rate. The flow rate test results shall be submitted and posted in accordance with Section 403.4.6.7. The exhaust fan shall meet the requirements of Section 403.4.6.1. The supply fan shall meet the requirements of Section 403.4.6.2. For Group R-2 dwelling and sleeping units, the system is required to have balanced whole house ventilation but is not required to have distributed whole house ventilation where the not distributed system coefficient from Table 403.4.3 is utilized to correct the whole house mechanical ventilation rate. The system shall be ((~~design~~)) designed and balanced to meet the pressure equalization requirements of Section 501.4. ((~~Intermittent dryer exhaust, intermittent range hood exhaust, and intermittent toilet room exhaust airflow rates above the residential dwelling or sleeping unit minimum ventilation rate~~)) Local exhaust systems that are not a component of the whole-house mechanical ventilation system are exempt from the balanced airflow calculation.

403.4.6.4 Furnace integrated supply. Systems using space condition heating and/or cooling air handler fans for outdoor air supply air distribution are not permitted.

EXCEPTION: Air handler fans shall be permitted that have multi-speed or variable speed supply airflow control capability with a low speed operation not greater than 25 percent of the rated supply air flow capacity during ventilation only operation. Outdoor air intake openings must meet the provisions of Sections 401.4 and 401.5 and must include a motorized damper that is activated by the whole house ventilation system controller. Intake air openings shall be designed to limit the pressure difference to the outside to limiting the inlet free area maximum velocity to 500 ft per min. The motorized damper must be controlled to maintain the outdoor airflow intake airflow within 10 percent of the whole house mechanical exhaust airflow rate. The supply air handler shall provide supply air to each habitable space in the residential unit. The whole house ventilation system shall include exhaust fans in accordance with Section 403.4.6.1 to meet the pressure equalization requirements of Section 501.4. The flow rate for the outdoor air intake must be tested and verified at the minimum ventilation fan speed and the maximum heating or cooling fan speed. The results of the test shall be submitted and posted in accordance with Section 403.4.6.7.

403.4.6.5 Intermittent off operation. Whole house mechanical ventilation systems shall be provided with advanced controls that are configured to operate the system with intermittent off operation and shall operate for a least two hours in each four-hour segment. The whole house ventilation airflow rate determined in accordance with Section 403.4.2 as corrected by Section 403.4.3 shall be multiplied by the factor determined in accordance with Table 403.4.6.5.

Table 403.4.6.5

INTERMITTENT WHOLE HOUSE MECHANICAL VENTILATION RATE FACTORS[a,b]

Run-time Percentage in Each 4-hour Segment	50%	66%	75%	100%
Factor[a]	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.

403.4.6.6 Testing. Whole house mechanical ventilation systems shall be tested, balanced and verified to provide a flow rate not less than the minimum required by Sections 403.4.2 and 403.4.3. Testing shall be performed according to the ventilation equipment manufacturer's in-

structions, 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 and shall be posted in the residential unit in accordance with Section 403.4.6.7.

403.4.6.7 Certificate. A permanent certificate shall be completed by the mechanical contractor, test and balance contractor 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 whole house mechanical ventilation system as installed and the type of mechanical whole house ventilation system used to comply with Section 403.4.3.

403.4.7 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 403.4.7 and Table 403.3.1.1, including notes. Fans required by this section shall be provided with controls that enable manual override or automatic occupancy sensor, humidity sensor, timer controls, or pollutant sensor controls. An "on/off" switch shall meet this requirement for manual controls. Manual fan controls shall be provided with ready access in the room served by the fan.

Table 403.4.7
MINIMUM EXHAUST RATES

Area to be exhausted	Exhaust Rate	
	Intermittent	Continuous
((~~**Kitchens**~~	~~100 cfm~~	~~30 cfm~~))
Open kitchens	In accordance with Section 403.4.7.3	Not permitted
Enclosed kitchens	In accordance with Section 403.4.7.3	5 ACH based on kitchen volume
Bathrooms - Toilet rooms	50 cfm	20 cfm

403.4.7.1 Whole house exhaust controls. If the local exhaust fan is included in a whole house ventilation system in accordance with Section 403.4.6, the exhaust fan shall be controlled to operate as specified in Section 403.4.5.

403.4.7.2 Local exhaust fans. Exhaust fans shall meet the following criteria.

1. Exhaust fans shall be tested and rated in accordance with HVI 915, HVI 916, and HVI 920 or equivalent.

((~~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. Fan airflow rating and duct system shall be designed and installed to deliver at least the exhaust airflow required by Table 403.4.7. 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. Local exhaust systems shall be tested((~~, balanced~~)) and verified to provide a flow rate not less than the minimum required by this section.

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 403.4.3.~~)) Intermittent local exhaust system serving kitchens shall be rated for sound at a maximum of 3 sones at one or more airflow settings not less than 100 cfm at a static pressure not less than that determined at working speed as specified in HVI 916 Section 7.2.

5. Continuous local exhaust system serving kitchens shall be rated for sound at a maximum of 1 sone at one or more airflow settings not less than 100 cfm at a static pressure not less than that determined at working speed as specified in HVI 916 Section 7.2.

EXCEPTIONS: 1. The installed airflow is not required to be field-verified where 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 403.4.7.2.

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.~~)) Remote mounted fans need not meet sound requirements. To be considered for this exception, a remote mounted fan shall be mounted outside the kitchen, and there shall be at least 4 feet (1 m) of ductwork between the fan and the intake grille.

Table 403.4.7.2

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.

403.4.7.3 Local intermittent kitchen exhaust system. Kitchen range hoods for domestic cooking appliances shall meet or exceed either the minimum airflow or the minimum capture efficiency in accordance with Table 403.4.7.3. Capture efficiency ratings shall be determined in accordance with ASTM E3087.

EXCEPTION: Other intermittent kitchen exhaust fans, including downdraft, shall meet or exceed 300 cfm airflow.

Table 403.4.7.3
Kitchen Range Hood Airflow Rates (CFM) and ASTM E3087 Capture Efficiency (CE) Ratings According to Kitchen Range Fuel Type

Hood Over Electric Range	Hood Over Combustion Range
65 percent CE or 160 cfm	80 percent CE or 250 cfm

403.4.7.3.1 Field verification and diagnostic testing for local intermittent kitchen exhaust system. The local exhaust system for kitchens shall be installed to comply with local mechanical exhaust requirements specified in 403.4.7.3 and shall be field verified in accordance with the procedures below to confirm the model is rated by HVI or AHAM to comply with the following requirements:

1. Local intermittent exhaust system for kitchens shall be tested and verified to provide a minimum airflow rate or capture efficiency required by Section 403.4.7.3. Testing shall include verification of the maximum sound rating as specified in Section 403.4.7.2. Testing for the intermittent kitchen exhaust systems shall occur with the whole house ventilation system operating and with all dwelling unit or sleeping unit entry doors closed. Testing for exhaust systems that require mechanical makeup air in accordance with Section 505.4 shall include verifying that the mechanical makeup air opening is open. Testing for exhaust systems that require mechanical makeup air in accordance with Section 505.4 shall include verifying that the mechanical makeup air system is controlled to automatically start. Testing for exhaust systems that do not require mechanical makeup air in accordance with Section 505.4 and that are exempt from pressurize equalization per Section 501.4 shall be tested with operable openings manually opened unless design exhaust airflow can be achieved with all operable openings closed. 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.

EXCEPTION: The installed airflow is not required to be field-verified where an exhaust airflow rating at a pressure of 0.25 in. w.g. is used, provided the duct sizing meets the prescriptive requirements of Table 403.4.7.2.

2. The verification shall utilize certified rating data from *HVI Publication 911* or another directory of certified product performance ratings approved by the code official for determining compliance. The verification procedure shall consist of visual inspection of the local intermittent kitchen exhaust system to verify and record the following information:

2.1. The manufacturer name and model number.

2.2. The model is listed in the HVI directory.

2.3. The rated airflow value listed in the HVI directory.

2.4. The sound rating value listed in the HVI directory.

2.5. If the value for the rated airflow given in the directory is greater than or equal to the airflow requirements specified in Section 403.4.7.3 and if the value for the sone rating given in the directory is less than or equal to the sone rating requirements specified in 403.4.7.2, then the local intermittent kitchen exhaust system complies, otherwise the local intermittent kitchen exhaust system does not comply.

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0501 Section 501—General.

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 the property line; 10 feet (3048 mm) from operable openings into the building; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into the building which 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 property lines; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into the building; 10 feet (3048 mm) above adjoining grade.

3. **For environmental air exhaust other than enclosed parking garage and transformer vault exhaust:** 3 feet (914 mm) from property lines, 3 feet (914 mm) from operable openings into buildings for all occupancies other that 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 an approved factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the manufacturer's instructions.

EXCEPTIONS:
1. The separation between an air intake and exhaust outlet on a single listed package HVAC unit.
2. Exhaust from environmental air systems other than garages may be discharged into an open parking garage.
3. Except for Group I occupancies, where ventilation system design circumstances require building HVAC air to be relieved, such as during economizer operation, such air may be relieved into an open or enclosed parking garage within the same building.

4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the elevation required by Section 1613 of the *International Building Code* for utilities and attendant equipment.

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; 3 feet (914 mm) horizontally from, 10 feet above, or 10 feet below adjoining finished ((~~sidewalk~~)) walkways.

6. For transformer vault exhaust system outlets, in addition to the requirements of NFPA 70 Section 450.45: Ten 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) above walkways.

7. For elevator machinery rooms in enclosed or open parking garages: Exhaust outlets may discharge air directly into the parking garage.

((~~7.~~)) 8. For specific systems see the following sections:

((~~7.1.~~)) 8.1. Clothes dryer exhaust, Section 504.4.

((~~7.2.~~)) 8.2. Kitchen hoods and other kitchen exhaust equipment, Sections 506.3.13, 506.4 and 506.5.

((~~7.3.~~)) 8.3. Dust stock and refuse conveying systems, Section 511.2.

((~~7.4.~~)) 8.4. Subslab soil exhaust systems, Section 512.4.

((~~7.5.~~)) 8.5. Smoke control systems, Section 513.10.3.

((~~7.6.~~)) 8.6. Refrigerant discharge, Section 1105.7.

((~~7.7.~~)) 8.7. Machinery room discharge, Section 1105.6.1.

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: Intermittent ((~~domestic range~~)) kitchen exhaust, intermittent domestic dryer exhaust, and intermittent 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 or Section 505.

AMENDATORY SECTION (Amending WSR 16-01-148, filed 12/21/15, effective 7/1/16)

WAC 51-52-0504 Section 504—Clothes dryer exhaust.

504.4 Exhaust installation. Dryer exhaust ducts for clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper located where the duct terminates. Dryer exhaust ducts may terminate at exterior wall louvers with openings spaced not less than 1/2-inch in any direction.

Screens shall not be installed at the duct termination. Ducts shall not be connected or installed with sheet metal screws or other fasteners that will obstruct the exhaust flow. Clothes dryer exhaust ducts shall not be connected to a vent connector, vent or chimney. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums.

Domestic dryer exhaust ducts may terminate at a common location where each duct has an independent back-draft damper.

((~~504.10~~)) 504.11 Common exhaust systems for clothes dryers located in multistory structures. Where a common multistory duct system is designed and installed to convey exhaust from multiple clothes dryers, the construction of the system shall be in accordance with all of the following:

1. The shaft in which the duct is installed shall be constructed and fire-resistance rated as required by the *International Building Code*.

2. Dampers shall be prohibited in the exhaust duct. Penetrations of the shaft and ductwork shall be protected in accordance with Section 607.5.5, Exception 2.

3. Rigid metal ductwork shall be installed within the shaft to convey the exhaust. The ductwork shall be constructed of sheet steel having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage) and in accordance with SMACNA *Duct Construction Standards*.

4. The ductwork within the shaft shall be designed and installed without offsets.

5. The exhaust fan motor design shall be in accordance with Section 503.2.

6. The exhaust fan motor shall be located outside of the airstream.

7. The exhaust fan shall run continuously, and shall be connected to a standby power source.

8. Exhaust fan operation shall be monitored in an *approved* location and shall initiate an audible or visual signal when the fan is not in operation.

9. Makeup air shall be provided for the exhaust system to maintain the minimum flow for the exhaust fan when the dryers are not operating. Additionally, makeup air shall be provided when required by Section ((~~504.5~~)) 504.7.

10. A cleanout opening shall be located at the base of the shaft to provide *access* to the duct to allow for cleaning and inspection. The finished opening shall be not less than 12 inches by 12 inches (305 mm by 305 mm).

11. Screens shall not be installed at the termination.

12. The common multistory duct system shall serve only clothes dryers and shall be independent of other exhaust systems.

AMENDATORY SECTION (Amending WSR 16-01-148, filed 12/21/15, effective 7/1/16)

WAC 51-52-0505 Section 505—Domestic ((~~kitchen~~)) cooking exhaust equipment.

((~~505.1~~)) 505.3 Domestic ((~~systems~~)) exhaust ducts. ((~~Where domestic range hoods and domestic appliances equipped with downdraft exhaust are provided, such hoods and appliances~~)) Ducts serving domestic cooking exhaust equipment shall discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be ((~~air tight~~)) airtight, shall be equipped with a backdraft damper and shall be independent of all other exhaust systems.

Domestic kitchen exhaust ducts may terminate with other domestic dryer exhaust and residential local exhaust ducts at a common location where each duct has an independent back-draft damper.

Listed and labeled exhaust booster fans shall be permitted when installed in accordance with the manufacturer's installation instructions.

EXCEPTIONS:

1. In other than Group I-1 and I-2, where installed in accordance with the manufacturer's installation instructions and where ((~~mechanical ventilation is otherwise provided in accordance with Chapter 4~~)) continuous local exhaust is provided in an enclosed kitchen in accordance with Table 403.4.7, listed and labeled ductless range hoods shall not be required to discharge to the outdoors. The local exhaust from the residential dwelling or sleeping unit kitchen area may be combined with other exhaust ductwork where the exhaust register/grille in the kitchen is a minimum of 6 feet (1.8 M) from the domestic range cooktop. The exhaust register/grille shall be provided with a minimum MERV 3 filter or mesh filter (washable) for trapping grease.
2. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:
2.1. The duct shall be installed under a concrete slab poured on grade.
2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.
2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor concrete floor surface.
2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of the building.
2.5. The PVC ducts shall be solvent cemented.

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0506 Section 506—Commercial kitchen hood ventilation system ducts and exhaust equipment.

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 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.

506.3.9 Grease duct cleanout location, spacing and installation.

506.3.9.1 Grease duct horizontal cleanout. Cleanouts located on horizontal sections of ducts shall:

1. Be spaced not more than 20 feet (6096 mm) apart.
2. Be located not more than 10 feet (3048 mm) from changes in direction that are greater than 45 degrees (0.79 rad).
3. Be located on the bottom only where other locations are not available and shall be provided with internal damming of the opening such that grease will flow past the opening without pooling. Bottom cleanouts and openings shall be approved for the application and installed liquid-tight.
4. Not be closer than 1 inch (25.4 mm) from the edges of the duct.
5. Have dimensions of not less than 12 inches by 12 inches (305 mm by 305 mm). Where such dimensions preclude installation, the openings shall be not less than 12 inches (305 mm) on one side and shall be large enough to provide access for cleaning and maintenance.
6. Shall be located at grease reservoirs.
7. Be located within 3 feet (914 mm) of horizontal discharge fans.

506.3.9.2 Grease duct vertical cleanouts. Where ducts pass vertically through floors, cleanouts shall be provided. A minimum of one cleanout shall be provided on each floor. Cleanout openings shall be not less than 1 1/2 inches (38 mm) from all outside edges of the duct or welded seams.

506.3.11 Grease duct enclosures. A commercial kitchen grease duct serving a Type I hood that penetrates a ceiling, wall, floor or any concealed spaces shall be enclosed from the point of penetration to the outlet terminal. In-line exhaust fans not located outdoors shall be enclosed as required for grease ducts. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. The duct enclosure shall serve a single grease duct and shall not contain other ducts, piping or wiring systems. Duct enclosures shall be a shaft enclosure in accordance with Section 506.3.11.1, a field-applied enclosure assembly in accordance with Section 506.3.11.2 or a factory-built enclosure assembly in accordance with Section 506.3.11.3. Duct enclosures shall have a fire-resistance rating of not less than that of the assembly penetrated. The duct enclosure need not exceed 2 hours but shall not be less than 1 hour. Fire dampers and smoke dampers shall not be installed in grease ducts.

EXCEPTION: A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0515 Section 515—Waste or linen chute venting.

515.1 General. Waste or linen chutes shall be gravity vented ((~~per~~)) in accordance with NFPA 82.

EXCEPTION: Waste or linen chutes may be mechanically ventilated by an exhaust fan((~~. The exhaust fan~~)) in accordance with Section 713.13.7 of the *International Building Code* ((~~Section 713.13.7~~)).

AMENDATORY SECTION (Amending WSR 22-09-009, filed 4/8/22, effective 5/9/22)

WAC 51-52-0601 Section 601—General.

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 one thousand square feet (93 m^2) 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.~~)) Transfer air movement required to maintain pressurization difference within health care facilities in accordance with ASHRAE 170.
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 one hundred percent 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; 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.

AMENDATORY SECTION (Amending WSR 10-03-099, filed 1/20/10, effective 7/1/10)

WAC 51-52-0603 Section 603—Duct construction and installation.

603.5.1 Gypsum ducts. The use of gypsum boards to form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125°F (52°C) and the gypsum board surface temperature is maintained above the airstream dew-point temperature. Supply air ducts formed by gypsum boards shall not be incorporated in air-handling systems utilizing *direct evaporative* ((~~coolers~~)) *cooling systems*.

EXCEPTION: In other than Group I-2 occupancies, gypsum boards may be used for ducts that are only used for stairwell or elevator pressurization supply air. The gypsum duct shall not attach directly to the equipment.

OPTION 1

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0605 Section 605—Air filters.

605.1 General. ((~~Heating and air-conditioning~~)) Air handlers and ventilation systems shall be provided with *approved* air filters in accordance with Section 605.4. Filters shall be installed such that all return air, recirculated 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).

EXCEPTIONS: 1. Cooling coils that are designed, controlled and operated to provide sensible cooling only do not require filtration at the terminal device.
2. Ambient air that enters the building through intentional openings for natural ventilation or by infiltration is not required to be filtered.
3. Recirculated air serving systems without wetted cooling coils or with unducted heater (hydronic coils, fossil fuel heating elements or electric resistance heating elements) do not require filtration at the terminal device.

605.4 Particulate matter removal. Particulate matter filters or air cleaners ((~~having~~)) shall have a minimum efficiency reporting value (MERV) of not less than ((~~6 for ducted air handlers and not less than 4 for ductless mini-split systems shall be provided upstream of all cooling coils or other devices with wetted surfaces through which air is supplied to an occupiable space.~~)) the following:

1. MERV 13 for ducted air handlers and ventilation systems serving occupiable spaces in Groups A, B, E, M, R and I occupancies.

2. MERV 8 for ducted air handlers and ventilation systems serving occupiable spaces in Groups F, H, S, and U occupancies.

3. MERV 4 for unducted air handlers and fan coil units.

EXCEPTIONS: 1. Ducted air handlers and ventilation systems 500 cfm or less shall have a filter not less than MERV 8.
2. Recirculated air at fan powered variable air volume terminal units with hydronic heating coils or electric resistance heating elements shall have a filter not less than MERV 8.
3. Exhaust or relief air upstream of a heat exchanger or coil shall have a filter not less than MERV 6.

OPTION 2

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-0605 Section 605—Air filters.

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: Cooling coils that are designed, controlled and operated to provide sensible cooling only do not require filtration at the terminal device.

605.4 Particulate matter removal. Particulate matter filters or air cleaners having a minimum efficiency reporting value (MERV) of not less than 6 for ducted air handlers and not less than 4 for ductless mini-split systems shall be provided upstream of all cooling coils or other devices with wetted surfaces through which air is supplied to an occupiable space.

605.5 Smoke filtration capability. Air handlers and energy recovery ventilators serving occupiable spaces each with individual capacity greater than 500 cfm shall provide fan capacity and a filter box capable of housing a filter with a minimum efficiency reporting value (MERV) of not less than 13.

EXCEPTION: Air handlers that process 100 percent recirculated air with no outdoor air are not required to comply with this section.

NEW SECTION

WAC 51-52-0607 Section 607—Ducts and transfer openings.

607.5.2 Fire barriers. Ducts and air transfer openings that penetrate fire barriers shall be protected with *listed* fire dampers installed in accordance with their listing. Ducts and air transfer openings shall not penetrate enclosures for interior exit stairways and ramps and exit passageways except as permitted by Sections 1023.5 and 1024.6, respectively, of the *International Building Code*.

EXCEPTION: Fire dampers are not required at penetrations of fire barriers where any of the following apply:
1. Penetrations are tested in accordance with ASTM E119 or UL 263 as part of the fire-resistance-rated assembly.
2. Ducts are used as part of an *approved* smoke control system in accordance with Section 513 and where the fire damper would interfere with the operation of the smoke control system.
3. Such walls are penetrated by fully ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, are in areas of other than Group H and are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the *International Building Code*. For the purposes of this exception, a fully ducted HVAC system shall be a duct system for the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage (0.0217 inch (0.55 mm)) thickness and shall be continuous from the air-handling *appliance* or *equipment* to the air outlet and inlet terminals. Flexible air connectors shall be permitted in a fully ducted system, limited to the following installations:
3.1. Nonmetallic flexible connections that connect a duct to an air handling unit or *equipment* located within a mechanical room or located outdoors in accordance with Section 603.9.
3.2. Nonmetallic flexible air connectors in accordance with Section 603.6.2 that connect an overhead metal duct to a diffuser, grille, or register where the metal duct and diffuser, grille, or register are located within the same room.

607.5.3 Fire partitions. Ducts and air transfer openings that penetrate fire partitions shall be protected with listed fire dampers installed in accordance with their listing.

EXCEPTION: In *occupancies* other than Group H, fire dampers are not required where any of the following apply:
1. Corridor walls in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the *International Building Code* and the duct is protected as a through penetration in accordance with Section 714 of the *International Building Code*.
2. The partitions are tenant partitions in covered and open mall buildings where the walls are not required by provisions elsewhere in the *International Building Code* to extend to the underside of the floor or roof sheathing, slab, or deck above.
3. The duct system is constructed of *approved* materials in accordance with Section 603 and the duct penetrating the wall complies with all of the following requirements:
3.1. The duct shall not exceed 100 square inches (0.06 m^2).
3.2. The duct shall be constructed of steel not less than 0.0217 inch (0.55 mm) in thickness.
3.3. The duct shall not have openings that communicate the corridor with adjacent spaces or rooms.
3.4. The duct shall be installed above a ceiling.
3.5. The duct shall not terminate at a wall register in the fire-resistance-rated wall.

3.6. A minimum 12-inch-long (305 mm) by 0.060-inch-thick (1.52 mm) steel sleeve shall be centered in each duct opening. The sleeve shall be secured to both sides of the wall and all four sides of the sleeve with minimum 1.5-inch by 1.5-inch by 0.060-inch (38 mm by 38 mm by 1.52 mm) steel retaining angles. The retaining angles shall be secured to the sleeve and the wall with No. 10 (M5) screws. The annular space between the steel sleeve and the wall opening shall be filled with rock (mineral) wool batting on all sides.
4. Such walls are penetrated by fully ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, and are in areas of other than Group H and are in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 of the *International Building Code*. For the purposes of this exception, a fully ducted HVAC system shall be a duct system for conveying supply, return or *exhaust air* as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage (0.0217 inch (0.55 mm)) in thickness and shall be continuous from the air-handling *appliance* or *equipment* to the air outlet and inlet terminals. Flexible air connections shall be permitted in a fully ducted system, limited to the following installations:
4.1. Nonmetallic flexible connections that connect a duct to an air-handling unit or equipment located within a mechanical room or located outdoors in accordance with Section 603.9.
4.2. Nonmetallic flexible air connectors in accordance with Section 603.2.6 that connect an overhead metal duct to a diffuser, grille, or register where the metal duct and diffuser, grille, or register are located in the same room. Where the fully ducted HVAC system metal ductwork penetrates a corridor fire partition, the ductwork shall be continuous without openings to the corridor, to a mechanical room, or to a shaft enclosure.

NEW SECTION

WAC 51-52-0915 Section 915—Engine and gas turbine-powered equipment and appliances.

915.3 Installation of emergency and legally required power systems. Emergency power systems and legally required standby power systems required by the *International Building Code* or *International Fire Code* shall be installed in accordance with the *International Fire Code*, NFPA 70, NFPA 110, and NFPA 111.

915.3.1 Air intakes. Air intake opening locations for combustion and radiator cooling intake air shall be located on the exterior of the building in accordance with NFPA 110 and a minimum of 5 feet from the property line.

915.3.2 Air outlets. Air outlet opening locations shall comply with the following:

1. Combustion exhaust shall be located on the exterior of the building in accordance with Section 501.3.1 Item 2 for product conveying exhaust.

2. Radiator cooling outlet air shall be located on the exterior of the building in accordance with NFPA 110, a minimum of 5 feet from the property line and a minimum of 2 feet above grade.

915.4 Installation of optional standby power systems. Optional standby power systems shall be installed in accordance with the *International Fire Code*, NFPA 37, NFPA 70, and NFPA 111 as applicable.

915.4.1 Air intakes. Air intake opening locations for combustion and radiator cooling intake air shall be located on the exterior of the building in accordance with NFPA 110 and a minimum of 5 feet from the property line and may be located within an open or enclosed parking garage with sufficient exterior permanent opening area to provide the intake air.

915.4.2 Air outlets. Air outlet opening locations shall comply with the following:

1. Combustion exhaust shall be located on the exterior of the building in accordance with Section 501.3.1 Item 2 for product conveying exhaust.

2. Radiator cooling outlet air shall be located a minimum of 5 feet from the property line and may be discharged into an open or enclosed parking garage with sufficient exterior permanent opening area to relieve heat from the generator.

AMENDATORY SECTION (Amending WSR 22-09-009, filed 4/8/22, effective 5/9/22)

WAC 51-52-1101 ((~~Section 1101—Refrigeration, general.~~)) Reserved.

((~~**1101.2 Factory-built equipment and appliances.** *Listed* and *labeled* self-contained, factory-built *equipment* and appliances shall be tested in accordance with UL 207, 412, 471, 1995, or 60335-2-40. Such *equipment* and appliances are deemed to meet the design, manufacture and factory test requirements of this code if installed in accordance with their listing and the manufacturer's instructions.~~

~~**1101.6 General.** Refrigeration systems shall comply with the requirements of this code and, except as modified by this code, ASHRAE 15. Ammonia-refrigerating systems shall comply with this code and, except as modified by this code, ASHRAE 15, IIAR 2, IIAR 3, IIAR 4, and IIAR 25.~~

~~EXCEPTION: Systems utilizing A2L refrigerants complying with ASHRAE 15 are deemed to meet this code.~~))

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-1105 ((~~Section 1105—Machinery room, general requirements.~~)) Reserved.

((~~**1105.6.3 Ventilation rate.** For other than ammonia systems, the mechanical ventilation systems shall be capable of exhausting the minimum quantity of air both at normal operating and emergency conditions, as required by Sections 1105.6.3.1 and 1105.6.3.2. The minimum required emergency ventilation rate for ammonia shall be 30 air changes per hour and the room conditions shall be in accordance with IIAR2. Multiple fans or multispeed fans shall be allowed to produce the emergency ventilation rate and to obtain a reduced airflow for normal ventilation.~~))

AMENDATORY SECTION (Amending WSR 22-09-009, filed 4/8/22, effective 5/9/22)

WAC 51-52-1200 Chapter 12—Hydronic piping.

1209.5 ((~~Thermal barrier~~)) Insulation and thermal break required. Radiant floor heating and snow melt systems shall be provided with insulation and a thermal ((~~barrier~~)) break in accordance with Sections 1209.5.1 and 1209.5.2. Concrete slab-on-grade, asphalt and paver-system type pavements shall have a minimum of R-10 insulation installed under the area to be snow melted, or R-5 insulation shall be installed under and at the slab edges of the area to be snow melted. The insulation shall be located underneath the snow and ice melt hydronic piping or cable and along all edges of the pavement where the snow and ice melt system is installed in accordance with the snow and ice melt man-

ufacturer's instructions. Insulation R-values for slab-on-grade and suspended floor insulation shall be in accordance with the Washington State Energy Code.

1210.7.6 Expansion tanks. Shutoff valves shall be installed at connections to expansion tanks. A method of draining the expansion tank downstream of the shutoff valve shall be provided.

NEW SECTION

WAC 51-52-1305 Section 1305—Fuel oil system installation.

1305.7 Vent piping. Liquid fuel vent pipes shall terminate outside of buildings at a point not less than 5 feet (1524 mm) from building openings and not less than 15 feet (4572 mm) from outdoor air intakes. Outer ends of vent pipes shall terminate in a weatherproof vent cap or fitting or be provided with a weatherproof hood. Vent caps shall have a minimum free open area equal to the cross-sectional area of the vent pipe and shall not employ screens finer than No. 4 mesh. Vent pipes shall terminate sufficiently above the ground to avoid being obstructed with snow or ice. Vent pipes from tanks containing heaters shall be extended to a location where oil vapors discharging from the vent will be readily diffused. If the static head with a vent pipe filled with oil exceeds 10 pounds per square inch (psi) (69 kPa), the tank shall be designed for the maximum static head that will be imposed.

Liquid fuel vent pipes shall not be cross connected with fill pipes, lines from burners, or overflow lines from auxiliary tanks.

EXCEPTION: Liquid fuel vent pipes may terminate outside the building at a point not less than 2 feet from the fuel oil equipment combustion exhaust outlet.

AMENDATORY SECTION (Amending WSR 20-03-041, filed 1/8/20, effective 7/1/20)

WAC 51-52-1400 ((~~Chapter 14—Solar thermal systems.~~)) Reserved.

((~~**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, 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.~~))

AMENDATORY SECTION (Amending WSR 22-09-009, filed 4/8/22, effective 5/9/22)

WAC 51-52-1500 Chapter 15—Referenced standards. The following referenced standards are added to Chapter 15.

AHAM

Association of Home Appliance Manufacturers
1111 19th St. N.W., #402
Washington D.C. 20036
HRH-2 Household Range Hoods 403.4.7.3.4

ANCE

UL/CSA/ANCE 60335-2-40—2019 Household and Similar Electrical Appliances - Safety - Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and
Dehumidifiers 1101.2

ASHRAE

((~~**15-2019** Safety Standards for Refrigeration Systems. . . . . 1101.6, 1105.8, 1108.1~~

~~**34-2019** Designation and classification of refrigerants. . . . . 202, 1102.2.1, 1103.1~~

~~**62.2-2016**~~)) **62.2-2019** Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings 401.4, 403.4, 403.4.7.3.3, 403.4.11

ASTM

E3087—18: Standard Test Method for Measuring Capture Efficiency of Domestic Range Hoods . . . . . 403.4.7.3.2, Table 403.4.7.3.2

CSA

UL/CSA/ANCE 60335-2-40—2019 Household and Similar Electrical Appliances - Safety - Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and
Dehumidifiers. 1101.2

HVI address:
Home Ventilating Institute
1740 Dell Range Blvd., Suite H, PMB 450
Cheyenne, WY 82009

HVI Publication 911 Certified Home Ventilating Product Directory 403.4.7.3.4

HVI ((~~915-2015~~)) 915-2020 Procedure for Loudness Testing of Residential Fan Products. 403.4.6.1, 403.4.6.2, 403.4.7.2

HVI ((~~916-2015~~)) 916-2020 Air Flow Test Procedure. 403.4.6.1, 403.4.6.2, 403.4.7.2

HVI ((~~920-2015~~)) 920-2020 Product Performance Certification Procedure Including Verification and Challenge. 403.4.6.1, 403.4.6.2, 403.4.7.2

NFPA

110-22 Standard for Emergency and Standby Power Systems 915.3, 915.3.1, 915.3.2

111-22 Standard on Stored Electrical Energy Emergency and Standby Power Systems 915.3, 915.4

UL

((~~864-03~~)) 864-2014 Control Units and Accessories for Fire Alarm Systems with revisions through ((~~December 2014~~)) October 2018. . . . . 606.2.2

UL/CSA/ANCE 60335-2-40—2019 Household and Similar Electrical Appliances - Safety - Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers. 1101.2

AMENDATORY SECTION (Amending WSR 16-01-148, filed 12/21/15, effective 7/1/16)

WAC 51-52-21101 Section 101 (IFGC)—General.

101.2 Scope. This code shall apply to the installation of fuel gas piping systems, fuel gas utilization equipment, gaseous hydrogen systems and regulated accessories in accordance with Section 101.2.1 through 101.2.5.

EXCEPTIONS: 1. Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories high with separate means of egress and their accessory structures shall comply with the *International Residential Code*.
2. The standards for liquefied petroleum gas installations shall be the ((~~2014~~)) 2020 Edition of NFPA 58 (Liquefied Petroleum Gas Code) and the ((~~2015~~)) 2021 Edition of ANSI Z223.1/NFPA 54 (National Fuel Gas Code).

NEW SECTION

WAC 51-52-21116 Section 116 (IFGC)—Stop work order.

116.4 Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to fines established by the code official.

NEW SECTION

WAC 51-52-21409 Section 409 (IFGC)—Drips and sloped piping.

Table 409.1.1
Natural Gas Valve Standards

Valve Standards	Appliance Shutoff Valve Application Up to 1/2 psig Pressure	Other Valve Applications			
		Up to 1/2 psig Pressure	Up to 2 psig Pressure	Up to 5 psig Pressure	Up to 125 psig Pressure
ANSI Z21.15/CGA 9.1	X	--	--	--	--
ASME B16.44	X	X	X[a]	X[b]	--
ASME B16.33	X	X	X	X	X
ASME B16.38	--	X	X	X	X

For SI: 1 pound per square inch gauge = 6.895 cPsa
a. If labeled 2G.

b. If labeled 5G.

NEW SECTION

WAC 51-52-21800 Chapter 8—Referenced standards. The following referenced standards are added to Chapter 8.

ASME

B16.38-2012(R2017): Large Metallic Valves for Gas Distribution: Manually Operated, NPS 2 1/2 (DN 65) to NPS 12 (DN 300), 125 psig (8.6 bar) Maximum. . . . . Table 409.1.1