

Ordinance No. 124275

Council Bill No. 117872

AN ORDINANCE relating to the Seattle Mechanical Code, amending Chapter 22.400.010 of the Seattle Municipal Code, and adopting by reference Chapters 2 through 9, and Chapters 11 through 15 of the 2012 International Mechanical Code, and amending certain of those chapters; adopting a new Chapter 1 related to administration, permitting and enforcement; and repealing Sections 2-13 of Ordinance 123380.

Related Legislation File: CF 313181

Date Introduced and Referred: <u>8.5.13</u>	To: (committee): <u>Energy and Environment Committee</u>
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Date Re-referred:	To: (committee):
Date of Final Action: <u>9/16/13</u>	Date Presented to Mayor: <u>9/20/13</u>
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The City of Seattle - Legislative Department

Council Bill/Ordinance sponsored by: [Signature]

Committee Action:

Date	Recommendation	Vote
<u>08-13-13</u>	<u>Pass</u>	<u>3 MO, SC, TB; 0; 0</u>

This file is complete and ready for presentation to Full Council.

Full Council Action:

Date	Decision	Vote
<u>Sept. 16, 2013</u>	<u>Passed</u>	<u>9-0</u>

Law Department

CITY OF SEATTLE
ORDINANCE 124275
COUNCIL BILL 117872

AN ORDINANCE relating to the Seattle Mechanical Code, amending Chapter 22.400.010 of the Seattle Municipal Code, and adopting by reference Chapters 2 through 9, and Chapters 11 through 15 of the 2012 International Mechanical Code, and amending certain of those chapters; adopting a new Chapter 1 related to administration, permitting and enforcement; and repealing Sections 2-13 of Ordinance **123380**.

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. Section 22.400.010 of the Seattle Municipal Code is amended as follows:

22.400.010 Adoption of International Mechanical Code((=))

The Seattle Mechanical Code consists of: 1) the following portions of the ((2009)) 2012 edition of the International Mechanical Code published by the International Code Council, as amended by City Council by ordinance: Chapters 2 through 9, Chapters 11 through 15, and 2) Chapter 1 relating to administration, permitting and enforcement adopted by City Council ordinance. One copy of the ((2009)) 2012 International Mechanical Code is filed with the City Clerk in C.F. ((310926)) 313187.

Section 2. Chapter 1 of the Seattle Mechanical Code is adopted to read as follows:

CHAPTER 1

ADMINISTRATION

SECTION 101

TITLE

101.1 Title. These regulations shall be known as the "Seattle Mechanical Code," may be cited as such, and are referred to herein as "this code." All references to the *International Mechanical Code* contained in this code mean the *Seattle Mechanical Code*.

1 **103.2 Applicability of city laws.** A mechanical permit application shall be considered under
2 the Seattle Mechanical, Fuel Gas and Energy codes in effect on a date as provided below, or on a
3 date as otherwise required by law.

4 1. Mechanical permit applications shall be considered under the codes in effect on the date
5 used to determine the codes applicable to the building permit application according to
6 Seattle Building Code Section 101.3 if any of Items 1.1 through 1.3 apply:

7 1.1 The mechanical permit application is submitted as part of a building permit
8 application;

9 1.2 The mechanical permit application is for work directly associated with a building
10 permit but is submitted separately from the building permit application; or

11 1.3 The mechanical permit application is for initial tenant alterations submitted no later
12 than 18 months after the date of the approved final inspection for the building, and is
13 submitted before the expiration date of the building permit for the tenant alteration, as
14 determined by Seattle Building Code Section 106.9.

15 2. Mechanical permit applications other than those subject to Item 1 shall be considered
16 under the codes in effect on the date a complete mechanical permit application is
17 submitted that complies with all the requirements of Section 116.

18 **103.3 Additions, alterations and repairs.** Additions, alterations, repairs and replacement of
19 equipment or systems shall comply with the provisions for new equipment and systems except as
20 otherwise provided in Section 104 of this code.

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

24 **103.4 Internal consistency.** Where, in any specific case, different sections of this code specify
25 different materials, methods of construction or other requirements, the most restrictive governs.
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1 Where there is a conflict between a general requirement and a specific requirement, the specific
2 requirement is applicable.

3 **103.5 Referenced codes and standards.** The codes and standards referenced in this code are
4 part of the requirements of this code to the extent prescribed by each such reference. Where
5 differences occur between provisions of this code and referenced codes and standards, the
6 provisions of this code apply.

7 **Exception:** Where enforcement of a code provision would violate the conditions of the
8 listing of the equipment or appliance, the conditions of the listing and manufacturer's
9 instructions apply.

10 **103.6 Appendices.** Provisions in the *International Mechanical Code* appendices do not apply
11 unless specifically adopted.

12 **103.7 Metric units.** Wherever in this ordinance there is a conflict between metric units of
13 measurement and English units, the English units govern.

14 **103.8 References to other codes.** Whenever an International, National or Uniform Code is
15 referenced in this code, it means the Seattle edition of that code, including local amendments.
16 References to the "Building Code", "Fuel Gas Code", "Fire Code", "Residential Code" and
17 "Plumbing Code" mean the Seattle editions of those codes.

18 SECTION 104

19 APPLICATION TO EXISTING MECHANICAL SYSTEMS

20 **104.1 Additions, alterations or repairs.** Additions, alterations, renovations or repairs may be
21 made to any mechanical system without requiring the existing mechanical system to comply with
22 all the requirements of this code, if the addition, alteration, renovation or repair conforms to the
23 standards required for a new mechanical system. Additions, alterations, renovations or repairs
24 shall not cause an existing system to become unsafe, unhealthy or overloaded.

1 Minor additions, alterations, renovations, and repairs to existing mechanical systems may be
2 installed in accordance with the law in effect at the time the original installation was made, if
3 approved by the code official.

4 **104.2 Existing installations.** Mechanical systems lawful at the time of the adoption of this code
5 may continue their use, be maintained or repaired, be converted to another type of fuel, or have
6 components replaced if the use, maintenance, repair, conversion of fuel, or component
7 replacement is done in accordance with the basic original design and location, and no hazard to
8 life, health or property has been or is created by such mechanical system.

9 **104.3 Changes in building occupancy.** Mechanical systems that are a part of a building or
10 structure undergoing a change in use or occupancy as defined in the Building Code shall comply
11 with all requirements of this code that are applicable to the new use or occupancy.

12 **104.4 Maintenance.** All mechanical systems, materials, equipment, appurtenances and all parts
13 thereof shall be maintained in proper operating condition in accordance with the original design
14 and in a safe and hazard-free condition. All devices or safeguards that were required by a code in
15 effect when the mechanical system was installed shall be maintained in conformance with the
16 code edition under which installed. The owner or the owner's designated agent is responsible for
17 maintenance of mechanical systems and equipment. To determine compliance with this
18 subsection, the code official may cause a mechanical system or equipment to be reinspected.

19 The fire chief and the code official each have authority to obtain compliance with the
20 requirements of this subsection.

21 **Exception:** The code official may modify the requirements of this section where all or a
22 portion of the building is unoccupied.

23 **104.5 Moved buildings.** Building or structures moved into or within the City shall comply with
24 standards adopted by the code official. No building shall be moved into or within the City
25 unless, prior to moving, the code official has inspected the building for compliance with this
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1 code and the permit holder has agreed to correct all deficiencies found and has been issued a
2 building permit for the work. A bond or cash deposit in an amount sufficient to abate or
3 demolish the building shall be posted prior to issuance of a permit. See Section 116 for
4 information required on plans. Any moved building that is not in complete compliance with
5 standards for moved buildings within eighteen months from the date of permit issuance and is
6 found to be a public nuisance may be abated.

7 **104.6 Historic buildings and structures.** The code official may modify the specific
8 requirements of this code as it applies to landmarks and require in lieu thereof alternate
9 requirements that, in the opinion of the code official, will result in a reasonable degree of safety
10 to the public and the occupants of those buildings.

11 For purposes of this section a landmark is a building or structure that has been nominated for
12 designation or has been designated for preservation by the City Landmarks Preservation Board,
13 or that has been designated for preservation by the State of Washington, or has been listed or
14 determined eligible to be listed in the National Register of Historic Places, or is a structure in a
15 landmark or special review district subject to a requirement to obtain a certificate of approval
16 before making a change to the external appearance of the structure.

17 SECTION 105

18 ALTERNATE MATERIALS AND METHODS OF CONSTRUCTION

19 **105.1 Alternate materials and methods.** This code does not prevent the use of any material,
20 design or method of construction not specifically allowed or prohibited by this code, provided
21 the alternate has been approved and its use authorized by the code official. The code official may
22 approve an alternate, provided the code official finds that the proposed alternate complies with
23 the provisions of this code and that the alternate, when considered together with other safety
24 features of the building or other relevant circumstances, will provide at least an equivalent level
25 of strength, effectiveness, fire resistance, durability, safety and sanitation. The code official may
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1 require that sufficient evidence or proof be submitted to reasonably substantiate any claims
2 regarding the use or suitability of the alternate. The code official may, but is not required to,
3 record the approval of alternates and any relevant information in the files of the code official or
4 on the approved construction documents.

5 SECTION 106

6 MODIFICATIONS

7 **106.1 Modifications.** The code official may modify the provisions of this code for individual
8 cases if the code official finds: (1) there are practical difficulties involved in carrying out the
9 provisions of this code; (2) the modification is in conformity with the intent and purpose of this
10 code; and (3) the modification will provide a reasonable level of strength, effectiveness, fire
11 resistance, durability, safety and sanitation when considered together with other safety features
12 of the building or other relevant circumstances. The code official may, but is not required to,
13 record the approval of modifications and any relevant information in the files of the code official
14 or on the approved construction documents.

15 SECTION 107

16 TESTS

17 **107.1 Tests.** Whenever there is insufficient evidence of compliance with the provisions of this
18 code or evidence that any material or method of construction does not conform to the
19 requirements of this code, the code official may require tests as proof of compliance, to be made
20 at no expense to the City. Test methods shall be as specified in this code or by other recognized
21 test standards. If there are no recognized and accepted test methods for the proposed alternate,
22 the code official shall determine the test procedures. All tests shall be made by an approved
23 agency. Reports of such tests shall be retained by the code official for the period required for
24 retention of public records.

1 **108.5 Cooperation of other officials and officers.** The code official may request, and shall
2 receive so far as is required in the discharge of the code official's duties, the assistance and
3 cooperation of other officials of the City of Seattle.

4 **108.6 Responsibility for compliance.** Compliance with the requirements of this code is the
5 obligation of the owner of the building, structure or premises, the duly authorized agent of the
6 owner, and other persons responsible for the condition or work, and not of the City or any of its
7 officers, employees or agents.

8 SECTION 109

9 UNSAFE EQUIPMENT AND HAZARD CORRECTION ORDER

10 **109.1 Unsafe equipment.** Any equipment regulated by this code that is found to be unsafe is
11 hereby declared to be a public nuisance and may be abated.

12 **109.2 Emergency order.** Whenever the code official finds that any equipment regulated by this
13 code is in such a dangerous and unsafe condition as to constitute an imminent hazard to life or
14 limb, the code official may issue an emergency order directing that the equipment be restored to
15 a safe condition by a date certain. The order may also require that the building, structure or
16 premises, or portion thereof, containing the equipment be vacated within a reasonable time to be
17 specified in the order. In the case of extreme danger, the order may specify immediate vacation
18 of the building, structure or premises, or may authorize immediate disconnection of the utilities
19 or energy source.

20 **109.2.1 Service of emergency order.** The order shall be posted on the premises or
21 personally served on the owner of the building or premises or any person responsible for the
22 condition. The order shall specify the time for compliance.

23 **109.2.2 Effect of emergency order.** No person may occupy a building, structure or
24 premises, or portion thereof, after the date on which the building is required to be vacated
25 until the building, structure or premises, or portion thereof, is restored to a safe condition as
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1 required by the order and this code. It is a violation for any person to fail to comply with an
2 emergency order issued by the code official.

3 **109.3 Hazard correction order.** Whenever the code official finds that unsafe equipment exists,
4 the code official may issue a hazard correction order specifying the conditions causing the
5 equipment to be unsafe and directing the owner or other person responsible for the unsafe
6 equipment to correct the condition by a date certain. In lieu of correction, the owner may submit
7 a report or analysis to the code official analyzing said conditions and establishing that the
8 equipment is, in fact, safe. The code official may require that the report or analysis be prepared
9 by a licensed engineer.

10 **109.3.1 Service of hazard correction order.** The order shall be posted on the premises or
11 served on the owner of the building or premises or any person responsible for the condition
12 by certified mail with return receipt requested. The order shall specify the time for
13 compliance.

14 **109.3.2 Effect of hazard correction order.** It is a violation for any person to fail to comply
15 with a hazard correction order as specified in this subsection.

16 SECTION 110

17 ADMINISTRATIVE REVIEW

18 **110.1 Administrative review by the code official.** Applicants may request administrative
19 review by the code official of decisions or actions pertaining to the administration and
20 enforcement of this code. Requests shall be addressed to the code official.

21 **110.2 Administrative review by the Construction Codes Advisory Board.** Applicants may
22 request review of decisions or actions pertaining to the application and interpretation of this code
23 by the Construction Codes Advisory Board according to International Building Code Section
24 103.11, except for stop work orders, notices of violations and revocations of permits. The
25 review will be performed by three or more members of the Construction Codes Advisory Board,
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1 chosen by the Board Chair. The Chair shall consider the subject of the review and members'
2 expertise when selecting members to conduct a review. The decision of the review panel is
3 advisory only; the final decision is made by the code official.

4 SECTION 111

5 ENFORCEMENT, VIOLATIONS AND PENALTIES

6 **111.1 Violations.** It is a violation of this code for any person to:

- 7 1. Install, erect, construct, enlarge, alter, repair, replace, remodel, move, improve, remove,
8 convert or demolish, equip, occupy, use or maintain any mechanical system or equipment
9 or cause or permit the same to be done in the City, contrary to or in violation of any of the
10 provisions of this code.
- 11 2. Use any material or install any device, appliance or equipment that is subject to this code
12 and has not been approved by the code official.
- 13 3. Knowingly aid, abet, counsel, encourage, hire, induce or otherwise procure another to
14 violate or fail to comply with this code.
- 15 4. Violate or fail to comply with any final order issued by the code official pursuant to the
16 provisions of this code.
- 17 5. Remove, mutilate, destroy or conceal any notice or order issued or posted by the code
18 official pursuant to the provisions of this code, or any notice or order issued or posted by
19 the code official in response to a natural disaster or other emergency.
- 20 6. Conduct work under a permit without requesting an inspection as required by Section 119.

21 **111.2 Notice of violation.** If, after investigation, the code official determines that standards or
22 requirements of this code have been violated or that orders or requirements have not been
23 complied with, the code official may serve a notice of violation upon the owner, agent, or other
24 person responsible for the action or condition. The notice of violation shall state the standards or
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1 requirements violated, shall state what corrective action, if any, is necessary to comply with the
2 standards or requirements, and shall set a reasonable time for compliance.

3 **111.2.1 Service of notice of violation.** The notice shall be served upon the owner, agent or
4 other responsible person by personal service or regular first class mail addressed to the last
5 known address of such person, or if no address is available after reasonable inquiry, the
6 notice may be posted in a conspicuous place on the premises. The notice may also be posted
7 if served by personal service or first class mail. Nothing in this section limits or precludes
8 any action or proceeding to enforce this code, and nothing obligates or requires the code
9 official to issue a notice of violation prior to the imposition of civil or criminal penalties.

10 **111.2.2 Review of notice of violation by the code official.** Any person affected by a notice
11 of violation issued pursuant to Section 111.2 may obtain a review of the notice by making a
12 request in writing within ten days after service of the notice. When the last day of the period
13 computed is a Saturday, Sunday, or city holiday, the period runs until 5 p.m. Of the next
14 business day.

15 **111.2.2.1 Review procedure.** The review shall occur not less than ten nor more than 20
16 days after the request is received by the code official unless otherwise agreed to by the
17 person requesting the review. Any person affected by the notice of violation may submit
18 additional information to the code official.

19 The review shall be made by a representative of the code official who will review any
20 additional information that is submitted and the basis for issuance of the notice of
21 violation. The reviewer may request clarification of the information received and a site
22 visit.

23 **111.2.2.2 Decision.** After the review, the code official shall:

- 24 1. Sustain the notice;
- 25 2. Withdraw the notice;

1 3. Continue the review to a date certain; or

2 4. Amend the notice.

3 **111.2.2.3 Order.** The code official shall issue an order containing the decision within 15
4 days of the date that the review is completed and shall cause the order to be mailed by
5 regular first class mail to the persons requesting the review and the persons named on the
6 notice of violation, addressed to their last known address.

7 **111.3 Stop work orders.** The code official may issue a stop work order whenever any work is
8 being done contrary to the provisions of this code, or in the event of dangerous or unsafe
9 conditions related to equipment or construction. The stop work order shall identify the violation
10 and may prohibit work or other activity on the site.

11 **111.3.1 Service of stop work order.** The code official may serve the stop work order by
12 posting it in a conspicuous place at the site, if posting is physically possible. If posting is not
13 physically possible, then the stop work order may be served in the manner set forth in
14 Revised Code of Washington (RCW) 4.28.080 for service of a summons or by sending it by
15 first class mail to the last known address of: the property owner, the person doing or causing
16 the work to be done, or the holder of a permit if work is being stopped on a permit. For
17 purposes of this section, service is complete at the time of posting or of personal service, or if
18 mailed, three days after the date of mailing. When the last day of the period so computed is a
19 Saturday, Sunday or city holiday, the period runs until 5 p.m. on the next business day.

20 **111.3.2 Effective date of stop work order.** Stop work orders are effective when posted, or
21 if posting is not physically possible, when one of the persons identified in Section 111.3.1 is
22 served.

23 **111.3.3 Review of stop work orders by the code official.** Any person aggrieved by a stop
24 work order may obtain a review of the order by delivering to the code official a request in
25 writing within two business days of the date of service of the stop work order.

1 **111.3.3.1 Review procedure.** The review shall occur within two business days after
2 receipt by the code official of the request for review unless otherwise agreed by the
3 person making the request. Any person affected by the stop work order may submit
4 additional information to the code official for consideration as part of the review at any
5 time prior to the review. The review will be made by a representative of the code official
6 who will review all additional information received and may also request a site visit.

7 **111.3.3.2 Decision.** After the review, the code official may:

- 8 1. Sustain the stop work order;
- 9 2. Withdraw the stop work order;
- 10 3. Modify the stop work order; or
- 11 4. Continue the review to a date certain.

12 **111.3.3.3 Order.** The code official shall issue an order of the code official containing the
13 decision within two business days after the review is completed and shall cause the order
14 to be sent by regular first class mail to the person or persons requesting the review, any
15 person on whom the stop work order was served, and any other person who requested a
16 copy before issuance of the order, addressed to their last known address.

17 **111.4 Authority to disconnect utilities in emergencies.** The code official has the authority to
18 disconnect fuel-gas utility service or energy supplies to a building, structure, premises or
19 equipment regulated by this code in case of emergency where necessary to eliminate an
20 immediate hazard to life or property. The code official may enter any building or premises to
21 disconnect utility service. The code official shall, whenever possible, notify the serving utility,
22 the owner and the occupant of the building, structure or premises of the decision to disconnect
23 prior to taking such action, and shall notify the serving utility, owner and occupant of the
24 building, structure or premises in writing of such disconnection immediately thereafter.

1 **111.5 Authority to condemn equipment.** Whenever the code official determines that any
2 equipment or portion thereof regulated by this code is hazardous to life, health or property, the
3 code official shall order in writing that such equipment either be disconnected, removed or
4 restored to a safe or sanitary condition, as appropriate. The written notice shall fix a date certain
5 for compliance with such order. It is a violation for any person to use or maintain defective
6 equipment after receiving such notice.

7 When any equipment or installation is to be disconnected, the code official shall give written
8 notice of such disconnection and causes therefore within 24 hours to the serving utility, the
9 owner and the occupant of the building, structure or premises. When any equipment is
10 maintained in violation of this code, and in violation of a notice issued pursuant to the provisions
11 of this section, the code official shall institute any appropriate action to prevent, restrain, correct
12 or abate the violation.

13 **111.6 Connection after order to disconnect.** No person shall make connections from any
14 energy, fuel or power supply nor supply energy or fuel to any equipment regulated by this code
15 that has been disconnected or ordered to be disconnected by the code official, or the use of which
16 has been ordered to be discontinued by the code official until the code official authorizes the
17 reconnection and use of such equipment.

18 **111.7 Civil penalties.** Any person violating or failing to comply with the provisions of this
19 code is subject to a cumulative civil penalty in an amount not to exceed \$500 per day for each
20 violation from the date the violation occurs or begins until compliance is achieved. In cases
21 where the code official has issued a notice of violation, the violation will be deemed to begin, for
22 purposes of determining the number of days of violation, on the date compliance is required by
23 the notice of violation.

24 **111.8 Enforcement in Municipal Court.** Civil actions to enforce this chapter shall be brought
25 exclusively in Seattle Municipal Court, except as otherwise required by law or court rule. In any
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1 civil action for a penalty, the City has the burden of proving by a preponderance of the evidence
2 that a violation exists or existed; the issuance of a notice of violation or of an order following a
3 review by the code official is not itself evidence that a violation exists.

4 **111.9 Judicial review.** Because civil actions to enforce this code must be brought exclusively
5 in Seattle Municipal Court pursuant to Section 111.8, orders of the code official, including
6 notices of violation issued under this chapter, are not subject to judicial review pursuant to
7 chapter 36.70C RCW.

8 **111.10 Alternative criminal penalty.** Anyone who violates or fails to comply with any notice
9 of violation or order issued by the code official pursuant to this code or who removes, mutilates,
10 destroys or conceals a notice issued or posted by the code official shall, upon conviction thereof,
11 be punished by a fine of not more than \$5000 or by imprisonment for not more than 365 days, or
12 by both such fine and imprisonment for each separate violation. Each day's violation shall
13 constitute a separate offense.

14 **111.11 Additional relief.** The code official may seek legal or equitable relief to enjoin any acts
15 or practices and abate any condition when necessary to achieve compliance.

16 SECTION 112

17 RECORDING OF ORDERS AND NOTICES

18 **112.1 Recording.** The code official may record a copy of any order or notice with the
19 Department of Records and Elections of King County.

20 SECTION 113

21 RULES OF THE CODE OFFICIAL

22 **113.1 Authority.** The code official has authority to issue interpretations of this code and to adopt
23 and enforce rules and regulations supplemental to this code as may be deemed necessary to
24 clarify the application of the provisions of this code. Such interpretations, rules and regulations
25 shall be in conformity with the intent and purpose of this code.

1 **113.2 Procedure for adoption of rules.** The code official shall promulgate, adopt and issue
2 rules according to the procedures specified in the Administrative Code, Chapter 3.02 of the
3 Seattle Municipal Code.

4 SECTION 114

5 CONSTRUCTION CODES ADVISORY BOARD

6 **114.1 CCAB committee.** A committee of the Construction Codes Advisory Board may
7 examine proposed administrative rules, appeals and amendments relating to this code and related
8 provisions of other codes and make recommendations to the code official and to the City Council
9 for changes in this code. The committee will be called on as needed by the Construction Codes
10 Advisory Board.

11 SECTION 115

12 PERMITS

13 **115.1 Permits required.** Except as otherwise specifically provided in this code, a permit shall be
14 obtained from the code official prior to each installation, alteration, repair, replacement or
15 remodel of any equipment or mechanical system regulated by this code. A separate mechanical
16 permit is required for each separate building or structure.

17 **115.2 Work exempt from permit.**

18 **115.2.1 Mechanical.** A mechanical permit is not required for the work listed below.

- 19 1. Any portable heating appliance, portable ventilating equipment, or portable cooling
20 unit, if the total capacity of these portable appliances does not exceed 40 percent of
21 the cumulative heating, cooling or ventilating requirements of a building or dwelling
22 unit and does not exceed 3 kW or 10,000 Btu input.
- 23 2. Any closed system of steam, hot or chilled water piping within heating or cooling
24 equipment regulated by this code.

1 **Exception:** A mechanical engineer's stamp or submission of construction documents is not
2 required if the code official finds that the nature of the work applied for is such that review of
3 construction documents is not necessary to obtain compliance with this code.

4 **116.3 Information on construction documents.**

5 **116.3.1 Clarity of plans.** Plans shall be drawn to a clearly indicated and commonly accepted
6 scale upon substantial paper such as blueprint quality or standard drafting paper. Tissue
7 paper, posterboard or cardboard will not be accepted. The plans shall be of microfilm quality
8 and limited to a minimum size of 18 inches by 18 inches and a maximum size of 41 inches
9 by 54 inches. Plans and specifications shall be of sufficient clarity to show that the proposed
10 installation will conform to the provisions of this code and to the provisions of all applicable
11 laws, ordinances, rules, regulations and orders. Plans may be submitted in electronic format
12 as determined by the code official.

13 **116.3.2 Fire-resistive notes.** The code official may require that plans for buildings more than
14 two stories in height of other than Group R-3 and Group U occupancies indicate how
15 required structural and fire-resistive integrity will be maintained where a penetration will be
16 made for electrical, mechanical, plumbing and communication conduits, pipes and similar
17 systems.

18 **116.3.3 Information required on plans.** The plans or specifications shall show the
19 following:

- 20 1. Layout for each floor with dimensions of all working spaces and a legend of all
21 symbols used.
- 22 2. Location, size and material of all piping.
- 23 3. Location, size and materials of all air ducts, air inlets and air outlets.
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- 1 4. Location of all fans, warm-air furnaces, boilers, absorption units, refrigerant
2 compressors and condensers and the weight of all pieces of such equipment weighing
3 200 pounds or more.
- 4 5. Rated capacity or horsepower and efficiency rating of all boilers, warm-air furnaces,
5 heat exchangers, blower fans, refrigerant compressors and absorption units. See also
6 the *International Energy Conservation Code*.
- 7 6. Location, size and material of all combustion products vents and chimneys.
- 8 7. Location and area of all ventilation and combustion air openings and ducts.
- 9 8. Location of all air dampers and fire shutters.
- 10 9. The first sheet of each set of plans and specifications shall show the address of the
11 proposed work and the name and address of the owner or lessee of the premises.
- 12 10. Architectural drawings, typical envelope cross sections and other drawings or data
13 may be required to support system sizing calculations or other thermal requirements
14 of this code or the *International Energy Conservation Code*.

SECTION 117

APPLICATION REVIEW AND PERMIT ISSUANCE

17 **117.1 Issuance.** The application and, construction documents shall be reviewed by the code
18 official. The construction documents may be reviewed by other departments of the City to check
19 compliance with the laws and ordinances under their jurisdiction.

20 **117.1.1 Decision and issuance of permit.** If the code official finds that the work as
21 described in an application for a permit and the construction documents substantially
22 conform to the requirements of this code and other pertinent laws and ordinances and that the
23 fees specified in the Seattle Municipal Code, Title 22, Subtitle IX, Permit Fees have been
24 paid, the code official shall issue a permit to the applicant. When the permit is issued, the
25 applicant or the applicant's authorized agent becomes the permit holder.

1 **117.1.2 Compliance with approved plans and permit.** When the code official issues a
2 permit, the code official shall endorse the permit in writing or in electronic format and stamp
3 the plans "APPROVED." Such approved plans and permit shall not be changed, modified or
4 altered without authorization from the code official, and all work shall be done in accordance
5 with the approved construction documents and permit except as the code official may require
6 during field inspection to correct errors or omissions.

7 **117.2 Revisions to the permit.** When changes to the approved work are made during
8 construction, approval of the code official shall be obtained prior to execution. The building or
9 mechanical inspector may approve minor changes for work not reducing the structural strength
10 or fire and life safety of the structure. The building or mechanical inspector shall determine if it
11 is necessary to revise the approved construction documents. If revised plans are required,
12 changes shall be shown on two sets of plans that shall be submitted to and approved by the code
13 official, accompanied by appropriate fees as specified in the Seattle Municipal Code, Title 22,
14 Subtitle IX, Permit Fees prior to occupancy. All changes shall conform to the requirements of
15 this code and other pertinent laws and ordinances and other issued permits.

16 Minor changes shall not incur additional fees if these changes do not (1) add to the general
17 scope of work; (2) change the basic design concept; (3) involve major relocation of equipment,
18 ducts, or pipes; (4) substantially alter approved equipment size; or (5) require extensive re-
19 review of the plans and specifications.

20 **117.3 Cancellation of permit applications.** Applications may be cancelled if no permit is
21 issued by the earlier of the following: (1) twelve months following the date of application; or (2)
22 sixty days after the date of written notice that the permit is ready to be issued. After cancellation,
23 construction documents may be returned to the applicant or destroyed by the code official.

24 The code official shall notify the applicant in writing at least 30 days before the application is
25 cancelled. The notice shall specify a date by which a request for extension must be submitted in
26

1 order to avoid cancellation. The date shall be at least two weeks prior to the date on which the
2 application will be cancelled.

3 **117.4 Extensions prior to permit issuance.** At the discretion of the code official, applications
4 for projects that require more than 12 months to review and approve may be extended for a
5 period that provides reasonable time to complete the review and approval, but in no case longer
6 than 24 months from the date of the original application. No application may be extended more
7 than once. After cancellation, the applicant shall submit a new application and pay a new fee to
8 restart the application process.

9 Notwithstanding other provisions of this code, applications may be extended where issuance
10 of the permit is delayed by litigation, preparation of environmental impact statements, appeals,
11 strikes or other causes related to the application that are beyond the applicant's control, or while
12 the applicant is making progress toward issuance of a master use permit.

13 **117.5 Retention of plans.** One set of approved plans, which may be on microfilm or in
14 electronic format, shall be retained by the code official. One set of approved plans shall be
15 returned to the applicant and shall be kept at the site of the building or work for use by the
16 inspection personnel at all times when the work authorized is in progress.

17 **117.6 Validity of permit.** The issuance or granting of a permit or approval of construction
18 documents shall:

- 19 1. Not be construed to be a permit for, or an approval of, any violation of any of the
20 provisions of this code or other pertinent laws and ordinances.
- 21 2. Not prevent the code official from requiring the correction of errors in the construction
22 documents, or from preventing building operations being carried on thereunder when in
23 violation of this code or of other pertinent laws and ordinances of the City.
- 24 3. Not prevent the code official from requiring correction of conditions found to be in
25 violation of this code or other pertinent laws and ordinances of the City, or
26

- 1 4. Not be construed to extend the period of time for which any such permit is issued or
2 otherwise affect any period of time for compliance specified in any notice or order issued
3 by the code official or other administrative authority requiring the correction of any such
4 conditions.

5 **117.7 Permit expiration.** Authority to do the work authorized by a permit expires 18 months
6 from the date of issuance. An approved renewal extends the life of the permit for an additional
7 18 months from the prior expiration date. An approved reestablishment extends the life of the
8 permit for 18 months from the date the permit expired.

9 **Exceptions:**

- 10 1. Initial permits for major construction projects that require more than 18 months to
11 complete may be issued for a period that provides reasonable time to complete the
12 work, according to an approved construction schedule. The building official may
13 authorize a permit expiration date not to exceed three years from the date of issuance..
14 2. The code official may issue permits that expire in less than 18 months if the code
15 official determines a shorter period is appropriate to complete the work.

16 **117.8 Renewal of permits.** Permits may be renewed and renewed permits may be further
17 renewed by the code official, if the following conditions are met:

- 18 1. Application for renewal is made within the 30 day period immediately preceding the date
19 of expiration of the permit; and
20 2. If the project has had an associated discretionary Land Use review, and the land use
21 approval has not expired; and
22 3. If an application for renewal is made more than 18 months after the date of mandatory
23 compliance with a new or revised edition of this code, the permit shall not be renewed
24 unless:
25
26
27

1 3.1 The code official determines that the permit complies, or is modified to comply
2 with the Seattle Mechanical, Fuel Gas and Energy codes in effect on the date of
3 application for renewal; or

4 3.2 The work authorized by the permit is substantially underway and progressing at a
5 rate approved by the building official. "Substantially underway" means that
6 normally required inspections have been approved for work such as foundations,
7 framing, mechanical, insulation and finish work is being completed on a continuing
8 basis; or

9 3.3 Commencement or completion of the work authorized by the permit is delayed by
10 litigation, appeals, strikes or other extraordinary circumstances related to the work
11 authorized by the permit, beyond the permit holder's control, subject to approval by
12 the code official.

13 **117.9 Reestablishment of expired permits.** A new permit is required to complete work if a
14 permit has expired and was not renewed.

15 **Exception:** A permit that expired less than one year prior to the date of a request for
16 reestablishment may be reestablished upon approval of the code official if it complies with
17 Items 2 and 3 of Section 117.8. Once re-established the permit will not be considered to
18 have expired. The new expiration date of a re-established permit shall be determined in
19 accordance with Section 117.7.

20 **117.10 Revocation of mechanical permits.** Whenever the code official determines there are
21 grounds for revoking a permit, the code official may issue a notice of revocation. The notice of
22 revocation shall identify the reason for the proposed revocation, including the violations, the
23 conditions violated, and any alleged false or misleading information provided.

1 **117.10.1 Standards for revocation.** The code official may revoke a permit if:

- 2 1. The code or the permit has been or is being violated and issuance of a notice of
3 violation or stop work order has been or would be ineffective to secure compliance
4 because of circumstances related to the violation; or
5 2. The permit was obtained with false or misleading information.

6 **117.10.2 Service of notice of revocation.** The notice of revocation shall be served on the
7 owner of the property on which the work is occurring, the holder of a permit if different than
8 the owner, and the person doing or causing the work to be done. The notice of revocation
9 shall be served in the manner set forth in RCW 4.28.080 for service of a summons or sent by
10 first class mail to the last known address of the responsible party. For purposes of this
11 section, service is complete at the time of personal service, or if mailed, three days after the
12 date of mailing. When the last day of the period so computed is a Saturday, Sunday or city
13 holiday, the period runs until 5 p.m. on the next business day.

14 **117.10.3 Effective date of revocation.** The code official shall identify in the notice of
15 revocation a date certain on which the revocation will take effect. This date may be stayed
16 pending complete review by the code official pursuant to Section 117.10.4.

17 **117.10.4 Review by the code official for notice of revocation.** Any person aggrieved by a
18 notice of revocation may obtain a review by making a request in writing to the code official
19 within three business days of the date of service of the notice of revocation.

20 **117.10.4.1 Review procedure.** The review will be made by a representative of the code
21 official who will review all additional information received and may also request a site
22 visit. After the review, the code official may:

- 23 1. Sustain the notice of revocation and affirm or modify the date the revocation will
24 take effect;
25 2. Withdraw the notice of revocation;

3. Modify the notice of revocation and affirm or modify the date the revocation will take effect; or
4. Continue the review to a date certain.

117.10.4.2 Order of revocation of permit. The code official shall issue an order of the code official containing the decision within ten days after the review is completed and shall cause the same to be sent by regular first class mail to the person or persons requesting the review, any other person on whom the notice of revocation was served, and any other person who requested a copy before issuance of the order.

SECTION 118

FEES

118.1 Fees. A fee for each mechanical permit and for other activities related to the enforcement of this code shall be paid as set forth in the Seattle Municipal Code, Title 22, Subtitle IX, Permit Fees.

SECTION 119

INSPECTIONS

119.1 General. All construction or work for which a permit is required is subject to inspection by the code official, and certain types of construction shall have special inspections by registered special inspectors specified in Chapter 17 of the *International Building Code*.

119.2 Inspection requests. The owner of the property or the owner's authorized agent, or the person designated by the owner/agent to do the work authorized by a permit shall notify the code official that work requiring inspection as specified in this section and Section 120 is ready for inspection.

119.3 Access for inspection. The permit holder and the person requesting any inspections required by this code shall provide access to and means for proper inspection of such work, including safety equipment required by the Washington Industrial Safety and Health Agency.

1 The work shall remain accessible and exposed for inspection purposes until approved by the
2 code official. Neither the code official nor the City shall be liable for expense entailed in the
3 required removal or replacement of any material to allow inspection.

4 **119.4 Inspection record.** Work requiring a mechanical permit shall not be commenced until the
5 permit holder or the permit holder's agent has posted an inspection record in a conspicuous place
6 on the premises and in a position that allows the code official to conveniently make the required
7 entries regarding inspection of the work. This record shall be maintained in such a position by
8 the permit holder or the permit holder's agent until final approval has been granted by the code
9 official.

10 **119.5 Approvals required.** No work shall be done on any part of the building or structure
11 beyond the point indicated in each successive inspection without first obtaining the written
12 approval of the code official. Written approval shall be given only after an inspection has been
13 made of each successive step in the construction as indicated by each of the inspections required
14 in this code.

15 **119.5.1 Effect of approval.** Approval as a result of an inspection is not approval of any
16 violation of the provisions of this code or of other pertinent laws and ordinances of the City.
17 Inspections presuming to give authority to violate or cancel the provisions of this code or of
18 other pertinent laws and ordinances of the City are not valid.

19 **119.6 Final inspection.** When the installation of a mechanical system is complete, an additional
20 and final inspection shall be made.

21 **119.7 Operation of mechanical equipment.** The requirements of this section do not prohibit the
22 operation of any mechanical systems installed to replace existing equipment or fixtures serving
23 an occupied portion of the building in the event a request for inspection of such equipment or
24 fixture has been filed with the code official not more than 48 hours after such replacement work
25
26
27
28

1 is completed, and before any portion of such mechanical system is concealed by any permanent
2 portion of the building.

3 **119.8 Testing of equipment and systems.** Refrigeration equipment regulated by this code shall
4 be tested and approved as required by Chapter 11 of this code. Fuel-oil piping shall be tested
5 and approved as required by Chapter 13 of this code.

6 **119.9 Other inspections.** In addition to the “called” inspections specified above, the code
7 official may make or require any other inspections of any mechanical work to ascertain
8 compliance with the provisions of this code and other laws and ordinances that are enforced by
9 the code official.

10 **119.10 Special investigation.** If work for which a permit or approval is required is commenced
11 or performed prior to making formal application and receiving the code official’s permission to
12 proceed, the code official may make a special investigation inspection before a permit is issued
13 for the work. If a special investigation is made, a special investigation fee may be assessed in
14 accordance with the Fee Subtitle.

15 **119.11 Reinspections.** The code official may require a reinspection if work for which inspection
16 is called is not complete, corrections required are not made, the inspection record is not properly
17 posted on the work site, the approved plans are not readily available to the inspector, access is
18 not provided on the date for which inspection is requested, if deviations from construction
19 documents that require the approval of the code official have been made without proper
20 approval, or as otherwise required by the code official.

21 **119.11.1 Compliance with Section 104.4.** For the purpose of determining compliance with
22 Section 104.4, Maintenance, the code official or the fire chief may cause any structure or
23 system to be reinspected.

24 **119.11.2 Reinspection fee.** The code official may assess a reinspection fee as set forth in the
25 Seattle Municipal Code, Title 22, Subtitle IX, Permit Fees for any action for which
26

1 reinspection is required. In instances where reinspection fees have been assessed, no
2 additional inspection of the work will be performed until the required fees have been paid.

3 SECTION 120

4 CONNECTION APPROVAL

5 **120.1 Energy connections.** No person shall make connections from a source of energy fuel to a
6 mechanical system or equipment regulated by this code for which a permit is required until
7 approved by the code official.

8 **120.2 Temporary connections.** The code official may authorize temporary connection of the
9 mechanical equipment to the source of energy fuel for the purpose of testing the equipment, or
10 for use under a temporary certificate of occupancy.

11 SECTION 121

12 REFRIGERATION LICENSES

13 **121.1 Refrigeration licenses.** No person shall perform any of the services or activities related to
14 refrigeration systems regulated by Chapter 11 without a license required by Chapter 6.82 of the
15 Seattle Municipal Code, or under the direct supervision of a person holding a required license.

16 SECTION 122

17 OPERATING PERMITS FOR REFRIGERATION SYSTEMS

18 **122.1** An operating permit issued by the code official is required to operate any refrigeration
19 system meeting any one of the following criteria:

- 20 1. Any system over 50 horsepower, or
- 21 2. Any system over 50 tons of refrigerant effect, or
- 22 3. Any system that contains over 150 pounds of refrigerant, or
- 23 4. Any system that includes a refrigerant containing a pressure vessel over six inches in
24 diameter with a capacity of more than 5 cubic feet and a design working pressure under
25 250 psig, or
- 26
- 27

1 5. Any system that includes a refrigerant containing a pressure vessel over six inches in
2 diameter having a capacity of one and one-half cubic feet and a design working pressure
3 over 250 psig.

4 **122.2** The operating permit will not be issued until the system has been inspected and approved
5 by the code official as safe to operate and in compliance with the provisions of this code. The
6 permit is valid for a period of one year, renewable annually. The permit shall be displayed in a
7 conspicuous place adjacent to the refrigeration system.

8
9 Section 3. The following sections of Chapter 2 of the International Mechanical Code,
10 2012 Edition, are amended as follows:

11 **CHAPTER 2**
12 **DEFINITIONS**
13 **SECTION 201**
14 **GENERAL**

15 ***

16 **201.3 Terms defined in other codes.** Where terms are not defined in this code and are defined
17 in the *International Building Code*, *International Fire Code*, *Seattle Electrical Code*,
18 *International Fuel Gas Code* or the ~~((*International*))~~ *Uniform Plumbing Code*, such terms shall
19 have meanings ascribed to them as in those codes.

20 ***

21 **SECTION 202**
22 **GENERAL DEFINITIONS**

23 ***

24 ~~((**AUTOMATIC BOILER.** Any class of boiler that is equipped with the controls and limit~~
25 ~~devices specified in Chapter 10.))~~

1 ***

2 **BOILER.** A closed heating *appliance* intended to supply hot water or steam for space heating,
3 processing or power purposes. (~~Low pressure boilers operate at pressures less than or equal to~~
4 ~~15 pounds per square inch (psi) (103 kPa) for steam and 160 psi (1103 kPa) for water. High-~~
5 ~~pressure boilers operate at pressures exceeding those pressures.~~)

6 **BOILER CODE.** The Seattle Boiler and Pressure Vessel Code.

7 ***

8 **[A] CODE.** These regulations, subsequent amendments thereto, or any emergency rule or
9 regulation that (~~the administrative authority having jurisdiction~~) has been lawfully adopted.

10 **[A] CODE OFFICIAL.** The (~~officer or other designated authority charged with the~~
11 ~~administration and enforcement of this code~~) Director of the Department of Planning and
12 Development, or a duly authorized representative.

13 ***

14 **CONDITIONED SPACE.** (~~An area, room or space being heated or cooled by any equipment~~
15 ~~or appliance.~~) A cooled space, heated space (fully heated), heated space (semi-heated), or
16 indirectly conditioned space.

17 **CONFINED SPACE.** A space having a volume less than 50 cubic feet per 1,000 Btu per hour
18 (Btu/h) (4.8 m³/kW) of the aggregate input rating of all appliances installed in that space.

19 ***

20 **CONTAINER (REFRIGERANT).** A cylinder for the transportation of refrigerant.

21 ***

22 **DAMPER.** A manually or automatically controlled device to regulate draft or the rate of flow of
23 air or *combustion* gases.

24 **Backdraft damper.** A damper installed to restrict introduction of unconditioned air from an
25 unconditioned space to a conditioned space.

1 **Fire damper.** See “fire damper”.

2 **Smoke damper.** See “smoke damper”.

3 **Volume damper.** A device that, when installed, will restrict, retard or direct the flow of air
4 in a duct, or the products of *combustion* in a heat-producing *appliance*, its vent connector,
5 vent or *chimney* therefrom.

6 ***

7 **DIRECT REFRIGERATION SYSTEM.** A system in which the evaporator or condenser of the
8 refrigerating system is in direct contact with the air or other substances to be cooled or heated.

9 See Figure 2-1.



14
15 ***

16
17 **ENVIRONMENTAL AIR.** Air that is, at temperatures not exceeding 250⁰F (121⁰C), conveyed
18 to or from occupied areas through ducts which are not part of the heating or air-conditioning
19 system, such as ventilation for human usage, *relief air*, domestic kitchen range exhaust,
20 bathroom exhaust, domestic clothes dryer exhaust, transformer vault exhaust, elevator exhaust,
21 and parking garage exhaust.

22 ***

23 **EXIT PASSAGEWAY.** An exit component that provides for a protected path of egress travel in
24 a horizontal direction to an exit or to the exit discharge.

25 ***

1 **[F] GAS ROOM.** A separately ventilated, fully enclosed room in which only compressed gases
2 and associated equipment and supplies are stored or used.

3 ***

4 **[B] HIGH-RISE BUILDING.** A building with an occupied floor located more than 75 feet (22
5 860 mm) above the lowest level of fire department vehicle access.

6 ***

7 **HOOD.** An air intake device used to capture by entrapment, impingement, adhesion or similar
8 means, grease, moisture, heat and similar contaminants before they enter a duct system.

9 **Type I.** A kitchen hood for collecting and removing grease vapors and smoke generated from
10 medium-duty, heavy-duty, extra-heavy-duty, and some light-duty cooking appliances. Such
11 hoods are equipped with a fire suppression system.

12 **Type II.** A general kitchen hood for collecting and removing steam, vapor, heat, odors and
13 products of *combustion* generated from some light-duty cooking appliances.

14 ***

15 **INDIRECT REFRIGERATION SYSTEM.** A system in which a secondary coolant cooled or
16 heated by the refrigerating system is circulated to the air or other substance to be cooled or
17 heated. See Figure 2-2. Indirect systems are distinguished by the method of application shown
18 below:

19 **Closed system.** A system in which a secondary fluid is either cooled or heated by the
20 refrigerating system and then circulated within a closed circuit in indirect contact with the air
21 or other substance to be cooled or heated.

22 **Double-indirect open-spray system.** A system in which the secondary substance for an
23 indirect open-spray system is heated or cooled by an intermediate coolant circulated from a
24 second enclosure.

1 deep fat fryers, donut fryers, kettle fryers and pressure fryers), (~~electric and gas conveyor pizza~~
2 ~~ovens;~~) electric and gas tilting skillets (braising pans) and electric and gas rotisseries.

3 ***

4 **PERSON.** Any individual, receiver, administrator, executor, assignee, trustee in bankruptcy,
5 trust, estate, firm, partnership, joint venture, club, company, joint stock company, business trust,
6 municipal corporation, political subdivision of the State of Washington, corporation, limited
7 liability company, association, society or any group of individuals acting as a unit, whether
8 mutual, cooperative, fraternal, nonprofit or otherwise, and the United States or any
9 instrumentality thereof.

10 ***

11 ~~((POWER BOILER. See "Boiler."))~~

12 ***

13 ~~((PRESSURE VESSELS. Closed containers, tanks or vessels that are designed to contain~~
14 ~~liquids or gases, or both, under pressure.))~~

15 ***

16 **PRODUCT-CONVEYING.** Conveying solid particulates, such as refuse, dust, fumes and
17 smoke; liquid particulate matter, such as spray residue, mists and fogs; vapors, such as vapors
18 from flammable or corrosive liquids; noxious and toxic gases; and air at temperatures exceeding
19 250°F (121°C). Examples include, but are not limited to, combustion engine, industrial vacuum
20 system, chemical booth, paint booth, paint enclosure and photo lab exhaust.

21 ***

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

23 ***

24 ~~((STEAM-HEATING BOILER. A boiler operated at pressures not exceeding 15 psi (103 kPa)~~
25 ~~for steam.))~~

1 ***

2 **THIMBLE.** A listed fitting designed to be installed in the opening in a masonry chimney
3 through which the chimney connector passes.

4 ***

5 **UNCONFINED SPACE.** A space having a volume not less than 50 cubic feet per 1,000 Btu/h
6 (4.8m³/kW) of the aggregate input rating of all fuel-burning appliances installed in that space.
7 Rooms communicating directly with the space in which the appliances are installed, through
8 openings not furnished with doors, are considered a part of the unconfined space.

9 ***

10 **UNSAFE.** Constituting a fire or health hazard or otherwise dangerous to human life,
11 constituting a hazard to safety, health or public welfare.

12 ***

13 **WATER HEATER.** Any heating *appliance or equipment*, not exceeding a pressure of 160 psi
14 (1103 kPa), a volume of 120 gallons and a heat input of 200,000 Btu/hr, that heats potable water
15 and supplies such water to the potable hot water distribution system.

16 **[W] WHOLE HOUSE VENTILATION SYSTEM.** A mechanical ventilation system,
17 including fans, controls, and ducts, which replaces, by direct or indirect means, air from the
18 habitable rooms with *outdoor air*.

19 ***

20 Section 4. The following sections of Chapter 3 of the International Mechanical Code,
21 2012 Edition, are amended as follows:

1 ***

2 **SECTION 303**

3 **EQUIPMENT AND APPLIANCE LOCATION**

4 ***

5 **303.7 Pit locations.** Appliances installed in pits or excavations shall not come in direct contact
6 with the surrounding soil. The sides of the pit or excavation shall be held back a minimum of 12
7 inches (305 mm) from the *appliance*, and a minimum of 30 inches (762 mm) on the control side.
8 Where the depth exceeds 12 inches (305 mm) below adjoining grade, the walls of the pit or
9 excavation shall be lined with concrete or masonry. Such concrete or masonry shall extend a
10 minimum of 4 inches (102 mm) above adjoining grade and shall have sufficient lateral load-
11 bearing capacity to resist collapse. The *appliance* shall be protected from flooding in an
12 *approved* manner.

13 **[B] 303.8 ((Elevator shafts. Mechanical systems shall not be located in an elevator shaft.))**

14 **Installation of pipes or ducts conveying gases, vapors or liquids in hoistways, machine**
15 **rooms, or machinery spaces for elevators.** Pipes and ducts conveying gases, vapors or liquids
16 shall not be installed in elevator hoistways, elevator machine rooms, and elevator machinery
17 spaces.

18 **Exceptions:**

- 19 1. Only ducts for heating, cooling, ventilating, and venting these spaces are permitted to
20 be installed in the hoistway, machine room, and machinery space.
- 21 2. Ducts and electrical conduit may pass through an elevator machine room or machinery
22 space if they are separated from the room or space by construction equal to the rated
23 construction of the room or space and located so that all required clearances are
24 maintained.

1 If a vented machine room is not vented directly to the outside of the building, the
2 vent shall be enclosed within a fire barrier with at least a one-hour fire-resistance
3 rating, or as required for a shaft where it passes through occupied floors.

4 3. Standard sprinkler protection conforming to the requirements of NFPA 13 is permitted
5 to be installed in these spaces, subject to rules promulgated by the code official.

6 4. Subject to the approval of the code official, pipes that are protected with double
7 containment whose joints are threaded, soldered or welded joints are permitted. Pipes
8 shall not be located less than 7 feet above the floor in machine rooms.

9 **[B] 303.9 Interior exit stairways and exit passageways.** Mechanical systems shall not be
10 located in interior exit stairways and ramps and exit passageways. Penetrations into and openings
11 through interior exit stairways and ramps and exit passageways are prohibited except for:

12 1. Equipment allowed or required by the International Building Code to serve the interior
13 exit stairway and exit passageways such as:

14 1.1 Ductwork and equipment necessary for independent ventilation or stairway
15 pressurization,

16 1.2 Sprinkler piping,

17 1.3 Standpipes,

18 1.4 Electrical raceway serving the interior exit stairway or ramp terminating in a steel
19 box not exceeding 16 square inches (10 323 mm²) in area, and

20 1.5 Piping used exclusively for the drainage of rainfall runoff from roof areas
21 provided the roof is not used for a helistop or heliport.

22 2. Unfired heaters allowed by the International Building Code for freeze protection of fire
23 protection equipment may penetrate one protective membrane. The conduit serving the
24 heater may penetrate both protective membranes.

1 from the opening to the *appliance*. A level service space not less than 30 inches (762 mm) deep
2 and 30 inches (762 mm) wide shall be present at the front or service side of the *appliance*. If the
3 depth of the passageway or the service space exceeds 12 inches (305 mm) below the adjoining
4 grade, the walls of the passageway shall be lined with concrete or masonry. Such concrete or
5 masonry shall extend a minimum of 4 inches (102 mm) above the adjoining grade and shall have
6 sufficient lateral-bearing capacity to resist collapse. The clear access opening dimensions shall
7 be a minimum of 22 inches by 30 inches (559 mm by 762 mm), and large enough to allow
8 removal of the largest *appliance*.

9 **Exceptions:**

- 10 1. The passageway is not required where the level service space is present when the
11 access is open and the *appliance* is capable of being serviced and removed through the
12 required opening.
- 13 2. Where the passageway is unobstructed and not less than 6 feet high (1929 mm) and 22
14 inches (559 mm) wide for its entire length, the passageway shall not be limited in
15 length.

16 **306.4.1 Electrical requirements.** A luminaire controlled by a switch located at the required
17 passageway opening and a receptacle outlet shall be provided at or near the *appliance*
18 location in accordance with the Seattle Electrical Code ((NFPA-70)).

19 **306.5 Equipment and appliances on roofs or elevated structures.** Where *equipment or*
20 appliances requiring access (~~(or appliances)~~) are located on an elevated structure or the roof of a
21 building such that personnel will have to climb higher than 16 feet (4877 mm) above grade to
22 access such equipment or appliances, an interior or exterior means of access shall be provided.
23 Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in
24 height or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-

1 percent slope). Such access shall not require the use of portable ladders. Where access involves
2 climbing over parapet walls, the height shall be measured to the top of the parapet wall.

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

5 [W] 1. The side railing shall extend above the parapet or roof edge not less than ~~((30))~~ 42
6 inches ~~((762))~~ 1067 mm).

7 [W]2. Ladders shall have rung spacing not to exceed ~~((14))~~ 12 inches ~~((356))~~ 305 mm)
8 on center. The uppermost rung shall be a maximum of 24 inches (610 mm) below the
9 upper edge of the roof hatch, roof or parapet, as applicable.

10 [W]3. Ladders shall have a toe spacing not less than ~~((6))~~ 7 inches ~~((152))~~ 178 mm)
11 deep.

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

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

15 6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and
16 landings capable of withstanding 100 pounds per square foot (488.2 kg/ m²). Landing
17 dimensions shall be not less than 18 inches (457 mm) and not less than the width of the
18 ladder served. A guard rail shall be provided on all open sides of the landing.

19 7. Climbing clearance. The distance from the centerline of the rungs to the nearest
20 permanent object on the climbing side of the ladder shall be a minimum of 30 inches (762
21 mm) measured perpendicular to the rungs. This distance shall be maintained from the
22 point of ladder access to the bottom of the roof hatch. A minimum clear width of 15-
23 inches (381 mm) shall be provided on both sides of the ladder measured from the
24 midpoint of and parallel with the rungs except where cages or wells are installed.

1 8. Landing required. The ladder shall be provided with a clear and unobstructed bottom
2 landing area having a minimum dimension of 30 inches (762 mm) by 30 inches (762
3 mm) centered in front of the ladder.

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

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

6 **Interpretation:** Item 10 allows access to ladders to be restricted to authorized personnel, and
7 prohibits storage that blocks or restricts access to the ladder.

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

10 **Exception:** This section shall not apply to Group R-3 occupancies.

11 **306.5.1 Sloped roofs.** Where appliances, *equipment*, fans or other components that require
12 service are installed on a roof having a slope of three units vertical in 12 units horizontal (25-
13 percent slope) or greater and having an edge more than 30 inches (762 mm) above grade at
14 such edge, a level platform shall be provided on each side of the *appliance* or *equipment* to
15 which access is required for service, repair or maintenance. The platform shall be not less
16 than 30 inches (762 mm) in any dimension and shall be provided with guards. The guards
17 shall extend not less than 42 inches (1067 mm) above the platform, shall be constructed so as
18 to prevent the passage of a 21-inch diameter (533 mm) sphere and shall comply with the
19 loading requirements for guards specified in the *International Building Code*. Access shall
20 not require walking on roofs having a slope greater than four units vertical in 12 units
21 horizontal (33-percent slope). Where access involves obstructions greater than 30 inches (762
22 mm) in height, such obstructions shall be provided with ladders installed in accordance with
23 Section 306.5 or stairs installed in accordance with the requirements specified in the
24 *International Building Code* in the path of travel to and from appliances, fans or *equipment*
25 requiring service.
26

1 **306.5.2 Electrical requirements.** A receptacle outlet shall be provided at or near the
2 *equipment* location in accordance with the Seattle Electrical Code ((NFPA-70)).

SECTION 307

CONDENSATE DISPOSAL

5 **307.1 Fuel-burning appliances.** Liquid *combustion* by-products of condensing appliances shall
6 be collected, pH neutralized and discharged to an *approved* plumbing fixture or disposal area in
7 accordance with the manufacturer's installation instructions. Condensate piping shall be of
8 *approved* corrosion-resistant material and shall not be smaller than the drain connection on the
9 appliance. Such piping shall maintain a minimum horizontal slope in the direction of discharge
10 of not less than one-eighth unit vertical in 12 units horizontal (1-percent slope).

11 **307.2 Evaporators and cooling coils.** Condensate drain systems shall be provided for *equipment*
12 and appliances containing evaporators or cooling coils. Condensate drain systems shall be
13 designed, constructed and installed in accordance with Sections 307.2.1 through 307.2.4.

14 **307.2.1 Condensate disposal.** Condensate from all cooling coils and evaporators shall be
15 conveyed from the drain pan outlet to an *approved* place of disposal. Such piping shall
16 maintain a minimum horizontal slope in the direction of discharge of not less than one-eighth
17 unit vertical in 12 units horizontal (1-percent slope). Condensate shall not discharge into a
18 street, alley or other areas so as to cause a nuisance.

19 **307.2.2 Drain pipe materials and sizes.** Components of the condensate disposal system
20 shall be cast iron, galvanized steel, copper, cross-linked polyethylene, polybutylene,
21 polyethylene, ABS, CPVC or PVC pipe or tubing. All components shall be selected for the
22 pressure and temperature rating of the installation. Joints and connections shall be made in
23 accordance with the applicable provisions of (~~Chapter 7 of the *International*~~) the *Uniform*
24 *Plumbing Code* relative to the material type. Condensate waste and drain line size shall be
25 not less than 3/4-inch (19 mm) internal diameter and shall not decrease in size from the drain
26

pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with Table 307.2.2.

TABLE 307.2.2
CONDENSATE DRAIN SIZING

EQUIPMENT CAPACITY	MINIMUM CONDENSATE PIPE DIAMETER
Up to 20 tons of refrigeration	$\frac{3}{4}$ inch
Over 20 tons to 40 tons of refrigeration	1 inch
Over 40 tons to 90 tons of refrigeration	$1\frac{1}{4}$ inch
Over 90 tons to 125 tons of refrigeration	$1\frac{1}{2}$ inch
Over 125 tons to 250 tons of refrigeration	2 inch

1 inch = 25.4 mm, 1 ton = 3.517 kW

307.2.3 Auxiliary and secondary drain systems. In addition to the requirements of Section 307.2.1, where damage to any building components could occur as a result of overflow from the *equipment* primary condensate removal system, one of the following auxiliary protection methods shall be provided for each cooling coil or fuel-fired *appliance* that produces condensate:

1. An auxiliary drain pan with a separate drain shall be provided under the coils on which condensation will occur. The auxiliary pan drain shall discharge to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drain. The pan shall have a minimum depth of 1-1/2 inches (38 mm), shall not be less than 3 inches (76 mm) larger than the unit or the coil dimensions in width and length and shall be constructed of corrosion-resistant material. Galvanized sheet steel pans shall have a minimum thickness of not less than 0.0236 inch (0.6010 mm) (No. 24 gage). Nonmetallic pans shall have a minimum thickness of not less than 0.0625 inch (1.6 mm).
2. A separate overflow drain line shall be connected to the drain pan provided with the *equipment*. Such overflow drain shall discharge to a conspicuous point of disposal to

1 alert occupants in the event of a stoppage of the primary drain. The overflow drain line
2 shall connect to the drain pan at a higher level than the primary drain connection.

3 3. An auxiliary drain pan without a separate drain line shall be provided under the coils
4 on which condensate will occur. Such pan shall be equipped with a water-level
5 detection device conforming to UL 508 that will shut off the *equipment* served prior to
6 overflow of the pan. The auxiliary drain pan shall be constructed in accordance with
7 Item 1 of this section.

8 4. A water-level detection device conforming to UL 508 shall be provided that will shut
9 off the *equipment* served in the event that the primary drain is blocked. The device
10 shall be installed in the primary drain line, the overflow drain line, or in the
11 equipment-supplied drain pan, located at a point higher than the primary drain line
12 connection and below the overflow rim of such pan.

13 **[W] Exceptions:**

14 1. Fuel-fired appliances that automatically shut down operation in the event of a
15 stoppage in the condensate drainage system.

16 2. Unducted fan coil units where there is no factory option available for water-level
17 detection devices and are installed directly within the occupied space.

18 **307.2.3.1 Water-level monitoring devices.** On downflow units and all other coils that do
19 not have a secondary drain or provisions to install a secondary or auxiliary drain pan, a
20 water-level monitoring device shall be installed inside the primary drain pan. This device
21 shall shut off the *equipment* served in the event that the primary drain becomes restricted.
22 Devices installed in the drain line shall not be permitted.

23 **Exception:** Water-level monitoring devices are not required for unducted fan coil
24 units where there is no factory option available for water-level detection devices and
25 the units are installed directly within the occupied space.

1 Section 5. The following sections of Chapter 4 of the International Mechanical Code,
2 2012 Edition, are amended as follows:

3 **CHAPTER 4**
4 **VENTILATION**
5 **SECTION 401**
6 **GENERAL**

7 ***

8 **401.2 Ventilation required.** Every occupied space other than enclosed parking garages, loading
9 docks and motor vehicle repair garages shall be ventilated in accordance with Section 401.2.1 or
10 401.2.2. Enclosed parking garages, loading docks and motor vehicle repair garages shall be
11 ventilated by mechanical means in accordance with Sections 403 and 404.

12 **[W] 401.2.1 Group R occupancies.** Ventilation in Group R occupancies shall be provided
13 in accordance with the Sections 403.8 and 403.9.

14 **401.2.2 All other occupancies.** Ventilation in all other occupancies shall be provided by
15 natural means in accordance with Section 402 or by mechanical means in accordance with
16 Section 403. ((Where the air infiltration rate in a dwelling unit is less than 5 air changes per
17 hour when tested with a blower door at a pressure of 0.2-inch water column (50 Pa) in
18 accordance with Section 402.4.1.2 of the *International Energy Conservation Code*, the
19 dwelling unit shall be ventilated by mechanical means in accordance with Section 403.))

20 ***

21 **401.4 Intake opening location.** Air intake openings shall comply with all of the following:

- 22 1. Intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or
23 buildings on the same lot. Where openings front on a street or public way, the distance
24 shall be measured from the opposite side of the street or public way.

1 2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet
2 (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents,
3 streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section
4 501.2.1. Outdoor air intake openings shall be permitted to be located less than 10 feet
5 (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that
6 the openings are located not less than 25 feet (7620 mm) vertically above such locations.
7 Where openings front on a street or public way, the distance shall be measured from the
8 closest edge of the street or public way. The exhaust from a bathroom, clothes dryer or
9 kitchen in a dwelling shall not be considered to be a hazardous or noxious contaminant.

10 **Exception:** Enclosed parking garage and repair garage intakes are permitted to be
11 located less than 10 feet horizontally of the street, alley, parking lots and loading
12 docks.

13 3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources
14 where such sources are located within 10 feet (3048 mm) of the opening.

15 4. Intake openings on structures in flood hazard areas shall be at or above the elevation
16 required by Section 1612 of the *International Building Code* for utilities and attendant
17 equipment.

18 5. Intake openings shall not be located:

19 5.1. In a crawl space;

20 5.2. Less than one foot (305 mm) above a roof, adjacent grade, or other surface directly
21 below the intake; or

22 5.3. Under a deck having a surface height less than three feet above grade or other surface
23 directly below the intake.

1 **Interpretation:** For purposes of this section, lot line includes any property line separating one
2 lot from another lot, but does not include any property line separating a lot from a public
3 street or alley right-of-way.

4 ***

5 **401.7 Compliance and commissioning.** Compliance with Sections 402 and 403.1 through 403.8
6 shall be demonstrated through engineering calculations. Documentation of calculations shall be
7 submitted on the permit plan sets. Testing and commissioning shall be performed and
8 documented in accordance with the *International Energy Code*.

9 **SECTION 402**

10 **NATURAL VENTILATION**

11 **[B] 402.1 Natural ventilation.** *Natural ventilation* of an occupied space shall be through
12 windows, doors, louvers or other openings to the outdoors. The operating mechanism for such
13 openings shall be provided with ready access so that the openings are readily controllable by the
14 building occupants.

15 **Exception:** Automatically controlled natural ventilation systems do not require ready access
16 and control by building occupants.

17 ***

18 **SECTION 403**

19 **MECHANICAL VENTILATION**

20 ***

21 **[W] 403.2 Outdoor air required.** The minimum outdoor airflow rate shall be determined in
22 accordance with Section 403.3. (~~Ventilation supply systems shall be designed to deliver the~~
23 ~~required rate of outdoor airflow to the *breathing zone* within each *occupiable space*.)~~)

1 **[W] Exceptions:**

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

9 **[W] 403.2.1 Recirculation of air.** The ~~((outdoor))~~ air required by Section 403.3 shall not be
10 recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from
11 being recirculated as a component of supply air to building spaces, except that:

- 12 1. Ventilation air shall not be recirculated from one *dwelling* to another or to dissimilar
13 occupancies.
- 14 2. Supply air to a swimming pool and associated deck areas shall not be recirculated
15 unless such air is dehumidified to maintain the relative humidity of the area at 60
16 percent or less. Air from this area shall not be recirculated to other spaces where
17 ~~((more than))~~ 10 percent or more of the resulting supply airstream consists of air
18 recirculated from these spaces.
- 19 3. Where mechanical exhaust is required by Note b in Table 403.3, recirculation of air
20 from such spaces shall be prohibited. All air supplied to such spaces shall be
21 exhausted, including any air in excess of that required by Table 403.3.
- 22 4. Building HVAC air used as transfer air for heat removal may be recirculated. ~~((Where
23 mechanical exhaust is required by Note g in Table 403.3, mechanical exhaust is
24 required and recirculation is prohibited where more than 10 percent of the resulting
25 supply airstream consists of air recirculated from these spaces.))~~

1 **403.2.2 Transfer air.** Except where recirculation from such spaces is prohibited by Table
2 403.3, air transferred from occupiable spaces is not prohibited from serving as *makeup air* for
3 required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and
4 smoking lounges. The amount of transfer air and *exhaust air* shall be sufficient to provide the
5 flow rates as specified in Section 403.3. The required outdoor airflow rates specified in Table
6 403.3 shall be introduced directly into such spaces or into the occupied spaces from which air
7 is transferred or a combination of both.

8 **403.2.3 Outdoor air delivery.** The outdoor air shall be ducted in a fully enclosed path
9 directly to every air-handling unit in each zone not provided with sufficient operable opening
10 area for natural ventilation to occur.

11 **Exception:** Ducts may terminate within 12 inches of the intake to an HVAC unit if they
12 are physically fastened so that the outdoor air duct is directed into the unit intake.

13 **403.3 Outdoor airflow rate.** Ventilation systems shall be designed to have the capacity to
14 supply the minimum outdoor airflow rate determined in accordance with this section. The
15 occupant load utilized for design of the ventilation system shall not be less than the number
16 determined from the estimated maximum occupant load rate indicated in Table 403.3.
17 Ventilation rates for occupancies not represented in Table 403.3 shall be those for a listed
18 *occupancy* classification that is most similar in terms of occupant density, activities and building
19 construction; or shall be determined by an *approved* engineering analysis. The ventilation system
20 shall be designed to supply the required rate of *ventilation air* continuously during the period the
21 building is occupied, except as otherwise stated in other provisions of the code.

22 With the exception of smoking lounges, the ventilation rates in Table 403.3 are based on the
23 absence of smoking in occupiable spaces. Where smoking is anticipated in a space other than a
24 smoking lounge, the ventilation system serving the space shall be designed to provide ventilation
25 over and above that required by Table 403.3 in accordance with accepted engineering practice.

[W] Exception: ((The occupant load is not required to be determined based on the estimated maximum occupant load rate indicated in Table 403.3 where *approved* statistical data document the accuracy of an alternate anticipated occupant density.)) 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 estimated maximum occupancy rates.

[W] TABLE 403.3

MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _a CFM/FT ² a	EXHAUST AIRFLOW RATE CFM/FT ² a
Correctional facilities				
Cells				
without plumbing fixtures	25	5	0.12	—
with plumbing fixtures ^{g,k}	25	5	0.12	1.0

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² ^a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, <i>R_p</i> CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, <i>R_a</i> CFM/FT ² ^a	EXHAUST AIRFLOW RATE CFM/FT ² ^a
Dining halls (see food and beverage service)	—	—	—	—
Guard stations	15	5	0.06	—
Day room	30	5	0.06	—
Booking/waiting	50	7.5	0.06	—
Dry cleaners, laundries				
Coin-operated dry cleaner	20	15	—	—
Coin-operated laundries	20	7.5	0.06	—
Commercial dry cleaner	30	30	—	—
Commercial laundry	10	25	—	—
Storage, pick up	30	7.5	0.12	—
Education				

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² ^a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT ^{2 a}	EXHAUST AIRFLOW RATE CFM/FT ² ^a
Auditoriums	150	5	0.06	—
Corridors (see public spaces)	—	—	—	—
Media center	25	10	0.12	—
Sports locker rooms ^{g,k}	—	—	—	0.5
Music/theater/dance	35	10	0.06	—
((Smoking lounges ^b	70	60		—))
Day care (through age 4)	25	10	0.18	—
Classrooms (ages 5-8)	25	10	0.12	—
Classrooms (age 9 plus)	35	10	0.12	—
Lecture classroom	65	7.5	0.06	—
Lecture hall (fixed seats)	150	7.5	0.06	—
Art classroom ^g	20	10	0.18	0.7

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² ^a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _p CFM/PERS ON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _a CFM/FT ^{2 a}	EXHAUST AIRFLOW RATE CFM/FT ² ^a
Science laboratories ^{g,k}	25	10	0.18	1.0
Wood/metal shops ^{g,k}	20	10	0.18	0.5
Computer lab	25	10	0.12	—
Multiuse assembly	100	7.5	0.06	—
Locker/dressing rooms ^{g,k}	—	—	—	0.25
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	—	—	—	0.7
Hospitals, nursing and convalescent				
homes				
Autopsy rooms ^b	—	—	—	0.5

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² ^a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _a CFM/FT ² ^a	EXHAUST AIRFLOW RATE CFM/FT ² ^a
Medical procedure rooms	20	15	—	—
Operating rooms	20	30	—	—
Patient rooms	10	25	—	—
Physical therapy	20	15	—	—
Recovery and ICU	20	15	—	—
Hotels, motels, resorts and dormitories				
Multipurpose assembly	<u>120</u>	5	0.06	—
Bathrooms/toilet—private ^{g,k}	—	—	—	25/50 ^f
Bedroom/living room	<u>10</u>	5	0.06	—
Conference/meeting	<u>50</u>	5	0.06	—
Dormitory sleeping areas	<u>20</u>	5	0.06	—
Gambling casinos	<u>120</u>	7.5	0.18	—
Lobbies/prefunction	<u>30</u>	7.5	0.06	—

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² ^a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _a CFM/FT ² ^a	EXHAUST AIRFLOW RATE CFM/FT ² ^a
Offices				
Conference rooms	50	5	0.06	—
<u>[W]</u> Kitchenettes	—	—	—	<u>0.30</u>
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	—
<u>[W]</u> Private dwellings, single and multiple				
Garages, common for multiple units ^b	—	—	—	0.75
Garages, separate for each dwelling ^b	—	—	—	100 cfm per car
Kitchens ^b	—	—	—	25/100 ^f

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _a CFM/FT ² a	EXHAUST AIRFLOW RATE CFM/FT ² a
Elevator car	—	—	—	1.0
<u>Elevator lobbies in garages</u>	—	—	1.0	—
Shower room (per shower head) ^{g,k}	—	—	—	50/20 ^f
((Smoking lounges ^b	70	60	—	—))
Toilet rooms — public ^{g,k}	—	—	—	50/70 ^e
Places of religious worship	120	5	0.06	—
Courtrooms	70	5	0.06	—
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	—
Retail stores, sales floors and showroom floors				

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² _a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT ² _a	EXHAUST AIRFLOW RATE CFM/FT ² _a
Sales (except as below)	15	7.5	0.12	—
Dressing rooms	—	—	—	0.25
Mall common areas	40	7.5	0.06	—
Shipping and receiving	—	—	0.12	—
((Smoking lounges ^b	70	60	—	—))
Storage rooms	—	—	0.12	—
Warehouses (see storage)	—	—	—	—
Specialty shops				
Automotive motor-fuel	—	—	—	1.5
dispensing stations ^b				
Barber	25	((7.5)) <u>20</u>	0.06	0.5
Beauty salons ^b	25	20	0.12	0.6
Nail salons ^{b,h}	25	20	0.12	0.6

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² ^a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT ² ^a	EXHAUST AIRFLOW RATE CFM/FT ² ^a
Embalming room ^b	—	—	—	2.0
Pet shops (animal areas) ^b	10	7.5	0.18	0.9
Supermarkets	8	7.5	0.06	—
[W] 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 ⁱ	—	—	0.30	0.5
Gym, stadium, arena (play area) ⁱ	—	—	0.30	—
Spectator areas	150	7.5	0.06	—

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² ^a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _a CFM/FT ² ^a	EXHAUST AIRFLOW RATE CFM/FT ² ^a
<u>garages</u> ^l <u>[W] Storage rooms,</u> <u>chemical</u> Warehouses <u>Non-retail storage spaces</u> <u>>100 sf^k</u>	=	=	=	1.5
Theaters Auditoriums (see education) Lobbies Stages, studios Ticket booths	— 150 70 60	— 5 10 5	— 0.06 0.06 0.06	— — — —
Transportation Platforms	100	7.5	0.06	—

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OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ² a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _a CFM/FT ² a	EXHAUST AIRFLOW RATE CFM/FT ² a
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
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 m³/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 m³/(s • m²),

°C = [(°F) -32]/1.8, 1 square foot = 0.0929 m².

a. Based upon *net occupiable floor area*.

1 b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited
2 (see Section 403.2.1, Item 3).

3 c. Spaces unheated or maintained below 50°F are not covered by these requirements unless
4 the occupancy is continuous.

5 d. Ventilation systems (~~in enclosed parking garages~~) shall comply with Section 404.

6 e. Rates are per water closet or urinal. The higher rate shall be provided where the exhaust
7 system is designed to operate intermittently. The lower rate shall be permitted only where
8 the exhaust system is designed to operate continuously while occupied.

9 f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the
10 exhaust system is designed to operate intermittently. The lower rate shall be permitted
11 only where the exhaust system is designed to operate continuously while occupied.

12 [W] g. Mechanical exhaust is required and recirculation is prohibited (~~except that~~
13 ~~recirculation shall be permitted where the resulting supply airstream consists of not more~~
14 ~~than 10 percent air recirculated from these spaces (see Section 403.2.1, Items 2 and 4).)~~)

15 h. For nail salons, each nail station shall be provided with a *source capture system* capable
16 of exhausting not less than 50 cfm per station.

17 [W] i. A laundry area within a kitchen or bathroom is not required to have local exhaust. For
18 the laundry area to qualify as being within the kitchen, the laundry room door must open
19 directly into the kitchen and not into an adjacent corridor. Where there are doors that
20 separate the laundry area from the kitchen or bathroom the door shall be louvered.

21 [W] j. When combustion equipment is intended to be used on the playing surface, additional
22 dilution ventilation and/or source control shall be provided.

23 k. Transfer air permitted in accordance with Section 403.2.2. For non-retail storage areas,
24 transfer air is also permitted from an adjacent open parking garage, or an enclosed

1 parking garage or loading dock that is mechanically ventilated in accordance with Section
2 404.

3 1. This space shall be maintained at a positive pressure. See Section 404.3.

4 ***

5 **403.6 Variable air volume system control.** Variable air volume air distribution systems, other
6 than those designed to supply only 100-percent outdoor air, shall be provided with controls to
7 regulate the flow of outdoor air. Such control system shall be designed to maintain the flow rate
8 of outdoor air at a rate of not less than that required by Section 403.3 over the entire range of
9 supply air operating rates. Calculations and a description of controls operation shall be submitted
10 with the permit drawings.

11 ***

12 **[W] 403.8 Ventilation systems for Group R occupancies.** Each dwelling unit or sleeping unit
13 shall be equipped with local exhaust and whole house ventilation systems and shall comply with
14 Sections 403.8.1 through 403.8.10. All occupancies other than Group R occupied spaces that
15 support the Group R occupancy shall meet the ventilation requirements of Section 402 or
16 Sections 403.1 to 403.7.

17 **403.8.1 Minimum ventilation performance.** Ventilation systems shall be designed and installed
18 to satisfy the ventilation requirements of Table 403.3 or Table 403.8.1. Breathing zone
19 ventilation rates from Table 403.3 shall be calculated per Section 403.3.1.1 and corrected per
20 zone air distribution effectiveness requirements per Section 403.3.1.2.

Table 403.8.1

Ventilation Rates for All Group R Private Dwellings, Single and Multiple

(Continuously Operating Systems)

Floor Area (ft²)	Bedrooms¹				
	<u>0-1</u>	<u>2-3</u>	<u>4-5</u>	<u>6-7</u>	<u>>7</u>
<u><1500</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
<u>1501 - 3000</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>	<u>105</u>
<u>3001 - 4500</u>	<u>60</u>	<u>75</u>	<u>90</u>	<u>105</u>	<u>120</u>
<u>4501 - 6000</u>	<u>75</u>	<u>90</u>	<u>105</u>	<u>120</u>	<u>135</u>
<u>6001 - 7500</u>	<u>90</u>	<u>105</u>	<u>120</u>	<u>135</u>	<u>150</u>
<u>>7500</u>	<u>105</u>	<u>120</u>	<u>135</u>	<u>150</u>	<u>165</u>

¹Ventilation rates in table are minimum outdoor airflow rates measured in cfm.

403.8.2 Control and operation. Controls for and operation of ventilation systems shall comply with this section.

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

1. Location of controls. Controls for all ventilation systems shall be readily accessible by the occupant.

2. Instructions. Operating instructions for whole house ventilation systems shall be provided to the occupant by the installer of the system.

1 3. Local exhaust ventilation systems. Local exhaust ventilation systems shall be controlled
2 by manual switches, dehumidistats, timers, or other approved means.

3 4. Continuous whole house ventilation systems. Continuous whole house ventilation
4 systems shall operate continuously. Exhaust fans, forced-air system fans, or supply fans
5 shall be equipped with "fan on" as override controls. Controls shall be capable of
6 operating the ventilation system without energizing other energy-consuming appliances.
7 A label shall be affixed to the controls that reads "Whole House Ventilation (see
8 operating instructions)."

9 5. Intermittent whole house ventilation systems. Intermittent whole house ventilation
10 systems shall comply with the following:

11 5.1 They shall be capable of operating intermittently and continuously.

12 5.2 They shall have controls capable of operating the exhaust fans, forced-air system
13 fans, or supply fans without energizing other energy-consuming appliances.

14 5.3 The ventilation rate shall be adjusted according to the exception in Section
15 403.8.5.1.

16 5.4 The system shall be designed so that it can operate automatically based on the type
17 of control timer installed.

18 5.5 The intermittent mechanical ventilation system shall operate at least one hour out of
19 every four.

20 5.6 The system shall have a manual control and automatic control, such as a 24-hour
21 clock timer.

22 5.7 At the time of final inspection, the automatic control shall be set to operate the
23 whole house fan according to the schedule used to calculate the whole house fan
24 sizing.

1 5.8 A label shall be affixed to the control that reads "Whole House Ventilation (see
2 operating instructions)."

3 **403.8.3 Outdoor air intake locations.** Outdoor air intakes shall be classified as either
4 operable openings or mechanical air intakes. The intake locations for operable openings and
5 mechanical air intakes shall comply with the following:

6 1. Openings for mechanical air intakes shall comply with Section 401.4. Operable openings
7 shall comply with Section 401.4 items 2, 4 and 5 only.

8 2. Intake openings shall not be located closer than 10 feet from an appliance vent outlet
9 unless such vent outlet is 3 feet above the outdoor air inlet. The vent shall be permitted
10 to be closer if specifically allowed by Chapter 8 or by the International Fuel Gas Code.

11 3. Intake openings shall be located where they will not pick up objectionable odors, fumes,
12 or flammable vapors.

13 4. Intake openings shall be located where they will not take air from a hazardous or
14 unsanitary location.

15 5. Intake openings shall be located where they will not take air from a room or space
16 having a fuel-burning appliance.

17 6. Intake openings shall not be located closer than 10 feet from a vent opening of a
18 plumbing drainage system unless the vent opening is at least 3 feet above the air inlet.

19 7. Intake openings shall not be located where they will take air from an attic, crawl space,
20 or garage.

21 **403.8.4 Local exhaust ventilation requirements.** Local exhaust ventilation systems shall
22 exhaust at least the volume of air required for exhaust in Table 403.3. Exhaust shall be
23 provided in each kitchen, bathroom, water closet, laundry area, indoor swimming pool, spa,
24 and other rooms where water vapor or cooking odor is produced. Local exhaust ventilation
25 ducts shall terminate outdoors.

1 **403.8.4.1 Local exhaust systems.** Exhaust systems shall be designed and installed to
2 meet all of the criteria below:

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

20 **403.8.4.2 Local exhaust fans.** Exhaust fan construction and sizing shall meet the
21 following criteria.

- 22 1. Exhaust fans shall be tested and rated in accordance with the airflow and sound
23 rating procedures of the Home Ventilating Institute: HVI 915 Loudness Testing and
24 Rating Procedure; HVI 916 Airflow Test Procedure; and HVI 920 Product
25 Performance Certification Procedure

1 **Exception:** Range hoods and down-draft exhaust fans used for local exhaust for
2 kitchens are not required to be rated.

3 2. Fan airflow rating and duct systems shall be designed and installed to deliver at least
4 the exhaust airflow required by Table 403.3. The airflows required refer to the
5 delivered airflow of the system as installed and tested using a flow hood, flow grid,
6 or other airflow measurement device.

7 **EXCEPTIONS:**

8 1. An exhaust airflow rating at a pressure of 0.25 in. w.g. may be used,
9 provided the duct sizing meets the prescriptive requirements of Table
10 403.8.4.2.

11 2. Where a range hood or down-draft exhaust fan is used to satisfy the local
12 exhaust requirements for kitchens, the range hood or down draft exhaust
13 shall not be less than 100 cfm at 0.10 in. w.g.

Table 403.8.4.2

Prescriptive Exhaust Duct Sizing

<u>Fan Tested</u> <u>cfm at 0.25</u> <u>inches w.g.</u>	<u>Minimum</u> <u>Flex</u> <u>Diameter</u>	<u>Maximum</u> <u>Length in</u> <u>Feet</u>	<u>Minimum</u> <u>Smooth</u> <u>Diameter</u>	<u>Maximum</u> <u>Length in</u> <u>Feet</u>	<u>Maximum</u> <u>Elbows¹</u>
<u>50</u>	<u>4 inches</u>	<u>25</u>	<u>4 inches</u>	<u>70</u>	<u>3</u>
<u>50</u>	<u>5 inches</u>	<u>90</u>	<u>5 inches</u>	<u>100</u>	<u>3</u>
<u>50</u>	<u>6 inches</u>	<u>No Limit</u>	<u>6 inches</u>	<u>No Limit</u>	<u>3</u>
<u>80</u>	<u>4 inches²</u>	<u>NA</u>	<u>4 inches</u>	<u>20</u>	<u>3</u>
<u>80</u>	<u>5 inches</u>	<u>15</u>	<u>5 inches</u>	<u>100</u>	<u>3</u>
<u>80</u>	<u>6 inches</u>	<u>90</u>	<u>6 inches</u>	<u>No Limit</u>	<u>3</u>
<u>100</u>	<u>5 inches²</u>	<u>NA</u>	<u>5 inches</u>	<u>50</u>	<u>3</u>
<u>100</u>	<u>6 inches</u>	<u>45</u>	<u>6 inches</u>	<u>No Limit</u>	<u>3</u>
<u>125</u>	<u>6 inches</u>	<u>15</u>	<u>6 inches</u>	<u>No Limit</u>	<u>3</u>
<u>125</u>	<u>7 inches</u>	<u>70</u>	<u>7 inches</u>	<u>No Limit</u>	<u>3</u>

1. For each additional elbow, subtract 10 feet from length.

2. Flex ducts of this diameter are not permitted with fans of this size.

403.8.5 Whole house ventilation requirements. All whole house ventilation systems shall comply with Sections 403.8.5.1 and 403.8.5.2. Each dwelling unit or sleeping unit shall be equipped with one of the following four types of mechanical whole house ventilation systems:

1. A system using exhaust fans (see Section 403.8.6);

1 2. A system integrated with forced-air systems (see Section 403.8.7);

2 3. A system using supply fans (see Section 403.8.8); or

3 4. A heat or energy recovery ventilation system (see Section 403.8.9).

4 The whole house exhaust system is permitted to be one of the local exhaust systems
5 required by Section 403.8.4 as long as the requirements of this section, in addition to the
6 requirements of Section 403.8.4, are met.

7 **403.8.5.1 Outdoor air.** Outdoor air shall be distributed to each habitable space. Where
8 outdoor air supply intakes are separated from exhaust vents by doors, means shall be
9 provided to ensure airflow to all separated habitable spaces by installing distribution
10 ducts, installed grilles, transoms, doors undercut to a minimum of 1/2- inch above the
11 surface of the finish floor covering, or other similar means where permitted by the
12 International Building Code.

13 The mechanical system shall operate continuously to supply at least the volume of
14 outdoor air required in Table 403.3 or Table 403.8.1.

15 **EXCEPTION:** Intermittently operating ventilation systems: The whole house
16 mechanical ventilation system is permitted to operate intermittently where the system
17 has controls that enable operation for not less than 25 percent of each 4-hour segment
18 and the ventilation rate prescribed in Table 403.3 or Table 403.8.1 is multiplied by the
19 factor determined in accordance with Table 403.8.5.1.

20 The intermittent mechanical ventilation system shall operate at least one hour out of
21 every four. A minimum of ~~two~~ six cycles are required per day.

Table 403.8.5.1

Intermittent Whole House Mechanical Ventilation Rate Factors^{a, b}

<u>Run-Time</u>						
<u>Percentage in Each</u>						
<u>4-Hour Segment</u>	<u>25%</u>	<u>33%</u>	<u>50%</u>	<u>66%</u>	<u>75%</u>	<u>100%</u>
<u>Ventilation Rate</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1.5</u>	<u>1.3</u>	<u>1.0</u>
<u>Factor (F_v)^a</u>						

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.

Intermittent Mechanical Ventilation Airflow Calculation Examples:

Example #1: Calculating fan airflow based on Table 403.8.5.1 values:

An intermittently operated whole house fan that serves a dwelling unit with a continuous ventilation requirement of 30 CFM (from Table 403.3 or 403.8.1) is controlled to operate with an on-time of 3 hours and off-time of 1 hours throughout the day.

The minimum intermittent ventilation rate is calculated as follows:

$Q_r = 30 \text{ CFM (from Table 403.3 or 403.8.1)}$

Cycle time = 4 hours

(where: cycle time is equal to the on-time plus the off-time)

Run-time percentage = $3 / 4 = 75\%$

(where: f is equal to the on-time divided by the cycle time)

Ventilation rate factor (F_v) 1.3 (from Table 403.8.5.1)

$Q_f = Q_r \times F_v = 30 \text{ CFM} \times 1.3 = 39$

1 **Example #2:** Calculating fan airflow based on footnote a to Table 403.8.5.1:

2 An intermittently operated whole house fan that serves a dwelling unit with a continuous
3 ventilation requirement of 30 CFM (from Table 403.3 or 403.8.1) is controlled to operate with
4 an on-time of 1 hour and off-time of 3 hour throughout the day.

5 The minimum intermittent ventilation rate is calculated as follows:

6 $Q_r = 30$ CFM (from Table 403.3 or 403.8.1)

7 Cycle time = 4 hours

8 _____ (where: cycle time is equal to the on-time plus the off-time)

9 Run-time percentage = $1/4 = 25\%$ (this is greater than 50%)

10 _____ (where: f is equal to the on-time divided by the cycle time)

11
12 Ventilation rate factor $F_v = 4$ (per footnote a of Table 403.8.5.1)

13 $Q_f = Q_r \times F_v = 30$ CFM $\times 4 = 120$ CFM

14 See ASHRAE 62.2 Appendix B for further explanation and examples.

15
16 **403.8.5.2 Whole house supply system general requirements.** Whole house ventilation
17 systems integrated with a forced-air system, systems using supply fans and systems using a
18 heat or energy recovery ventilation system shall comply with the following.

- 19 1. Outdoor air louvers shall be adequately sized for the required airflow and shall
20 comply with Section 401.5. Outdoor air intake locations shall comply with
21 mechanical air intake requirements of Section 403.8.3.
22 2. Outdoor air ducts for ventilation integrated with forced air systems and exhaust
23 ducts for heat or energy recovery systems shall be provided with a means for
24 balancing the system to the required airflow via balance dampers or other devices.

1 3. Outdoor air ducts, for ventilation integrated with forced air systems shall be
2 provided with motorized dampers.

3 **Exceptions:**

4 1. Outdoor air ducts at heat or energy recovery ventilation systems are not
5 required to have motorized dampers.

6 2. Outdoor air ducts at continuous ventilation systems are not required to have
7 motorized dampers.

8 4. Outdoor air ducts in the conditioned space shall be insulated to a minimum of R-4.
9 In heat or energy recovery ventilation systems, ducts upstream of the heat
10 exchanger shall also be insulated to at least R-4.

11 Note: See *Seattle Energy Code* for additional insulation requirements.

12 5. All outdoor air ducts shall be designed and installed to deliver at least the outdoor
13 airflow required by Section 403.8.5.1. The airflows required refer to the delivered
14 airflow of the system as installed and tested using a flow hood, flow grid, or other
15 airflow measurement device.

16 **Exception:** The outdoor air duct for supply fan systems and heat or energy
17 recovery systems may be prescriptively sized per Table 403.8.5.2 for dedicated
18 outdoor air ducts upstream of the supply fan. Supply fans shall have the
19 capacity to provide the amount of outdoor air required by Section 403.8.5.1 at
20 0.40 in. w.g. in accordance with HVI 916, Home Ventilation Institute Airflow
21 Test Procedure. When prescriptively sized the system shall be tested and
22 balanced using a flow hood, flow-grid, or other airflow measurement device.

23 6. Whole house ventilation controls for intermittent operation shall allow concurrent
24 operation of the forced-air fan and the associated outdoor air motorized damper.

1 1.3. Inlets shall be screened or otherwise protected from entry by insects, leaves, or
2 other material.

3 1.4. Inlets shall provide not less than 4 square inches of net free area of opening for
4 each 10 cfm of outdoor air required in Table 403.3 or Table 403.8.1.

5 1.5. Any inlet or combination of inlets which provide 10 cfm at 10 pascals as in
6 accordance with HVI 916 Home Ventilation Institute Air Flow Test Procedure,
7 and HVI 920 Home Ventilation Institute Product Performance Certification
8 Procedure are deemed equivalent to 4 square inches of net free area.

9 1.6. Each occupiable space shall have a minimum of one air inlet that has a
10 minimum of 4 square inches of net free area.

11 2. In high-rise buildings, outdoor air may be drawn in through operable windows,
12 doors, louvers or other operable openings to the outdoors. Exterior spaces shall have
13 a minimum openable area of 4 percent of the total floor area being ventilated. Doors
14 exiting to a corridor, court or public way shall not be used to provide outdoor air.
15 The operable openings shall comply with the following:

16 2.1. Openings shall be controllable, securable, and shall be designed to not
17 compromise the thermal properties of the building envelope.

18 2.2. Openings shall be readily accessible to occupants, including compliance with
19 Section 1109.13 of the International Building Code for designated Accessible
20 units, Type A units and Type B units.

21 3. For interior adjoining spaces without outdoor air openings, one of the following two
22 options shall be used to ventilate the interior adjoining space:

23 3.1. Provide a whole house transfer fan at the interior adjoining space sized to
24 provide a minimum of the ventilation rate required per Section 403.8.5.1. The
25 transfer fan shall circulate air between the interior room or space and the

1 adjacent habitable space. The transfer fan may operate continuously or
2 intermittently using controls per Section 403.8.2.

3 3.2. Provide a permanent opening to the interior adjoining space. Opening shall be
4 unobstructed and shall have an area of not less than 8 percent of the floor area
5 of the interior adjoining space, but not less than 25 square feet.

6 **403.8.6.2 Outside air intake locations.** All outside air intake opening types described in
7 Section 403.8.6.1 shall be classified as operable openings and shall not be classified as
8 mechanical air intakes. The intake locations shall comply with Section 403.8.3.

9 **403.8.6.3 Whole house exhaust system.** Whole house exhaust system shall be designed
10 and installed to meet all of the applicable criteria below:

11 1. Whole house ventilation exhaust shall be discharged outdoors.

12 2. Exhaust outlets shall comply with Section 501.3.2.

13 3. Exhaust ducts in systems which are designed to operate intermittently shall be
14 equipped with backdraft dampers.

15 4. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4.5.
16 Terminal outlet elements shall have at least the equivalent net free area of the
17 ductwork.

18 5. Terminal outlet elements shall be screened or otherwise protected as required by
19 Section 501.3.2.

20 6. One of the required local exhaust fans for the laundry room or bathroom may be
21 designated as the whole house exhaust fan.

22 7. Exhaust fans in separate dwelling units or sleeping units shall not share common
23 exhaust ducts unless the system is engineered for this operation.

24 8. Where permitted by Chapter 5, whole house exhaust ducts may be combined with
25 other local exhaust ducts. If more than one of the exhaust fans in a dwelling unit or

1 sleeping unit shares a common exhaust duct then each exhaust fan shall be equipped
2 with a backdraft damper to prevent the recirculation of exhaust air from one room to
3 another room via the exhaust ducting system.

4 **403.8.6.4 Whole house exhaust and transfer fans.** Exhaust fan construction and sizing
5 shall meet the following criteria.

- 6 1. Exhaust and transfer fans shall be tested and rated in accordance with the airflow and
7 sound rating procedures of the HVI 915 Loudness Testing and Rating Procedure;
8 HVI 916 Airflow Test Procedure, and HVI 920 Product Performance Certification
9 Procedure.
- 10 2. Installation of system or equipment shall be carried out in accordance with
11 manufacturers' design requirements and installation instructions.
- 12 3. Fan airflow rating and duct system shall be designed and installed to deliver at least
13 the outdoor airflow required by Table 403.3 or Table 403.8.1. The airflows required
14 refer to the delivered airflow of the system as installed and tested using a flow hood,
15 flow grid, or other airflow measurement device.

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

18 **403.8.6.5 Fan noise.** Whole house exhaust and transfer fans located 4 feet or less from
19 the interior grille shall have a sone rating of 1.0 or less measured at 0.10 inches water
20 gauge. Manufacturer's noise ratings shall be determined in accordance with HVI 915
21 Loudness Testing and Rating Procedure. Remotely mounted fans shall be acoustically
22 isolated from the structural elements of the building and from attached ductwork using
23 insulated flexible duct or other approved material.

1 **403.8.7 Whole house ventilation integrated with forced-air systems.** This section
2 establishes minimum requirements for mechanical whole house ventilation systems using
3 forced-air system fans.

4 **403.8.7.1 Outdoor air.** Forced-air system fan ventilation systems shall provide outdoor
5 air through one of the following methods:

- 6 1. A dedicated outdoor air louver and outdoor air duct for each dwelling unit or
7 sleeping unit shall supply outdoor air to the return side of the forced-air system fan;
8 or
9 2. A central outdoor air delivery system that supplies multiple dwelling units or
10 sleeping units shall supply outdoor air to the return side of the forced air system fan.

11 **403.8.7.2 Whole house forced-air system.** Where outdoor air is provided to each
12 habitable dwelling unit or sleeping unit by a forced air system, the outdoor air duct shall
13 be connected to the return air stream at a point within 4 feet upstream of the forced-air
14 unit. It shall not be connected directly to the forced-air unit cabinet in order to prevent
15 thermal shock to the heat exchanger. At a minimum, filtration of the outdoor air shall be
16 provided at the forced-air unit. The filter shall be accessible for regular maintenance and
17 replacement. The filter shall have a Minimum Efficiency Rating Value (MERV) of at
18 least 6.

19 **403.8.8 Whole house ventilation with supply fan systems.** This section establishes
20 minimum requirements for mechanical whole house ventilation systems using supply fan
21 systems.

22 **403.8.8.1 Outdoor air.** Supply fan ventilation systems shall provide outdoor air through
23 one of the following methods:

- 24 1. A dedicated outdoor air louver and outdoor air duct for each dwelling unit or
25 sleeping unit shall supply outdoor air to a supply fan; or

1 2. A central outdoor air supply fan system shall distribute unconditioned or conditioned
2 air to multiple dwelling units or sleeping units.

3 **403.8.8.2 Whole house supply system.** Where outdoor air is provided to each habitable
4 dwelling unit or sleeping unit by supply fan systems the outdoor air shall be filtered.

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

8 **403.8.9 Whole house ventilation with heat recovery or energy recovery ventilation**
9 **systems.** This section establishes minimum requirements for mechanical whole house
10 ventilation systems using heat recovery or energy recovery ventilation systems.

11 **403.8.9.1 Outdoor air.** Heat recovery or energy recovery ventilation systems shall
12 provide outdoor air through one of the following methods:

13 1. A dedicated outdoor air louver and outdoor air duct for each dwelling unit or
14 sleeping unit shall supply outdoor air to the heat recovery or energy recovery
15 ventilator; or

16 2. A central outdoor air heat recovery or energy recovery unit shall distribute
17 conditioned air to multiple dwelling units or sleeping units.

18 **403.8.9.2 Whole house heat recovery ventilator system.** Where outdoor air is provided
19 to each habitable dwelling unit or sleeping unit by heat recovery or energy recovery
20 ventilator the outdoor air shall be filtered. The filter shall be located on the upstream side
21 of the heat exchanger in both the intake and exhaust airstreams with a Minimum
22 Efficiency Rating Value (MERV) of at least 6. The system filter may be located at the
23 intake device or in line with the fan. The filter shall be accessible for regular maintenance
24 and replacement.

1 **403.8.10 Local exhaust ventilation and whole house ventilation alternate performance**
2 **or design requirements.** In lieu of complying with Sections 403.8.4 or 403.8.5 compliance
3 with the section shall be demonstrated through engineering calculations by an engineer
4 licensed to practice in the state of Washington or by performance testing. Documentation of
5 calculations or performance test results shall be submitted to and approved by the code
6 official. Performance testing shall be conducted in accordance with approved test methods.

7 **403.8.11 Alternate systems.** When approved by the code official, systems designed in
8 accordance with ASHRAE Standard 62.2 shall be permitted.

9 **403.9 Corridors.** Air movement in corridors shall comply with Section 601 of this code and the
10 International Building Code.

SECTION 404

VENTILATION OF ENCLOSED MOTOR VEHICLE OCCUPANCIES

((ENCLOSED PARKING GARAGES))

14 **404.1 Enclosed parking garage((s)), loading dock, and motor vehicle repair garage exhaust**
15 **ventilation systems.** Mechanical ventilation systems for enclosed parking garages, loading
16 docks, and motor vehicle repair garages shall ((be permitted to)) operate intermittently in
17 accordance with Item 1, Item 2 or both.

- 18 1. The system shall be arranged to operate automatically upon detection of vehicle operation
19 or the presence of occupants by approved automatic detection devices.
- 20 2. The system shall be arranged to operate automatically by means of carbon monoxide
21 detectors applied in conjunction with nitrogen dioxide detectors that modulate the
22 ventilation system by staging fans or varying fan speed to maintain gas concentrations
23 below specified maximum levels. Such detectors shall be designed for the specific use and
24 installed in accordance with their manufacturers' recommendations. Mechanical

1 ventilation systems and gas sensor systems controls shall comply with Section 1412.9 of
2 the *International Energy Conservation Code*.

3 **404.1.1 Ventilation makeup air.** Ventilation makeup air shall be mechanically supplied to
4 levels of enclosed loading docks and parking garages more than 3 stories above or below the
5 nearest garage or loading dock entrance or exit.

6 **404.1.2 Exhaust termination point.** Exhaust termination points shall comply with Section
7 501.3.1.1.

8 **404.2 Minimum ventilation.**

9 **404.2.1 Enclosed parking garages and motor vehicle repair garages.** In enclosed parking
10 garages and motor vehicle repair garages, ((A))automatic operation of the system shall not
11 reduce the ventilation airflow rate below 0.05 cfm per square foot ($0.00025 \text{ m}^3/\text{s} \cdot \text{m}^2$) of the
12 floor area and the ventilation system shall be capable of producing a ventilation airflow rate
13 of 0.75 cfm per square foot ($0.0038 \text{ m}^3/\text{s} \cdot \text{m}^2$) of floor area.

14 **Exception:** Ventilation systems located in areas with automated parking systems where the
15 engines of the motor vehicles are not operating shall provide a continuous ventilation
16 airflow rate of 50 cfm per parking stall. This exception does not apply to the vehicle drop
17 off area.

18 **404.2.2 Enclosed loading docks.** In enclosed loading docks automatic operation of the
19 system shall not reduce the ventilation airflow rate below 1.0 cfm per square foot (0.00507
20 $\text{m}^3/\text{s} \cdot \text{m}^2$) of the floor area and the ventilation systems shall be capable of producing a
21 ventilation airflow rate of 1.5 cfm per square foot ($0.0076 \text{ m}^3/\text{s} \cdot \text{m}^2$) of floor area.

22 **404.3 Occupied spaces accessory to public garages and motor vehicle repair garages.**

23 Connecting offices, waiting rooms, ticket booths, elevator lobbies and similar uses that are
24 accessory to a public garage or motor vehicle repair garage shall be maintained at a positive

1 pressure relative to the garage and shall be provided with ventilation in accordance with Section
2 403.3.

3 **404.4 Motor vehicle repair garages.** In buildings used for the repair of motor vehicles, each
4 repair stall or stand shall be equipped with an exhaust capture system that connects directly to the
5 repair engine exhaust source and prevents the escape of fumes. The exhaust system shall exhaust
6 to the outdoor atmosphere. See Section 502.15 for additional requirements. Ventilation shall be
7 provided for the motor vehicle repair garage in accordance with Section 404.

8 SECTION 405

9 SYSTEMS CONTROL

10 **405.1 General.** Mechanical ventilation systems shall be provided with manual or automatic
11 controls that will operate such systems whenever the spaces are occupied. Air-conditioning
12 systems that supply required *ventilation air* shall be provided with controls designed to
13 automatically maintain the required outdoor air supply rate during occupancy. Additional
14 mechanical system control requirements are contained in the *International Energy Code*.

15 SECTION 406

16 VENTILATION OF UNINHABITED SPACES

17 **406.1 General.** ~~((Uninhabited spaces, such as crawl))~~ Crawl spaces and attics(~~(s)~~) shall be
18 provided with *natural ventilation* openings as required by the *International Building Code* or
19 shall be provided with a mechanical exhaust and supply air system. The mechanical exhaust rate
20 shall be not less than 0.02 cfm per square foot ($0.00001 \text{ m}^3/\text{s} \cdot \text{m}^2$) of horizontal area and shall be
21 automatically controlled to operate when the relative humidity in the space served exceeds 60
22 percent.

23 Section 6. The following sections of Chapter 5 of the International Mechanical Code,
24 2012 Edition, are amended as follows:

25 CHAPTER 5

1 2. For other product-conveying outlets: 10 feet (3048 mm) from the property lines; 3 feet
2 (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into
3 buildings; 10 feet (3048 mm) above adjoining grade.

4 **Interpretation:** Item 2 includes central vacuum systems, dry cleaner, photo lab, school
5 chemical lab, nail salon source capture system exhaust and combustion engine exhaust.

6 [W] 3. For all *environmental air* exhaust other than enclosed parking garage and transformer
7 vault exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable
8 openings into buildings for all occupancies other than Group U, and 10 feet (3048 mm)
9 from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious.

10 **Exceptions:**

11 1. The separation between an air intake and exhaust outlet on a single listed package

12 HVAC unit.

13 2. Exhaust from environmental air systems other than garages may be discharged
14 into an open parking garage.

15 3. Except for Group I occupancies, where ventilation system design circumstances
16 require building HVAC air to be relieved, such as during economizer operation,
17 such air may be relieved into an open or enclosed parking garage within the same
18 building.

19 4. Exhaust outlets serving structures in flood hazard areas shall be installed at or above the
20 elevation required by Section 1612 of the *International Building Code* for utilities and
21 attendant equipment.

22 5. For enclosed parking garage, loading dock, and motor vehicle repair garage exhaust
23 outlets: Exhaust ventilation openings and duct terminations shall be located not less than
24 10 feet (3048 mm) from property lines, operable openings into buildings, and mechanical
25 air intakes; 10 feet (3048 mm) above adjoining finished walking surfaces other than

1 alleys. Exhaust outlets extending to the roof shall extend 3 feet (914 mm) above the roof
2 surface.

3 [W] 6. For elevator machinery rooms in enclosed or open parking garages: Exhaust outlets
4 may discharge air directly into the parking garage.

5 7. For transformer vault exhaust systems: Exhaust ventilation openings and duct terminations
6 shall be located not less than 10 feet (3048 mm) from fire escapes, required means of
7 egress at the exterior of the building, elements of the exit discharge, combustible exterior
8 wall coverings, unprotected openings, operable openings and property lines other than a
9 public way. Exhaust outlets shall be located on the exterior of the building. See Seattle
10 Building Code Section 426 for additional requirements.

11 ((5)) 8. For specific systems see the following sections:

12 ((5.1)) 8.1. Clothes dryer exhaust, Section 504.4.

13 ((5.2)) 8.2. Kitchen hoods and other kitchen exhaust *equipment*, Sections 506.3.13, 506.4
14 and 506.5.

15 ((5.3)) 8.3. Dust stock and refuse conveying systems, Section 511.2.

16 ((5.4)) 8.4. Subslab soil exhaust systems, Section 512.4.

17 ((5.5)) 8.5. Smoke control systems, Section 513.10.3.

18 ((5.6)) 8.6. Refrigerant discharge, Section 1105.7.

19 ((5.7)) 8.7. Machinery room discharge, Section 1105.6.1.

20 **501.3.1.1 Exhaust discharge.** *Exhaust air* shall not be directed onto walkways in such a manner
21 that the users of the walkway are subjected to the exhaust air stream.

22 **Note:** Seattle Land Use Code (Municipal Code Title 23) requires that the venting of odors,
23 vapors, smoke, cinders, dust, gas and fumes shall be at least 10 feet (3048 mm) above finished
24 sidewalk grade, and directed away as much as possible from residential uses within 50 feet
25 (15 240 mm) of the vent in some locations.

1 [F] **502.4.1 Hydrogen limit in rooms.** For flooded lead acid, flooded nickel cadmium and
2 VRLA batteries, the ventilation system shall be designed to limit the maximum concentration
3 of hydrogen to 1.0 percent of the total volume of the room.

4 [F] **502.4.2 Ventilation rate in rooms.** Continuous ventilation shall be provided at a rate of
5 not less than 1 cubic foot per minute per square foot (cfm/ft²) [0.00508 m³/(s • m²)] of floor
6 area of the room.

7 **502.4.3 Supervision.** Mechanical ventilation systems required by Section 502.4 shall be
8 supervised by an approved central, proprietary or remote station service or shall initiate an
9 audible and visual signal at a constantly attended on-site location.

10 ***

11 [F] **502.7 Application of flammable finishes.** Mechanical exhaust as required by this section
12 shall be provided for operations involving the application of flammable finishes. Spray finishing
13 operations conducted in Group A, E, I or R occupancies shall be located in a spray room
14 protected with an approved automatic sprinkler system installed in accordance with International
15 Building Code Section 903.3.1.1 and separated vertically and horizontally from other areas in
16 accordance with the International Building Code. In other occupancies, spray-finishing
17 operations shall be conducted in a spray room, spray booth or limited spraying area approved for
18 such use.

19 [F] **502.7.1 During construction.** Ventilation shall be provided for operations involving the
20 application of materials containing flammable solvents in the course of construction,
21 *alteration* or demolition of a structure.

22 [F] **502.7.2 Limited spraying spaces.** Positive mechanical ventilation which provides a
23 minimum of six complete air changes per hour shall be installed in limited spraying spaces.
24 Such system shall meet the requirements of the *International Fire Code* for handling
25 flammable vapors. Explosion venting is not required.

1 **Exception:** Negative mechanical ventilation, providing a minimum of six complete air
2 changes per hour, is allowed in lieu of positive mechanical ventilation if a fan rated for
3 Class I, Division 2 hazardous locations in accordance with the *Seattle Electrical Code* is
4 installed.

5 **[F] 502.7.3 Flammable vapor areas.** Mechanical ventilation of flammable vapor areas shall
6 be provided in accordance with Sections 502.7.3.1 through 502.7.3.6.

7 **[F] 502.7.3.1 Operation.** Mechanical ventilation shall be kept in operation at all times while
8 spraying operations are being conducted and for a sufficient time thereafter to allow vapors
9 from drying coated articles and finishing material residue to be exhausted. Spraying
10 *equipment* shall be interlocked with the ventilation of the flammable vapor area such that
11 spraying operations cannot be conducted unless the ventilation system is in operation.

12 **[F] 502.7.3.2 Recirculation.** Air exhausted from spraying operations shall not be
13 recirculated.

14 **Exceptions:**

15 1. Air exhausted from spraying operations shall be permitted to be recirculated as
16 *makeup air* for unmanned spray operations provided that:

17 1.1. The solid particulate has been removed.

18 1.2. The vapor concentration is less than 25 percent of the lower flammable limit
19 (LFL).

20 1.3. *Approved equipment* is used to monitor the vapor concentration.

21 1.4. An alarm is sounded and spray operations are automatically shut down if the
22 vapor concentration exceeds 25 percent of the LFL.

23 1.5. In the event of shutdown of the vapor concentration monitor, 100 percent of the
24 air volume specified in Section 510 is automatically exhausted.

1 2. Air exhausted from spraying operations is allowed to be recirculated as makeup air
2 to manned spraying operations where all of the conditions provided in Exception 1
3 are included in the installation and documents have been prepared to show that the
4 installation does not pose a life safety hazard to personnel inside the spray booth,
5 spraying space or spray room.

6 **[F] 502.7.3.3 Air velocity.** Ventilation systems shall be designed, installed and
7 maintained such that the average air velocity over the open face of the booth, or booth
8 cross section in the direction of airflow during spraying operations, is not less than 100
9 feet per minute (0.51 m/s).

10 **[F] 502.7.3.4 Ventilation obstruction.** Articles being sprayed shall be positioned in a
11 manner that does not obstruct collection of overspray.

12 **[F] 502.7.3.5 Independent ducts.** Each spray booth and spray room shall have an
13 independent exhaust duct system discharging to the outdoors.

14 **Exceptions:**

- 15 1. Multiple spray booths having a combined frontal area of 18 square feet (1.67
16 m²) or less are allowed to have a common exhaust where identical spray-
17 finishing material is used in each booth. If more than one fan serves one booth,
18 such fans shall be interconnected so that all fans operate simultaneously.
- 19 2. Where treatment of exhaust is necessary for air pollution control or energy
20 conservation, ducts shall be allowed to be manifolded if all of the following
21 conditions are met:
- 22 2.1. The sprayed materials used are compatible and will not react or cause
23 ignition of the residue in the ducts.
- 24 2.2. Nitrocellulose-based finishing material shall not be used.

1 2.3. A filtering system shall be provided to reduce the amount of overspray
2 carried into the duct manifold.

3 2.4. Automatic sprinkler protection shall be provided at the junction of each
4 booth exhaust with the manifold, in addition to the protection required by
5 this chapter.

6 **[F] 502.7.3.6 Fan motors and belts.** Electric motors driving exhaust fans shall not be
7 placed inside booths or ducts. Fan rotating elements shall be nonferrous or nonsparking
8 or the casing shall consist of, or be lined with, such material. Belts shall not enter the duct
9 or booth unless the belt and pulley within the duct are tightly enclosed.

10 **[F] 502.7.4 Dipping operations.** Flammable vapor areas of dip tank operations shall be
11 provided with mechanical ventilation adequate to prevent the dangerous accumulation of
12 vapors. Required ventilation systems shall be so arranged that the failure of any ventilating
13 fan will automatically stop the dipping conveyor system.

14 **[F] 502.7.5 Electrostatic apparatus.** The flammable vapor area in spray-finishing
15 operations involving electrostatic apparatus and devices shall be ventilated in accordance
16 with Section 502.7.3.

17 **[F] 502.7.6 Powder coating.** Exhaust ventilation for powder-coating operations shall be
18 sufficient to maintain the atmosphere below one-half of the minimum explosive
19 concentration for the material being applied. Nondeposited, air-suspended powders shall be
20 removed through exhaust ducts to the powder recovery system.

21 **[F] 502.7.7 Floor resurfacing operations.** To prevent the accumulation of flammable vapors
22 during floor resurfacing operations, mechanical ventilation at a minimum rate of 1 cfm/ft²
23 [0.00508 m³/(s • m²)] of area being finished shall be provided. Such exhaust shall be by
24 *approved* temporary or portable means. Vapors shall be exhausted to the exterior of the
25 building.

1 ***

2 **502.14 Motor vehicle operation.** In areas where motor vehicles operate, mechanical ventilation
3 shall be provided in accordance with Section 403. Additionally, areas in which stationary motor
4 vehicles are operated shall be provided with a *source capture system* that connects directly to the
5 motor vehicle exhaust systems. When the source capture system extends more than 10 feet from
6 the tailpipe connection to the outdoors, the system shall exhaust at a rate of 600 cfm for heavy-
7 duty diesel vehicles and at a rate of 300 cfm for all other vehicles.

8 **Exceptions:**

- 9 1. This section shall not apply where the motor vehicles being operated or repaired are
10 electrically powered.
11 2. This section shall not apply to one- and two-family dwellings.
12 3. This section shall not apply to motor vehicle service areas where engines are operated
13 inside the building only for the duration necessary to move the motor vehicles in and
14 out of the building.

15 **[F] 502.15 Repair garages and other spaces.** Where Class I liquids or LP-gas are stored or used
16 within a building having a basement or pit wherein flammable vapors could accumulate, the
17 basement or pit shall be provided with ventilation designed to prevent the accumulation of
18 flammable vapors therein.

19 ***

20 **502.18 Specific rooms.** Specific rooms, including bathrooms, locker rooms, smoking lounges
21 and toilet rooms, shall be exhausted in accordance with the ventilation requirements of Chapter
22 4.

23 **Interpretation:** RCW 70.160.030 states: "No person may smoke in a public place or in any
24 place of employment." A public place is defined in RCW 70.160.020 in part as: "...A public
25 place does not include a private residence unless the private residence is used to provide
26

1 licensed child care, foster care, adult care, or other similar social service care on the premises.
2 This chapter is not intended to restrict smoking in private facilities which are occasionally
3 open to the public except upon the occasions when the facility is open to the public.”

4 ***

5 **SECTION 504**

6 **CLOTHES DRYER EXHAUST**

7 ***

8 **504.2 Exhaust penetrations.** Where a clothes dryer exhaust duct penetrates a wall or ceiling
9 membrane, the annular space shall be sealed with noncombustible material, *approved* fire
10 caulking or a noncombustible dryer exhaust duct wall receptacle. Ducts that exhaust clothes
11 dryers shall not penetrate or be located within any fireblocking, draftstopping or any wall,
12 floor/ceiling or other assembly required by the *International Building Code* to be fire-resistance
13 rated, unless such duct is constructed of galvanized steel or aluminum of the thickness specified
14 in Section 603.4 and the fire-resistance rating is maintained in accordance with the *International*
15 *Building Code*. Fire dampers, combination fire/smoke dampers and any similar devices that will
16 obstruct the exhaust flow shall be prohibited in clothes dryer exhaust ducts.

17 **504.2.1 Protection required.** Protective shield plates shall be placed where nails or screws
18 from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates
19 shall be placed on the finished face of all framing members where there is less than 1-1/4
20 inches (32 mm) between the duct and the finished face of the framing member. Protective
21 shield plates shall be constructed of steel, have a thickness of 0.062 inch (1.6 mm) and
22 extend a minimum of 2 inches (51 mm) above sole plates and below top plates.

23 **504.3 Cleanout.** Each vertical riser shall be provided with a means for cleanout.

24 **504.4 Exhaust installation.** Dryer exhaust ducts for clothes dryers shall terminate on the outside
25 of the building and shall be equipped with a backdraft damper. Screens shall not be installed at
26

1 the duct termination. Ducts shall not be connected or installed with sheet metal screws or other
2 fasteners that will obstruct the exhaust flow. Clothes dryer exhaust ducts shall not be connected
3 to a vent connector, vent or *chimney*. (~~Clothes dryer exhaust ducts shall not extend into or~~
4 ~~through ducts or plenums.~~)

5 ***

6 **504.6 Domestic clothes dryer ducts.** Exhaust ducts for domestic clothes dryers shall conform to
7 the requirements of Sections 504.6.1 through (~~504.6.7~~) 504.6.6 and Section 504.2.1.

8 **504.6.1 Material and size.** Exhaust ducts shall have a smooth interior finish and shall be
9 constructed of metal a minimum 0.016 inch (0.4 mm) thick. The exhaust duct size shall be 4
10 inches (102 mm) nominal in diameter.

11 **504.6.2 Duct installation.** Exhaust ducts shall be supported at 4-foot (1219 mm) intervals
12 and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting
13 in the direction of airflow. Ducts shall not be joined with screws or similar fasteners that
14 protrude into the inside of the duct.

15 **504.6.3 Transition ducts.** Transition ducts used to connect the dryer to the exhaust duct
16 system shall be a single length that is *listed* and *labeled* in accordance with UL 2158A.
17 Transition ducts shall be a maximum of 8 feet (2438 mm) in length and shall not be
18 concealed within construction.

19 **504.6.4 Duct length.** The maximum allowable exhaust duct length shall be determined by
20 one of the methods specified in Section 504.6.4.1 or 504.6.4.2.

21 **504.6.4.1 Specified length.** The maximum length of the exhaust duct shall be 35 feet (10
22 668 mm) from the connection to the transition duct from the dryer to the outlet terminal.
23 Where fittings are used, the maximum length of the exhaust duct shall be reduced in
24 accordance with Table 504.6.4.1.

[W] Exception: The maximum length of the duct may be increased in an engineered exhaust system when a listed and labeled dryer exhaust booster fan is installed in accordance with the manufacturer's installation instructions.

504.6.4.2 Manufacturer's instructions. The maximum length of the exhaust duct shall be determined by the dryer manufacturer's installation instructions. The code official shall be provided with a copy of the installation instructions for the make and model of the dryer. Where the exhaust duct is to be concealed, the installation instructions shall be provided to the code official prior to the concealment inspection. In the absence of fitting equivalent length calculations from the clothes dryer manufacturer, Table 504.6.4.1 shall be used.

TABLE 504.6.4.1
DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH

DRYER EXHAUST DUCT FITTING TYPE	EQUIVALENT LENGTH
4" radius mitered 45-degree elbow	2 feet 6 inches
4" radius mitered 90-degree elbow	5 feet
6" radius smooth 45-degree elbow	1 foot
6" radius smooth 90-degree elbow	1 foot 9 inches
8" radius smooth 45-degree elbow	1 foot
8" radius smooth 90-degree elbow	1 foot 7 inches
10" radius smooth 45-degree elbow	9 inches
10" radius smooth 90-degree elbow	1 foot 6 inches

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.0175 rad.

504.6.5 Length identification. Where the exhaust duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet (1829 mm) of the exhaust duct connection.

504.6.6 Exhaust duct required. Where space for a clothes dryer is provided, an exhaust duct system shall be installed. Where the clothes dryer is not installed at the time of occupancy, the exhaust duct shall be capped at the location of the future dryer.

1 **Exception:** Where a *listed* condensing clothes dryer is installed prior to occupancy of
2 structure.

3 ~~((504.6.7 Protection required. Protective shield plates shall be placed where nails or screws~~
4 ~~from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates~~
5 ~~shall be placed on the finished face of all framing members where there is less than 1-1/4~~
6 ~~inches (32 mm) between the duct and the finished face of the framing member. Protective~~
7 ~~shield plates shall be constructed of steel, have a thickness of 0.062 inch (1.6 mm) and~~
8 ~~extend a minimum of 2 inches (51 mm) above sole plates and below top plates.))~~

9 **504.7 Commercial clothes dryers.** The installation of dryer exhaust ducts serving commercial
10 clothes dryers shall comply with the *appliance* manufacturer's installation instructions. Exhaust
11 fan motors installed in exhaust systems shall be located outside of the airstream. In multiple
12 installations, the fan shall operate continuously or be interlocked to operate when any individual
13 unit is operating. Ducts shall have a minimum *clearance* of 6 inches (152 mm) to combustible
14 materials. Clothes dryer transition ducts used to connect the *appliance* to the exhaust duct system
15 shall be limited to single lengths not to exceed 8 feet (2438 mm) in length and shall be *listed* and
16 *labeled* for the application. Transition ducts shall not be concealed within construction.

17 [W] 504.7.1 Protection required. Protective shield plates shall be provided in accordance
18 with Section 504.2.1.

19 **504.8 Common exhaust systems for clothes dryers located in multistory structures.** Where a
20 common multistory duct system is designed and installed to convey exhaust from multiple
21 clothes dryers, the construction of the system shall be in accordance with all of the following:

- 22 1. The shaft in which the duct is installed shall be constructed and fire-resistance rated as
23 required by the *International Building Code*.
- 24 2. Dampers shall be prohibited in the exhaust duct. Penetrations of the shaft and ductwork
25 shall be protected in accordance with Section 607.5.5, Exception 2.

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

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

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

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

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

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

12 [W] 9. Makeup air shall be provided for the exhaust system to maintain the minimum flow
13 for the exhaust fan when the dryers are not operating. Additionally, makeup air shall be
14 provided when required by Section 504.5.

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

18 11. Screens shall not be installed at the termination.

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

21 SECTION 505

22 DOMESTIC KITCHEN EXHAUST EQUIPMENT

23 [W] 505.1 Domestic systems. Where domestic range hoods and domestic appliances equipped
24 with downdraft exhaust are located within dwelling units, such hoods and appliances shall
25 discharge to the outdoors through sheet metal ducts constructed of galvanized steel, stainless
26

1 steel, aluminum or copper. Such ducts shall have smooth inner walls, shall be air tight, shall be
2 equipped with a backdraft damper, and shall be independent of all other exhaust systems.

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

5 **Exceptions:**

- 6 1. Where installed in accordance with the manufacturer's installation instructions and
7 where mechanical (~~or natural ventilation~~) is otherwise provided in accordance with
8 Chapter 4, *listed* and *labeled* ductless range hoods shall not be required to discharge to
9 the outdoors.

10 **Interpretation:** Chapter 4 requires separate local exhaust systems in kitchens, including
11 where ductless range hoods (also known as recirculating hoods) are used. Ductless range
12 hoods are permitted in dwelling units where exhaust systems in the kitchen meet the
13 requirements for local exhaust. In no case is natural ventilation, such as an operable
14 window, allowed to substitute for the required kitchen local exhaust system.

- 15 2. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust
16 systems shall be permitted to be constructed of Schedule 40 PVC pipe and fittings
17 provided that the installation complies with all of the following:
18 2.1. The duct shall be installed under a concrete slab poured on grade.
19 2.2. The underfloor trench in which the duct is installed shall be completely backfilled
20 with sand or gravel.
21 2.3. The PVC duct shall extend not more than 1 inch (25 mm) above the indoor
22 concrete floor surface.
23 2.4. The PVC duct shall extend not more than 1 inch (25 mm) above grade outside of
24 the building.
25 2.5. The PVC ducts shall be solvent cemented.

1 ***

2 **SECTION 506**

3 **COMMERCIAL KITCHEN HOOD VENTILATION SYSTEM DUCTS AND EXHAUST**
4 **EQUIPMENT**

5 ***

6 **506.3 Ducts serving Type I hoods.** Type I exhaust ducts shall be independent of all other
7 exhaust systems except as provided in Section 506.3.5. Commercial kitchen duct systems serving
8 Type I hoods shall be designed, constructed and installed in accordance with Sections 506.3.1
9 through 506.3.13.3.

10 **506.3.1 Duct materials.** Ducts serving Type I hoods shall be constructed of materials in
11 accordance with Sections 506.3.1.1 and 506.3.1.2.

12 **506.3.1.1 Grease duct materials.** Grease ducts serving Type I hoods shall be constructed
13 of steel having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 gage) or
14 stainless steel not less than 0.0450 inch (1.14 mm) (No. 18 gage) in thickness.

15 **Exception:** Factory-built commercial kitchen grease ducts *listed* and *labeled* in accordance
16 with UL 1978 and installed in accordance with Section 304.1.

17 **506.3.1.2 Makeup air ducts.** Makeup air ducts connecting to or within 18 inches (457
18 mm) of a Type I hood shall be constructed and installed in accordance with Sections
19 603.1, 603.3, 603.4, 603.9, 603.10 and 603.12. Duct insulation installed within 18 inches
20 (457 mm) of a Type I hood shall be noncombustible or shall be *listed* for the application.

21 **506.3.2 Joints, seams and penetrations of grease ducts.** Joints, seams and penetrations of
22 grease ducts shall be made with a continuous liquid-tight weld or braze made on the external
23 surface of the duct system.

1 **Exceptions:**

- 2 1. Penetrations shall not be required to be welded or brazed where sealed by devices that are
3 *listed* for the application.
- 4 2. Internal welding or brazing shall not be prohibited provided that the joint is formed or
5 ground smooth and is provided with ready access for inspection.
- 6 3. Factory-built commercial kitchen grease ducts *listed* and *labeled* in accordance with UL
7 1978 and installed in accordance with Section 304.1.

8 **506.3.2.1 Duct joint types.** Duct joints shall be butt joints, welded flange joints with a
9 maximum flange depth of 1/2 inch (12.7 mm) or overlapping duct joints of either the
10 telescoping or bell type. Overlapping joints shall be installed to prevent ledges and
11 obstructions from collecting grease or interfering with gravity drainage to the intended
12 collection point. The difference between the inside cross-sectional dimensions of
13 overlapping sections of duct shall not exceed 1/4 inch (6 mm). The length of overlap for
14 overlapping duct joints shall not exceed 2 inches (51 mm).

15 **506.3.2.2 Duct-to-hood joints.** Duct-to-hood joints shall be made with continuous
16 internal or external liquid-tight welded or brazed joints. Such joints shall be smooth,
17 accessible for inspection, and without grease traps.

18 **Exceptions:** This section shall not apply to:

- 19 1. A vertical duct-to-hood collar connection made in the top plane of the hood in
20 accordance with all of the following:
- 21 1.1. The hood duct opening shall have a 1-inch-deep (25 mm), full perimeter, welded
22 flange turned down into the hood interior at an angle of 90 degrees (1.57 rad) from
23 the plane of the opening.
- 24
25
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1 1.2. The duct shall have a 1-inch-deep (25 mm) flange made by a 1-inch by 1-inch (25
2 mm by 25 mm) angle iron welded to the full perimeter of the duct not less than 1 inch
3 (25 mm) above the bottom end of the duct.

4 1.3. A gasket rated for use at not less than 1,500°F (815°C) is installed between the duct
5 flange and the top of the hood.

6 1.4. The duct-to-hood joint shall be secured by stud bolts not less than 1/4 inch (6.4 mm)
7 in diameter welded to the hood with a spacing not greater than 4 inches (102 mm) on
8 center for the full perimeter of the opening. All bolts and nuts are to be secured with
9 lockwashers.

10 2. *Listed and labeled* duct-to-hood collar connections installed in accordance with Section
11 304.1.

12 **506.3.2.3 Duct-to-exhaust fan connections.** Duct-to-exhaust fan connections shall be
13 flanged and gasketed at the base of the fan for vertical discharge fans; shall be flanged,
14 gasketed and bolted to the inlet of the fan for side-inlet utility fans; and shall be flanged,
15 gasketed and bolted to the inlet and outlet of the fan for in-line fans. Gasket and sealing
16 materials shall be rated for continuous duty at a temperature of not less than 1500°F
17 (816°C).

18 **506.3.2.4 Vibration isolation.** A vibration isolation connector for connecting a duct to a
19 fan shall consist of noncombustible packing in a metal sleeve joint of *approved* design or
20 shall be a coated-fabric flexible duct connector (~~*(listed and labeled for the application)*~~)
21 rated for continuous duty at temperature of not less than 1500° F (816° C). Vibration
22 isolation connectors shall be installed only at the connection of a duct to a fan inlet or
23 outlet.

24 **506.3.2.5 Grease duct test.** Prior to the use or concealment of any portion of a grease
25 duct system, a leakage test shall be performed. Ducts shall be considered to be concealed
26

1 where installed in shafts or covered by coatings or wraps that prevent the ductwork from
2 being visually inspected on all sides. The permit holder shall be responsible to provide
3 the necessary *equipment* and perform the grease duct leakage test. A light test shall be
4 performed to determine that all welded and brazed joints are liquid tight. A light test shall
5 be performed by passing a lamp having a power rating of not less than 100 watts through
6 the entire section of ductwork to be tested. The lamp shall be open so as to emit light
7 equally in all directions perpendicular to the duct walls. A test shall be performed for the
8 entire duct system, including the hood-to-duct connection. The duct work shall be
9 permitted to be tested in sections, provided that every joint is tested. For *listed* factory-
10 built grease ducts, this test shall be limited to duct joints assembled in the field and shall
11 exclude factory welds.

12 **506.3.3 Grease duct supports.** Grease duct bracing and supports shall be of noncombustible
13 material securely attached to the structure and designed to carry gravity and seismic loads
14 within the stress limitations of the *International Building Code*. Bolts, screws, rivets and
15 other mechanical fasteners shall not penetrate duct walls.

16 **506.3.4 Air velocity.** Grease duct systems serving a Type I hood shall be designed and
17 installed to provide an air velocity within the duct system of not less than 500 feet per minute
18 (2.5 m/s).

19 **Exception:** The velocity limitations shall not apply within duct transitions utilized to connect
20 ducts to differently sized or shaped openings in hoods and fans, provided that such transitions
21 do not exceed 3 feet (914 mm) in length and are designed to prevent the trapping of grease.

22 **506.3.5 Separation of grease duct system.** A separate grease duct system shall be provided
23 for each Type I hood. (~~A separate grease duct system is not required~~) Multiple Type I
24 hoods are permitted to be combined where all of the following conditions are met:

- 25 1. All interconnected hoods are located within the same story.
- 26
27
28

- 1 2. All interconnected hoods are located within the same room or in adjoining rooms.
- 2 3. Interconnecting ducts do not penetrate assemblies required to be fire-resistance rated.
- 3 4. The grease duct system does not serve solid-fuel-fired appliances.

4 **506.3.6 Grease duct clearances.** Where enclosures are not required, grease duct systems and
5 exhaust *equipment* serving a Type I hood shall have a *clearance* to combustible construction
6 of not less than 18 inches (457 mm), and shall have a *clearance* to noncombustible
7 construction and gypsum wallboard attached to noncombustible structures of not less than 3
8 inches (76 mm).

9 **Exceptions:**

- 10 1. Factory-built commercial kitchen grease ducts *listed* and *labeled* in accordance with UL
11 1978.
- 12 2. *Listed* and *labeled* exhaust *equipment* installed in accordance with Section 304.1.
- 13 3. Where commercial kitchen grease ducts are continuously covered on all sides with a *listed*
14 and *labeled* field-applied grease duct enclosure material, system, product or method of
15 construction specifically evaluated for such purpose in accordance with ASTM E 2336,
16 the required *clearance* shall be in accordance with the listing of such material, system,
17 product or method.

18 **506.3.7 Prevention of grease accumulation in grease ducts.** Duct systems serving a Type I
19 hood shall be constructed and installed so that grease cannot collect in any portion thereof,
20 and the system shall slope not less than one-fourth unit vertical in 12 units horizontal (2-
21 percent slope) toward the hood or toward a grease reservoir designed and installed in
22 accordance with Section 506.3.7.1. Where horizontal ducts exceed 75 feet (22 860 mm) in
23 length, the slope shall be not less than one unit vertical in 12 units horizontal (8.3 percent
24 slope).

25 **506.3.7.1 Grease reservoirs.** Grease reservoirs shall:

- 1 1. Be constructed as required for the grease duct they serve.
- 2 2. Be located on the bottom of the horizontal duct or the bottommost section of the duct
- 3 riser.
- 4 3. Have a length and width of not less than 12 inches (305 mm). Where the grease duct is
- 5 less than 12 inches (305 mm) in a dimension, the reservoir shall be not more than 2 inches
- 6 (51 mm) smaller than the duct in that dimension.
- 7 4. Have a depth of not less than 1 inch (25.4 mm).
- 8 5. Have a bottom that is sloped to a point for drainage.
- 9 6. Be provided with a cleanout opening constructed in accordance with Section 506.3.8 and
- 10 installed to provide direct access to the reservoir. The cleanout opening shall be located on
- 11 a side or on top of the duct so as to permit cleaning of the reservoir.
- 12 7. Be installed in accordance with the manufacturer's instructions where manufactured
- 13 devices are utilized.

14 **506.3.8 Grease duct cleanouts and openings.** Grease duct cleanouts and openings shall
15 comply with all of the following:

- 16 1. Grease ducts shall not have openings except where required for the operation and
- 17 maintenance of the system.
- 18 2. Sections of grease ducts that are inaccessible from the hood or discharge openings shall be
- 19 provided with cleanout openings.
- 20 3. Cleanouts and openings shall be equipped with tight-fitting doors constructed of steel
- 21 having a thickness not less than that required for the duct.
- 22 4. Cleanout doors shall be installed liquid tight.
- 23 5. Door assemblies including any frames and gaskets shall be approved for the application and
- 24 shall not have fasteners that penetrate the duct.
- 25 6. Gasket and sealing materials shall be rated for not less than 1500°F (816°C).
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1 7. Listed door assemblies shall be installed in accordance with the manufacturer's
2 instructions.

3 **506.3.8.1 Personnel entry.** Where ductwork is large enough to allow entry of personnel,
4 not less than one *approved* or *listed* opening having dimensions not less than 22 inches
5 by 20 inches (559 mm by 508 mm) shall be provided in the horizontal sections, and in the
6 top of vertical risers. Where such entry is provided, the duct and its supports shall be
7 capable of supporting the additional load, and the cleanouts specified in Section 506.3.8
8 are not required.

9 **506.3.8.2 Cleanouts serving in-line fans.** A cleanout shall be provided for both the inlet
10 side and outlet side of an in-line fan except where a duct does not connect to the fan.
11 Such cleanouts shall be located within 3 feet (914 mm) of the fan duct connections.

12 **506.3.9 Grease duct cleanout location, spacing and installation.**

13 **506.3.9.1 Grease duct horizontal cleanouts.** Cleanouts serving horizontal sections of
14 grease ducts shall:

- 15 1. Be spaced not more than 20 feet (6096 mm) apart.
- 16 2. Be located not more than 10 feet (3048 mm) from changes in direction that are greater
17 than 45 degrees (.79 rad).
- 18 3. Be located on the bottom only where other locations are not available and shall be
19 provided with internal damming of the opening such that grease will flow past the
20 opening without pooling. Bottom cleanouts and openings shall be approved for the
21 application and installed liquid-tight.
- 22 4. Not be closer than 1 inch (25.4 mm) from the edges of the duct.
- 23 5. Have opening dimensions of not less than 12 inches by 12 inches (305 mm by 305
24 mm). Where such dimensions preclude installation, the opening shall be not less than
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1 12 inches (305 mm) on one side and shall be large enough to provide access for
2 cleaning and maintenance.

3 6. Shall be located at grease reservoirs.

4 **506.3.9.2 Grease duct vertical cleanouts.** Where ducts pass vertically through floors,
5 cleanouts shall be provided. A minimum of one cleanout shall be provided on each floor.
6 Cleanout openings shall be not less than 1-1/2 inches (38 mm) from all outside edges of
7 the duct or welded seams. The opening minimum dimensions shall be 12 inches (305
8 mm) on each side.

9 **506.3.10 Underground grease duct installation.** Underground grease duct installations
10 shall comply with all of the following:

- 11 1. Underground grease ducts shall be constructed of steel having a minimum thickness of
12 0.0575 inch (1.463 mm) (No. 16 gage) and shall be coated to provide protection from
13 corrosion or shall be constructed of stainless steel having a minimum thickness of 0.0450
14 inch (1.140 mm) (No. 18 gage).
- 15 2. The underground duct system shall be tested and approved in accordance with Section
16 506.3.2.5 prior to coating or placement in the ground.
- 17 3. The underground duct system shall be completely encased in concrete with a minimum
18 thickness of 4 inches (102 mm).
- 19 4. Ducts shall slope toward grease reservoirs.
- 20 5. A grease reservoir with a clean out to allow cleaning of the reservoir shall be provided at
21 the base of each vertical duct riser.
- 22 6. Cleanouts shall be provided with access to permit cleaning and inspection of the duct in
23 accordance with Section 506.3.
- 24 7. Cleanouts in horizontal ducts shall be installed on the topside of the duct.
- 25 8. Cleanout locations shall be legibly identified at the point of access from the interior space.

1 **[W] 506.3.11 Grease duct enclosures.** A grease duct serving a Type I hood that penetrates a
2 ceiling, wall, floor or any concealed spaces shall be enclosed from the point of penetration to
3 the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected
4 openings are permitted by the *International Building Code*. The duct enclosure shall serve a
5 single grease duct and shall not contain other ducts, piping or wiring systems. Duct
6 enclosures shall be either field-applied or factory-built. Duct enclosures shall have a fire-
7 resistance rating of not less than that of the assembly penetrated. The duct enclosure need not
8 exceed 2 hours but shall be ((and)) not less than 1 hour. Duct enclosures shall be as
9 prescribed by Section 506.3.10.1, 506.3.10.2 or 506.3.10.3.

10 **506.3.11.1 Shaft enclosure.** Commercial kitchen grease ducts constructed in accordance
11 with Section 506.3.1 shall be permitted to be enclosed in accordance with the
12 *International Building Code* requirements for shaft construction. Such grease duct
13 systems and exhaust *equipment* shall have a *clearance* to combustible construction of not
14 less than 18 inches (457 mm), and shall have a *clearance* to noncombustible construction
15 and gypsum wallboard attached to noncombustible structures of not less than 6 inches (76
16 mm). Duct enclosures shall be sealed around the duct at the point of penetration and
17 vented to the outside of the building through the use of weather-protected openings.

18 **Interpretation:** Gypsum wallboard installed on a combustible substrate or on wood studs
19 does not cause the wall to be considered as a noncombustible assembly, and the 18 inch
20 minimum clearance still applies. The classification of combustible and noncombustible
21 materials is not changed by the use of fire-retardant-treated wood products or fire rated
22 (Type "X") gypsum wallboard.

23 **506.3.11.2 Field-applied grease duct enclosure.** Commercial kitchen grease ducts
24 constructed in accordance with Section 506.3.1 shall be enclosed by field-applied grease
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1 duct enclosure that is a listed and labeled material, system, product, or method of
2 construction specifically evaluated for such purpose in accordance with ASTM E 2336.

3 The surface of the duct shall be continuously covered on all sides from the point at which
4 the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-
5 penetration fire-stop system classified in accordance with ASTM E 814 or UL 1497 and
6 having a “F” and “T” rating equal to the fire-resistance rating of the assembly being
7 penetrated. Such systems shall be installed in accordance with the listing and the
8 manufacturer’s installation instructions. Partial application of a field-applied grease duct
9 enclosure system shall not be installed for the sole purpose of reducing clearances to
10 combustibles at isolated sections of grease duct. Exposed duct-wrap systems shall be
11 protected where subject to physical damage.

12 **506.3.11.3 Factory-built grease duct assemblies.** Factory-built grease duct assemblies
13 incorporating integral enclosure materials shall be *listed* and *labeled* for use as
14 commercial kitchen grease duct assemblies in accordance with UL 2221. Duct
15 penetrations shall be protected with a through-penetration firestop system classified in
16 accordance with ASTM E 814 or UL 1479 and having an “F” and “T” rating equal to the
17 fire-resistance rating of the assembly being penetrated. Such assemblies shall be installed
18 in accordance with the listing and the manufacturer’s installation instructions.

19 **506.3.11.4 Duct enclosure not required.** A duct enclosure shall not be required for a
20 grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.

21 **506.3.12 Grease duct fire-resistive access opening.** Where cleanout openings are located in
22 ducts within a fire-resistance-rated enclosure, access openings shall be provided in the
23 enclosure at each cleanout point. Access openings shall be equipped with tight-fitting sliding
24 or hinged doors that are equal in fire-resistive protection to that of the shaft or enclosure. An
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1 *approved* sign shall be placed on access opening panels with wording as follows: “ACCESS
2 PANEL. DO NOT OBSTRUCT.”

3 **506.3.13 Exhaust outlets serving Type I hoods.** Exhaust outlets for grease ducts serving
4 Type I hoods shall conform to the requirements of Sections 506.3.13.1 through 506.3.13.3.

5 **506.3.13.1 Termination above the roof.** Exhaust outlets that terminate above the roof
6 shall have the discharge opening located not less than 40 inches (1016 mm) above the
7 roof surface.

8 **506.3.13.2 Termination through an exterior wall.** Exhaust outlets shall be permitted to
9 terminate through exterior walls where the smoke, grease, gases, vapors and odors in the
10 discharge from such terminations do not create a public nuisance or a fire hazard. Such
11 terminations shall not be located where protected openings are required by the
12 *International Building Code*. Other exterior openings shall not be located within ((3)) 10
13 feet (((914)) 3048 mm) of such terminations.

14 **Note:** See Director’s Rule 6-2005, or any rule superseding Director’s Rule 6-2005 for
15 additional requirements.

16 **506.3.13.3 Termination location.** Exhaust outlets shall be located not less than 10 feet
17 (3048 mm) horizontally from parts of the same or contiguous buildings, adjacent
18 buildings and adjacent property lines and shall be located not less than 10 feet (3048 mm)
19 above the adjoining grade level. Exhaust outlets shall be located not less than 10 feet
20 (3048 mm) horizontally from or not less than 3 feet (914 mm) above air intake openings
21 into any building.

22 **Exception:** Exhaust outlets shall terminate not less than 5 feet (1524 mm) horizontally from
23 parts of the same or contiguous building, an adjacent building, adjacent property line and air
24 intake openings into a building where air from the exhaust outlet discharges away from such
25 locations.

1 **Interpretation:** For purposes of this section, property line includes any property line
2 separating one lot from another lot, but does not include any property line separating a lot
3 from a public street or alley right-of-way.

4 **506.4 Ducts serving Type II hoods.** Commercial kitchen exhaust systems serving Type II hoods
5 shall comply with Sections 506.4.1 and 506.4.2.

6 **506.4.1 Ducts.** Ducts and plenums serving Type II hoods shall be constructed of rigid
7 metallic materials. Duct construction, installation, bracing and supports shall comply with
8 Chapter 6. A duct serving a Type II hood that penetrates a fire-resistance-rated ceiling, floor
9 or wall shall be enclosed in a duct enclosure from the point of penetration to the outlet
10 terminal. Ducts subject to positive pressure and ducts conveying moisture-laden or waste-
11 heat-laden air shall be constructed, joined and sealed in an *approved* manner.

12 **506.4.2 Type II terminations.** Exhaust outlets serving Type II hoods shall terminate in
13 accordance with the hood manufacturer's installation instructions and shall comply with all
14 of the following:

- 15 1. Exhaust outlets shall terminate not less than 3 feet (914 mm) in any direction from
16 openings into the building.
- 17 2. Outlets shall terminate not less than 10 feet (3048 mm) from property lines or buildings on
18 the same lot.
- 19 3. Outlets shall terminate not less than 10 feet (3048 mm) above grade.
- 20 4. Outlets that terminate above a roof shall terminate not less than 30 inches (762 mm) above
21 the roof surface.
- 22 5. Outlets shall terminate not less than 30 inches (762 mm) from exterior vertical walls
- 23 6. Outlets shall be protected against local weather conditions.
- 24 7. Outlets shall not be directed onto walkways.

1 8. Outlets shall meet the provisions for exterior wall opening protectives in accordance with
2 the *International Building Code*.

3 ***

4 **SECTION 507**

5 **COMMERCIAL KITCHEN HOODS**

6 **507.1 General.** Commercial kitchen exhaust hoods shall comply with the requirements of this
7 section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors
8 and residues. Commercial kitchen exhaust hood systems shall operate during the cooking
9 operation.

10 **Exceptions:**

11 1. Factory-built commercial exhaust hoods that are listed and labeled in accordance with UL
12 710, and installed in accordance with Section 304.1 shall not be required to comply with
13 Sections 507.4, 507.5, 507.7, 507.11, 507.12, 507.13, 507.14, and 507.15.

14 2. Factory-built commercial cooking recirculating systems that are listed and labeled in
15 accordance with UL 710B, and installed in accordance with Section 304.1 shall not be
16 required to comply with Sections 507.4, 507.5, 507.7, 507.11, 507.12, 507.13, 507.14, and
17 507.15. Spaces in which such systems are located shall be considered to be kitchens and
18 shall be ventilated in accordance with Table 403.3. The kitchen exhaust system shall
19 discharge in accordance with Section 501.3.1, item 3. For the purpose of determining the
20 floor area required to be ventilated, each individual *appliance* shall be considered as
21 occupying not less than 100 square feet (9.3 m²).

22 3. Net exhaust volumes for hoods shall be permitted to be reduced during part-load cooking
23 conditions, where engineered or *listed* multispeed or variable-speed controls automatically
24 operate the exhaust system to maintain capture and removal of cooking effluents as
25 required by this section. Reduced volumes shall not be below that required to maintain
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1 capture and removal of effluents from the idle cooking appliances that are operating in a
2 standby mode.

3 **507.2 Where required.** A Type I or Type II hood shall be installed at or above all *commercial*
4 *cooking appliances* in accordance with Sections 507.2.1 and 507.2.2 and Table 507.2.1. Where
5 any cooking *appliance* under a single hood requires a Type I hood, a Type I hood shall be
6 installed. Where a Type II hood is required, a Type I or Type II hood shall be installed.

7 **Exception:** Where cooking appliances are equipped with integral down-draft exhaust systems
8 and such appliances and exhaust systems are listed and labeled for the application in
9 accordance with NFPA 96, a hood shall not be required at or above them.

10 **507.2.1 Type I hoods.** Type I hoods shall be installed where cooking *appliances* produce
11 grease or smoke as a result of the cooking process. Type I hoods shall be installed over
12 *medium-duty, heavy-duty and extra-heavy-duty cooking appliances*. Type I hoods shall be
13 installed over *light-duty cooking appliances* that produce grease or smoke.

14 **Exceptions:**

15 1. A Type I hood shall not be required for an electric cooking appliance where an
16 approved testing agency provides documentation that the appliance effluent contains 5
17 mg/m³ or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m³/s) in
18 accordance with Section 17 of UL 710B.

19 [W] 2. A Type I hood is not required in R-2 occupancies with not more than 16
20 residents.

21 **507.2.1.1 Operation.** Type I hood systems shall be designed and installed to
22 automatically activate the exhaust fan whenever cooking operations occur. The activation
23 of the exhaust fan shall occur through an interlock with the cooking appliances, by means
24 of heat sensors or by means of other *approved* methods. A method of interlock between
25 an exhaust hood system and appliances equipped with standing pilot burners shall not
26

1 cause the pilot burners to be extinguished. A method of interlock between an exhaust
2 hood system and cooking appliances shall not involve or depend upon any component of
3 a fire extinguishing system.

4 **507.2.1.2 Exhaust flow rate label.** Type I hoods shall bear a label indicating the
5 minimum exhaust flow rate in cfm per linear foot (1.55 L/s per linear meter) of hood that
6 provides for capture and containment of the exhaust effluent for the cooking appliances
7 served by the hood, based on the cooking appliance duty classifications defined in this
8 code.

9 **507.2.2 Type II hoods.** Type II hoods shall be installed for collecting and removing steam,
10 vapor, heat or odors from ~~((above))~~ dishwashers and appliances that produce heat or moisture
11 and do not produce grease or smoke as a result of the cooking process, except where the heat
12 and moisture loads from such appliances are incorporated into the HVAC system design or
13 into the design of a separate removal system. Type II hoods shall be installed for collecting
14 and removing steam, vapor, heat or odors from ~~((above))~~ all appliances that produce products
15 of *combustion* and do not produce grease or smoke as a result of the cooking process. Spaces
16 containing cooking appliances that do not require Type II hoods shall be provided with
17 exhaust at a rate of 0.70 cfm per square foot (0.00033 m³/s). For the purpose of determining
18 the floor area required to be exhausted, each individual *appliance* that is not required to be
19 installed under a Type II hood shall be considered as occupying not less than 100 square feet
20 (9.3 m²). Such additional square footage shall be provided with exhaust at a rate of 0.70 cfm
21 per square foot [$.00356 \text{ m}^3/(\text{s} \bullet \text{m}^2)$].

22 **507.2.3 Domestic cooking appliances used for commercial purposes.** Domestic cooking
23 appliances utilized for commercial purposes shall be provided with Type I, ~~((or))~~ Type II or
24 residential hoods ~~((as required for the type of appliances and processes))~~ in accordance with
25 Sections 507.2, 507.2.1 and 507.2.2 and Table 507.2.2.

507.2.4 Extra-heavy-duty. Type I hoods for use over *extra-heavy-duty cooking appliances* shall not cover *heavy-, medium- or light-duty appliances*. Such hoods shall discharge to an exhaust system that is independent of other exhaust systems.

Note: The definition of extra-heavy-duty cooking appliance includes appliances using solid fuel.

[W] Table 507.2.1 Type of Hood Required for Commercial Cooking Appliances

<u>TYPE OF APPLIANCE¹</u>	<u>TYPE OF HOOD REQUIRED²</u>		
	<u>TYPE I³</u>	<u>TYPE II</u>	<u>NONE</u>
<u>Baking oven</u>	<u>Solid fuel</u>	<u>> 6 kW</u>	<u>≤ 6 kW</u>
<u>Charbroiler</u>	<u>All sizes</u>		
<u>Coffee maker</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>
<u>Coffee roaster⁴</u>		<u>All sizes</u>	
<u>Convection ovens (electric)</u>		<u>> 6 kW</u>	<u>< 6 kW</u>
<u>Deep-fat fryer</u>	<u>All sizes</u>		
<u>Dishwasher</u>		<u>> 140°F</u>	<u>≤ 140°F</u>
<u>Grill</u>	<u>All sizes</u>		
<u>Hot dog display heater</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>
<u>Microwave oven</u>			<u>All sizes</u>
<u>Pastry oven</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>
<u>Pizza oven</u>	<u>Solid fuel</u>	<u>> 6 kW</u>	<u>≤ 6 kW</u>

1	<u>Popcorn maker</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>		
2	<u>Roasting oven⁵</u>	<u>> 6 kW</u>	<u>≤ 6 kW</u>			
3	<u>Roll warmer</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>		
4						
5	<u>Solid-fuel burning appliances</u>	<u>All sizes & all food</u>				
6		<u>products</u>				
7	<u>Soup warmer, soup preparation</u>					
8	<u>cooking unit</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>		
9						
10	<u>Steam reconstitution device</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>		
11	<u>Steam table</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>		
12	<u>Steamer</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>		
13	<u>Toaster</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>		
14						
15	<u>Warming oven</u>		<u>> 6 kW</u>	<u>≤ 6 kW</u>		

¹ The code official shall determine hood requirements for appliances not listed in the table.

² Section 507.2 describes Type I and Type II kitchen hoods.

³ The definition of extra-heavy-duty cooking appliance includes all appliances utilizing solid fuel.

⁴ Puget Sound pollution control requires an after-burner for particulates.

⁵ Roasting ovens are used to cook raw or partially cooked food.

Table 507.2.2 Type of Hood Required for Domestic Cooking Appliances ^{1,2}

<u>Type of Space³</u>	<u>Type of cooking</u>	<u>Type of hood</u>
<u>Church</u>	1) <u>Boiling, steaming and warming precooked food</u>	<u>Type II</u>
	2) <u>Roasting, pan frying and deep frying</u>	<u>Type I</u>
<u>Community or party room in apartment and condominium</u>	1) <u>Boiling, steaming and warming precooked food</u>	<u>Residential hood⁴ or Type II⁵</u>
	2) <u>Roasting, pan frying and deep frying</u>	<u>Type I</u>
<u>Day care</u>	1) <u>Boiling, steaming and warming precooked food</u>	<u>Residential hood⁴ or Type II⁵</u>
	2) <u>Roasting, pan frying and deep frying</u>	<u>Type I</u>
<u>Dormitory, boarding home, nursing home</u>	1) <u>Boiling, steaming and warming precooked food</u>	<u>Type II</u>
	2) <u>Roasting, pan frying and deep frying</u>	<u>Type I</u>
<u>Office lunch room</u>	1) <u>Boiling, steaming and warming precooked food</u>	<u>Residential hood⁴ or Type II⁵</u>

	<u>2) Roasting, pan frying and deep frying</u>	<u>Type I</u>
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¹ Commercial cooking appliances shall comply with Section 507.2

² Requirements in this table apply to electric or gas fuel appliances only. Solid fuel appliances or charbroilers require Type I hoods.

³ The code official shall determine hood requirements for other types of spaces.

⁴ Residential hood shall vent to outside.

⁵ Type II hood required when more than one appliance is used.

507.13 Capacity of hoods. Commercial food service hoods shall exhaust a minimum net quantity of air determined in accordance with this section and Sections 507.13.1 through 507.13.5. The net quantity of *exhaust air* shall be calculated by subtracting any airflow supplied directly to a hood cavity from the total exhaust flow rate of a hood. Where any combination of *heavy-duty, medium-duty and light-duty cooking appliances* are utilized under a single hood, the exhaust rate required by this section for the heaviest duty *appliance* covered by the hood shall be used for the entire hood.

507.13.1 Extra-heavy-duty (solid fuel) cooking appliances. The minimum net airflow for hoods, as determined by Section 507.2, used for *extra-heavy-duty cooking appliances* shall be determined as follows:

Type of Hood	CFM per linear foot of hood
Backshelf/pass-over	Not allowed
Double island canopy (per side)	550
Eyebrow	Not allowed

Single island canopy	700
Wall-mounted canopy	550

For SI: 1 cfm per linear foot = 1.55 L/s per linear meter.

SECTION 508

COMMERCIAL KITCHEN MAKEUP AIR

508.1 Makeup air. *Makeup air* shall be supplied during the operation of commercial kitchen exhaust systems that are provided for *commercial cooking appliances*. ~~((The amount of *makeup air* supplied to the building from all sources shall be approximately equal to the amount of *exhaust air* for all exhaust systems for the building.))~~ A separate makeup air system for the kitchen shall supply not less than 90 percent of the air to be exhausted. The *makeup air* shall not reduce the effectiveness of the exhaust system. *Makeup air* shall be provided by gravity or mechanical means or both. Mechanical *makeup air* systems shall be automatically controlled to start and operate simultaneously with the exhaust system. Exterior windows and doors shall not be used to provide commercial kitchen makeup air. When individual kitchen hoods are designed to exhaust greater than 5000 cfm, refer to *International Energy Code* for additional makeup air system requirements. *Makeup air* intake opening locations shall comply with Section 401.4.

Exceptions:

1. Where the total airflow for the exhaust system is less than 400 cfm, makeup air is not required; or
2. In atriums, food courts, and similar areas, occupant ventilation air that would otherwise exfiltrate or be exhausted by other mechanical exhaust systems may be used to provide all makeup air, or a portion of makeup air when a direct path through permanent openings exists for occupant ventilation air to transfer to the kitchen hood area. That portion of air not supplied by occupant ventilation air shall be provided by a separate

1 or 4 is present in concentrations exceeding 1 percent of the median lethal concentration of the
2 substance for acute inhalation toxicity.))

3 In lieu of complying with this section, research and educational laboratories are permitted
4 to comply with rules adopted by the Director for laboratory exhaust systems for hazardous
5 materials.

6 Note: See Director's Rule 30-2005, or any rule superseding Director's Rule 30-2005 for
7 alternate provisions for research and education laboratories.

8 **[F] 510.2.1 Lumber yards and woodworking facilities.** *Equipment* or machinery located
9 inside buildings at lumber yards and woodworking facilities which generates or emits
10 combustible dust shall be provided with an *approved* dust-collection and exhaust system
11 installed in conformance with this section and the *International Fire Code*. *Equipment* and
12 systems that are used to collect, process or convey combustible dusts shall be provided with
13 an *approved* explosion-control system.

14 **[F] 510.2.2 Combustible fibers.** *Equipment* or machinery within a building which generates
15 or emits combustible fibers shall be provided with an *approved* dust-collecting and exhaust
16 system. Such systems shall comply with this code and the *International Fire Code*.

17 **510.2.3 Model shops and other intermittent use facilities.** Equipment or machinery located
18 inside buildings that emit dust but are used on an intermittent basis, such as in model shops,
19 research and development facilities, hobby, and other non-production uses, shall be provided
20 with a local, point of use dust collection system. The dust collector is permitted to be a
21 portable type with high efficiency filters to allow exhaust air to be discharged back into the
22 space. Such collectors are not required to be provided with an approved explosion-control
23 system. Such systems shall be limited to an aggregate airflow of no more than 1,500 cfm per
24 room.

25 ***

1 **510.7 Suppression required.**

2 **510.7.1 Ducts.** Ducts shall be protected with an *approved* automatic fire suppression system
3 installed in accordance with the *International Building Code*.

4 **Exceptions:**

- 5 1. An approved automatic fire suppression system shall not be required in ducts
6 conveying materials, fumes, mists and vapors that are nonflammable and
7 noncombustible under all conditions and at any concentrations.
- 8 2. Automatic fire suppression systems shall not be required in metallic and
9 noncombustible, nonmetallic exhaust ducts in semiconductor fabrication facilities.
- 10 3. An *approved* automatic fire suppression system shall not be required in ducts
11 where the largest cross-sectional diameter of the duct is less than 10 inches (254
12 mm).
- 13 4. For laboratories, as defined in Section 510.1, automatic fire protection systems
14 shall not be required for metallic ducts that serve ((in)) laboratory hoods or other
15 exhaust systems.
- 16 5. An *approved* automatic fire suppression system is not required in metallic ducts
17 serving fume hoods if all fume hoods served by the duct are equipped with an
18 approved fire suppression system.

19 **510.7.2 Fume hoods.** Approved automatic fire suppression shall be installed in fume hoods
20 within which operations are conducted involving hazardous materials that have the potential
21 to create a flammable vapor, gas, fume, mist, or dust in concentrations exceeding 25 percent
22 of the lower flammability limit of the substance or mixture for the expected room
23 temperature in the absence of the fume hood and under normal operating conditions.

24 ***

25 **SECTION 511**

DUST, STOCK AND REFUSE CONVEYING SYSTEMS

511.1 Dust, stock and refuse conveying systems. Dust, stock and refuse conveying systems shall comply with the provisions of Section 510 and Sections 511.1.1 through 511.2.

511.1.1 Collectors and separators. Collectors and separators involving such systems as centrifugal separators, bag filter systems and similar devices, and associated supports shall be constructed of noncombustible materials and shall be located on the exterior of the building or structure. A collector or separator shall not be located nearer than 10 feet (3048 mm) to combustible construction or to an unprotected wall or floor opening, unless the collector is provided with a metal vent pipe that extends above the highest part of any roof with a distance of 30 feet (9144 mm).

Exceptions:

1. Collectors such as "Point of Use" collectors, close extraction weld fume collectors, spray finishing booths, stationary grinding tables, sanding booths, and integrated or machine-mounted collectors shall be permitted to be installed indoors provided the installation is in accordance with the *International Fire Code* and NFPA 70.
2. Collectors in independent exhaust systems handling combustible dusts shall be permitted to be installed indoors provided that such collectors are installed in compliance with the *International Fire Code* and ((NFPA-70)) the Seattle Electrical Code.

511.1.2 Discharge pipe. Discharge piping shall conform to the requirements for ducts, including clearances required for high-heat appliances, as contained in this code. A delivery pipe from a cyclone collector shall not convey refuse directly into the firebox of a boiler, furnace, dutch oven, refuse burner, incinerator or other *appliance*.

511.1.3 Conveying systems exhaust discharge. An exhaust system shall discharge to the outside of the building either directly by flue or indirectly through the bin or vault into which the system discharges except where the contaminants have been removed. Exhaust system

1 discharge shall be permitted to be recirculated provided that the solid particulate has been
2 removed at a minimum efficiency of 99.9 percent at 10 microns (10.01 mm), vapor
3 concentrations are less than 25 percent of the LFL, and *approved equipment* is used to
4 monitor the vapor concentration.

5 **511.1.4 Spark protection.** The outlet of an open-air exhaust terminal shall be protected with
6 an *approved* metal or other noncombustible screen to prevent the entry of sparks.

7 **511.1.5 Explosion relief vents.** A safety or explosion relief vent shall be provided on all
8 systems that convey combustible refuse or stock of an explosive nature, in accordance with
9 the requirements of the *International Building Code*.

10 **511.1.5.1 Screens.** Where a screen is installed in a safety relief vent, the screen shall be
11 attached so as to permit ready release under the explosion pressure.

12 **511.1.5.2 Hoods.** The relief vent shall be provided with an *approved* noncombustible
13 cowl or hood, or with a counterbalanced relief valve or cover arranged to prevent the
14 escape of hazardous materials, gases or liquids.

15 ***

16 SECTION 512

17 SUBSLAB SOIL EXHAUST SYSTEMS

18 ***

19 **512.2 Materials.** Subslab soil exhaust system duct material shall be air duct material *listed* and
20 *labeled* to the requirements of UL 181 for Class 0 air ducts, or any of the following piping
21 materials that comply with the ((*International*)) *Uniform Plumbing Code* as building sanitary
22 drainage and vent pipe: cast iron; galvanized steel; brass or copper pipe; copper tube of a weight
23 not less than that of copper drainage tube, Type DWV; and plastic piping.

24 ***

25 SECTION 513

SMOKE CONTROL SYSTEMS

[F] **513.3 Special inspection and test requirements.** In addition to the ordinary inspection and test requirements which buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of Section 909 of the *International Building Code* shall undergo special inspections and tests sufficient to verify the proper commissioning of the smoke control design in its final installed condition. The design submission accompanying the *construction documents* shall clearly detail procedures and methods to be used and the items subject to such inspections and tests. Such commissioning shall be in accordance with generally accepted engineering practice and, where possible, based on published standards for the particular testing involved. The special inspections and tests required by this section shall be conducted under the same terms as found in Section 1704 of the *International Building Code*.

Note: See SFD Administrative Rules 9.01.13 and 9.02.09 or any rule superseding them for further specific requirements.

[F] **513.11 Power systems.** The smoke control system shall be supplied with two sources of power. Primary power shall be the normal building power systems. Secondary power shall be from an *approved* (~~standby~~) emergency source complying with Chapter 27 of the *International Building Code*. The (~~standby~~) emergency power source and its transfer switches shall be in a room separate from the normal power transformers and switch gear and ventilated directly to and from the exterior. The room shall be enclosed with not less than 1-hour fire-resistance-rated fire barriers constructed in accordance with Section 707 of the *International Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *International Building Code*, or both. Power distribution from the two sources shall be by independent routes. Transfer

1 to full (~~standby~~) emergency power shall be automatic and within 60 seconds of failure of the
2 primary power. The systems shall comply with (~~NFPA 70~~) the Seattle Electrical Code.

3 **Exception:** A separate room for the generator set is not required for systems having fixed fuel
4 quantities meeting the limits of *International Fire Code* Section 603.3 when located in a
5 sprinklered parking garage of Type I or II construction

6 **[F] 513.11.1 Power sources and power surges.** Elements of the smoke management system
7 relying on volatile memories or the like shall be supplied with uninterruptible power sources
8 of sufficient duration to span 15-minute primary power interruption. Elements of the smoke
9 management system susceptible to power surges shall be suitably protected by conditioners,
10 suppressors or other *approved* means.

11 **[F] 513.11.2 Wiring.** In addition to meeting requirements of the *Seattle Electrical Code*, all
12 wiring regardless of voltage, shall have fire-resistance-rated protection of at least two hours
13 or as required in rules promulgated by the code official.

14 **Exception:** Subject to the approval of the code official, fire-resistance-rating is not
15 required for wiring located in a parking garage.

16 **[F] 513.12 Detection and control systems.** Fire detection systems providing control input or
17 output signals to mechanical smoke control systems or elements thereof shall comply with NFPA
18 72 and the requirements of Chapter 9 of the *International Building Code* or the *International*
19 *Fire Code*. Such systems shall be equipped with a control unit complying with UL 864 and listed
20 as smoke control *equipment*.

21 Control systems for mechanical smoke control systems shall include provisions for
22 verification. Verification shall include positive confirmation of actuation, testing, manual
23 override, the presence of power downstream of all disconnects and, through a preprogrammed
24 weekly test sequence report, abnormal conditions audibly, visually and by printed report.

1 [F] 513.12.1 Wiring. ~~((In addition to meeting the requirements of NFPA 70, all wiring,~~
2 ~~regardless of voltage, shall be fully enclosed within continuous raceways.))~~ See Section
3 513.11.

4 [F] 513.12.2 Activation. Smoke control systems shall be activated in accordance with the
5 *International Building Code* or the *International Fire Code*.

6 [F] 513.12.3 Automatic control. Where completely automatic control is required or used,
7 the automatic control sequences shall be initiated from an appropriately zoned automatic
8 sprinkler system complying with Section 903.3.1.1 of the *International Fire Code* or from
9 manual controls that are readily accessible to the fire department, and any smoke detectors in
10 the building ~~((required by engineering analysis)).~~

11 ***

12 Section 7. The following sections of Chapter 6 of the International Mechanical Code,
13 2012 Edition, are amended as follows:

14 CHAPTER 6

15 DUCT SYSTEMS

16 SECTION 601

17 GENERAL

18 ***

19 [B] 601.2 Air movement in egress elements. Corridors shall not serve as supply, return,
20 exhaust, relief or *ventilation air* ducts.

21 **Exceptions:**

- 22 1. Use of a corridor as a source of *makeup air* for exhaust systems in rooms that open
23 directly onto such corridors, including toilet rooms, bathrooms, dressing rooms,
24 ~~((smoking lounges))~~ and janitor closets, shall be permitted, provided that each such
25
26
27

1 corridor is directly supplied with (~~outdoor~~) air at a rate greater than the rate of
2 *makeup air* taken from the corridor.

3 2. Where located within a *dwelling unit*, the use of corridors for conveying return air shall
4 not be prohibited.

5 3. Where located within tenant spaces of 1,000 square feet (93 m²) or less in area, use of
6 corridors for conveying return air is permitted.

7 4. Incidental air movement from pressurized rooms within health care facilities, provided
8 that the corridor is not the primary source of supply or return to the room.

9 [W] 5. Where such air is part of an engineered smoke control system.

10 [W] 6. Air supplied to corridors serving residential occupancies shall not be considered as

11 providing ventilation air to the dwelling units subject to the following:

12 6.1 The air supplied to the corridor is one hundred percent outside air; and

13 6.2 The dwelling units have conforming ventilation air independent of the air
14 supplied to the corridor; and

15 6.3 For other than high-rise buildings, the supply fan will automatically shut off
16 upon activation of corridor smoke detectors which shall be spaced at no more
17 than 30 feet (9144 mm) on center along the corridor; or

18 6.4 For high-rise buildings, the supply fan will automatically shut off upon
19 activation of the smoke detectors required by Seattle Fire Code Section
20 907.2.13.1 or upon receipt of another *approved* fire alarm signal. The supply
21 fan is not required to be automatically shut off when used as part of an
22 *approved* building stairwell or elevator hoistway pressurization system.

23 **[B] 601.2.1 Corridor ceiling.** Use of the space between the corridor ceiling and the floor or
24 roof structure above as a return air *plenum* is permitted for one or more of the following
25 conditions:

- 1 1. The corridor is not required to be of fire-resistance-rated construction;
- 2 2. The corridor is separated from the *plenum* by fire-resistance-rated construction;
- 3 3. The air-handling system serving the corridor is shut down upon activation of the air-
- 4 handling unit smoke detectors required by this code;
- 5 4. The air-handling system serving the corridor is shut down upon detection of sprinkler
- 6 waterflow where the building is equipped throughout with an automatic sprinkler
- 7 system; or
- 8 5. The space between the corridor ceiling and the floor or roof structure above the
- 9 corridor is used as a component of an *approved* engineered smoke control system.

10 ***

11 SECTION 602

12 PLENUMS

13 ***

14 **602.2 Construction.** *Plenum* enclosures shall be constructed of materials permitted for the type
15 of construction classification of the building.

16 The use of gypsum boards to form plenums shall be limited to systems where the air
17 temperatures do not exceed 125°F (52°C) and the building and mechanical system design
18 conditions are such that the gypsum board surface temperature will be maintained above the
19 airstream dew-point temperature as determined by the registered design professional. Air
20 plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing
21 evaporative coolers.

22 **602.2.1 Materials within plenums.** Except as required by Sections 602.2.1.1 through
23 602.2.1.5, materials within plenums shall be noncombustible or shall be listed and labeled as
24 having a flame spread index of not more than 25 and a smoke-developed index of not more
25 than 50 when tested in accordance with ASTM E 84 or UL 723.

1 **Exceptions:**

- 2 1. Rigid and flexible ducts and connectors shall conform to Section 603.
- 3 2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and
- 4 604.
- 5 3. This section shall not apply to materials exposed within plenums in one- and two-
- 6 family dwellings.
- 7 4. This section shall not apply to smoke detectors.
- 8 5. Combustible materials fully enclosed within one of the following:
- 9 5.1. Continuous noncombustible raceways or enclosures.
- 10 5.2. Approved gypsum board assemblies.
- 11 5.3. Materials listed and labeled for installation within a plenum.
- 12 6. Materials in Group H, Division 5 fabrication areas and the areas above and below
- 13 the fabrication area that share a common air recirculation path with the fabrication
- 14 area.

15 **602.2.1.1 Wiring.** Combustible electrical wires and cables and optical fiber cables

16 exposed within a plenum shall be listed as having a maximum peak optical density of

17 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread

18 distance of 5 feet (1524 mm) or less when tested in accordance with NFPA 262 or shall

19 be installed in metal raceways or metal sheathed cable. Combustible optical fiber and

20 communication raceways exposed within a plenum shall be listed as having a maximum

21 peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a

22 maximum flame spread distance of 5 feet (1524 mm) or less when tested in accordance

23 with ANSI/UL 2024. Only plenum-rated wires and cables shall be installed in plenum-

24 rated raceways. Electrical wires and cables, optical fiber cables and raceways addressed

1 in this section shall be listed and labeled and shall be installed in accordance with the
2 Seattle Electrical Code ((NFPA-70)).

3 **602.2.1.2 Fire sprinkler piping.** Plastic fire sprinkler piping exposed within a *plenum*
4 shall be used only in wet pipe systems and shall have a peak optical density not greater
5 than 0.50, an average optical density not greater than 0.15, and a flame spread of not
6 greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Piping shall be
7 *listed and labeled*.

8 **602.2.1.3 Pneumatic tubing.** Combustible pneumatic tubing exposed within a *plenum*
9 shall have a peak optical density not greater than 0.50, an average optical density not
10 greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in
11 accordance with UL 1820. Combustible pneumatic tubing shall be *listed and labeled*.

12 **602.2.1.4 Electrical equipment in plenums.** Electrical *equipment* exposed within a
13 *plenum* shall comply with Sections 602.2.1.4.1 and 602.2.1.4.2.

14 **602.2.1.4.1 Equipment in metallic enclosures.** Electrical *equipment* with metallic
15 enclosures exposed within a *plenum* shall be permitted.

16 **602.2.1.4.2 Equipment in combustible enclosures.** Electrical *equipment* with
17 combustible enclosures exposed within a *plenum* shall be *listed and labeled* for such
18 use in accordance with UL 2043.

19 **602.2.1.5 Foam plastic insulation.** Foam plastic insulation used as interior wall or
20 ceiling finish, or as interior trim, in plenums shall exhibit a flame spread index of 75 or
21 less and a smoke-developed index of 450 or less when tested in accordance with ASTM
22 E 84 or UL 723 and shall also comply with one or more of Sections 602.2.1.5.1,
23 602.2.1.5.2 and 602.2.1.5.3.

24 **602.2.1.5.1 Separation required.** The foam plastic insulation shall be separated from
25 the plenum by a thermal barrier complying with Section 2603.4 of the *International*

1 *Building Code* and shall exhibit a flame spread index of 75 or less and a smoke-
2 developed index of 450 or less when tested in accordance with ASTM E 84 or UL
3 723 at the thickness and density intended for use.

4 **602.2.1.5.2 Approval.** The foam plastic insulation shall exhibit a flame spread index
5 of 25 or less and a smoke-developed index of 50 or less when tested in accordance
6 with ASTM E 84 or UL 723 at the thickness and density intended for use and shall
7 meet the acceptance criteria of Section 803.1.2 of the *International Building Code*
8 when tested in accordance with NFPA 286.

9 The foam plastic insulation shall be approved based on tests conducted in
10 accordance with Section 2603.10 of the *International Building Code*.

11 **602.2.1.5.3 Covering.** The foam plastic insulation shall be covered by corrosion-
12 resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm)
13 and shall exhibit a flame spread index of 75 or less and a smoke-developed index of
14 450 or less when tested in accordance with ASTM E 84 or UL 723 at the thickness
15 and density intended for use.

16 ***

17 SECTION 603

18 DUCT CONSTRUCTION AND INSTALLATION

19 ***

20 **603.5 Nonmetallic ducts.** Nonmetallic ducts shall be constructed with Class 0 or Class 1 duct
21 material and shall comply with UL 181. Fibrous duct construction shall conform to the
22 SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct*
23 *Construction Standards*. The air temperature within nonmetallic ducts shall not exceed 250°F
24 (121°C).

1 ***

2 **603.14 Location.** Ducts shall not be installed in or within 4 inches (102 mm) of the earth, except
3 where such ducts comply with Section 603.8. Ducts installed in parking garages shall provide a
4 clear floor height of not less than 6 feet 6 inches at the vehicle and pedestrian traffic areas,
5 except where a minimum vertical clearance of 98 inches must be provided for required van-
6 accessible parking spaces, access aisles serving them, and vehicular routes between the van-
7 accessible parking spaces and the garage entrance and exit.

8 ***

9 **SECTION 605**

10 **AIR FILTERS**

11 ***

12 **[W] 605.4 Particulate matter removal.** Particulate matter filters or air cleaners having a
13 minimum efficiency reporting value (MERV) of not less than 6 for ducted air handlers and not
14 less than 4 for unducted air handlers shall be provided upstream of all cooling coils or other
15 devices with wetted surfaces through which air is supplied to an occupiable space.

16 **SECTION 606**

17 **SMOKE DETECTION SYSTEMS CONTROL**

18 ***

19 **606.2 Where required.** Smoke detectors shall be installed where indicated in Sections 606.2.1
20 through 606.2.3.

21 **Exception:** Smoke detectors shall not be required where air distribution systems are
22 incapable of spreading smoke beyond the enclosing walls, floors and ceilings of the room or
23 space in which the smoke is generated.

24 **606.2.1 Return air systems.** Smoke detectors shall be installed in return air systems with a
25 design capacity greater than 2,000 cfm (0.9 m³/s), in the return air duct or *plenum* upstream
26

1 of any filters, *exhaust air* connections, outdoor air connections, or decontamination
2 *equipment* and appliances.

3 **Exception:** Smoke detectors are not required in the return air system where all portions
4 of the building served by the air distribution system are protected by area smoke detectors
5 connected to a fire alarm system in accordance with the *International Fire Code*. The
6 area smoke detection system shall comply with Section 606.4.

7 **606.2.2 Common supply and return air systems.** Where multiple air-handling systems
8 share common supply or return air ducts or plenums with a combined design capacity greater
9 than 2,000 cfm (0.9 m³/s), the return air system shall be provided with smoke detectors in
10 accordance with Section 606.2.1.

11 **Exception:** Individual smoke detectors shall not be required for each fan-powered
12 terminal unit, provided that such units do not have an individual design capacity greater
13 than 2,000 cfm (0.9 m³/s) and will be shut down by activation of one of the following:

- 14 1. Smoke detectors required by Sections 601.2, 606.2.1 and 606.2.3.
- 15 2. An *approved* area smoke detector system located in the return air *plenum* serving
16 such units.
- 17 3. An area smoke detector system as prescribed in the exception to Section 606.2.1. In
18 all cases, the smoke detectors shall comply with Sections 606.4 and 606.4.1.

19 The shutdown of fan-powered terminal units may be performed by a building automation
20 system upon activation of smoke detection as described in Section 606.2.2, Exception Items
21 1, 2, or 3. The building automation system is not required to be listed as a smoke control
22 system and is not required to comply with UL Standard 864: Standard for Control Units and
23 Accessories for Fire Alarm Systems.

24 **606.2.3 Return air risers.** Where return air risers serve two or more stories and serve any
25 portion of a return air system having a design capacity greater than 15,000 cfm (7.1 m³/s),
26

1 smoke detectors shall be installed at each story. Such smoke detectors shall be located
2 upstream of the connection between the return air riser and any air ducts or plenums.

3 ***

4 **[F] 606.4 Controls operation.** Upon activation, the smoke detectors shall shut down all
5 operational capabilities of the air distribution system in accordance with the listing and labeling
6 of appliances used in the system. Air distribution systems that are part of a smoke control system
7 shall switch to the smoke control mode upon activation of a detector.

8 **[F] 606.4.1 Supervision.** The duct smoke detectors shall be connected to the building's fire
9 alarm control unit (~~(a fire alarm system)~~) where a fire alarm system is required by Section
10 907.2 of the *International Fire Code*. Duct detectors shall not activate a fire alarm signal.
11 The actuation of a duct smoke detector shall activate a visible and audible supervisory signal
12 at a constantly attended location.

13 **Exceptions:**

- 14 1. The supervisory signal at a constantly attended location is not required where the
15 duct smoke detector activates the building's alarm-indicating appliances.
16 2. In occupancies not required to be equipped with a fire alarm system, actuation of a
17 smoke detector shall activate a visible and audible signal in an *approved* location.
18 Duct smoke detector trouble conditions shall activate a visible or audible signal in
19 an *approved* location and shall be identified as air duct detector trouble.

20 **[B] SECTION 607**

21 **DUCT AND TRANSFER OPENINGS**

22 ***

23 **607.3 Damper testing, ratings and actuation.** Damper testing, ratings and actuation shall be in
24 accordance with Sections 607.3.1 through 607.3.3.

1 **607.3.1 Damper testing.** Dampers shall be listed and labeled in accordance with the
2 standards in this section. Fire dampers shall comply with the requirements of UL 555. Only
3 fire dampers *labeled* for use in dynamic systems shall be installed in heating, ventilation and
4 *air-conditioning* systems designed to operate with fans on during a fire. Smoke dampers shall
5 comply with the requirements of UL 555S. Combination fire/smoke dampers shall comply
6 with the requirements of both UL 555 and UL 555S. Ceiling radiation dampers shall comply
7 with the requirements of UL 555C or shall be tested as part of a fire-resistance-rated
8 floor/ceiling or roof/ceiling assembly in accordance with ASTM E119 or UL 263.

9 **607.3.2 Damper rating.** Damper ratings shall be in accordance with Sections 607.3.2.1
10 through 607.3.2.3.

11 **607.3.2.1 Fire damper ratings.** Fire dampers shall have the minimum fire protection
12 rating specified in Table 607.3.2.1 for the type of penetration.

13 **TABLE 607.3.2.1**

14 **FIRE DAMPER RATING**

15

TYPE OF PENETRATION	MINIMUM DAMPER RATING (hour)
16 Less than 3-hour fire-resistance-rated 17 assemblies	1-1/2
18 3-hour or greater fire-resistance-rated 19 assemblies	3

20

21

22 **TABLE 607.3.2.1**
FIRE DAMPER RATING

23

TYPE OF PENETRATION	MINIMUM DAMPER RATING (hour)
24 Less than 3-hour fire-resistance-rated assemblies	1 1/2
25 3-hour or greater fire-resistance-rated assemblies	3

26

1 **607.3.2.2 Smoke damper ratings.** Smoke damper leakage ratings shall be Class I or II.
2 Elevated temperature ratings shall not be less than 250°F (121°C).

3 **607.3.2.3 Combination fire/smoke damper ratings.** Combination fire/smoke dampers
4 shall have the minimum fire protection rating specified for fire dampers in Table
5 717.3.2.1 of the *International Building Code* for the type of penetration and shall also
6 have a minimum smoke damper rating as specified in Section 717.3.2.2 of the
7 *International Building Code*.

8 **607.3.3 Damper actuation.** Damper actuation shall be in accordance with Sections 607.3.3.1
9 through 607.3.3.4 as applicable.

10 **607.3.3.1 Fire damper actuation device.** The fire damper actuation device shall meet
11 one of the following requirements:

- 12 1. The operating temperature shall be approximately 50°F (28°C) above the normal
13 temperature within the duct system, but not less than 160°F (71°C).
- 14 2. The operating temperature shall be not more than 350°F (177°C) where located in a
15 smoke control system complying with Section 909 of the *International Building*
16 *Code*.

17 **Interpretation:** Dampers associated with exhaust fans used for hoistway and stairway
18 pressurization are permitted to comply with Section 607.3.3.1, item 2.

19 **607.3.3.2 Smoke damper actuation.** The smoke damper shall close upon actuation of a
20 *listed* smoke detector or detectors installed in accordance with Section 907.3 of the
21 *International Building Code* and one of the following methods, as applicable:

- 22 1. Where a smoke damper is installed within a duct, a smoke detector shall be
23 installed in the duct within 5 feet (1524 mm) of the damper with no air outlets or
24 inlets between the detector and the damper. The detector shall be *listed* for the air
25 velocity, temperature and humidity anticipated at the point where it is installed.

1 Other than in mechanical smoke control systems, dampers shall be closed upon fan
2 shutdown where local smoke detectors require a minimum velocity to operate.

3 2. Where a smoke damper is installed above smoke barrier doors in a smoke barrier, a
4 spot-type detector *listed* for releasing service shall be installed on either side of the
5 smoke barrier door opening.

6 3. Where a smoke damper is installed within an unducted opening in a wall, a spot-
7 type detector *listed* for releasing service shall be installed within 5 feet (1524 mm)
8 horizontally of the damper.

9 4. Where a smoke damper is installed in a corridor wall or ceiling, the damper shall
10 be permitted to be controlled by a smoke detection system installed in the corridor.

11 5. Where a total-coverage smoke detector system is provided within areas served by a
12 heating, ventilation and air-conditioning (HVAC) system, smoke dampers shall be
13 permitted to be controlled by the smoke detection system.

14 **607.3.3.3 Combination fire/smoke damper actuation.** Combination fire/smoke damper
15 actuation shall be in accordance with Sections 607.3.3.1 and 607.3.3.2. Combination
16 fire/smoke dampers installed in smoke control system shaft penetrations shall not be
17 activated by local area smoke detection unless it is secondary to the smoke management
18 system controls.

19 **607.3.3.4 Ceiling radiation damper actuation.** The operating temperature of a ceiling
20 radiation damper actuation device shall be 50°F (28°C) above the normal temperature
21 within the duct system, but not less than 160°F (71°C).

22 ***

23 Section 8. The following sections of Chapter 7 of the International Mechanical Code,
24 2012 Edition, are amended as follows:

1 **Exception:** Within dwelling units, unobstructed stud and joist spaces shall not be
2 prohibited from conveying combustion air, provided that not more than one required
3 fireblock is removed.

4 2. Have a minimum cross-sectional dimension of 3 inches (76 mm).

5 3. Terminate in an unobstructed space allowing free movement of combustion air to the
6 appliances.

7 4. Have the same cross-sectional areas as the free area of the openings to which they connect.

8 5. Serve a single appliance enclosure.

9 6. Not serve both upper and lower combustion air openings where both such openings are
10 used. The separation between ducts serving upper and lower combustion air openings shall
11 be maintained to the source of combustion air.

12 7. Not be screened where terminating in an attic space.

13 8. Not slope downward toward the source of combustion air, where serving the upper
14 required combustion air opening.

15 **701.5 Prohibited sources.** Openings and ducts shall not connect appliance enclosures with a
16 space in which the operation of a fan will adversely affect the flow of the combustion air.

17 Combustion air shall not be obtained from a hazardous location, except where the fuel-fired
18 appliances are located within the hazardous location and are installed in accordance with this
19 code. Combustion air shall not be taken from a refrigeration machinery room, except where a
20 refrigerant vapor detector system is installed to automatically shut off the combustion process in
21 the event of refrigerant leakage. Combustion air shall not be obtained from any location below
22 the design flood elevation.

23 **701.6 Opening location and protection.** Combustion air openings to the outdoors shall comply
24 with the location and protection provisions of Sections 401.4 and 401.5 applicable to outdoor air
25 intake openings.

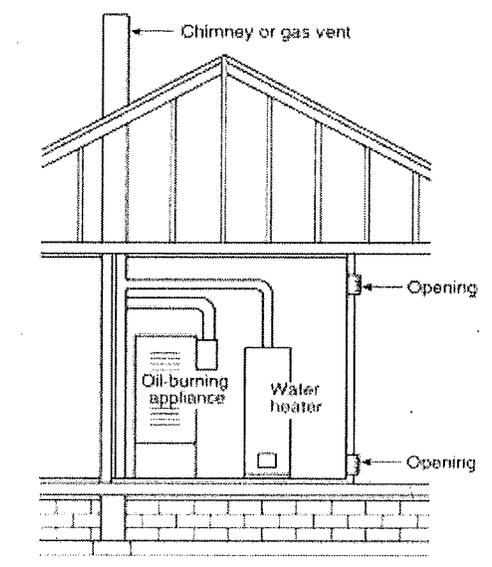


FIGURE 703.2.1 Appliances Located in Confined Spaces – All Air Taken from Inside the Building

703.2.1 Size of openings. Each opening shall have a free area of not less than 1 in.² per 1000 Btu/hr (140in.² per gal/hr) (22 cm²/kW), based on the total input rating of all appliances in the space.

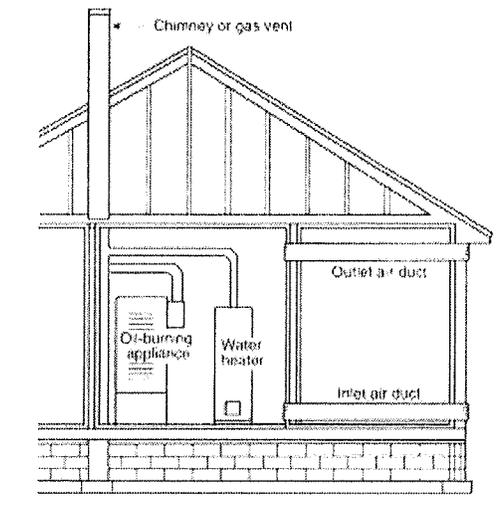
703.2.2 Source of air. Each opening shall freely communicate with interior areas of the building that, in turn, have adequate infiltration from the outside.

703.3 All air taken from outdoors. Where all air will be taken from outdoors, the *confined space* shall be provided with two permanent openings, one near the top of the space and one in or near the bottom.

703.3.1 Source of air. The openings shall communicate directly or by means of ducts with the outdoors or to spaces such as an attic or crawl space, that themselves freely communicate with the outdoors, as shown in Figure 703.3.2.1, Figure 703.3.2.2, and Figure 703.3.2.3.

1 **703.3.2 Vertical ducts.** Where communicating with the outdoors directly or by means of
2 vertical ducts, each opening shall have a free area of not less than 1 inch² per 4000 Btu/hr (35
3 inch² per gal/hr) (5.5 cm²/kW), based on the total input rating of all appliances in the space.

4 **703.3.3 Horizontal ducts.** Where communicating with the outdoors by means of horizontal
5 ducts, each opening shall have a free area of not less than 1 inch² per 2000 Btu/hr (70 inch²
6 per gal/hr) (11 cm²/kW), based on the total input rating of all appliances in the space.



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17 **FIGURE 703.3.2.1 Appliances Located in Confined**
18 **Spaces - All Air from Outdoors**

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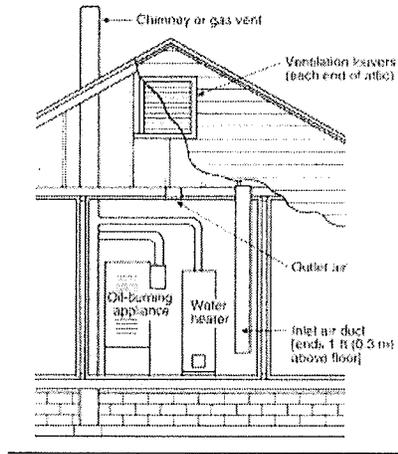
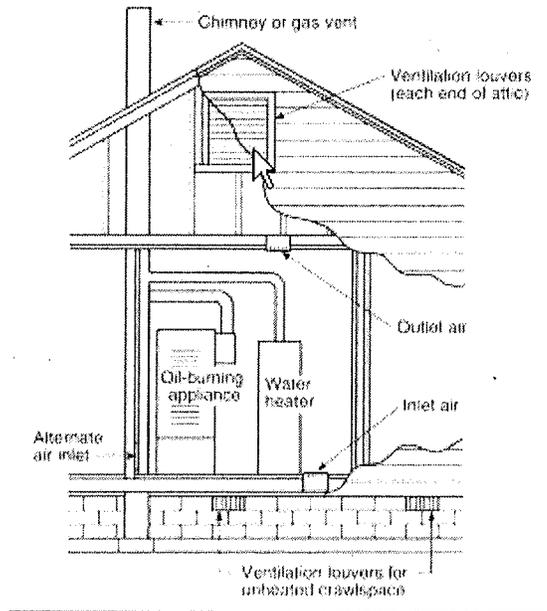


FIGURE 703.3.2.2 Appliances Located in Confined Spaces - All Air from Outdoors Through Ventilated Attic



Notes:

1 **704.2 Size of openings.** For furnace or boiler rooms adjacent to outside walls and where
2 combustion air is provided by natural ventilation from the outside, there shall be a permanent air
3 supply inlet having a total free area of not less than 1 in.² per 4000 Btu/hr (35 in.² per gal/hr) (5.5
4 cm²/kW), based on the total input rating of the burner or burners, but in no case less than 35 in.²
5 (0.425 m²). For furnace or boiler rooms that are not adjacent to outside walls, the combustion air
6 shall be supplied in a manner acceptable to the building official.

7 **SECTION 705**

8 **LOUVERS AND GRILLES**

9 **705.1 Louvers and grilles.** In calculating the free area required by Sections 701, 702, 703 and
10 704, the blocking effect of louvers, grilles, or screens protecting openings shall be taken into
11 consideration.

12 **705.2 Screens.** Screens used in louvers or grilles shall not be smaller than 1/4 in(6.3 mm) mesh
13 and shall be accessible for cleaning.

14 **705.3 Size of openings.** If the free area through a particular design of louver or grille is known, it
15 shall be used in calculating the size of the opening needed to provide the free area required. If
16 the free area of the design is not known, it shall be assumed that wood louvers will have 20
17 percent to 25 percent free area and metal louvers and grilles will have 60 percent to 75 percent
18 free area.

19 **SECTION 706**

20 **SPECIAL CONDITIONS**

21 **706.1 Special conditions.** Where an appliance is installed in a location where the operation of
22 exhaust fans, kitchen ventilation systems, clothes dryers or fireplaces can create conditions of
23 unsatisfactory combustion or venting, special provisions shall be made subject to the approval of
24 the building official.

1 Section 9. The following sections of Chapter 8 of the International Mechanical Code,
2 2012 Edition, are amended as follows:

3 **CHAPTER 8**

4 **CHIMNEYS AND VENTS**

5 ***

6 **SECTION 804**

7 **DIRECT-VENT, INTEGRAL VENT AND MECHANICAL DRAFT SYSTEMS**

8 ***

9 **804.3 Mechanical draft systems.** Mechanical draft systems of either forced or induced draft
10 design shall be listed and labeled in accordance with UL 378 and shall comply with Sections
11 804.3.1 through 804.3.7.

12 **804.3.1 Forced draft systems.** Forced draft systems and all portions of induced draft
13 systems under positive pressure during operation shall be designed and installed so as to be
14 gas tight to prevent leakage of *combustion* products into a building.

15 **804.3.2 Automatic shutoff.** Power exhausters serving automatically fired *appliances* shall be
16 electrically connected to each *appliance* to prevent operation of the *appliance* when the
17 power exhauster is not in operation.

18 **804.3.3 Termination.** The termination of *chimneys* or vents equipped with power exhausters
19 shall be located a minimum of 10 feet (3048 mm) from the lot line or from adjacent
20 buildings. The exhaust shall be directed away from the building.

21 **804.3.4 Horizontal terminations.** Horizontal terminations shall comply with the following
22 requirements:

- 23 1. Where located adjacent to walkways, the termination of mechanical draft systems shall
24 be not less than ((7)) 10 feet (((2134)) 3048 mm) above the level of the walkway.

- 1 2. Vents shall terminate at least 3 feet (914 mm) above any forced air inlet located within
2 10 feet (3048 mm).
- 3 3. The vent system shall terminate at least 4 feet (1219 mm) below, 4 feet (1219 mm)
4 horizontally from or 1 foot (305 mm) above any door, window or gravity air inlet into
5 the building.
- 6 4. The vent termination point shall not be located closer than 3 feet (914 mm) to an
7 interior corner formed by two walls perpendicular to each other.
- 8 5. The vent termination shall not be mounted directly above or within 3 feet (914 mm)
9 horizontally from an oil tank vent or gas meter.
- 10 6. The bottom of the vent termination shall be located at least 12 inches (305 mm) above
11 finished grade.

12 **804.3.5 Vertical terminations.** Vertical terminations shall comply with the following
13 requirements:

- 14 1. Where located adjacent to walkways, the termination of mechanical draft systems shall
15 be not less than ((7)) 10 feet (((2134)) 3048 mm) above the level of the walkway.
- 16 2. Vents shall terminate at least 3 feet (914 mm) above any forced air inlet located within
17 10 feet (3048 mm) ((horizontally)).
- 18 3. Where the vent termination is located below an adjacent roof structure, the termination
19 point shall be located at least 3 feet (914 mm) from such structure.
- 20 4. The vent shall terminate at least 4 feet (1219 mm) below, 4 feet (1219 mm) horizontally
21 from or 1 foot (305 mm) above any door, window or gravity air inlet for the building.
- 22 5. A vent cap shall be installed to prevent rain from entering the vent system.
- 23 6. The vent termination shall be located at least 3 feet (914 mm) horizontally from any
24 portion of the roof structure.

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SECTION 918

~~((FORCED-))AIR-HANDLING UNITS ((WARM-AIR-FURNACES))~~

918.2 Minimum duct sizes for furnaces. The minimum unobstructed total area of the outdoor and return air ducts or openings to a forced-air warm-air furnace shall be not less than 2 square inches per 1,000 Btu/h (4402 mm²/kW) output rating capacity of the furnace and not less than that specified in the furnace manufacturer's installation instructions. The minimum unobstructed total area of supply ducts from a forced-air warm-air furnace shall not be less than 2 square inches for each 1,000 Btu/h (4402 mm²/kW) output rating capacity of the furnace and not less than that specified in the furnace manufacturer's installation instructions.

Exception: The total area of the supply air ducts and outdoor and return air ducts shall not be required to be larger than the minimum size required by the furnace manufacturer's installation instructions.

918.6 Prohibited sources. Outdoor or return air for forced-air heating and cooling systems shall not be taken from the following locations:

1. Less than 10 feet (3048 mm) from an *appliance* vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outdoor air inlet.
2. Where there is the presence of objectionable odors, fumes or flammable vapors; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A hazardous or insanitary location or a refrigeration *machinery room* as defined in this code.

1 4. A room or space, the volume of which is less than 25 percent of the entire volume served
2 by such system. Where connected by a permanent opening having an area sized in
3 accordance with Sections 918.2 and 918.3, adjoining rooms or spaces shall be considered
4 as a single room or space for the purpose of determining the volume of such rooms or
5 spaces.

6 **Exception:** The minimum volume requirement shall not apply where the amount of return
7 air taken from a room or space is less than or equal to the amount of supply air delivered to
8 such room or space.

9 5. A closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or
10 unconditioned attic.

11 **Exceptions:**

12 5.1 Where return air intakes are located not less than 10 feet (3048 mm) from cooking
13 appliances, and serve the kitchen area only, taking return air from a kitchen shall not
14 be prohibited.

15 5.2 Dedicated forced-air systems serving only a garage shall not be prohibited from
16 obtaining return air from the garage.

17 6. ~~((An unconditioned))~~ A crawl space, ~~((by means of direct connection to the return side of a
18 forced air system. Transfer openings in the crawl space enclosure shall not be prohibited.))~~

19 7. A room or space containing a fuel-burning *appliance* where such room or space serves as
20 the sole source of return air.

21 **Exceptions:**

22 7.1. This shall not apply where the fuel-burning appliance is a direct-vent appliance.

23 7.2. This shall not apply where the room or space complies with the following
24 requirements:

1 4. Be provided with potable water backflow protection in accordance with ((~~Section 608~~ of
2 the *International*)) Uniform Plumbing Code.

3 5. Have air intake opening locations in accordance with Section 401.4.
4

5 Section 11. The following sections of Chapter 11 of the International Mechanical Code,
6 2012 Edition, are amended as follows:

7 **CHAPTER 11**
8 **REFRIGERATION**

9
10 **SECTION 1101**

11 **GENERAL**

12 ***

13 **1101.4 Water connection.** Water supply and discharge connections associated with refrigeration
14 systems shall be made in accordance with this code and the ((*International*)) Uniform Plumbing
15 Code.

16 ***

17 **SECTION 1104**

18 **SYSTEM APPLICATION REQUIREMENTS**

19 ***

20 **1104.2 Machinery room.** Except as provided in Sections 1104.2.1 and 1104.2.2, all components
21 containing the refrigerant shall be located either outdoors or in a *machinery room* where the
22 quantity of refrigerant in an independent circuit of a system exceeds the amounts shown in Table
23 1103.1. For refrigerant blends not listed in Table 1103.1, the same requirement shall apply when
24 the amount for any blend component exceeds that indicated in Table 1103.1 for that component.
25 This requirement shall also apply when the combined amount of the blend components exceeds a
26

1 limit of 69,100 parts per million (ppm) by volume. Machinery rooms required by this section
2 shall be constructed and maintained in accordance with Section 1105 for Group A1 and B1
3 refrigerants and in accordance with Sections 1105 and 1106 for Group A2, B2, A3 and B3
4 refrigerants.

5 **Exceptions:**

- 6 1. Machinery rooms are not required for *listed equipment* and appliances containing not
7 more than 6.6 pounds (3 kg) of refrigerant, regardless of the refrigerant's safety
8 classification, where installed in accordance with the equipment's or appliance's
9 listing and the *equipment or appliance* manufacturer's installation instructions.
- 10 2. Piping in conformance with Section 1107 is allowed in other locations to connect
11 components installed in a *machinery room* with those installed outdoors.

12 **1104.2.1 Institutional occupancies.** The amounts shown in Table 1103.1 shall be reduced by
13 50 percent for all areas of institutional occupancies except kitchens, laboratories and
14 mortuaries. The total of all Group A2, B2, A3 and B3 refrigerants shall not exceed 550
15 pounds (250 kg) in occupied areas or machinery rooms.

16 **1104.2.2 Industrial occupancies and refrigerated rooms.** This section applies only to
17 industrial occupancies and refrigerated rooms for manufacturing, food and beverage
18 preparation, meat cutting, other processes and storage. Machinery rooms are not required
19 where all of the following conditions are met:

- 20 1. The space containing the machinery is separated from other occupancies by tight
21 construction with tight-fitting doors.
- 22 2. Access is restricted to authorized personnel.
- 23 3. The floor area per occupant is not less than 100 square feet (9.3 m²) where machinery
24 is located on floor levels with exits more than 6.6 feet (2012 mm) above the ground.
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1 Where provided with egress directly to the outdoors or into *approved* building exits,
2 the minimum floor area shall not apply.

3 4. Refrigerant detectors are installed as required for machinery rooms in accordance
4 with Section 1105.3.

5 5. Surfaces having temperatures exceeding 800°F (427°C) and open flames are not
6 present where any Group A2, B2, A3 or B3 refrigerant is used (see Section 1104.3.4).

7 6. All electrical *equipment* and appliances conform to Class 1, Division 2, *hazardous*
8 *location* classification requirements of ((NFPA 70)) the Seattle Electrical Code where
9 the quantity of any Group A2, B2, A3 or B3 refrigerant, other than ammonia, in a
10 single independent circuit would exceed 25 percent of the lower flammability limit
11 (LFL) upon release to the space.

12 7. All refrigerant-containing parts in systems exceeding 100 horsepower (hp) (74.6 kW)
13 drive power, except evaporators used for refrigeration or dehumidification;
14 condensers used for heating; control and pressure relief valves for either; and
15 connecting piping, shall be located either outdoors or in a *machinery room*.

16 **1104.4 Volume calculations.** Volume calculations shall be in accordance with Sections 1104.4.1
17 through 1104.4.3.

18 **1104.4.1 Noncommunicating spaces.** Where the refrigerant-containing parts of a system are
19 located in one or more spaces that do not communicate through permanent openings or
20 HVAC ducts, the volume of the smallest, enclosed occupied space shall be used to determine
21 the permissible quantity of refrigerant in the system.

22 **1104.4.2 Communicating spaces.** Where an evaporator or condenser is located in an air duct
23 system, the volume of the smallest, enclosed occupied space served by the duct system shall
24 be used to determine the maximum allowable quantity of refrigerant in the system.

1 **Interpretation:** The requirement for continuous mechanical ventilation to the outdoors means
2 that fire dampers are not allowed on machinery room ventilation ducts.

3 **Exception:** Where a refrigerating system is located outdoors more than 20 feet (6096 mm)
4 from any building opening and is enclosed by a penthouse, lean-to or other open structure,
5 natural (~~or mechanical~~) ventilation shall be (~~provided~~) permitted. *There shall be no*
6 *openings to the building*. Location of the openings shall be based on the relative density of
7 the refrigerant to air. The free-aperture cross section for the ventilation of the *machinery room*
8 shall be not less than:

9
$$F = \sqrt{G} \quad \text{(Equation 11-1)}$$

10 For SI: $F = 0.138 \sqrt{G}$

11 where:

12 F = The free opening area in square feet (m²).

13 G = The mass of refrigerant in pounds (kg) in the largest
14 system, any part of which is located in the
15 *machinery room*.

16 **1105.6.1 Discharge location.** The discharge of the air shall be to the outdoors in accordance
17 with Chapter 5. Exhaust from mechanical ventilation systems shall be discharged not less
18 than 20 feet (6096 mm) from a property line or openings into buildings.

19 **1105.6.2 Makeup air.** Provisions shall be made for *makeup air* to replace that being
20 exhausted. Openings for *makeup air* shall be located to avoid intake of *exhaust air*. Supply
21 and exhaust ducts to the *machinery room* shall serve no other area, shall be constructed in
22 accordance with Chapter 5 and shall be covered with corrosion-resistant screen of not less
23 than 1/4-inch (6.4 mm) mesh.

24 **1105.6.3 Ventilation rate other than ammonia systems.** For other than ammonia systems,
25 the mechanical ventilation systems shall be capable of exhausting the minimum quantity of
26 air both at normal operating and emergency conditions, as required by Sections 1105.6.3.1
27 and 1105.6.3.2. (~~The minimum required ventilation rate for ammonia shall be in accordance~~
28

1 with HAR2.) Multiple fans or multispeed fans shall be allowed to produce the emergency
2 ventilation rate and to obtain a reduced airflow for normal ventilation.

3 **1105.6.3.1 Quantity—normal ventilation.** During occupied conditions, the mechanical
4 ventilation system shall exhaust the larger of the following:

- 5 1. Not less than 0.5 cfm per square foot ($0.0025 \text{ m}^3/\text{s} \cdot \text{m}^2$) of *machinery room* area ((or
6 20 cfm ($0.009 \text{ m}^3/\text{s}$) per person)); or
7 2. A volume required to limit the room temperature rise to 18°F (10°C) taking into
8 account the ambient heating effect of all machinery in the room; or
9 3. Not less than 20 cfm ($0.009 \text{ m}^3/\text{s}$) per person.

10 **1105.6.3.1.1 Quantity—unoccupied condition.** During unoccupied conditions, the
11 mechanical ventilation system is permitted to exhaust the larger of the following:

- 12 1. Not less than 0.25 cfm per square foot ($0.00125 \text{ m}^3/\text{s} \cdot \text{m}^2$) of *machinery room* area; or
13 2. A volume required to limit the room temperature rise to 18°F (10°C) taking into
14 account the ambient heating effect of all machinery in the room.

15 The system shall be provided with controls that increase the ventilation to the rate
16 required for occupied spaces when the space is illuminated.

17 **1105.6.3.2 Quantity—emergency conditions.** Upon actuation of the refrigerant detector
18 required in Section 1105.3, the mechanical ventilation system shall *exhaust air* from the
19 *machinery room* in the following quantity:

20
$$Q = 100 \times \sqrt{G} \quad (\text{Equation 11-2})$$

21 For SI: $Q = 0.07 \times \sqrt{G}$

22 where:

23 Q = The airflow in cubic feet per minute (m^3/s).

24 G = The design mass of refrigerant in pounds (kg) in
25 the largest system, any part of which is located in
26 the *machinery room*.

1 **1105.6.4 Ventilation rate—ammonia.** The minimum required normal and emergency
2 ventilation rates for ammonia shall be in accordance with IIAR2 and Sections 1105.6.4.1 and
3 1105.6.4.2.

4 **1105.6.4.1 Quantity—normal ventilation.** During normal conditions, the mechanical
5 ventilation system shall exhaust the larger of the following:

- 6 1. Not less than 2 cfm per square foot (0.01 m³/s •m²) of *machinery room* area; or
- 7 2. A volume required to limit the room temperature rise to 18°F (10°C) taking into
8 account the ambient heating effect of all machinery in the room; or
- 9 3. Not less than 5 air changes per hour.

10 **1105.6.4.2 Quantity—emergency conditions.** Upon actuation of the refrigerant detector
11 required in Section 1105.3, the mechanical ventilation system shall *exhaust air* from the
12 *machinery room* at a rate of not less than 30 air changes per hour or in accordance with
13 IIAR 2.

14 **[F] 1105.6.5 Standby source of power required.** Where *mechanical ventilation*, treatment
15 systems, temperature control, alarm, detection or other electrically operated systems are
16 required, such systems shall be provided with a legally-required standby source of power.
17 See the *International Building Code* Chapter 27 and *Seattle Electrical Code* Article 701.

18 **Exception:** Legally required standby power is not required where an approved fail-safe
19 engineered system is installed.

20 **1105.7 Termination of relief devices.** Pressure relief devices, fusible plugs and purge systems
21 located within the *machinery room* shall terminate outside of the structure at a location not less
22 than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm)
23 from any window, ventilation opening or exit.

1 **[F] 1106.7 Alarm activation.** Where continuous ventilation is provided, failure of the
2 ventilation system shall automatically activate an audible and visual alarm.

3 **SECTION 1107**

4 **REFRIGERANT PIPING**

5 ***

6 **1107.2 Piping location.** Refrigerant piping that crosses an open space that affords passageway in
7 any building shall be not less than 7 feet 3 inches (2210 mm) above the floor unless the piping is
8 located against the ceiling of such space. Refrigerant piping shall not be placed in any elevator,
9 dumbwaiter or other shaft containing a moving object or in any shaft that has openings to living
10 quarters or to an exit access corridor, enclosed stairway or exit passageway. ~~((means of egress))~~.
11 Refrigerant piping shall not be installed in a lobby that is part of an exit system, ~~((n enclosed~~
12 ~~public))~~ stairway, exit passageway ~~((stair landing))~~ or ~~((means of egress))~~ exit access corridor.

13 **Exceptions:**

- 14 1. Refrigerant piping and equipment is permitted to be separated from the corridor, stair,
15 passageway by construction equal to the rated construction of the space and located so
16 that all required clearances are maintained.
- 17 2. Refrigerant piping is permitted to pass through corridors if located above a ceiling and
18 the piping has no joints in the corridor.
- 19 3. Refrigerant piping is permitted to pass through lobbies that are part of an exit system if
20 the refrigeration system contains not more than the amount of refrigerant allowed by
21 Section 1104.3.

22 **1107.2.1 Piping in concrete floors.** Refrigerant piping installed in concrete floors shall be
23 encased in pipe ducts. The piping shall be isolated and supported to prevent damaging
24 vibration, stress and corrosion.

1 refrigerant suction and discharge lines 6 inches (152 mm) and smaller. (~~Type F steel pipe~~
2 ~~shall not be used for refrigerant~~) Refrigerant lines having an operating temperature less than
3 -20°F (-29°C) shall be designed to meet the requirements of ASME B31.5 Refrigeration
4 Piping and Heat Transfer Components.

5 **1107.5.2 Copper and brass pipe.** Standard iron-pipe size, copper and red brass (not less
6 than 80-percent copper) pipe shall conform to ASTM B 42 and ASTM B 43.

7 **1107.5.3 Copper tube.** Copper tube used for refrigerant piping erected on the premises shall
8 be seamless copper tube of Type ACR (hard or annealed) complying with ASTM B 280.

9 Where *approved*, copper tube for refrigerant piping erected on the premises shall be seamless
10 copper tube of Type K, L or M (drawn or annealed) in accordance with ASTM B 88.

11 Annealed temper copper tube shall not be used in sizes larger than a 2-inch (51 mm) nominal
12 size. Mechanical joints shall not be used on annealed temper copper tube in sizes larger than
13 $7/8$ -inch (22.2 mm) OD size.

14 **1107.5.4 Copper tubing joints.** Copper tubing joints used in refrigerating systems
15 containing Group A2, A3, B2 or B3 refrigerants shall be brazed. Soldered joints shall not be
16 used in such refrigerating systems.

17 **1107.5.5 Aluminum tube.** Type 3003-0 aluminum tubing with high-pressure fittings shall
18 not be used with methyl chloride and other refrigerants known to attack aluminum.

19 ***

20 **1107.8 Stop valves.** All systems containing more than 6.6 pounds (3 kg) of a refrigerant in
21 systems using positive-displacement compressors shall have stop valves installed as follows:

- 22 1. At the inlet of each compressor, compressor unit or condensing unit.
- 23 2. At the discharge outlet of each compressor, compressor unit or condensing unit and of each
24 liquid receiver.

25 **Exceptions:**

CHAPTER 15

REFERENCED STANDARDS

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section ((102.8)) 103.5.

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
1791 Tullie Circle, NE
Atlanta, GA 30329

Standard reference number	Title	Referenced in code number section
ASHRAE— 2009	ASHRAE Fundamentals Handbook	603.2
15—2010	Safety Standard for Refrigeration Systems	1101.6, 1105.8, 1108.1
34—2010	Designation and Safety Classification of Refrigerants	202, 1102.2.1, 1103.1
62.1—2010	Ventilation for Acceptable Indoor Air Quality	403.3.2.3.2
<u>62.2—2010</u>	<u>Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings</u>	<u>403.8.11</u>

1 180—2008 Standard Practice for Inspection and Maintenance of 102.3
2 Commercial Building HVAC Systems

3
4 **ASME** American Society of Mechanical Engineers

5 Three Park Avenue

6 New York, NY 10016-5990

7 Standard	8 Title	9 Referenced
10 reference	11 in code	12 number
13 number	14 section	15 number

16 ***

17 B31.5—2010 Refrigeration Piping and Heat Transfer Components 1107.5.1

18 ***

19 Section 15. Sections 2-13 of Ordinance 123380 are repealed.

20 Section 16. During the transition period, an applicant who submits a valid and fully
21 complete mechanical permit application may elect to have the application considered under the
22 provisions of Ordinance 123380 rather than this Ordinance. The transition period begins on the
23 effective date of this Ordinance and extends through the later of: (a) October 11, 2013; or (b) the
24 60th day following the effective date of this Ordinance (unless the 60th day is a Saturday,
25 Sunday, or federal or City holiday, in which case the 60th day shall be deemed to be the next day
26 that is not a Saturday, Sunday, or federal or City holiday).

27 Section 17. The provisions of this ordinance are declared to be separate and severable.
28 The invalidity of any clause, sentence, paragraph, subdivision, section or portion of this
ordinance, or the invalidity of the application thereof to any person, owner, or circumstance shall

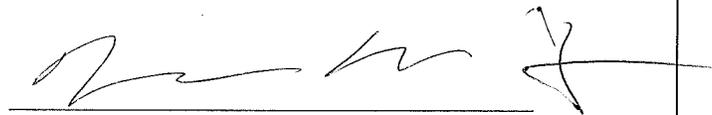
1 not affect the validity of the remainder of this ordinance, or the validity of its application to other
2 persons, owners, or circumstances.

3 Section 18. This ordinance shall take effect and be in force 30 days after its approval by
4 the Mayor, but if not approved and returned by the Mayor within ten days after presentation, it
5 shall take effect as provided by Seattle Municipal Code Section 1.04.020.

6 Passed by the City Council the 16th day of September, 2013, and
7 signed by me in open session in authentication of its passage this
8 16th day of September, 2013.

9
10 
11 President _____ of the City Council

12
13 Approved by me this 25th day of September, 2013.

14
15 
16 Michael McGinn, Mayor

17
18 Filed by me this 26 day of September, 2013.

19
20 
21 for Monica Martinez Simmons, City Clerk

22 (Seal)

FISCAL NOTE FOR NON-CAPITAL PROJECTS

Department:	Contact Person/Phone:	CBO Analyst/Phone:
DPD	Maureen Traxler/233-3892	Melissa Lawrie/684-5805

Legislation Title:

AN ORDINANCE relating to the Seattle Mechanical Code, amending Chapter 22.400.010 of the Seattle Municipal Code, and adopting by reference Chapters 2 through 9, and Chapters 11 through 15 of the 2012 International Mechanical Code, and amending certain of those chapters; adopting a new Chapter 1 related to administration, permitting and enforcement; and repealing Sections 2-13 of Ordinance 123380.

Summary of the Legislation:

This legislation adopts the 2012 Seattle Mechanical Code, consisting of the 2012 International Mechanical Code and Seattle amendments.

Background:

This legislation is one of seven coordinated bills that regulate construction and use of buildings in Seattle. Six are prepared by the Department of Planning and Development (DPD): the Seattle Building, Residential, Mechanical, Fuel Gas, Energy and Existing Building codes. The seventh bill adopts the 2012 Plumbing Code, which is administered by Public Health – Seattle & King County. These codes are the current state and national standards for building construction. A related bill adopting the 2012 Seattle Fire Code is being heard by the City Council Public Safety, Civil Rights and Technology Committee.

New editions of these codes are adopted by the State every 3 years, and State law requires local jurisdictions to enforce them. Seattle adds local amendments to the State codes. A list of the most significant Seattle amendments is attached.

 X **This legislation does not have any financial implications.**

Other Implications:

a) **Does the legislation have indirect financial implications, or long-term implications?**

No

b) **What is the financial cost of not implementing the legislation?**

There is no cost if the legislation is not implemented.

c) **Does this legislation affect any departments besides the originating department?**

Departments that will build or alter buildings or mechanical systems will be required to meet updated construction standards. However, state law requires all cities and counties to adopt the state codes. The Seattle amendments are enhancements of the state codes.

d) What are the possible alternatives to the legislation that could achieve the same or similar objectives?

The alternative is to adopt the state codes only, without Seattle amendments.

e) Is a public hearing required for this legislation?

No.

f) Is publication of notice with *The Daily Journal of Commerce* and/or *The Seattle Times* required for this legislation?

No.

g) Does this legislation affect a piece of property?

No.

List attachments to the fiscal note below:

Attachment 1: Changes in 2012 Seattle Mechanical Code

Attachment 1

Changes in 2012 Seattle Mechanical Code

Highlights of changes

Most of the changes in the International Mechanical Code and Seattle amendments are technical changes that will not have a major impact on construction. The most significant of the changes are listed here.

- 103.1 More complete provisions for vesting of permit applications are added to chapter 1.
- 117 Rules about expiration, renewal and reestablishment of permits are clarified.
- 306.5 Permanent access to mechanical equipment located on a roof more than 16 feet above grade is required. Clearances are specified to assure access to the ladders.
- 307 Ph neutralization of condensate from fuel-burning appliances is required to be provided upstream of discharge to the plumbing drainage.
- Table 403.3 Nail salons are required to provide systems to remove fumes and dust at each nail station.
- 403.8.5 Revised state amendments require ventilation systems for residences to be set to operate at least one hour in every 4 hour period. Previous codes have required one hour in every 12 hour period.
- 505.1 A Seattle interpretation clarifies when an additional exhaust fan is required in kitchens that have recirculating range hoods.
- 507.2 Commercial kitchen exhaust hoods are not required for appliances that have downdraft exhaust systems.
- 603.10 Amendments are deleted that provided specific requirements for seismic bracing of ducts. The requirements have become inconsistent with national standards. DPD will develop guidelines to replace the code amendments.
- 1105 Refrigerant leak detectors are required to have a visual and audible alarm that transmits to an attended location.
- 1105 & 1106 The requirements for ventilation of refrigerant machinery rooms are revised to distinguish between rooms that are occupied and those that are not, and between rooms that contain ammonia and those that do not.
- 1107.2 New amendments specify conditions under which refrigerant piping may be located in or near corridors and exits.
- Chapter 16 An updated version of ASHRAE 62, the national standard for ventilation, is adopted. The new standard has revised values for the amount of ventilation air required in several occupancies.



City of Seattle
Office of the Mayor

July 16, 2013

Honorable Sally J. Clark
President
Seattle City Council
City Hall, 2nd Floor

Dear Council President Clark:

I am pleased to transmit the attached proposed Council Bill that adopts the 2012 Seattle Mechanical Code. It is one of seven coordinated bills that regulate construction and use of buildings in Seattle. Six are prepared by the Department of Planning and Development (DPD): the Seattle Building, Residential, Mechanical, Fuel Gas, Energy and Existing Building codes. The seventh bill adopts the 2012 Plumbing Code, which is administered by Public Health – Seattle & King County. These codes are the current state and national standards for building construction. A related bill adopting the 2012 Seattle Fire Code is being heard by the City Council Public Safety, Civil Rights and Technology Committee.

These codes are adopted by the State, and State law requires local jurisdictions to enforce them. Seattle adds local amendments to the State codes. (A list of the most significant Seattle amendments is attached to the fiscal note for this legislation.) The Construction Codes Advisory Board (CCAB) has reviewed these proposed ordinances. CCAB, which consists of representatives of the general public, and design, development and construction industries, has devoted countless hours to reviewing and discussing these proposals. A draft of the Seattle Mechanical Code was made available for public comment in February 2013, and a CCAB subcommittee reviewed it last fall. There is substantial consensus about this ordinance.

Thank you for your consideration of this legislation. Adoption of the new codes will provide additional flexibility of building design and will enhance safety for the citizens of Seattle. Should you have questions, please contact Maureen Traxler at 233-3892.

Sincerely,

Michael McGinn
Mayor of Seattle

cc: Honorable Members of the Seattle City Council

STATE OF WASHINGTON -- KING COUNTY

--SS.

303313
CITY OF SEATTLE, CLERKS OFFICE

No.

Affidavit of Publication

The undersigned, on oath states that he is an authorized representative of The Daily Journal of Commerce, a daily newspaper, which newspaper is a legal newspaper of general circulation and it is now and has been for more than six months prior to the date of publication hereinafter referred to, published in the English language continuously as a daily newspaper in Seattle, King County, Washington, and it is now and during all of said time was printed in an office maintained at the aforesaid place of publication of this newspaper. The Daily Journal of Commerce was on the 12th day of June, 1941, approved as a legal newspaper by the Superior Court of King County.

The notice in the exact form annexed, was published in regular issues of The Daily Journal of Commerce, which was regularly distributed to its subscribers during the below stated period. The annexed notice, a

CT:124272-290 TITLE ONLY

was published on

10/09/13

The amount of the fee charged for the foregoing publication is the sum of \$321.75 which amount has been paid in full.



[Signature]
Subscribed and sworn to before me on
10/09/2013 *[Signature]*

Notary public for the State of Washington,
residing in Seattle

Affidavit of Publication

City of Seattle

The full text of the following legislation, passed by the City Council on September 16, 2013, and published below by title only, will be mailed upon request, or can be accessed at <http://clerk.seattle.gov>. For information on upcoming meetings of the Seattle City Council, please visit <http://www.seattle.gov/council/calendar>. Contact: Office of the City Clerk at (206) 684-8344.

ORDINANCE NO. 124272

AN ORDINANCE relating to land use and zoning; amending the Official Land Use Map to rezone properties located at 525 Northeast Northgate Way from Neighborhood Commercial 3 with a 66 foot height limit (NC3-65) to NC3 with an 85 foot height limit (NC3-85) and accepting a Property Use and Development Agreement in connection with the rezone.

ORDINANCE NO. 124273

AN ORDINANCE relating to the Seattle Building Code, amending Chapter 22.100.010 of the Seattle Municipal Code, and adopting by reference Chapters 2 through 29, Chapters 31 through 33 and Chapter 35 of the 2012 International Building Code, and amending certain of those chapters; adopting a new Chapter 1 related to administration, permitting and enforcement; adopting a new Chapter 30 related to elevators and conveying systems, and repealing Sections 2-33 of Ordinance 123384.

ORDINANCE NO. 124274

AN ORDINANCE relating to the Seattle Plumbing Code, repealing Section 22.500.010 of the Seattle Municipal Code, amending Section 22.502.016 of the Seattle Municipal Code; and adopting by reference Chapter 51-56 of the Washington Administrative Code, and amending certain of those chapters; adopting a new Chapter 1 related to administration, permitting and enforcement; and repealing Sections 2-46 of Ordinance 119774.

ORDINANCE NO. 124275

AN ORDINANCE relating to the Seattle Mechanical Code, amending Chapter 22.400.010 of the Seattle Municipal Code, and adopting by reference Chapters 2 through 9, and Chapters 11 through 15 of the 2012 International Mechanical Code, and amending certain of those chapters; adopting a new Chapter 1 related to administration, permitting and enforcement; and repealing Sections 2-13 of Ordinance 123380.

ORDINANCE NO. 124276

AN ORDINANCE relating to the Seattle Fuel Gas Code amending Section 22.420.010 and adopting by reference Chapters 2 through 8 of the 2012 International Fuel Gas Code, and amending certain of those chapters; adopting a new Chapter 1 for the Seattle Fuel Gas Code related to administration, permitting and enforcement; and repealing Sections 2-7 of Ordinance 123381.

ORDINANCE NO. 124277

AN ORDINANCE accepting for general street purposes 13 deeds and one correction deed conveyed to the City of Seattle by the Central Puget Sound Regional Transit Authority ("Sound Transit") in connection with the Central Link Light Rail Transit Project as agreed to in a Property Acquisition and Transfer Procedures Agreement between the City of Seattle and Sound Transit, dated August 12, 2003 ("Property Transfer

Agreement"); laying off, opening, widening, extending, and establishing portions of the rights-of-way located on Martin Luther King Jr. Way South between South Holly Street and South Othello Street; placing the real property conveyed by the deeds under the jurisdiction of the Seattle Department of Transportation; and ratifying and confirming certain prior acts.

ORDINANCE NO. 124278

AN ORDINANCE vacating the south 240 feet of the alley adjacent to Lots 4-11 in Block 33, D.T. Denny's Home Addition to the City of Seattle, on the petition of the Burkheimer Family Limited Liability Company, a Washington limited liability company, and accepting a Property Use and Development Agreement as reflected in Clerk File 309868.

State of Washington, King County

ORDINANCE NO. 124279

AN ORDINANCE authorizing the acceptance of a conditional gift of funds from the Mark and Susan Torrance Foundation and Rails to Trails Conservancy to be applied towards the purchase of automated bicycle and pedestrian counters, the installation of said counters, the posting of data collected by some of these counters on a public facing website, expressing the City's gratitude for the gift, and ratifying and confirming prior acts.

ORDINANCE NO. 124280

AN ORDINANCE relating to the City Light Department; authorizing the General Manager and Chief Executive Officer to execute an amendment to an agreement with the Sacramento Municipal Utility District.

ORDINANCE NO. 124281

AN ORDINANCE appropriating money to pay certain audited claims and ordering the payment thereof.

ORDINANCE NO. 124282

AN ORDINANCE relating to the Seattle Residential Code, amending Section 22.150.010, and adopting by reference Chapters 2 through 10, 12 through 24, Section P2904, 44, and Appendices F and G of the 2012 International Residential Code, and amending certain of those chapters; adopting a new Chapter 1 related to administration, permitting and enforcement; and repealing Sections 2-18 of Ordinance 123383.

ORDINANCE NO. 124283

AN ORDINANCE relating to the Seattle Existing Building Code, amending Chapter 22.110 of the Seattle Municipal Code and adopting by reference Chapters 2 through 5, 7 through 11, 13 through 16, A1, and A3 through A6 of the 2012 International Existing Building Code; amending certain of those chapters, and adopting a new Chapter 1 related to administration, permitting and enforcement; and repealing Sections 2-12 of Ordinance 123379.

ORDINANCE NO. 124284

An Ordinance relating to the Seattle Energy Code, amending Section 22.700.010 of the Seattle Municipal Code; and adopting by reference Chapters 51-11C and 51-11R of the Washington Administrative Code, and amending certain of those chapters; and repealing Sections 2-18 of Ordinance 123430.

ORDINANCE NO. 124285

AN ORDINANCE related to establishing a Local Infrastructure Project Area for Downtown and South Lake Union; authorizing the Mayor to execute an interlocal agreement with King County.

ORDINANCE NO. 124286

AN ORDINANCE accepting an allocation of transferrable development rights and adopting an infrastructure funding plan to support the creation of a Landscape Conservation and Local Infrastructure Program.

ORDINANCE NO. 124287

AN ORDINANCE creating a Local Infrastructure Project Area and amending Sections 23.48.011, 23.49.011, and 23.58A.044 of the Seattle Municipal Code to implement a Landscape Conservation and Local Infrastructure Program.

ORDINANCE NO. 124288

AN ORDINANCE relating to the Seattle Fire Code, adopting as the Seattle Fire Code the 2012 edition of the International Fire Code with some exceptions, amending and adding various provisions to that code; amending Section 22.600.020 of the Seattle Municipal Code; and repealing Sections 2-44 of Ordinance 123393.

ORDINANCE NO. 124289

AN ORDINANCE related to the Central Puget Sound Regional Transit Authority ("Sound Transit") authorizing the Director of the Seattle Department of Transportation to execute an amendment to the Agreement between the City of Seattle and Sound Transit for Grant of Non-Exclusive Use of a Light Rail Transit Way as related to the Central Link Light Rail Transit Project to reflect the approved alignment for the Link Light Rail Transit Project, including the revised Northgate Link Extension and portion of the East Link segment located within the City of Seattle.

ORDINANCE NO. 124290

AN ORDINANCE relating to grant funds from non-City sources; authorizing the Director of Transportation (Director) to accept specified grants and execute related agreements for and on behalf of the City; changing appropriations in the 2013 Adopted Budget for the Seattle Department of Transportation (SDOT); adding a new project; revising allocations for certain projects in the 2013-2018 CIP; and ratifying and confirming certain prior acts.

Date of publication in the Seattle Daily Journal of Commerce, October 9, 2013.

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