

ORDINANCE No 119080

Ed

Law Dept

COUNCIL BILL No 112218

The City

AN ORDINANCE relating to the Seattle Mechanical Code: repealing Section 22.400.010 (Ordinance 117722 as amended by Ordinances 117863 and 118101); adding a new Section 22.400.010 to adopt Chapters 2 through 9, Chapters 11, 13, 15 and 16 of the 1997 Uniform Mechanical Code and the Uniform Mechanical Code Standards contained in Appendix A of the 1997 Uniform Mechanical Code; and amending the adopted Uniform Mechanical Code by: adding a new Chapter 1 related to administration, permitting and enforcement; amending Chapter 2, Definitions; amending certain provisions of Chapter 3 related to general requirements for mechanical systems; amending certain provisions of Chapter 4 related to ventilation air supply; amending certain provisions of Chapter 5 related to exhaust systems; amending certain provisions of Chapter 6 related to duct systems; amending certain provisions of Chapter 7 related to combustion air; amending certain provisions of Chapter 8 related to chimneys and vents; amending certain provisions of Chapter 9 related to special fuel-burning equipment; amending certain provisions of Chapter 11 related to refrigeration; and amending certain provisions in Chapter 13 related to fuel gas piping.

Honorable President

Your Committee on

to which was referred the within Council report that we have considered the same

BEAD DO

7-13-98 Full Council

COMPTROLLER FILE No.

Introduced: <u>JUN 13 1998</u>	By: <u>DRAGO</u>
Referred: <u>JUN 13 1998</u>	To: <u>Business, Economic & Community Development Committee</u>
Referred:	To:
Referred:	To:
Reported: <u>7-13-98</u>	Second Reading:
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Vetoed by Mayor:	Veto Published:
Passed over Veto:	Veto Sustained:



Law Department

The City of Seattle--Legislative Department

REPORT OF COMMITTEE

Date Reported
and Adopted

able President:

Committee on

h was referred the within Council Bill No.

that we have considered the same and respectfully recommend that the same:

BEAD Do approve 3-0

3-98 Full Council Action: Passed 9-0



Committee Chair

ORDINANCE 119080

1 AN ORDINANCE relating to the Seattle Mechanical Code: repealing Section 22.400.010
2 (Ordinance 117722 as amended by Ordinances 117863 and 118101); adding a new
3 Section 22.400.010 to adopt Chapters 2 through 9, Chapters 11, 13, 15 and 16 of the
4 1997 Uniform Mechanical Code and the Uniform Mechanical Code Standards
5 contained in Appendix A of the 1997 Uniform Mechanical Code; and amending the
6 adopted Uniform Mechanical Code by: adding a new Chapter 1 related to
7 administration, permitting and enforcement; amending Chapter 2, Definitions;
8 amending certain provisions of Chapter 3 related to general requirements for
9 mechanical systems; amending certain provisions of Chapter 4 related to ventilation
10 air supply; amending certain provisions of Chapter 5 related to exhaust systems;
11 amending certain provisions of Chapter 6 related to duct systems; amending certain
12 provisions of Chapter 7 related to combustion air; amending certain provisions of
13 Chapter 8 related to chimneys and vents; amending certain provisions of Chapter 9
14 related to special fuel-burning equipment; amending certain provisions of Chapter 11
15 related to refrigeration; and amending certain provisions in Chapter 13 related to fuel
16 gas piping.

9 **BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:**

10
11 **Section 1.** Section 22.400.010 of the Seattle Municipal Code adopting the 1994
12 Uniform Mechanical Code (Ordinance 117722 as amended by Ordinances 117863 and
13 118101) is hereby repealed, and a new Section 22.400.010 is added to the Seattle Municipal
14 Code to read as follows:

14 22.400.010 Adoption of Uniform Mechanical Code

15 The Seattle Mechanical Code shall consist of the following portions of the 1997
16 edition of the Uniform Mechanical Code as published by the International Conference of
17 Building Officials, together with the amendments and additions thereto adopted: Chapters 2
18 through 9, Chapters 11, 13, 15 and 16 and the Uniform Mechanical Code standards
19 contained in Appendix A. One copy of the 1997 Uniform Mechanical Code is filed with the
20 City Clerk in C. F. 302708.

19 **Section 2.** Wherever in this ordinance there is a conflict between metric units of
20 measurement and English units, the English units shall govern.

21
22 **Section 3.** The 1997 Uniform Mechanical Code is amended by adding Chapter 1
23 to read as follows:

24 **Chapter 1**

25 **ADMINISTRATION**

26 **Part I—General**

27 **SECTION 101 — TITLE**

28 These regulations shall be known as the "Seattle Mechanical Code," may be cited as such,
and will be referred to herein as "this code."

SECTION 102 — PURPOSE

The purpose of this code is to provide minimum standards to safeguard life or limb, health,
property and public welfare by regulating and controlling the design, construction,
installation, quality of materials, location, operation, and maintenance or use of heating,

ventilating, cooling, refrigeration systems, incinerators and other miscellaneous heat-producing appliances within the City.

1 The purpose of this code is to provide for and promote the health, safety and welfare
2 of the general public, and not to create or otherwise establish or designate any particular
3 class or group of persons who will or should be especially protected or benefited by the
4 terms of this code.

5 SECTION 103 — SCOPE

6 **103.1 Applicability.** The provisions of this code shall apply to the erection, installation,
7 alteration, repair, relocation, replacement, addition to, use or maintenance of any heating,
8 ventilating, cooling, refrigeration systems, incinerators or other miscellaneous heat-
9 producing appliances within the City. The design and testing of equipment regulated by this
10 code shall be subject to the approval of the building official.

11 **103.2 Alterations.** Additions, alterations, repairs and replacement of equipment or systems
12 shall comply with the provisions for new equipment and systems except as otherwise
13 provided in Section 104 of this code.

14 **103.3 Most Restrictive.** Where, in any specific case, different sections of this code specify
15 different materials, methods of construction or other requirements, the most restrictive shall
16 govern. Where there is a conflict between a general requirement and a specific requirement,
17 the specific requirement shall be applicable.

18 **103.4 Appendix A.** The Uniform Mechanical Code Standards in Appendix A shall be
19 considered to be part of this code.

20 **103.5 Appendix C.** Appendix C contains gas-venting tables and is intended to serve only as
21 a guide.

22 SECTION 104 — APPLICATION TO EXISTING MECHANICAL SYSTEMS

23 **104.1 Additions, Alterations or Repairs.** Additions, alterations, renovations or repairs may
24 be made to any mechanical system without requiring the existing mechanical system to
25 comply with all the requirements of this code, provided the addition, alteration, renovation
26 or repair conforms to that required for a new mechanical system. Additions, alterations,
27 renovations or repairs shall not cause an existing system to become unsafe, unhealthy or
28 overloaded.

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

104.2 Existing Installations. Mechanical systems lawfully in existence at the time of the
adoption of this code may have their use, maintenance or repair, conversion of fuel, or
component replacement continued if the use, maintenance, repair, conversion of fuel, or
component replacement is in accordance with the basic original design and location, and no
hazard to life, health or property has been created by such mechanical system.

104.3 Changes in Building Occupancy. Mechanical systems which are a part of any
building or structure undergoing a change in use or occupancy, as defined in the Building
Code, shall comply with all requirements of this code which may be applicable to the new
use or occupancy.

104.4 Maintenance. All mechanical systems, materials and appurtenances, both existing
and new, and all parts thereof shall be maintained in proper operating condition in
accordance with the original design and in a safe and hazard-free condition. All devices or
safeguards which are required by this code shall be maintained in conformance with the
code edition under which installed. The owner or the owner's designated agent shall be
responsible for maintenance of mechanical systems and equipment. To determine

compliance with this subsection, the building official may cause a mechanical system or equipment to be reinspected.

The Fire Chief and the building official shall each have authority to obtain compliance with the requirements of this subsection.

EXCEPTION: The building official may modify the requirements of this section where all or a portion of the building is unoccupied.

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

104.6 Historic Buildings and Structures. The building official may modify the specific requirements of this code as it applies to buildings and structures designated as landmarks of historical or cultural importance and require in lieu thereof alternate requirements which, in the opinion of the building official, will result in a reasonable degree of safety to the public and the occupants of those buildings.

A historic building or structure is one which has been designated for preservation by the City Landmarks Preservation Board or the State of Washington, has been listed, or has been determined eligible to be listed, in the National Register of Historic Places, has been officially nominated for such status, or is a structure contributing to the character of a designated landmark or special review district.

SECTION 105 — ALTERNATE MATERIALS AND METHODS OF CONSTRUCTION

This code does not prevent the use of any material, design or method of construction not specifically allowed or prohibited by this code, provided the alternate has been approved and its use authorized by the building official.

The building official may approve an alternate, provided he/she finds that the proposed alternate complies with the provisions of this code and that the alternate, when considered together with other safety features of the building or other relevant circumstances, will provide at least an equivalent level of strength, effectiveness, fire resistance, durability, safety and sanitation.

The building official may require that sufficient evidence or proof be submitted to reasonably substantiate any claims regarding the use or suitability of the alternate. The building official may, but is not required to, record the approval of modifications and any relevant information in the files of the building official or on the approved permit plans.

SECTION 106 — MODIFICATIONS

The building official may approve modifications for individual cases, provided the building official finds: (1) there are practical difficulties involved in carrying out the provisions of this code; (2) the modification is in conformity with the intent and purpose of this code; and (3) the modification will provide a reasonable level of fire protection and structural integrity when considered together with other safety features of the building or other relevant circumstances. The building official may, but is not required to, record the approval of modifications and any relevant information in the files of the building official or on the approved permit plans.

SECTION 107 — TESTS

Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that any material or method of construction does not conform to the requirements

of this code, the building official may require tests as proof of compliance to be made at no expense to the City.

1 Test methods shall be as specified in this code or by other recognized test standards.
2 If there are no recognized and accepted test methods for the proposed alternate, the building
3 official shall determine the test procedures.

4 All tests shall be made by an approved agency. Reports of such tests shall be retained
5 by the building official.

6 **SECTION 108 — JURISDICTION - POWERS AND DUTIES OF BUILDING** 7 **OFFICIAL**

8 **108.1 Jurisdiction.** The Department of Construction and Land Use is the code enforcement
9 agency in the City of Seattle for this code. The Director of the Department of Construction
10 and Land Use is the building official.

11 **108.2. General.** The building official is authorized and directed to enforce this code, except
12 that enforcement of Chapter 13 is the primary responsibility of the Director of Public Health,
13 and enforcement authority as provided in this code to the building official is also vested in
14 the Director of Public Health or the Fire Chief. Compliance with the requirements of this
15 code is the obligation of the owner of the building, structure or premises, the duly authorized
16 agent of the owner, or other person responsible for the condition or work, and not of the City
17 or any of its officers or employees.

18 **108.3 Deputies.** The building official may appoint such officers and inspectors and other
19 employees as shall be authorized from time to time. The building official may deputize such
20 inspectors or employees as may be necessary to carry out the functions of the Department of
21 Construction and Land Use.

22 **108.4 Right of Entry.** With the consent of the owner or occupier of a building or premises,
23 or pursuant to a lawfully issued warrant, the building official may enter a building or
24 premises at any reasonable time to perform the duties imposed by this code.

25 **108.5 Stop Orders.** Whenever any work is being done contrary to the provisions of this
26 code, or in the event of dangerous or unsafe conditions related to construction or demolition,
27 the building official may order the affected work stopped by a notice describing the
28 violation in writing, posted on the premises or served on any person responsible for the
condition or work. It is unlawful for any person to engage in or to cause such work to be
done until authorization from the building official is received.

108.6 Authority to Disconnect Utilities in Emergencies. The building official has the
authority to disconnect fuel-gas utility service or energy supplies to a building, structure,
premises or equipment regulated by this code in case of emergency where necessary to
eliminate an immediate hazard to life or property. The building official may enter any
building or premises to disconnect utility service. The building official shall, whenever
possible, notify the serving utility, the owner and occupant of the building, structure or
premises of the decision to disconnect prior to taking such action, and shall notify such
serving utility, owner and occupant of the building, structure or premises in writing of such
disconnection immediately thereafter.

108.7 Authority to Condemn Equipment. Whenever the building official ascertains that
any equipment, or portion thereof, regulated by this code has become hazardous to life,
health or property, the building official shall order in writing that such equipment may either
be removed or restored to a safe or sanitary condition, as appropriate. The written notice
itself shall fix a time limit for compliance with such order. It is unlawful for any person to
use or maintain defective equipment after receiving such notice.

When such equipment or installation is to be disconnected, written notice of such
disconnection and causes therefor shall be given within 24 hours to the serving utility, the
owner and occupant of the building, structure or premises. When any equipment is

maintained in violation of this code, and in violation of a notice issued pursuant to the provisions of this section, the building official shall institute any appropriate action to prevent, restrain, correct or abate the violation.

1 **108.8 Connection after Order to Disconnect.** No person shall make connections from any
2 energy, fuel or power supply nor supply energy or fuel to any equipment regulated by this
3 code which has been disconnected or ordered to be disconnected by the building official, or
4 the use of which has been ordered to be discontinued by the building official until the
5 building official authorizes the reconnection and use of such equipment.

6 **108.9 Liability.** Nothing contained in this code is intended to be nor shall be construed to
7 create or form the basis for any liability on the part of the City, or its officers, employees or
8 agents, for any injury or damage resulting from the failure of equipment to conform to the
9 provisions of this code, or by reason or in consequence of any inspection, notice, order,
10 certificate, permission or approval authorized or issued or done in connection with the
11 implementation or enforcement of this code, or by reason of any action or inaction on the
12 part of the City related in any manner to the enforcement of this code by its officers,
13 employees or agents.

14 This code shall not be construed to relieve from or lessen the responsibility of any
15 person owning, operating or controlling any building or structure for any damages to persons
16 or property caused by defects, nor shall the Department of Construction and Land Use or the
17 City of Seattle be held as assuming any such liability by reason of the inspections authorized
18 by this code or any permits or certificates issued under this code.

19 **108.10 Cooperation of Other Officials and Officers.** The building official may request,
20 and shall receive so far as is required in the discharge of the building official's duties, the
21 assistance and cooperation of other officials of the City of Seattle.

22 **SECTION 109 — UNSAFE EQUIPMENT AND HAZARD CORRECTION ORDER**

23 **109.1 Unsafe Equipment.** Any equipment regulated by this code which constitutes a fire or
24 health hazard or is otherwise dangerous to human life is, for the purpose of this section,
25 unsafe. Any use of equipment regulated by this code constituting a hazard to safety, health
26 or public welfare by reason of inadequate maintenance, dilapidation, obsolescence, fire
27 hazard, disaster, damage or abandonment is, for the purpose of this section, an unsafe use.
28 Any such unsafe equipment is hereby declared to be a public nuisance and may be abated.

1 **109.2 Hazard Correction Order.** Whenever the building official finds that unsafe
2 equipment exists, the building official may issue a hazard correction order specifying the
3 conditions causing the equipment to be unsafe and directing the owner or other person
4 responsible for the unsafe equipment to correct the condition. In lieu of correction, the
5 owner may submit a report or analysis to the building official analyzing said conditions and
6 establishing that the equipment is, in fact, safe. The building official may require that the
7 report or analysis be prepared by a licensed engineer. It is unlawful for any person to fail to
8 comply with a hazard correction order as specified in this subsection.

9 **SECTION 110 — APPEALS**

10 Appeals from decisions or actions pertaining to the administration and enforcement of this
11 code shall be addressed to the building official. The appellant may request a review by three
12 or more members of the Construction Codes Advisory Board, convened by the Chair. The
13 issue of the appeal shall be taken into account by the Chair when selecting members to hear
14 an appeal. The results of this appeal shall be advisory only.

15 **SECTION 111 — VIOLATIONS AND PENALTIES**

16 **111.1 Violations.** It is a violation of this code for any person, firm or corporation to install,
17 erect, construct, enlarge, alter, repair, replace, remodel, move, improve, remove, convert or
18 demolish, equip, occupy, use or maintain any mechanical systems or equipment or cause or
19 permit the same to be done in the City, contrary to or in violation of any of the provisions of
20 this code.

It is a violation of this code for any person, firm or corporation to use any material or to install any device, appliance or equipment which does not comply with the applicable standards of this code or which has not been approved by the building official.

1 **111.2 Notice of Violation.** If, after investigation, the building official determines that
2 standards or requirements of this code have been violated, the building official may serve a
3 notice of violation upon the owner or other person responsible for the action or condition.
4 The notice of violation shall state the standards or requirements violated, shall state what
5 corrective action, if any, is necessary to comply with the standards or requirements, and
6 shall set a reasonable time for compliance. The notice shall be served upon the owner or
7 other responsible person by personal service, registered mail or certified mail with return
8 receipt requested, addressed to the last known address of such person. In addition, a copy of
9 the notice may be posted at a conspicuous place on the property. The notice of violation
10 shall be considered an order of the building official. Nothing in this subsection shall be
11 deemed to limit or preclude any action or proceeding pursuant to Sections 108 or 109 of this
12 code, and nothing in this section shall be deemed to obligate or require the building official
13 to issue a notice of violation prior to the imposition of civil or criminal penalties in this
14 section.

9 **111.3 Civil Penalties.** Any person, firm or corporation failing to comply with the provisions
10 of this code shall be subject to a cumulative civil penalty in an amount not to exceed \$500
11 per day for each violation from the date the violation occurs or begins until compliance is
12 achieved. In cases where the building official has issued a notice of violation, the violation
13 will be deemed to begin, for purposes of determining the number of days of violation, on the
14 date compliance is required by the notice of violation.

13 **111.4 Criminal Penalty.** Anyone who violates or fails to comply with any order issued by
14 the building official pursuant to this code or who removes, mutilates, destroys or conceals a
15 notice issued or posted by the building official shall, upon conviction thereof, be punished
16 by a fine of not more than \$1,000 or by imprisonment for not more than 360 days, or by
17 both such fines and imprisonment. Each day's violation or failure to comply shall constitute
18 a separate offense.

17 Anyone violating or failing to comply with any of the provisions of this code and
18 who within the past five years has a judgment against them pursuant to Section 111.3, shall
19 upon conviction thereof, be punished by a fine in a sum not to exceed \$500 or imprisonment
20 for not more than 180 days, or by both such fine and imprisonment. Each day's violation or
21 failure to comply shall constitute a separate offense.

20 **111.5 Additional Relief.** The building official may seek legal or equitable relief to enjoin
21 any acts or practices and abate any condition which constitutes a violation of this code when
22 civil or criminal penalties are inadequate to effect compliance.

22 **SECTION 112 — NOTICES**

23 It is unlawful for any person to remove, mutilate, destroy or conceal any notice issued or
24 posted by the building official pursuant to the provisions of this code or any notice issued or
25 posted by the building official in response to a natural disaster or other emergency.

25 The building official may record a copy of any order or notice with the Department
26 of Records and Elections of King County.

26 The building official may record with the Department of Records and Elections of
27 King County a notification that a permit has expired without a final inspection after
28 reasonable efforts have been made to provide a final inspection.

SECTION 113 — RULES OF THE BUILDING OFFICIAL

113.1 Authority. The building official shall have the power to render interpretations of this code and to adopt and enforce rules and regulations supplemental to this code as may be

deemed necessary in order to clarify the application of the provisions of this code. Such interpretations, rules and regulations shall be in conformity with the intent and purpose of this code. The building official is authorized to promulgate, adopt and issue the following rules:

1. "Building Construction Standards" to promulgate standards which are acceptable as a method or as an alternative design for meeting code required performance criteria, to recognize new technical data affecting code requirements, and to eliminate conflicts among code requirements.
2. "Code Interpretations" to interpret and clarify conditions or language expressed in this code.
3. Any other rule necessary for the administration of the purpose and intent of this code.

113.2 Procedure for Adoption of Rules. The building official shall promulgate, adopt and issue rules according to the procedures as specified in Chapter 3.02 of the Administrative Code, Seattle Municipal Code.

SECTION 114 — CONSTRUCTION CODES ADVISORY BOARD

A committee of the Construction Codes Advisory Board may examine proposed administrative rules, appeals and amendments relating to this code and related provisions of other codes and make recommendations to the building official and to the City Council for changes in this code. The committee will be called on an as-needed basis by the Construction Codes Advisory Board.

SECTION 115 — PERMITS

115.1 Permits Required. It is unlawful to make any installation, alteration, repair, replacement or remodel any mechanical system regulated by this code except as permitted in Section 115.2 of this code, or allow the same to be done without first obtaining a separate mechanical permit for each separate building or structure. All work shall comply with this code, even where no permit is required.

115.2 Work Exempt from Permit.

115.2.1 Mechanical. A mechanical permit shall not be required for the following:

1. Any portable heating appliance, portable ventilating equipment, or portable cooling unit, provided that the total capacity of these portable appliances shall not exceed 40 percent of the cumulative heating, cooling or ventilating requirements of a building or dwelling unit and shall not exceed 3 kW or 10,000 Btu input.
2. Any closed system of steam, hot or chilled water piping within heating or cooling equipment regulated by this code.
3. Minor work or the replacement of any component part of a mechanical system which does not alter its original approval and complies with other applicable requirements of this code.

115.2.2 Refrigeration. A refrigeration permit shall not be required for the following:

1. Any self-contained refrigerating equipment for which an operating permit is not required.
2. Any self-contained refrigeration system which does not exceed three horsepower rating.

Exemption from the permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of the City.

115.3 Flood Hazard Areas. In addition to the permit required by this section, all work to be performed in areas of special flood hazard, as identified in the report entitled "Flood

1 Insurance Study for King County, Washington and Incorporated Areas” and the
2 accompanying Flood Insurance Rate Maps and filed in C.F. 295948, is subject to additional
3 standards and requirements, including floodplain development approval or a Floodplain
4 Development License, as set forth in Chapter 25.06, the Seattle Floodplain Development
5 Ordinance.

6 **115.4 Emergency Repairs.** In the case of an emergency, the installation, alteration or repair
7 of any refrigeration system or equipment may be made without a permit, provided that
8 application for a permit shall be made within twenty-four hours or within one working day
9 from the time when the emergency work was started.

10 **SECTION 116 — APPLICATION FOR PERMIT AND INFORMATION ON PLANS**
11 **AND SPECIFICATIONS**

12 **116.1 Application.** To obtain a permit, the applicant shall first file an application in writing
13 on a form furnished by the Department of Construction and Land Use for that purpose.
14 Every such application shall:

- 15 1. Identify and describe the work to be covered by the permit for which application is made.
- 16 2. Describe the land on which the proposed work is to be done by legal description, property
17 address or similar description that will readily identify and definitely locate the proposed
18 building or work.
- 19 3. Provide contractor's state license number (required if permit is to be issued to the
20 contractor). To obtain a permit for work on a refrigeration system, the applicant shall also
21 provide the number of the refrigeration contractor license issued by the City.
- 22 4. Be accompanied by plans, diagrams, computations and specifications, equipment schedule
23 and other data as required in Sections 116.2 and 116.3.
- 24 5. State the valuation of the mechanical work to be done. The value or valuation of the
25 mechanical work shall be the estimated current value of all labor and material, whether
26 actually paid for or not, for which the permit is issued.
- 27 6. Be signed by the owner of the property or building, or his/her authorized agent, who may
28 be required to submit evidence to indicate such authority.
7. Give such other data and information as may be required by the building official.
8. Indicate the name of the owner and contractor and the name, address and phone number of
a contact person.

116.2 Plans and Specifications. Plans, engineering calculations, diagrams and other data
shall be submitted in one or more sets with each application for a permit. The building
official may require plans, computations and specifications to be prepared and designed by
an engineer or architect licensed by the state to practice as such. Projects having a total
mechanical valuation of \$30,000 or larger shall require a mechanical engineering stamp and
signature on each sheet.

EXCEPTION: The building official may waive the requirements for a mechanical
engineers stamp or submission of plans, calculations or other data if the building official finds that
the nature of the work applied for is such that the reviewing of plans is not necessary to obtain
compliance with this code.

116.3 Information on Plans and Specifications.

116.3.1 Clarity of plans. Plans shall be drawn to a clearly indicated and commonly accepted
scale upon substantial paper such as blueprint quality or standard drafting paper. Tissue
paper, posterboard or cardboard will not be accepted. The plans shall be of microfilm

quality and limited to a minimum size of 18 inches by 18 inches and a maximum size of 41 inches by 54 inches.

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

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

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

SECTION 117 — PERMIT ISSUANCE

117.1 Issuance.

117.1.1 General. The application, plans, specifications, and other data filed by an applicant for permit shall be reviewed by the building official. Such plans may be reviewed by other departments of the City to check compliance with the laws and ordinances under their jurisdiction. If the building official finds that the work as described in an application for a permit and the plans, specifications and other data filed therewith substantially conforms to the requirements of this code and other pertinent laws and ordinances and that the fees specified in the Fee Subtitle have been paid, the building official shall issue a permit therefor to the applicant who becomes the permit holder or authorized agent.

EXCEPTION: The building official may issue a permit for the construction of part of a building or structure before complete plans for the whole building or structure have been submitted or approved, provided that the proposed project complies with the State Environmental Policy Act as adopted by the City (Chapter 25.05 Seattle Municipal Code) and as amended and the Land Use Code as amended; and provided further that adequate information and plans have been

filed and checked to assure compliance with all pertinent requirements of this and other pertinent codes. The holder of such a permit shall proceed at his/her own risk without assurance that the permit for the entire building or structure will be granted.

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117.1.2 Compliance with Approved Plans and Permit. When the building official issues a permit, the building official shall endorse the permit in writing and endorse in writing or stamp the plans "APPROVED." Such approved plans and permit shall not be changed, modified or altered without authorization from the building official, and all work shall be done in accordance with the approved plans and permit except as the building official may require during field inspection to correct errors or omissions.

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117.1.3 Amendments to the Permit. When substitutions or changes are made during construction, approval shall be secured prior to execution, however, the building inspector may approve minor modifications for work not reducing the structural strength and fire and life safety of the structure. The building inspector shall determine if it is necessary to revise the approved plans. These substitutions and changes shall conform to the requirements of this code and other pertinent laws and ordinances. Minor substitutions or changes shall be documented, but shall not incur additional fees if these substitutions and/or changes do not (1) add to the general scope of work; (2) change the basic design concept; (3) involve major relocation of equipment, ducts, or pipes; (4) substantially alter approved equipment size; (5) require extensive re-review of the plans and specifications.

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All other changes, substitutions, or clarifications shall be shown on two sets of plans which shall be submitted to and approved by the building official prior to execution or occupancy. These submittals shall be accompanied by appropriate fees as specified in the Fee Subtitle prior to issuance of the Certificate of Occupancy.

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117.1.4 Cancellation of Permit Application. An application shall be deemed abandoned and void if a permit is not issued after a period of sixty days from the date of notice of approval for issuance or if corrections are not received after a period of sixty days from the date of notification of required corrections; provided that the building official may extend the period for issuance or submission of corrections if it is determined that there are good reasons for the delay, such as litigation or appeals or if a different schedule is agreed upon in writing before the end of the sixty day period. If the permit application is canceled, the site may be inspected to verify that no work has taken place. The application and any accompanying plans and specifications shall be destroyed. If the application is being reviewed concurrently with a master use permit application, and is for a project vested to a prior Land Use Code, and the project does not conform with the codes in effect while it is being reviewed, cancellation of the building permit application under the provisions of this section shall cause the concurrent cancellation of the Master Use Permit application.

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117.2 Retention of Plans. One set of approved plans, which may be on microfilm, shall be retained by the building official. One set of approved plans shall be returned to the applicant, and shall be kept at the site of the building or work at all times during which the work authorized is in progress for use by the inspection personnel.

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117.3 Validity of permit. The issuance or granting of a permit or approval of plans shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or other pertinent laws and ordinances. No permit presuming to give authority to violate or cancel the provisions of this code shall be valid, except insofar as the work or use which it authorizes is lawful.

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The issuance of a permit based upon plans shall not prevent the building official from thereafter requiring the correction of errors in said plans, or from preventing building operations being carried on thereunder when in violation of this code or of other pertinent laws and ordinances of the City.

The issuance of a mechanical permit shall not prevent the building official from requiring correction of conditions found to be in violation of this code or other pertinent laws of the City, nor shall the period of time for which any such permit is issued be

construed to extend or otherwise affect any period of time for compliance specified in any notice or order issued by the building official or other administrative authority requiring the correction of any such conditions.

1 **117.4 Permit Expiration and Renewal.**

2 **117.4.1 Expiration.** Permits and renewed permits shall expire eighteen months from the
3 date of issuance.

4 **EXCEPTIONS:** 1. Initial permits for major construction projects that require more
5 than eighteen months to complete, according to a construction schedule submitted by the
6 applicant, may be issued for a period that provides reasonable time to complete the work but in no
7 case longer than three years.

8 2. Permits which expire in less than eighteen months may be issued where the building
9 official determines a shorter period is appropriate.

10 **117.4.2 Renewal.** Permits may be renewed and renewed permits may be further renewed by
11 the building official, provided the following conditions are met:

- 12 1. Application for renewal shall be made within the thirty-day period immediately
13 preceding the date of expiration of the permit;
- 14 2. The work authorized by the permit has been started and is progressing at a rate approved
15 by the building official. Progress justifying renewal of a permit, except as specified by
16 Item 3, shall include, but is not limited to, requesting of a required inspection, the
17 arranging of financing, selection of contractors and subcontractors, securing other
18 necessary permits and licenses, site preparation such as demolition, clearing and
19 excavation, soils investigation and work done to overcome unusual construction
20 difficulties;
- 21 3. If an application for renewal is made either more than eighteen months after the date of
22 mandatory compliance with a new or revised edition of this code or after the effective
23 date of an amendment to applicable provisions of the Land Use Code, the permit shall
24 not be renewed unless:

25 (i) The building official determines that the permit complies, or is modified to
26 comply with the code or codes in effect on the date of application renewal; or

27 (ii) The work authorized by the permit is substantially underway and progressing
28 at a rate approved by the building official. Progress justifying renewal of the permit shall be
evidenced by notification by the permit holder that a construction step is ready for an
inspection required by Section 119.4 of this code.

Permits may also be renewed where commencement or completion of the work
authorized by the permit is delayed by litigation, appeals, strikes or other causes related to
the work authorized by the permit, beyond the permit holder's control.

117.4.3 Re-establishment. A new permit shall be required to complete work where a permit
has expired and was not renewed.

EXCEPTION: A permit which has been expired for less than one year may be
reestablished upon approval of the building official provided it complies with Items 2 and 3 of
Section 117.4.2.

117.5 Suspension or Revocation. The building official may, by written order, suspend or
revoke a permit issued under the provisions of this code whenever the permit is issued in
error or on the basis of incorrect information supplied, or in violation of any ordinance or
regulation or any provisions of this code.

SECTION 118 — 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 Fee Subtitle.

SECTION 119 — INSPECTIONS

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119.1 General. All construction or work for which a permit is required is subject to inspection by the building official, and certain types of construction shall have special inspections by registered special inspectors as specified in Section 1701 of the Seattle Building Code.

119.2 Inspection Requests. It is the duty of 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, to notify the building official that work requiring inspection as specified in this section and Section 120 is ready for inspection.

It is the duty of the person requesting any inspections required by this code to provide access to and means for proper inspection of such work. It is the duty of the permit holder to cause the work to be accessible and exposed for inspection purposes until approved by the building official. Neither the building official nor the City shall be liable for expense entailed in the required removal or replacement of any material to allow inspection.

119.3 Inspection Record. Work requiring a mechanical permit shall not be commenced until the permit holder or agent has posted an inspection record in a conspicuous place on the premises and in a position which allows the building official to conveniently make the required entries thereon regarding inspection of the work. This record shall be maintained in such a position by the permit holder until final approval has been granted by the building official.

119.4 Approvals Required. No work shall be done on any part of the building or structure beyond the point indicated in each successive inspection without first obtaining the written approval of the building official. Such written approval shall be given only after an inspection has been made of each successive step in the construction as indicated by each of the inspections required in this section.

All mechanical systems for which a permit is required by this code shall be inspected by the building official. No portion of any mechanical system intended to be concealed shall be concealed until inspected and approved. Neither the building official nor the City shall be liable for expense entailed in the removal or replacement of material required to permit inspection. When the installation of a mechanical system is complete, an additional and final inspection shall be made.

Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other pertinent laws and ordinances of the City. Inspections presuming to give authority to violate or cancel the provisions of this code or of other pertinent laws and ordinances of the City shall not be valid.

119.5 Operation of Mechanical Equipment. The requirements of this section shall not be considered to prohibit the operation of any mechanical systems installed to replace existing equipment or fixtures serving an occupied portion of the building in the event a request for inspection of such equipment or fixture has been filed with the building official more than 48 hours after such replacement work is completed, and before any portion of such mechanical system is concealed by any permanent portion of the building.

119.6 Testing of Equipment and Systems. Refrigeration equipment regulated by this code shall be tested and approved as required by Chapter 11 of this code.

When applicable (see Section 103.5), fuel-gas piping shall be tested and approved as required by Chapter 13 of this code.

119.7 Other Inspections. In addition to the called inspections required by this code, the building official may make or require any other inspections of any mechanical work to

ascertain compliance with the provisions of this code and other laws and ordinances which are enforced by the building official.

1 Where work for which any permit or approval is required is commenced or
2 performed prior to making formal application and receiving the building official's
3 permission to proceed, the building official may make a special investigation inspection
4 before a permit may be issued for such work. Where a special investigation is made, a
5 special investigation fee may be assessed in accordance with the Fee Subtitle.

6 **119.8 Reinspections.** The building official may require a reinspection when work for which
7 inspection is called is not complete, corrections called for are not made, the inspection
8 record is not properly posted on the work site, the approved plans are not readily available to
9 the inspector, for failure to provide access on the date for which inspection is requested, or
10 when deviations from plans which require the approval of the building official have been
11 made without proper approval.

12 For the purpose of determining compliance with Section 104.4, Maintenance, the
13 building official or the Fire Chief may cause any structure to be reinspected.

14 The building official may assess a reinspection fee as set forth in the Fee Subtitle for
15 any action listed above for which reinspection may be required, whether or not a
16 reinspection is actually performed. A reinspection fee shall not be assessed the first time the
17 work subject to inspection is rejected for failure to comply with the requirements of this
18 code.

19 In instances where reinspection fees have been assessed, no additional inspection of
20 the work shall be performed until the required fees have been paid.

21 **SECTION 120 — CONNECTION APPROVAL**

22 **120.1 Energy Connections.** No person shall make connections from a source of energy fuel
23 to a mechanical system or equipment regulated by this code and for which a permit is
24 required until approved by the building official.

25 **120.2 Temporary Connections.** The building official may authorize temporary connection
26 of the mechanical equipment to the source of energy fuel for the purpose of testing the
27 equipment, or for use under a temporary certificate of occupancy.

28 **SECTION 121 — REFRIGERATION LICENSES**

No one shall perform any of the services or activities related to refrigeration systems as regulated by Chapter 11 without a license as required by Chapter 6.82 of the Seattle Municipal Code, or under the direct supervision of a person, firm, associates or corporation holding a required license.

SECTION 122 — OPERATING PERMITS FOR REFRIGERATION SYSTEMS

122.1 An operating permit issued by the building official shall be required to operate any refrigeration system meeting any one of the following criteria:

1. Any system over 50 horsepower, or
2. Any system over 50 tons of refrigerant effect, or
3. Any system which contains over 150 pounds of refrigerant, or
4. Any system which includes a refrigerant containing a pressure vessel over six inches in diameter with a capacity of more than 5 cubic feet and a design working pressure under 250 psig., or
5. Any system which includes a refrigerant containing a pressure vessel over six inches in diameter having a capacity of one and one-half cubic feet and a design working pressure over 250 psig.

122.2 The operating permit shall not be issued until the system has been inspected and approved by the building official as to its safe operation and compliance with the provisions

of this code. Such permit shall be valid for a period of one year, renewable annually. Such permit shall be displayed in a conspicuous place adjacent to the refrigeration system.

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2 **Section 4.** Section 203 of the 1997 Uniform Mechanical Code is amended as follows:

3 **SECTION 203 — A**

4 **ABSORBER (ADSORBER)** is that part of the low side of an absorption system used for absorbing (adsorbing) vapor refrigerant.

5 **ABSORPTION UNIT** is an absorption refrigeration system which has been factory assembled and tested prior to its installation.

6 **ACCESSIBLE** is having access to but which first may require the removal of an access panel, door or similar obstruction covering the item described.

7 **ACCESSIBLE, READILY**, means capable of being reached safely and quickly for operation, repair or inspection without requiring those to whom ready access is requisite to climb over or remove obstacles, or to resort to the use of portable access equipment.

8 **AIR, COMBUSTION.** See "combustion air," Section 205.

9 **AIR, CONDITIONED**, is air which has been treated to achieve a desired level of temperature, humidity or cleanliness.

10 **AIR, EXHAUST**, is air being removed from any space or piece of equipment and conveyed directly to the atmosphere by means of openings or ducts.

11 **AIR, MAKEUP**, is air which is provided to replace air being exhausted.

12 **AIR, OUTSIDE**, is air from outside the building intentionally conveyed by openings or ducts to rooms or to conditioning equipment.

13 **AIR, RETURN**, is air being recirculated or transferred within a building.

14 **AIR, SUPPLY**, is air being provided to a space or piece of equipment from the outside or inside a building by means of ducts or openings.

15 **AIR, TRANSFER**, is air being provided from a room to another room. See "air, return."

16 **AIR, VENTILATION**, is air being supplied to or removed from a room or space to which an occupant of the room or space is exposed.

17 **AIR-HANDLING UNIT** is a blower or fan used for the purpose of distributing supply air to a room, space or area.

18 **AIR-MOVING SYSTEM** is a system designed to provide heating, cooling or ventilation in which one or more air-handling units are used to supply air to a common space or to draw air from a common plenum or space.

19 **APPLIANCE** is a device which utilizes fuel or other forms of energy to produce light, heat, power, refrigeration or air conditioning. This definition also shall include a vented decorative appliance.

20 **APPLIANCE FUEL CONNECTOR** is an assembly of listed semirigid or flexible tubing and fittings to carry fuel between a fuel piping outlet and a fuel-burning appliance.

21 **APPROVED**, as to materials, equipment and method of construction, refers to approval by the building official as the result of investigation and tests by the building official, or by reason of accepted principles or tests by national authorities, technical or scientific organizations.

22 **APPROVED AGENCY** is an established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved by the building official.

APPROVED QUALIFIED WELDER is a person qualified in welding pipes who holds a valid certificate of competency from an approved agency based on demonstrated ability in meeting the requirements of Section IX of the ASME Boiler and Pressure Vessel Code.

ASSEMBLY BUILDING is a building or a portion of a building used for the gathering together of 50 or more persons for such purposes as deliberation, education, instruction, worship, entertainment, amusement, drinking or dining or awaiting transportation.

~~((AUTOMATIC BOILER. When applied to any class of boiler defined below, such boiler shall be equipped with certain controls and limit devices as specified in Section 1014 and Table 10-C.))~~

AZEOTROPE is a refrigerant blend comprising multiple components of different volatilities that, when used in refrigeration cycles, do not change volumetric composition or saturation temperature as they evaporate or condense at constant pressure.

Section 5. Section 204 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 204 — B

BACK-DRAFT DAMPER is a damper installed to restrict introduction of unconditioned air from an unconditioned space to a conditioned space.

BAROMETRIC DAMPER is any listed non-manual device that freely allows the flow of air in one direction, but does not allow conditioned air to escape. All installed combustion air dampers shall meet the installation requirements of the manufacturer.

Interpretation: "Bathroom" means a room equipped with a bathtub or shower.

BOILER is a closed vessel used for heating water or liquid, or for generating steam or vapor by direct application of heat from combustible fuels or electricity.

BOILER CODE is the Seattle Boiler Code.

BOILER, HIGH PRESSURE, is a boiler furnishing steam at pressures exceeding 15 pounds per square inch (103 kPa) or hot water at temperatures exceeding 250°F (121°C) or at pressures exceeding 160 pounds per square inch (1100 kPa).

BOILER ROOM is a room containing a ~~((steam or hot water))~~ boiler.

BREECHING is a metal connector for medium- and high-heat appliances. Breechings should have a thimble or liner of tile or heavy steel, at least 24 gage.

BRINE is a liquid used for the transmission of heat without a change in its state, having no flash point or a flash point above 150°F (65.5°C), as determined by the requirements of UMC Standard 2-3.

Btu/h is the listed maximum capacity of an appliance, absorption unit or burner expressed in British thermal units input per hour, unless otherwise noted.

BUILDING CODE is the ~~((Uniform Building Code promulgated by the International Conference of Building Officials, as adopted by this jurisdiction))~~ Seattle Building Code.

BUILDING OFFICIAL is the ~~((officer charged with the administration and enforcement of this code, or a regularly authorized deputy))~~ Director of the Department of Construction and Land Use. As used in this code, the term includes authorized representatives of the Director of the Department of Construction and Land Use.

~~((BURNER, AUTOMATIC BOILER, is a burner for an automatic boiler used to convey fuel into the combustion chamber in proximity to its combustion air supply so as to permit a stable controlled heat release compatible with the burner design and which is equipped with an ignition system to reliably ignite the entire heat release surface of the burner assembly.))~~

Section 6. Section 205 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 205 — C

CAS NUMBER is the Chemical Abstract System registry number.

CATEGORY, VENTED GAS APPLIANCE, is vented gas utilization equipment classified for venting purposes into four categories as follows:

Category I: An appliance that operates with a nonpositive vent pressure and with a flue loss not less than 17 percent.

Category II: An appliance that operates with a nonpositive vent pressure and with a flue loss less than 17 percent.

Category III: An appliance that operates with a positive vent pressure and with a flue loss not less than 17 percent.

Category IV: An appliance that operates with a positive vent pressure and with a flue loss less than 17 percent.

CENTRAL HEATING PLANT or HEATING PLANT is environmental heating equipment installed in a manner to supply heat by means of ducts or pipes to areas other than the room or space in which the equipment is located.

CHIMNEY is a vertical shaft enclosing one or more flues for conveying flue gases to the outside atmosphere.

Factory-built Chimney is a listed chimney.

Masonry Chimney is a chimney of solid masonry units, bricks, stones, listed masonry units or reinforced concrete, lined with suitable flue liners.

Metal Chimney is a chimney constructed of metal with a minimum thickness not less than 0.127-inch (No. 10 manufacturer's standard gage) (3.2 mm) steel sheet.

CHIMNEY CLASSIFICATIONS:

Chimney, High-heat Appliance-type, is a factory-built, masonry or metal chimney suitable for removing the products of combustion from fuel-burning high-heat appliances producing combustion gases exceeding 2,000°F (1093°C) measured at the appliance flue outlet.

Chimney, Low-heat Appliance-type, is a factory-built, masonry or metal chimney suitable for removing the products of combustion from fuel-burning low-heat appliances producing combustion gases not exceeding 1,000°F (538°C) under normal operating conditions but capable of producing combustion gases of 1,400°F (759°C) during intermittent forced firing for periods up to one hour. All temperatures are measured at the appliance flue outlet.

Chimney, Medium-heat Appliance-type, is a factory-built, masonry or metal chimney suitable for removing the products of combustion from fuel-burning medium-heat appliances producing combustion gases not exceeding 2,000°F (1093°C) measured at the appliance flue outlet.

Chimney, Residential Appliance-type, is a factory-built or masonry chimney suitable for removing products of combustion from residential-type appliances producing combustion gases not exceeding 1,000°F (538°C), measured at the appliance flue outlet. Factory-built Type H.T. chimneys have high-temperature thermal shock resistance.

CHIMNEY CONNECTOR is the pipe which connects a fuel-burning appliance to a chimney.

CLOSED COMBUSTION SOLID-FUEL-BURNING APPLIANCE is a heat-producing appliance that employs a combustion chamber that has no openings other than the flue collar, fuel charging door and adjustable openings provided to control the amount of combustion air that enters the combustion chamber.

COMBUSTIBLE MATERIAL is any material not meeting the definition of noncombustible material, including material made of or surfaced with wood, compressed

paper, plant fibers, plastics, or other material that will ignite and burn, whether flame proofed or not, or whether plastered or unplastered.

1 **COMBUSTION AIR** is the total amount of air provided to the space which contains fuel-burning equipment; it includes air for fuel combustion, for draft hood dilution and for ventilation of the equipment enclosure.

2 **COMPANION OR BLOCK VALVES.** See "valves, companion or block." See Section 224.

3 **COMPARTMENT** is a small enclosed room or space intended for the installation of equipment which is both a confined space and a room not large in comparison to the size of the equipment, formerly and commonly referred to as an equipment closet.

4 **COMPRESSOR, POSITIVE DISPLACEMENT,** is a compressor in which increase in pressure is attained by changing the internal volume of the compression chamber.

5 **COMPRESSOR, REFRIGERANT,** is a machine, with or without accessories, for compressing a refrigerant vapor.

6 **CONCEALED GAS PIPING** is gas piping that, when in place in a finished building, would require removal of permanent construction to gain access to the piping.

7 **CONDENSER** is that part of the system designed to liquefy refrigerant vapor by removal of heat.

8 **CONDENSING APPLIANCE** is an appliance which condenses part of the water vapor generated by the burning of hydrogen in fuels.

9 **CONDENSING UNIT** is a mechanical refrigeration system, consisting of one or more power-driven compressors, condensers, liquid receivers, if provided, and the regularly furnished accessories which have been factory assembled and tested prior to its installation.

10 **CONDITIONED SPACE** is an area, room or space normally occupied and being heated or cooled by any equipment for human habitation.

11 **CONFINED SPACE** is a room or space having a volume less than 50 cubic feet per 1,000 Btu/h (4.83 L/W) of the aggregate input rating of all fuel-burning appliances installed in that space.

12 **CONTAINER (REFRIGERANT)** is a cylinder for the transportation of refrigerant.

13 ~~((CONTINUOUS PILOT is a pilot that burns without turndown throughout the entire period that the boiler is in service, whether or not the main burner is firing.))~~

14 **COOLING** is air cooling to provide room or space temperatures of 68°F (20°C) or above.

15 **COOLING SYSTEM** is all of that equipment, including associated refrigeration, intended or installed for the purpose of cooling air by mechanical means and discharging such air into any room or space. This definition shall not include an evaporative cooler.

16 **COOLING UNIT** is a self-contained refrigeration system which has been factory assembled and tested, installed with or without conditioned air ducts and without connecting any refrigerant-containing parts. This definition shall not include a portable cooling unit or an absorption unit.

17 **CRITICAL PRESSURE, CRITICAL TEMPERATURE AND CRITICAL VOLUME** are the terms given to the state points of a substance at which liquid and vapor have identical properties. Above the critical pressure or critical temperature there is no line of demarcation between liquid and gaseous phases.

18 **Section 7.** Section 206 of the 1997 Uniform Building Code is amended as follows:

19 **SECTION 206 — D**

20 **DAMPERS** shall be defined as follows:

21 **Ceiling Damper** is an automatic-closing assembly complying with UL Standard 555C.

Chimney Damper is a movable valve or plate within the chimney connector for controlling the draft or flow of combustion gases.

Fire Damper is an automatic-closing metal assembly of one or more louvers, blades, slats or vanes complying with recognized standards.

Leakage Rated Damper. See "smoke damper."

Smoke Damper is a damper arranged to seal off airflow automatically through a part of an air-duct system so as to restrict the passage of smoke.

Volume Damper is a device which, when installed, will restrict, retard or direct the flow of air in a duct, or the products of combustion in heat-producing equipment, its vent connector, vent or chimney therefrom.

DECORATIVE APPLIANCES, VENTED, are appliances whose only function lies in the aesthetic effect of the flames.

DECORATIVE APPLIANCES FOR INSTALLATION IN SOLID-FUEL-BURNING FIREPLACES are self-contained, freestanding, fuel-gas-burning appliances designed for installation only in a vented solid-fuel-burning fireplace and whose primary function lies in the aesthetic effect of the flame.

DIRECT GAS-FIRED MAKEUP AIR HEATER is a heater in which all the products of combustion generated by the gas-burning device are released into the outside airstream being heated.

DIRECT-VENT APPLIANCES are appliances which are constructed and installed so that all air for combustion is derived from the outside atmosphere and all flue gases are discharged to the outside atmosphere.

DISTRICT HEATING PLANT is a power boiler plant designed to distribute hot water or steam to users located off the premises.

DRAFT HOOD is a device built into an appliance or made a part of the vent connector from an appliance, which is designed to:

1. Ensure the ready escape of the flue gases in the event of no draft, backdraft or stoppage beyond the draft hood.
2. Prevent a back draft from entering the appliance.
3. Neutralize the effect of stack action of the chimney or gas vent upon the operation of the appliance.

DUCT is a tube or conduit for transmission of air. This definition shall not include:

1. A vent, a vent connector or a chimney connector.
2. A tube or conduit wherein the pressure of the air exceeds 1 pound per square inch (6.9 Pa).
3. The air passages of listed self-contained systems.

DUCT FURNACE is a warm-air furnace normally installed in an air-distribution duct to supply warm air for heating. This definition shall apply only to a warm-air heating appliance which depends for air circulation on a blower not furnished as part of the furnace.

DUCT SYSTEMS are all ducts, duct fittings, plenums and fans assembled to form a continuous passageway for the distribution of air.

DWELLING is a building or portion thereof which contains not more than two dwelling units.

DWELLING UNIT is a building or portion thereof which contains living facilities, including provisions for sleeping, eating, cooking and sanitation, as required by this code, for not more than one family, or a congregate residence for 10 or fewer persons.

Section 8. Section 207 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 207 — E

1 **ELECTRIC HEATING APPLIANCE** is a device which produces heat energy to
2 create a warm environment by the application of electric power to resistance elements,
3 refrigerant compressors or dissimilar material junctions.

4 **ELECTRICAL CODE** is the (~~*National Electrical Code promulgated by the National*~~
5 ~~*Fire Protection Association, as adopted by this jurisdiction*~~) Seattle Electrical Code.

6 **EMERGENCY ALARM SYSTEM** is a system intended to provide the indication
7 and warning of abnormal conditions and summon appropriate aid.

8 **EMERGENCY CONTROL STATION** is an approved location on the premises
9 where signals from emergency equipment are received.

10 **ENERGY CODE** is the Washington State Energy Code with Seattle Supplement.

11 **EQUIPMENT** is a general term including materials, fittings, devices, appliances and
12 apparatus used as part of or in connection with installations regulated by this code.

13 **EVAPORATIVE COOLER** is a device used for reducing the sensible heat of air for
14 cooling by the process of evaporation of water into an airstream.

15 **EVAPORATIVE COOLING SYSTEM** is all of that equipment intended or installed
16 for the purpose of environmental cooling by an evaporative cooler from which the conditioned
17 air is distributed through ducts or plenums to the conditioned area.

18 **EVAPORATOR** is that part of a refrigeration system in which liquid refrigerant is
19 vaporized to produce refrigeration.

20 **Section 9.** Section 208 of the 1997 Uniform Mechanical Code is amended as
21 follows:

22 **SECTION 208 — F**

23 **FABRICATION AREA (FAB AREA)** is an area within a Group H, Division 6 or 7
24 Occupancy in which there are processes involving hazardous production materials and may
25 include ancillary rooms or areas such as dressing rooms and offices that are directly related to
26 the fab area processes.

27 **FIRE CODE** is the (~~*Uniform Fire Code promulgated by the International Fire Code*~~
28 ~~*Institute, as adopted by this jurisdiction*~~) Seattle Fire Code.

29 **FIREPLACE, SOLID-FUEL-BURNING**, is a listed and labeled factory-built or site-
30 built hearth and fire chamber constructed of noncombustible material for use with solid fuels
31 and provided with a chimney.

32 **FIREPLACE STOVE** is a chimney-connected, solid-fuel-burning stove (appliance)
33 having part of its fire chamber open to the room.

34 **FIRE-RESISTIVE CONSTRUCTION** is construction complying with the
35 requirements of the Building Code for the time period specified.

36 **FLAMMABILITY CLASSES.** Class 1 indicates refrigerants that do not show flame
37 propagation in air when tested by prescribed methods at specific conditions. Classes 2 and 3
38 signify refrigerants with "lower flammability" and "higher flammability," respectively; the
39 distinction depends on both the lower flammability limit (LFL) and heat of combustion.

40 **FLOOR FURNACE** is a completely self-contained furnace suspended from the floor
41 of the space being heated, taking air for combustion from outside such space and with means
42 for observing flames and lighting the appliance from such space.

43 **FLUE** is the general term for a passage through which flue gases pass from the
44 combustion chamber to the outer air.

FORCED-AIR-TYPE CENTRAL FURNACE is a central furnace equipped with a fan or blower which provides the primary means for circulation of air.

Downflow-type Central Furnace is a furnace designed with airflow essentially in a vertical path, discharging air at or near the bottom of the furnace.

Horizontal-type Central Furnace is a furnace designed for low headroom installations with airflow through the appliance in a horizontal path.

Upflow-type Central Furnace is a furnace designed with airflow essentially in a vertical path, discharging air at or near the top of the furnace.

FRACTIONATION is a change in composition of a blend by preferential evaporation of the more volatile component or condensation of the less-volatile component.

FUEL GAS is natural, manufactured, liquefied petroleum or a mixture of these.

FUSIBLE PLUG is a device arranged to relieve pressure by operation of a fusible member at a predetermined temperature.

Section 10. Section 210 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 210 — H

HAZARDOUS LOCATION is an area or space where combustible dust, ignitable fibers or flammable, volatile liquids, gases, vapors or mixtures are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

HAZARDOUS PROCESS PIPING (HPP) is a process material piping or tubing conveying a liquid or gas that has a degree-of-hazard rating in health, flammability or reactivity of Class 3 or 4 as ranked by UFC Standard 79-3.

HEAT PUMP is a refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

HEATING DEGREE DAY is a unit, based on temperature difference and time, used in estimating fuel consumption and specifying nominal annual heating load of a building. For any one day when the mean temperature is less than 65°F (18°C), there exist as many degree days as there are Fahrenheit degrees difference in temperature between mean temperature for the day and 65°F (18°C).

HEATING EQUIPMENT. Includes all warm-air furnaces, warm-air heaters, combustion products vents, heating air-distribution ducts and fans, all steam and hot-water piping together with all control devices and accessories installed as part of, or in connection with, any environmental heating system or appliance regulated by this code.

HEATING SYSTEM is a warm-air heating plant consisting of a heat exchanger enclosed in a casing, from which the heated air is distributed through ducts to various rooms and areas. A heating system includes the outside-air, return-air and supply-air system and all accessory apparatus and equipment installed in connection therewith.

HIGH SIDE is the portion of a refrigeration system subjected to approximately condenser pressure.

HIGH-DISTRIBUTION PRESSURE or **SECOND-STATE PRESSURE** (used in liquefied petroleum gas systems) is pressure exceeding 14 inches water column (3.5 kPa) but not exceeding 20 psig (137 kPa).

HOOD is an air-intake device connected to a mechanical exhaust system for collecting vapors, fumes, smoke, dust, steam, heat or odors from, at or near the equipment, place or area where generated, produced or released.

~~(**HOT WATER HEATING BOILER** is a boiler having volume exceeding 120 gallons (454 L), or a heat input exceeding 200,000 Btu/h (58.58 kW), or an operating temperature exceeding 210°F (99°C) that provides hot water to be used externally to itself.)~~

HPM STORAGE ROOM is a room used for the storage or dispensing of hazardous production material (HPM) and which is classified as a Group H, Division 1 or Division 2 Occupancy.

Section 11. Section 211 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 211 — I

IDLH (immediately dangerous to life and health) is a concentration of airborne contaminants, normally expressed in parts per million (ppm) or milligrams per cubic meter (mg/m^3), which represents the maximum level from which one could escape within 30 minutes without any escape-impairing symptoms or irreversible health effects. This level is established by the National Institute of Occupational Safety and Health (NIOSH).

INDUSTRIAL HEATING EQUIPMENT is an appliance or device for equipment used, or intended to be used, in an industrial, manufacturing or commercial occupancy for applying heat to any material being processed, but shall not include water heaters, boilers or portable equipment used by artisans in pursuit of a trade.

INSANITARY LOCATION is an area, a space or a room where the air is unfit or undesirable for circulation to occupied parts of a building.

~~((**INTERLOCK** is a device which senses a limit or off limit condition or improper sequence of events and shuts down the offending or related piece of equipment or prevents proceeding in an improper sequence in order to prevent a hazardous condition developing.~~

~~**INTERMITTENT PILOT** is a pilot which burns during light off and while the main burner is firing, and which is shut off with the main burner.~~

~~**INTERRUPTED PILOT** is a pilot which burns during light off and which is shut off during normal operation of the main burner.))~~

Section 12. Section 214 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 214 — L

LEL (lower explosive limit). See "LFL."

LFL (lower flammable limit or lower limit of flammability) is the minimum concentration of a combustible substance that is capable of propagating a flame through homogeneous mixture of the combustible and a gaseous oxidizer under the specified condition of test. The LFL is sometimes referred to as LEL (lower explosive limit); for the purposes of this definition, LFL and LEL are identical.

LIMITED CHARGE SYSTEM is a system in which, with the compressor idle, the internal volume and total refrigerant charge are such that the design pressure will not be exceeded by complete evaporation of the refrigerant charge.

LINE CONTACT INSTALLATION is where a furnace is installed so that building joists, studs or framing is contacted by the furnace jacket upon the lines formed by the intersection of the jacket sides with the top surface.

LIQUEFIED PETROLEUM GAS or LPG (LP-gas) shall mean and include a material composed predominantly of any of the following hydrocarbons or mixtures of them: propane, propylene, butanes (normal butane or isobutane) and butylenes.

When reference is made to liquefied petroleum gas in this code, it shall refer to liquefied petroleum gases in either the liquid or gaseous state.

LIQUEFIED PETROLEUM GAS FACILITIES are tanks, containers, container valves, regulating equipment, meters and appurtenances for the storage and supply of liquefied petroleum gas for a building or premises.

LISTED and **LISTING** are terms referring to equipment or materials included in a list published by an approved testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of current productions of listed equipment or materials and which listing states that the material or equipment complies with approved nationally recognized codes, standards or tests and has been tested or evaluated and found suitable for use in a specific manner.

LOW SIDE is the portion of a refrigeration system subjected to approximate evaporator pressure.

LOW-PRESSURE HOT-WATER-HEATING BOILER is a boiler furnishing hot water at pressures not exceeding 160 pounds per square inch (1100 kPa) and at temperatures not exceeding 250°F (121°C).

LOW-PRESSURE STEAM-HEATING BOILER is a boiler furnishing steam at pressures not exceeding 15 pounds per square inch (103 kPa).

Section 13. Section 215 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 215 — M

MACHINERY is the refrigeration equipment forming a part of the refrigeration system, including, but not limited to, a compressor, a condenser, a liquid receiver, an evaporator and connecting piping.

MANUFACTURER is the company or organization which evidences its responsibility by affixing its name, trademark or trade name to equipment or devices.

MANUFACTURER'S INSTALLATION INSTRUCTIONS are printed instructions included with equipment or devices for the purpose of information regarding safe and proper installation whether or not as part of the conditions of listing.

MEDIUM PRESSURE is pressure exceeding 14 inches water column (3.5 kPa) but not exceeding 5 psig (34 kPa).

~~(**MINIATURE BOILER** is a power boiler having an internal shell diameter of 16 inches (406 mm) or less, a gross volume of 5 cubic feet (142 L) or less, a heating surface of 20 square feet (1.86 m²) or less (not applicable to electric boilers) and not exceeding 100 psi (685 kPa).)~~

Section 14. Section 217 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 217 — O

OCCUPANCY is the purpose for which a building or part thereof is used or intended to be used.

OCCUPANCY CLASSIFICATION. For the purpose of this code, certain occupancies are defined as follows:

Group A Occupancies:

Group A Occupancies include the use of a building or structure, or a portion thereof, for the gathering together of 50 or more persons for purposes such as civic, social or religious functions, recreation, education or instruction, food or drink consumption, or awaiting transportation. A room or space used for assembly purposes by less than 50 persons and

accessory to another occupancy shall be included as a part of that major occupancy. Assembly occupancies shall include the following:

1 **Division 1.** A building or portion of a building having an assembly room with an occupant load of 1,000 or more and a legitimate stage.

2 **Division 2.** A building or portion of a building having an assembly room with an occupant load of less than 1,000 and a legitimate stage.

3 **Division 2.1.** A building or portion of a building having an assembly room with an occupant load of 300 or more without a legitimate stage, including such buildings used for educational purposes and not classed as a Group B or E Occupancy.

4 **Division 3.** A building or portion of a building having an assembly room with an occupant load of less than 300 without a legitimate stage, including such buildings used for educational purposes and not classed as a Group B or E Occupancy.

5 **Division 4.** Stadiums, reviewing stands and amusement park structures not included within other Group A Occupancies. Specific and general requirements for grandstands, bleachers and reviewing stands are to be found in Chapter 10 of the Building Code.

6 **EXCEPTION:** Amusement buildings or portions thereof which are without walls or a roof and constructed to prevent the accumulation of smoke in assembly areas.

7 **Group B Occupancies:**

8 Group B Occupancies shall include buildings, structures, or portions thereof, for office, professional or service-type transactions, which are not classified as Group H Occupancies. Such occupancies include occupancies for the storage of records and accounts, and eating and drinking establishments with an occupant load of less than 50.

9 **Group E Occupancies:**

10 **Division 1.** Any building used for educational purposes through the 12th grade by 50 or more persons for more than 12 hours per week or four hours in any one day.

11 **Division 2.** Any building used for educational purposes through the 12th grade by less than 50 persons for more than 12 hours per week or four hours in any one day.

12 **Division 3.** (~~Any building or portion thereof used for day care purposes for more than six persons.~~) Day care centers, preschools, and day treatment centers.

13 **EXCEPTION:** Family child day care homes shall be considered Group R, Division 3 Occupancies.

14 **Group F Occupancies:**

15 Group F Occupancies shall include the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as Group H Occupancies.

16 **Division 1.** Moderate-hazard factory and industrial occupancies shall include factory and industrial uses which are not classified as Group F, Division 2 Occupancies.

17 **Division 2.** Low-hazard factory and industrial occupancies shall include facilities producing noncombustible or nonexplosive materials which, during finishing, packing or processing, do not involve a significant fire hazard.

18 **Group H Occupancies:**

19 Group H Occupancies shall include buildings or structures, or portions thereof, that involve the manufacturing, processing, generation or storage of materials that constitute a high fire, explosion or health hazard. For definitions, identification and control of hazardous materials and pesticides, and the display of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in Group B, F, M or S Occupancies, see the Fire Code.

20 **Division 1.** Occupancies with a quantity of material in the building in excess of those listed in Table 3-D of the Building Code, which present a high explosion hazard.

21 **Division 2.** Occupancies where combustible dust is manufactured, used or generated in such a manner that concentrations and conditions create a fire or explosion potential; occupancies with a quantity of material in the building in excess of those listed in Table 3-D of

the Building Code, which present a moderate explosion hazard or a hazard from accelerated burning.

Division 3. Occupancies where flammable solids, other than combustible dust, are manufactured, used or generated.

Division 4. Repair garages and body shops not classified as Group S, Division 3 Occupancies.

Division 5. Aircraft repair hangars and heliports not classified as Group S, Division 5 Occupancies.

Division 6. Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials are in excess of those listed in Table 3-D or 3-E of the Building Code.

Division 7. Occupancies having quantities of materials in excess of those listed in Table 3-E of the Building Code that are health hazards.

Group I Occupancies:

Division 1.1. Nurseries for the full-time care of children under the age of six (each accommodating more than five children).

Hospitals, ~~((sanitariums))~~ psychiatric hospitals, nursing homes with nonambulatory or mobile nonambulatory patients and similar buildings ~~((each accommodating more than five patients)))~~.

Division 1.2. Health-care centers for ambulatory patients receiving outpatient medical care which may render the patient incapable of unassisted self-preservation (each tenant space accommodating more than five such patients).

Division 2. Nursing homes for ambulatory patients ~~((homes for children six years of age or over (each accommodating more than five patients or children)))~~.

Division 3. ~~((Mental))~~ Psychiatric hospitals, mental sanitariums, jails, prisons, reformatories and buildings where personal liberties of inmates or patients are similarly restrained.

Group M Occupancies:

Group M Occupancies shall include buildings, structures, or portions thereof, used for the display and sale of merchandise, and involving stocks of goods, wares or merchandise, incidental to such purposes and accessible to the public.

Group R Occupancies:

Division 1. Hotels and apartment houses.

Congregate residences (each accommodating more than 10 persons).

Division 2. Not used.

Division 3. ~~((Dwellings and 1))~~ Lodging houses and detached dwellings.
Family child day care homes.

Congregate residences (each accommodating 10 persons or less).

Group S Occupancies:

Group S Occupancies shall include the use of a building or structure, or a portion thereof, for storage not classified as a hazardous occupancy.

Division 1. Moderate hazard storage occupancies shall include buildings or portions of buildings used for storage of combustible materials that are not classified as a Group S, Division 2 or as a Group H Occupancy.

Division 2. Low-hazard storage occupancies shall include buildings, structures, or portions thereof, used for storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single-thickness divisions, or in paper wrappings and shall include ice plants, power plants and pumping plants.

Division 3. Division 3 Occupancies shall include repair garages where work is limited to exchange of parts and maintenance requiring no open flame or welding, motor vehicle fuel-

dispensing stations, and parking garages not classed as Group S, Division 4 open parking garages or Group U private garages.

Division 4. Open parking garages.

Division 5. Aircraft hangars where work is limited to exchange of parts and maintenance requiring no open flame or welding and helistops.

Group U Occupancies:

Division 1. Private garages, carports, sheds and agricultural buildings.

Division 2. Fences over 6 feet (1829 mm) high, tanks and towers.

Section 15. Section 218 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 218 — P

~~((PACKAGE BOILER may be any class of boiler defined herein and shall be a boiler equipped and shipped complete with fuel burning equipment, automatic controls and accessories, and mechanical draft equipment, if used.))~~

PEL (Permissible Exposure Limit) is the maximum permitted eight-hour time-weighted average concentration of an airborne contaminant. The maximum permitted time-weighted average exposures to be utilized are those published in 29 C.F.R. 1910.1000.

~~((PILOT is a burner smaller than the main burner, which is ignited by a spark or other independent and stable ignition source, and which provides ignition energy required to immediately light off the main burner.))~~

PIPELINE WELDER is a person qualified in welding pipes who holds a valid certificate of competency from an approved agency based on demonstrated ability in meeting the requirements of Section IX of the ASME Boiler and Pressure Vessel Code.

PIPING is the pipe or tube mains for interconnecting the various parts of a system. Piping includes pipe, tube, flanges, bolting, gaskets, valves, fittings, the pressure-containing parts of other components such as expansion joints, strainers and devices which serve such purposes as mixing, separating, snubbing, distributing, metering or controlling flow, pipe-supporting fixtures and structural attachments.

PLENUM is an air compartment or chamber, including uninhabited crawl spaces, areas above a ceiling or below a floor, including air spaces below raised floors of computer/data processing centers, or attic spaces, to which one or more ducts are connected and which forms part of either the supply-air, return-air or exhaust-air system, other than the occupied space being conditioned.

PLUMBING CODE is the Seattle Plumbing Code ((as adopted by this jurisdiction)).

PORTABLE COOLING UNIT is a self-contained refrigerating system, not over 3 horsepower rating, which has been factory assembled and tested, installed without supply-air ducts and without connecting any refrigerant-containing parts. This definition shall not include an absorption unit.

PORTABLE EVAPORATIVE COOLER is an evaporative cooler which discharges the conditioned air directly into the conditioned area without the use of ducts and can be readily transported from place to place without dismantling any portion thereof.

PORTABLE HEATING APPLIANCE is a heating appliance designed for environmental heating which may have a self-contained fuel supply and is not secured or attached to a building by any means other than by a factory-installed power-supply cord.

PORTABLE VENTILATING EQUIPMENT is ventilating equipment that can be readily transported from place to place without dismantling a portion thereof and which is not connected to a duct.

POSITIVE DISPLACEMENT COMPRESSOR is a compressor in which increase in pressure is attained by changing the internal volume of the compression chamber. ^{CS 19.2}

~~((POWER BOILER is a boiler in which steam is generated at pressures exceeding 15 psi (103 kPa).))~~

POWER BOILER PLANT is one or more power steam boilers or power hot-water boilers and connecting piping and vessels within the same premises.

~~((POWER HOT WATER BOILER (HIGH TEMPERATURE WATER BOILER) is a boiler used for heating water or liquid to a pressure exceeding 160 psi (1103 kPa) or to a temperature exceeding 250°F (121°C).))~~

PRESSURE, DESIGN, is the maximum working pressure for which a specific part of a refrigeration system is designed.

PRESSURE, FIELD TEST, is a test performed in the field to prove system tightness.

PRESSURE TEST is the minimum gage pressure to which a specific system component is subjected under test condition.

~~((PRESSURE VESSEL (Unfired) is a closed container, having a nominal internal diameter exceeding 6 inches (153 mm) and a volume exceeding 1½ cubic feet (42 L), for liquids, gases or vapors subjected to pressures exceeding 15 psi (103 kPa) or steam under any pressure.))~~

PRESSURE VESSEL—REFRIGERANT is a refrigerant-containing receptacle which is a portion of a refrigeration system, but shall not include evaporators, headers or piping of certain limited size and capacity.

PRESSURE-IMPOSING ELEMENT is a device or portion of the equipment used for the purpose of increasing the pressure of the refrigerant vapor.

PRESSURE-LIMITING DEVICE is a pressure-responsive mechanism designed to automatically stop the operation of the pressure-imposing element at a predetermined pressure.

PRESSURE-RELIEF DEVICE is a pressure-actuated valve or rupture member or fusible plug designed to automatically relieve excessive pressure.

PROCESS PIPING is piping or tubing which conveys liquid or gas and which is used directly in research, laboratory or production processes and which is not regulated under the mechanical or plumbing code.

~~((PURGE is an acceptable method of scavenging the combustion chamber, boiler passes and breeching to remove all combustible gases.))~~

Section 16. Section 220 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 220 — R

RADIANT HEATER is a heater designed to transfer heat primarily by direct radiation.

RECEIVER, LIQUID, is a vessel permanently connected to a refrigeration system by inlet and outlet pipes for storage of liquid refrigerant.

RECLAIMED REFRIGERANTS are refrigerants reprocessed to the same specifications as for new refrigerants by means that may include distillation. Such refrigerants have been chemically analyzed to verify that the specifications have been met. Reclaiming usually implies the use of processes or procedures that are available only at a reprocessing or manufacturing facility.

RECOVERED REFRIGERANTS are refrigerants removed from a system in any condition without necessarily testing or processing them.

RECYCLED REFRIGERANTS are refrigerants for which contaminants have been reduced by oil separation, noncondensable gases removal, and single or multiple passes through devices that reduce moisture, acidity and particulate matter, such as replaceable core filter driers. These procedures usually are performed at the field job site or in a local service shop.

1 **REFRIGERANT SAFETY CLASSIFICATIONS** are groupings that indicate the
2 toxicity and flammability classes in accordance with Section 1102. The classification group is
3 made up of a letter (A or B), which indicates the toxicity class, followed by a number (1, 2 or
4 3), which indicates the flammability class. Refrigerant blends are similarly classified, based on
5 the compositions at their worst cases of fractionation, as separately determined for toxicity and
6 flammability. In some cases, the worst case of fractionation is the original formulation.

7 **REFRIGERATION SYSTEM, DIRECT** is one in which the refrigerant evaporator
8 is in direct contact with the material or space to be refrigerated or is located in air-circulating
9 passages communicating with such spaces. (See Figure 2-1.)

10 **REFRIGERATION SYSTEM, DOUBLE DIRECT** is one in which an
11 evaporative refrigerant is used in a secondary circuit to condense or cool a refrigerant in a
12 primary circuit. For the purpose of this code, each system enclosing a separate body of an
13 evaporative refrigerant shall be considered as a separate direct system. (See Figure 2-2)

14 **REFRIGERATION SYSTEM, INDIRECT** is one in which a fluid cooled by a
15 refrigerating system is circulated to the material or space to be refrigerated or is used to cool
16 air so circulated. (See Figure 2-3). Indirect systems which are distinguished by the type or
17 method of application are as given in the following paragraphs:

18 **Indirect Open-Spray System** is one in which a brine cooled by an evaporator
19 located in an enclosure external to a cooling chamber is circulated to such cooling chamber
20 and is sprayed therein.

21 **Indirect Closed-Surface System** is one in which a brine cooled by an evaporator
22 located in an enclosure external to a cooling chamber is circulated to and through such a
23 cooling chamber in pipes or other closed circuits.

24 **Indirect Vented Closed-Surface System** is one in which a brine cooled by an
25 evaporator located in a vented enclosure external to a cooling chamber is circulated to and
26 through such cooling chamber in pipes or other closed circuits.

27 **Double Indirect Vented Open-Spray System** is one in which a brine cooled by an
28 evaporator located in a vented enclosure is circulated through a closed circuit to a second
29 enclosure where it cools another supply of a brine and this liquid in turn is circulated to a
30 cooling chamber and is sprayed therein.

31 **REFRIGERATED ROOM or SPACE** is a room or space in which an evaporator or
32 brine coil is located for the purpose of reducing or controlling the temperature within the room
33 or space to below 68°F (20°C).

34 **REFRIGERATION CAPACITY RATING** expressed as 1 horsepower, 1 ton or
35 12,000 Btu/h (3.52 kW) shall all mean the same quantity.

36 **REFRIGERATION MACHINERY ROOM** is a space that is designed to safely
37 house compressors and pressure vessels.

38 **REFRIGERATION SYSTEM, ABSORPTION**, is a heat-operated, closed
39 refrigeration cycle in which a secondary fluid, the absorbent, absorbs a primary fluid, the
40 refrigerant, that has been vaporized in the evaporator.

41 **REFRIGERATION SYSTEM, MECHANICAL**, is a combination of interconnected
42 refrigerant-containing parts constituting one closed refrigerant circuit in which a refrigerant is
43 circulated for the purpose of extracting heat and in which a compressor is used for compressing
44 the refrigerant vapor.

45 **REFRIGERATION SYSTEM, SELF-CONTAINED**, is a complete factory-
46 assembled and tested system that is shipped in one or more sections and has no refrigerant-
47 containing parts that are joined in the field by other than companion or block valves.

48 **RESIDENTIAL BUILDING** is a building or portion thereof designed or used for
49 human habitation.

RISER HEAT PIPE is a duct which extends at an angle of more than 45 degrees from the horizontal. This definition shall not include any boot connection.

ROOM HEATER is a freestanding, nonrecessed, environmental heating appliance installed in the space being heated and not connected to ducts.

ROOM LARGE IN COMPARISON WITH SIZE OF EQUIPMENT is one having a volume of at least 12 times the total volume of a furnace or air-conditioning appliance and at least 16 times the total volume of a boiler. Total volume of the appliance is determined from exterior dimensions and includes fan compartments and burner vestibules when used. When the actual ceiling height of a room is greater than 8 feet (2438 mm), the volume of the room is figured on the basis of a ceiling height of 8 feet (2438 mm).

RUPTURE MEMBER is a pressure-relief device that operates by the rupture of a diaphragm within the device on a rise to a predetermined pressure.

Section 17. Section 221 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 221 — S

SATURATION PRESSURE of a refrigerant is the pressure at which there is stable coexistence of the vapor and liquid or the vapor and solid phase.

SEAM, WELDED. See "joint, welded."

SELF-CONTAINED means having all essential working parts except energy and control connections so contained in a case or framework that they do not depend on appliances or fastenings outside of the machine.

SERVICE CORRIDOR is a fully enclosed passage used for transporting hazardous production materials and purposes other than required exiting.

SERVICE PIPING is the piping and equipment between the street gas main and the gas piping system inlet which is installed by and is under the control and maintenance of the serving gas supplier.

SHAFT is an interior space enclosed by walls or construction extending through one or more stories or basements which connects openings in successive floors or floors and roof, to accommodate elevators, dumbwaiters, mechanical equipment or similar devices to transmit light or ventilation air.

SHAFT ENCLOSURE is the walls or construction forming the boundaries of a shaft.

SLEEVE is a factory-built chimney fitting designed to protect combustible materials when it is necessary to penetrate a combustible wall to connect to a chimney.

SMOKE DETECTOR is an approved device that senses visible or invisible particles of combustion.

SOLDERED JOINT is a joint obtained by the joining of metal parts with metallic mixtures or alloys which melt at a temperature below 800°F (427°C) and above 400°F (204°C).

SOLID FUEL BURNING APPLIANCE is any factory-built appliance designed to burn solid fuels.

SOURCE SPECIFIC VENTILATION SYSTEM is a mechanical ventilation system including all fans, controls, and ducting, which is dedicated to exhausting contaminant-laden air to the exterior of the building from the room or space in which the contaminant is generated.

~~((STEAM HEATING BOILER is a boiler operated at pressures not exceeding 15 psi (103 kPa) for steam.))~~

STOP VALVE is a device to shut off the flow of refrigerant.

STRENGTH, ULTIMATE, is the highest stress level which the component can tolerate without rupture.

SUBSTANTIALLY AIRTIGHT DUCTS are welded or gasketed ducts which are mechanically fastened.

SYSTEM is a combination of equipment and/or controls, accessories, interconnecting means and terminal elements by which air is transferred.

Section 18. Section 222 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 222 — T

THIMBLE is a listed fitting designed to be installed in the opening in a masonry chimney through which the chimney connector passes.

TOXICITY CLASSES. Classes A and B signify refrigerants with “lower toxicity” and “higher toxicity,” respectively, based on prescribed measures of chronic (long-term, repeated exposures) toxicity.

TRANSITION GAS RISER is any listed or approved section or sections of pipe and fittings used to convey fuel gas and installed in a gas piping system for the purpose of providing a transition from below ground to above ground.

Section 19. Section 223 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 223 — U

UBC STANDARDS are those standards published in Volume 3 of the *Uniform Building Code* promulgated by the International Conference of Building Officials, as adopted by this jurisdiction.

UNCONDITIONED SPACE. See “conditioned space.”

UNCONFINED SPACE is a room or space having a volume equal to at least 50 cubic feet per 1,000 Btu/h (4.831 L/W) of the aggregate input rating of all fuel-burning appliances installed in that space. Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered a part of the unconfined space.

UNIT HEATER is a heating appliance designed for nonresidential space heating and equipped with an integral means for circulation of air.

UNPROTECTED TUBING is tubing which is not protected by enclosure or suitable location so that it is exposed to crushing, abrasion, puncture or similar mechanical damage under installed conditions.

UNUSUALLY TIGHT CONSTRUCTION is construction where:

1. Walls and ceilings exposed to the outside atmosphere have a continuous water vapor retarder with a rating of 1 perm or less with any openings gasketed or sealed, and
2. Weatherstripping on openable windows and doors, and
3. Caulking or sealants are applied to areas such as joints around window and door frames, between sole plates and floors, between wall-ceiling joints, between wall panels and at penetrations for plumbing, electrical and gas lines and at other openings.
4. Buildings built in compliance with the 1986 or later editions of Washington State Energy Code, Northwest Energy Code or equivalent.

Interpretation: 1986 and later editions of the Seattle Energy Code are considered equivalent.

USE (MATERIAL) is the placing in action or making available for service by opening or connecting any container utilized for confinement of material whether a solid, liquid or gas.

Section 20. Section 224 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 224 — V

VALVE, PRESSURE RELIEF, is a pressure-actuated valve held closed by a spring or other means and designed to automatically relieve pressure in excess of its setting; also called a safety valve.

VALVE, STOP, is a device in a piping system to shut off the flow of the fluid.

VALVE, THREE-WAY-TYPE STOP, is a manually operated valve with one inlet which alternately can stop flow to either of two outlets.

VALVES, COMPANION OR BLOCK, are pairs of mating stop valves valving off sections of refrigeration systems and arranged so that these sections may be joined before opening these valves or separated after closing them.

VENT is a listed factory-made vent pipe and vent fittings for conveying flue gases to the outside atmosphere.

Type B Gas Vent is a factory-made gas vent listed by a nationally recognized testing agency for venting listed or approved appliances equipped to burn only gas.

Type BW Gas Vent is a factory-made gas vent listed by a nationally recognized testing agency for venting listed or approved gas-fired vented wall furnaces.

Type L is a venting system consisting of listed vent piping and fittings for use with oil-burning appliances listed for use with Type L or with listed gas appliances.

VENT CONNECTOR, GAS, is that portion of a gas-venting system which connects a listed gas appliance to a gas vent and is installed within the space or area in which the appliance is located.

VENTED DECORATIVE APPLIANCE is a vented appliance whose only function lies in the esthetic effect of the flames.

VENTED WALL FURNACE is a vented environmental heating appliance designed for incorporation in, or permanent attachment to, a wall, floor, ceiling or partition and arranged to furnish heated air by gravity or by a fan. This definition shall not include floor furnaces, unit heaters and room heaters.

VENTILATING CEILING is a suspended ceiling (~~((containing many small apertures))~~) through which air, at low pressure, (~~((is forced downward))~~) moves to or from an overhead ((plenum dimensioned by the)) concealed space between suspended ceiling and the floor or roof above.

VENTILATION is the process of supplying and removing air by natural or mechanical means to and from any space. Such air may or may not be conditioned.

VENTILATION SYSTEM is all of that equipment intended or installed for the purpose of supplying air to, or removing air from, any room or space by mechanical means.

VENTING COLLAR is the outlet opening of an appliance provided for connection of the vent system.

VENTING SYSTEM is the vent or chimney and its connectors assembled to form a continuous open passageway from an appliance to the outside atmosphere for the purpose of removing products of combustion. This definition also shall include a venting assembly which is an integral part of an appliance.

VENTING SYSTEM—GRAVITY-TYPE is a system which depends entirely on the heat from the fuel being used to provide the energy required to vent an appliance.

VENTING SYSTEM—POWER-TYPE is a system which depends on a mechanical device to provide a positive draft within the venting system.

VOLUME, INTERNAL GROSS, is the volume as determined from internal dimensions of the container with no allowance for the volume of the internal parts.

Section 21. Section 225 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 225 — W

WALL HEATER. See definition of “vented wall furnace.”

WARM-AIR FURNACE is an environmental heating appliance designed or arranged to discharge heated air through any duct or ducts.

This definition shall not include a unit heater.

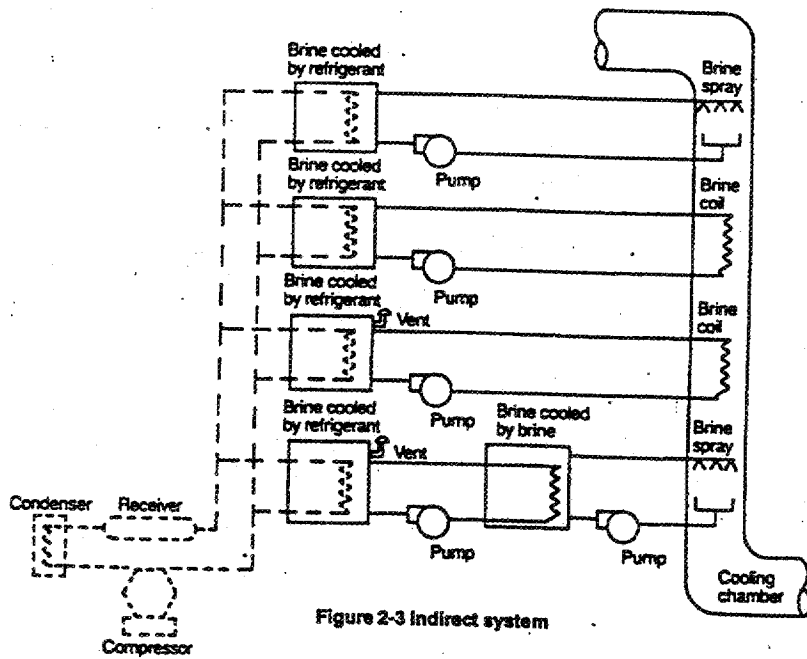
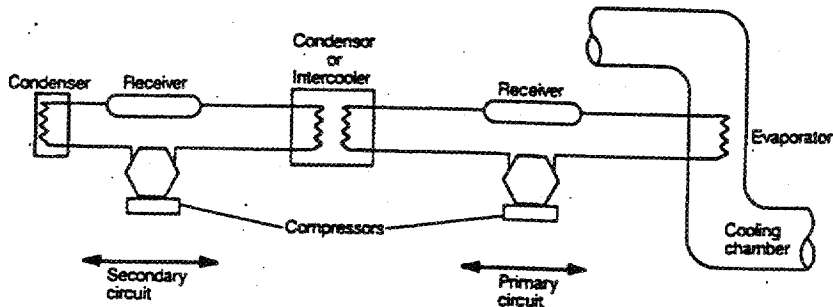
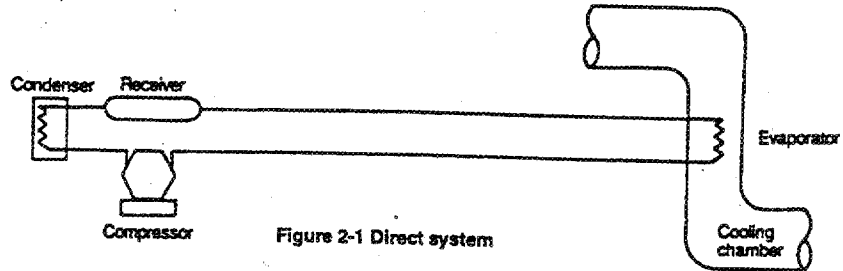
WATER HEATER (~~or HOT-WATER-HEATING-BOILER~~) is an appliance designed primarily to supply potable hot water and is equipped with automatic controls limiting water temperature to a maximum of 210 ° F (99 ° C) provided that a pressure of 160 psi volume of 120 gallons and a heat input of 200,000 Btu/h are not exceeded.

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

WOOD STOVE. See “Solid fuel burning appliance”.

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Section 22. Chapter 3 of the 1997 Uniform Mechanical Code is amended as follows:

Chapter 3

GENERAL REQUIREMENTS

SECTION 301 — SCOPE

301.1 General. Mechanical equipment providing space heating, ventilating, air conditioning or refrigeration and water heaters shall comply with the general requirements of this chapter and the specific requirements elsewhere in this code. Mechanical equipment providing other services to or within buildings, except for plumbing, is also covered by these requirements.

301.2 Standards of Quality. The standards listed below labeled a "UMC Standard" or a "UBC Standard" are also listed in Chapter 16, Part II, and are a part of this code. The other standards listed below are recognized standards. (See Sections 1601, 1602 and 1603.)

301.2.1 National Electrical Code. ANSI/NFPA 70 *National Electrical Code*.

301.2.2 Flame spread index. UBC Standard 8-1, Test Method for Surface-burning Characteristics of Building Materials.

SECTION 302 — APPROVAL OF EQUIPMENT

302.1 Listed Equipment. Equipment shall be approved prior to installation. Listed equipment may be approved by the building official upon determination that it is safe for use and complies with applicable nationally recognized standards as evidenced by the listing and label of an approved agency. Part III of Chapter 16, Recognized Standards, provides guidance as to available nationally recognized standards. Installers shall furnish satisfactory evidence that the appliance is constructed in conformity with the requirements of this code. A permanently attached label of an approved agency may be accepted as such evidence. Installers shall leave the manufacturer's installation and operating instructions attached to the equipment.

302.2 Unlisted Equipment. Unlisted equipment shall be approved prior to installation. Unlisted equipment may be approved by the building official upon determination that it is safe for use. Compliance with appropriate recognized standards as determined by the building official may be used in granting such approval. Part III of Chapter 16, Recognized Standards, provides guidance as to some recognized standards. Installers shall furnish satisfactory evidence that the appliance is constructed in conformity with the requirements of this code. A permanently attached label of an approved agency may be accepted as such evidence. Installers shall leave the manufacturer's installation and operating instructions attached to the equipment.

302.3 Tests. Nothing contained herein shall be construed to limit the building official's authority to require reasonable tests or other satisfactory evidence in making a determination of safe and appropriate use in granting approval of mechanical equipment.

302.4 Gas Appliances. All gas-fired, automatically controlled water heating, space heating, air conditioning and refrigeration equipment, cooking equipment, directly fired air heaters and clothes dryers shall have a nationally recognized label.

SECTION 303 — INSTALLATION

303.1 General. Equipment shall be installed as required by the terms of its approval. The conditions of listing and the manufacturer's installation instructions shall be the minimum requirements for installation. The specific requirements of this code and other relevant codes and regulations of this jurisdiction shall be additional requirements for approved installations.

303.1.1 Prohibited installations. No unvented or direct fired fuel-burning equipment shall be installed or used to provide comfort heating within any occupancy group other than Group F, S or U.

EXCEPTIONS: 1. Direct gas-fired makeup air heaters may be installed in accordance with Section 909.

2. Listed or approved unvented overhead room heaters may be installed in Group A, Divisions 2, 2.1, 3 or 4; Group B; Group H, Divisions 4 and 5 and Group M, provided the installation conforms to all of the following requirements:

2.1 All portions of the heater are located at least 8 feet (2438 mm) above the floor.

CS 19.2

2.2 At least two unobstructed permanent openings are provided to the room or space containing such heaters. These openings shall open directly to the outside of the building through the floor, roof or wall. The minimum combined total area of these openings shall be at least 1 square inch for each 1,000 Btu/h (2.2 mm²/W) input of the heater or heaters, with a minimum total area of 100 square inches (0.0645 m²). One half of the required openings shall be above the heater or heaters and one half shall be located below the heater or heaters. When approved by the building official, mechanical means may be used to exhaust the products of combustion to the exterior.

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3 **303.1.2 Floor furnaces.** Vented floor furnaces shall not be installed in a slab on grade or where it extends down into other than a raised, underfloor crawl space.

4 **303.1.3 Elevation of ignition source.** Equipment which has a flame, generates a spark or uses a glowing ignition source open to the space in which it is installed shall be elevated such that the source of ignition is at least 18 inches (457 mm) above the floor in Group S, Division 3, 4 or 5 and Group U, Division 1 Occupancies. When appliances installed within a Group U, Division 1 Occupancy are enclosed in a separate, approved compartment having access only from outside of the garage, such equipment may be installed at floor level, providing the required combustion air is taken from and discharged to the exterior of the garage. Such equipment shall not be installed in Group H Occupancies or control areas where open use, handling or dispensing of combustible, flammable or explosive materials occurs.

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8 **303.2 Conflicts.** Where conflicts between this code and the conditions of listing or the manufacturer's installation instructions occur, the more restrictive provisions shall be followed as determined by the building official.

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11 **303.3. Heat Exchanger and Cooling Coils Mounted in Furnaces.**

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13 **303.3.1 Prohibited Installations.** A furnace shall not be installed on the discharge side of a refrigerant evaporator or other air-cooling coil unless the furnace is specifically listed for such use. A furnace shall not be installed on the discharge side of an evaporative cooler unless the heat exchanger is of approved corrosion-resistant material.

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16 **303.3.2 Permissible Installations.** A refrigerant evaporator or other air-cooling coil may be installed in the air-discharge duct of a heating furnace if the furnace is listed for use with an air-cooling coil or is listed for operation at at least 0.5 water column (124 Pa) static pressure and conforms with Chapter 11. Conversion of existing furnaces for use with cooling coils is permissible if authorized by the manufacturer and approved by the building official.

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19 **SECTION 304 — LOCATION**

20 **304.1 General.** Equipment shall be located as required by this section, specific requirements elsewhere in this code and the conditions of the equipment's approval.

21 **Note:** See the Fire Code for additional requirements for the storage and supply of liquefied petroleum gas.

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23 **304.2 Indoor Locations.** Equipment inside buildings shall be located in compliance with the special hazards provisions of the Building Code. Fuel-burning equipment other than boilers not listed for closet or alcove installation shall be installed in rooms or spaces having a volume at least 12 times the total volume of the fuel-burning equipment. Boilers not listed for closet or alcove installation shall be installed in rooms having a volume at least 16 times the total volume of the boilers. The room volume shall be computed using the gross floor area and the actual ceiling height up to a maximum computational height of 8 feet (2438 mm). Such rooms or spaces shall be considered large in comparison with the size of the equipment.

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27 **EXCEPTION:** Approved equipment, listed and labeled for installation in rooms or spaces not large in comparison with the size of the equipment, such as those listed for installation in compartments or alcoves.

28 **304.3 Outdoor Locations.** Equipment installed outside buildings shall be listed and labeled for outdoor installation or shall be installed within an approved weatherproof enclosure.

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304.4 Pit Locations. Equipment installed in pits or excavations shall not come in direct contact with the surrounding soil. The sides of the pit or excavation shall be held back a minimum of 12 inches (305 mm) from the equipment, and a minimum of 30 inches on the control side. When the depth exceeds 12 inches (305 mm) below adjoining grade, the walls of the pit or excavation shall be lined with concrete or masonry extending a minimum of 4 inches (102 mm) above adjoining grade having sufficient lateral-bearing capacity to resist collapse. The equipment shall be protected from flooding in an approved manner. See also Section 307.4.

EXCEPTIONS: 1. Equipment designed for direct burial.

2. When approved, pits deeper than 12 inches (305 mm), but less than 36 inches (915 mm), may use stable earth with a slope no greater than 2 units vertical in 1 unit horizontal (200% slope).

304.5 Prohibited Locations. Equipment shall not be located in a hazardous location unless listed and approved for the specific installation. Fuel-burning equipment, electric resistance heating devices or electrostatic air cleaners shall not be installed in a surgical procedure or medical treatment room. Fuel-burning equipment shall not be installed in a closet, bathroom or a room readily usable as a bedroom, or in a room, compartment or alcove opening directly into any of these.

EXCEPTIONS: 1. Direct vent equipment and electric heat furnaces.

2. Access to furnaces located in an attic or underfloor crawl space may be through a closet.

3. A vented appliance located in an unconfined space in accordance with the combustion air requirements of Chapter 7.

4. A fireplace may be approved for installation in a bathroom or bedroom if equipped with an approved method of obtaining combustion air from outside.

5. A warm-air furnace in an enclosed space with combustion air obtained from outside the building in conformance with Chapter 7 and having a tightfitting gasketed door with a closer may have access through a bathroom or bedroom.

Interpretation: "Bathrooms" are rooms equipped with a shower or bathtub.

Equipment burning liquefied petroleum gas (LPG) or liquid fuel shall not be located in a pit, an underfloor space, below grade or similar location where vapors or fuel might unsafely collect unless an approved method for the safe collection, removal and containment or disposal of the vapors or fuel is provided.

In areas subject to flooding, equipment which would be damaged or create hazardous conditions if subjected to inundation shall not be installed at or below grade unless suitably protected by elevation or other approved means.

Interpretation: "Hazardous location" is defined in Section 210. It includes, but is not limited to, Groups H-1, H-2, H-3 and H-7 occupancies.

304.6 Clearances to Combustible Construction. Listed, heat-producing equipment shall be installed in such a manner as to maintain the required clearances to combustible construction specified in the listing. Unlisted, heat-producing equipment shall be installed in such a manner as to maintain the clearances to combustible construction specified in Table 3-A. Clearances to combustible construction for unlisted equipment in Table 3-A may be reduced from the required clearances by using the methods of protection specified in Table 3-B. Clearances from combustibles shall include but not be limited to such considerations as door swing, drawer pull, overhead projections or shelving and window swing, shutters, coverings and drapes. Devices such as door stops or limits, closers, drapery ties or guards, and the like shall not be used to provide the required clearances.

Interpretation: The clearance to combustibles for vented wall furnaces shall include a minimum of 12 inches (305 mm) clearance between every point in the swing of a door and air inlets and outlets for the furnace. The clearance shall be measured at right angles to the opening. Vented wall furnaces must be installed at least 18 inches (457 mm) below structural projections.

304.7 Clearances for Maintenance and Replacement. Clearances around equipment to elements of permanent construction, including other installed equipment, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent

1 construction or disabling the function of a required fire assembly. Clearances to construction
2 for furnaces and boilers in rooms or spaces not large in comparison with the size of the
3 equipment shall not be reduced by any method from the clearances required by the terms of
4 listing and the manufacturer's installation instructions. Warm-air furnaces within compartments
5 or alcoves shall have a minimum working space clearance of 3 inches (76 mm) along the sides,
6 back and top with a total width of the enclosing space being at least 12 inches (305 mm) wider
7 than the furnace. Furnaces having a firebox open to the atmosphere shall have at least 6 inches
8 (152 mm) working space along the front combustion chamber side.

4 **EXCEPTION:** Replacement warm-air furnaces or air-conditioning cooling coils may be installed in
5 an existing compartment or alcove with lesser width and depth when approved by the building official and
6 provided that such width and depth are in compliance with conditions of listing. Combustion-air openings at
7 the rear or side of the compartment shall comply with the requirements of Chapter 7 of this code.

6 **304.8 Clearances from Grade.** Equipment installed at grade level shall be supported on a
7 level concrete slab or other approved material extending a minimum of 3 inches (76 mm)
8 above adjoining grade or it shall be suspended a minimum of 6 inches (152 mm) above
9 adjoining grade.

8 **304.9 Protection from Damage.** Equipment shall not be installed in a location where it is
9 subject to mechanical damage unless protected by approved, substantial barriers.

10 **304.10 Mechanical equipment in hoistways, elevator machine rooms and machinery**
11 **spaces.** Mechanical equipment, ducts and pipes covered under this code shall not be located
12 within hoistways, elevator machine rooms or machinery spaces.

11 **EXCEPTIONS:** 1. Heating, cooling and ventilation equipment other than steam and fluid
12 equipment, may be located in hoistways, elevator machine rooms and spaces, provided they are
13 designed to serve only the hoistway, room or space.

13 2. Ducts and electrical conduit may pass through an elevator machine room or machinery space
14 provided they are separated from the room or space by construction equal to the rated construction of
15 the room or space and so located that all required clearances are maintained.

14 3. Ducts used to heat or cool a hoistway may be located in the hoistway. Ducts used to heat or
15 cool an elevator machine room or machinery space may be located in that room or space.

15 4. Life safety equipment serving only that space.

16 **304.11 Mechanical equipment in stairway enclosures.** No mechanical equipment shall be
17 installed in any stairway enclosure.

17 **EXCEPTIONS:** 1. Unfired heaters used where required for freeze protection of fire protection
18 equipment. See Building Code Section 1005.3.3.

18 2. Life safety equipment serving only that space.

19 3. Approved equipment required by Building Code Section 403.

20 **304.12 Termination of exhaust outlets.** Every exhaust system shall terminate at a point
21 outside of the building not less than 3 feet (914 mm) from any operable opening nor less
22 than 10 feet (3048 mm) from a mechanical air intake and shall be located at a point where it
23 will not cause a public nuisance or hazard.

22 **EXCEPTIONS:** 1. Air which is to be used for recirculation may be discharged to a supply
23 system.

23 2. Air which is suitable for recirculation may be discharged into a boiler room in such quantity as
24 is required to supply the needs of combustion.

24 3. Air suitable for recirculation may be discharged into normally unoccupied spaces.

25 SECTION 305 — TYPE OF FUEL AND FUEL CONNECTIONS

25 **305.1 General.** Fuel-burning equipment shall be designed for use with the type of fuel to
26 which it will be connected and the altitude at which it is installed. Appliances shall not be
27 converted from the fuel specified on the rating plate for use with a different fuel without
28 securing reapproval from the building official and as recommended by the manufacturer of
either the original equipment or the conversion equipment. The serving gas supplier may
convert appliances in accordance with procedures approved by the building official without
securing reapproval of the equipment if properly relabeled. Equipment shall not be installed or
altered in violation of the provisions of this code nor shall the fuel input rate be increased
beyond or decreased below the approved rating for the altitude at which the equipment is
installed.

1 **305.2 Fuel Shutoff Valves.** An approved fuel shutoff valve shall be installed in the fuel supply
2 piping serving each piece of fuel-burning equipment at an accessible location ahead of the
3 union or appliance connector. The shutoff valve shall be located such that it is within 3 feet
4 (914 mm) of the piece of equipment, in the same room or enclosure, and within sight of the
5 equipment, and shall not interfere with maintenance or removal of any equipment.

6 **EXCEPTIONS:** 1. Shutoff valves may be accessibly located inside or under an appliance when
7 such appliance can be removed without removal of the shutoff valve.

8 2. Shutoff valves may be accessibly located inside wall heaters and wall furnaces listed for recessed
9 installation where necessary maintenance can be performed without removal of the shutoff valve.

10 **305.3 Connections.** Each piece of equipment shall be connected to its fuel supply piping by a
11 union type connection; an approved appliance connector; or an approved, listed quick-
12 disconnect device. Appliance connectors shall be listed for the fuel used and shall not exceed 3
13 feet (914 mm) in length.

14 **EXCEPTION:** Connectors for domestic range and domestic clothes dryer shall not exceed 6 feet
15 (1830 mm) in length.

16 Appliance connectors shall not be concealed within or extend through a wall, partition,
17 floor or ceiling. Appliance connectors shall not extend through the equipment housing or
18 casing. Appliance connectors shall be of adequate size to provide the total demand of the
19 connected equipment in accordance with Table 3-D-1 or 3-D-2, as applicable. Appliance
20 connectors installed outdoors shall be listed for outdoor installation. Appliance connectors
21 shall not be in contact with soil and use of aluminum alloy connectors shall be limited to
22 interior locations and shall not be in contact with masonry, plaster or insulation nor shall they
23 be subject to repeated corrosive wettings.

24 **305.4 Prohibited Connections.** Equipment shall not be connected to a fuel supply by means
25 of a hose.

26 **EXCEPTIONS:** 1. Movable laboratory or shop equipment using approved fuel hose material not
27 exceeding 6 feet (1830 mm) in length.

28 2. Outdoor portable appliances using an approved outdoor fuel hose material not exceeding 15 feet
(4572 mm) in length connected to an approved outdoor shutoff valve and piping.

Equipment shall not be connected to fuel piping by quick-disconnect devices, swivel
joint mechanisms or devices that rely on the use of gaskets, ferrules or similar compression
sealing methods unless such fittings are listed for the intended use and approved for the
specific installation.

SECTION 306 — ELECTRICAL CONNECTIONS

306.1 General. Electrical connections to equipment regulated by this code shall be in
accordance with the Electrical Code.

306.2 Means of Disconnect. An approved, independent means of disconnect for the electrical
supply to each piece of equipment shall be provided in sight of the equipment served when the
supply voltage exceeds 50 volts.

306.3 Service Receptacle. A 120-volt service receptacle shall be located within 25 feet (7620
mm) of, and on the same level as, the equipment for maintenance. The service receptacle shall
not be connected on the load side of the required means of disconnect.

306.4 Illumination. Permanent switch controlled lighting shall be installed for maintenance of
equipment required by this code to be accessible or readily accessible. Such lighting shall
provide sufficient illumination to safely approach the equipment and perform the tasks for
which access is provided. Control of the lighting shall be provided at the access entrance.

EXCEPTIONS: 1. When fixed lighting of the building will provide the required illumination,
separate illumination is not required.

2. Equipment located on the roof or exterior wall of a building need not be provided with permanent
lighting.

SECTION 307 — ACCESS AND SERVICE SPACE

1 **307.1 General.** Equipment requiring routine inspection or maintenance shall be provided with
2 sufficient access to allow inspection, maintenance and replacement without removing
3 permanent construction or other equipment or disabling the function of required fire-resistant
4 construction.

5 **307.2 Equipment in Rooms.** Rooms containing equipment requiring access shall be provided
6 with a door and an unobstructed passageway measuring not less than 36 inches (914 mm) wide
7 and 80 inches (2032 mm) high.

8 **EXCEPTION:** Residential-type appliances installed in a compartment, alcove, basement or similar
9 space may be accessed by an opening or door and an unobstructed passageway measuring not less than 24
10 inches (610 mm) wide and large enough to permit removal of the largest appliance in the space, provided
11 that a service space of not less than 30 inches (762 mm) deep and the height of the appliance, but not less
12 than 30 inches (762 mm) is present at the front or service side of the appliance with the door open.

13 **307.3 Equipment in Attics.** Attics containing equipment requiring access shall be provided
14 with the following:

15 1. An access opening large enough to remove the largest piece of equipment, but not
16 less than 30 inches by 22 inches (762 mm by 559 mm);

17 2. An unobstructed passageway which:

18 2.1 Is large enough to remove the largest piece of equipment but not less than 30
19 inches (762 mm) high and 30 inches (762 mm) wide,

20 2.2 Is no more than 20 feet (6096 mm) in length when measured along the
21 center line of the passageway from the access opening to the equipment, and

22 2.3 Has continuous solid flooring not less than 24 inches (610 mm) wide
23 throughout its length; and

24 3. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide
25 located at the front or service side of the equipment.

26 **EXCEPTION:** The passageway and level service space may be omitted if the equipment can be
27 serviced and removed through the access opening.

28 **307.4 Equipment under Floors.** Underfloor spaces containing equipment requiring access
29 shall be provided with the following:

30 1. An access opening large enough to remove the largest piece of equipment, but not
31 less than 30 inches by 22 inches (762 mm by 559 mm);

32 2. An unobstructed passageway which:

33 2.1 Is large enough to remove the largest piece of equipment but not less than 30
34 inches (762 mm) high and 30 inches (762 mm) wide, and

35 2.2 Is no more than 20 feet (6096 mm) in length when measured along the
36 center line of the passageway from the access opening to the equipment;

37 3. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide
38 located at the front or service side of the equipment; and

39 4. Where the depth of the passageway or the service space exceeds 12 inches (305 mm)
40 below the adjoining grade, the walls of the passageway shall be lined with concrete or masonry
41 extending 4 inches (102 mm) above the adjoining grade and have sufficient lateral-bearing
42 capacity to resist collapse.

43 **EXCEPTION:** The passageway may be omitted if the level service space is present with the access
44 open and the equipment can be serviced and removed through the access opening.

45 **307.5 Equipment on Roofs or Elevated Structures.** Roofs or elevated structures containing
46 equipment requiring access shall be provided with the following:

47 1. An approved means of permanent access, the extent of which shall be from grade or
48 floor level to the equipment and its level service space. Such access shall not require climbing
49 over obstructions greater than 30 inches (762 mm) high or walking on roofs having a slope
50 greater than 4 units vertical in 12 units horizontal (33% slope).

EXCEPTIONS: 1. Equipment may be accessed by a portable ladder on the single-story portion of a Group R Occupancy or a Group U, Division 1 garage or carport.

2. Equipment may be accessed by portable ladder on the single-story portion of an existing building that does not exceed 16 feet (4880 mm) in height.

2. A level service platform at least 30 inches (762 mm) deep and 30 inches (762 mm) wide located at the front or service side of the equipment. The sides of the service platform shall be provided with a substantial railing not less than 42 inches (1067 mm) high and constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere where a side of the platform is within 10 feet (3048 mm) of a drop greater than 30 inches (762 mm).

Ladders and catwalks providing the required access shall be as required by the relevant safety regulations but shall not be less than the following:

1. Ladders shall:

1.1 Not be less than 14 inches (356 mm) wide,

1.2 Have a rung spacing not more than 14 inches (356 mm) on center,

1.3 Have a toe space at least 6 inches (152 mm) deep,

1.4 Provide intermediate landings not more than 18 feet (5486 mm) apart, and

1.5 Have side railings which extend at least 30 inches (762 mm) above the scuttle opening or coping to the step off.

2. Catwalks shall:

2.1 Not be less than 24 inches (610 mm) wide and

2.2 Have railings as required for service platforms.

Permanent ladders and catwalks shall be fixed to the structure as required by the Building Code. Stairways providing the required access shall comply with the Building Code.

307.6 Equipment in Overhead Spaces. Overhead spaces containing equipment requiring access shall be arranged to permit the required access and the surface below the equipment shall permit the safe use of a portable ladder or staging sufficient to accomplish the purposes for which the access was required or permanent access shall be provided as required by other provisions of this section.

SECTION 308 — EQUIPMENT SUPPORTS AND RESTRAINTS

308.1 General. Equipment shall be supported by substantial bases or hangers capable of supporting the loads to which they will be subjected as determined by the Building Code. Stationary equipment shall be fixed in position by substantial means which will prevent its incidental displacement. Such restraint shall accommodate both vertical and lateral loads including, where applicable, wind, snow and seismic as required by the Building Code.

308.2 Vibration Isolation. When vibration isolation of equipment is employed, an approved means of supplemental restraint shall be used to accomplish the support and restraint required by this section.

308.3 Prohibited Conditions. Piping, electrical conduit, ductwork, vents and the like shall not be used to provide support or restraint of equipment.

Where other portions of this code or provisions of the Building Code require noncombustible construction or supports, noncombustible materials shall also be used to meet the requirements of this section.

SECTION 309 — DISCHARGE OF BYPRODUCTS

309.1 General. Byproducts generated in the normal operation of equipment shall be collected and disposed in an approved manner.

309.2 Fuel-burning Equipment. Gaseous combustion byproducts of fuel-burning equipment shall be vented to the outside as required by the applicable provisions of Chapter 5, 8 or 9 of this code. Liquid combustion byproducts of condensing appliances shall be collected and

1 discharged to an approved plumbing fixture or disposal area in accordance with the
2 manufacturer's approved instructions. Approved corrosion-resistant condensate piping shall not
3 be smaller than the drain pan connection on the approved equipment and shall maintain a
4 minimum horizontal slope in the direction of discharge of not less than $\frac{1}{8}$ unit vertical in 12
5 units horizontal (1%).

6 **309.3 Chilled Water and Evaporator Coils.** Condensate, defrost and overflow discharges
7 from cooling coils shall be collected and discharged to an approved plumbing fixture or
8 disposal area. Approved corrosion-resistant discharge piping shall not be smaller than the drain
9 pan connection on the approved equipment and shall maintain a minimum horizontal slope in
10 the direction of discharge of not less than $\frac{1}{8}$ unit vertical in 12 units horizontal (1%). When
11 serving shop or field-fabricated drain pans or more than one piece of equipment, such drains
12 shall be sized as required by Chapter 11 of this code. Traps and vents for condensate drains
13 shall be installed according to the manufacturer's instructions.

14 **Interpretation:** Condensate, defrost, overflow discharges and waste water shall not drain over
15 a public way.

16 **309.4 Evaporative Coolers and Cooling Towers.** Overflow, blowdown and service drains
17 from evaporative coolers or air washers and cooling towers shall be collected and discharged to
18 an approved plumbing fixture capable of receiving the flow rate of either the equipment make-
19 up system or the blowdown discharge, whichever is greater.

20 SECTION 310 — IDENTIFICATION

21 **310.1 General.** Fuel-burning and electrically operated equipment shall, as a minimum, have
22 affixed a permanent and legible, factory-applied nameplate on which shall appear:

- 23 1. Name or trademark of the manufacturer.
- 24 2. Model and serial numbers.
- 25 3. Symbol of the listing agency certifying compliance with recognized standards.
- 26 4. Required clearances from combustibles, when applicable.
- 27 5. Type of fuel, when applicable.
- 28 6. Fuel input rating in Btu/h (W), when applicable.
7. Volts, amps and, for multiphase equipment, the number of phases.
8. Heat output in Btu/h (kW), when applicable.
9. Fusing requirements, when applicable.
10. Instructions for safe start-up, operation and shut-off.

11 **310.2 Refrigeration Equipment.** Equipment in refrigeration systems shall be further
12 identified as required by Chapter 11 of this code.

13 **310.3 Area Served.** Equipment serving different areas of a building other than where it is
14 installed shall be marked in an approved manner to permanently and uniquely identify the
15 piece of equipment and the area served.

16 **Interpretation:** Adhesive-backed labels may be used to mark equipment.

17 **310.4 Direction of Flow.** Equipment which relies on a particular direction of fluid flow in
18 order to operate properly or safely shall be permanently marked in an approved manner to
19 indicate the correct direction of flow.

20 SECTION 311 — CONTROLS

21 **311.1 General.** Equipment shall be provided with safety controls to limit or stop its operation
22 when unsafe conditions occur from out of limits operation or failure of a sequence or
23 component.

24 **311.2 Temperature.** Heating appliances connected to ducts shall have automatically resetting
25 temperature limiting controls which will prevent the discharge temperature from exceeding

200°F (93°C) under normal conditions and manually resetting temperature limiting controls which will prevent the discharge temperature from exceeding 250°F (121°C).

311.3 Burners. Fuel-burning equipment shall be equipped with an approved automatic means which will shut off the fuel supply to the equipment in the event of ignition or flame failure.

EXCEPTION: The listed shutoff devices shall not be required on range or cooking tops, log lighters, lights or other open-burner manually operated appliances, or listed appliances not requiring such devices and specific industrial appliances as approved by the building official.

SECTION 312 — PERSONNEL PROTECTION

312.1 Moving Parts. Exposed moving parts such as, but not limited to, flywheels, fans, pulleys, belts, shaft couplings and the like shall be provided with a suitable and substantial metal guard to prevent inadvertent contact. Such guards shall be removable for required maintenance.

312.2 Extreme Temperatures. Equipment which is intended to operate at temperatures above or below that at which injury by contact is likely to occur shall be so designed as to permit safe use or be insulated or isolated so as to prevent inadvertent contact.

312.3 Electrical Hazards. Equipment which presents a shock hazard shall be enclosed or installed as required by the Electric Code to guard against such hazards. Equipment capable of generating dangerous levels of electromagnetic fields shall be suitably shielded, grounded and isolated.

SECTION 313 — SOLID FUEL-BURNING APPLIANCES

313.1 Floor Protection. Floor protection for listed appliances shall be installed in accordance with the terms of the listing.

For listed appliances where no instructions for floor protection exist in the terms of the listing, floor protection shall be provided in the following manner:

313.1.1 Dimensions.

18 inches (457 mm) beyond the door or opening in front of the appliance.

12 inches (305 mm) beyond the rear.

12 inches (305 mm) beyond the sides.

313.1.2 Methods. Floor coverings shall be continuous (no holes or cracks) and sufficiently strong not to crack, tear or puncture with normal use. Floor protections may be covered with a noncombustible material for decorative appearance. Protection shall be provided, as applicable, in one of the following methods:

If there is 6 inches (152 mm) or more clearance between the bottom of the appliance and the floor, the floor shall be protected by a sheet of insulating millboard at least 1/4 inch (6 mm) thick or cement insulating board at least 1/2 inch (13 mm) thick or equivalent material, covered with a continuous sheet of at least 0.024-inch (No. 24 gage) sheet metal.

Where there is less than 6 inches (152 mm) of open air space, the floor shall be protected with hollow masonry units at least 4 inches (102 mm) thick arranged with the holes aligned to allow free air circulation through the floor protector.

The hollow masonry shall be covered with at least 24 gage sheet metal.

313.2 Wall Protection. For listed appliances, wall clearances and protection shall be as specified in the terms of the listing. For listed appliances where no instructions concerning wall clearances are provided in the terms of the listing, wall protection shall be as follows:

1. Unprotected walls. The appliance shall not be located closer than 42 inches (1067 mm) horizontally to any combustible material.

2. Protected walls. Reduced clearances may be allowed when an approved wall shield is installed. The shield shall be constructed and installed so that it extends 12 inches (305 mm) horizontally beyond the sides, 18 inches (457 mm) vertically above the top and 30 inches (762 mm) beyond the opening to the fire chamber for a wall perpendicular to the side containing the opening when closer than 36 inches (914 mm) to the wall. (See also Tables 3-E-1 and 3-E-2 for wall protection required for chimney connectors.) Adhesives, fasteners

and facing material shall be noncombustible. One of the following methods of construction shall be used:

1 2.1 A listed wall shield may be installed in accordance with the terms of the listing. This
2 will normally include an air space between the wall and the shield.

3 2.2 Listed appliances shall be installed with the clearances specified in the terms of the
4 listing. If a reduced clearance provision using a protective shield is not specified in the
5 terms of the listing, Table 3-B shall be used, starting with the listed clearance. If the listed
6 clearance is not found in Table 3-B, the next more restrictive clearance shall be used.

7 2.3 A noncombustible wall may be constructed of masonry units or metal studs, provided
8 it is spaced out from the existing wall at least 1 inch (25 mm) and the framing below is
9 adequate to carry the additional weight. Wall ties must be used to hold the masonry wall in
10 place. Vertical joints shall be left open at the top and bottom for air circulation.

11 2.4 A heat shield may be constructed using the clearances and materials specified in Table
12 3-B. A minimum air space of 1 inch (25 mm) is required regardless of the material used.
13 Final clearances are measured from the outer surface of the appliance to the original wall.
14 Openings shall be provided at the top and bottom for air circulation.

15 2.5 A heat shield may be approved by the building official when constructed of materials
16 other than those found in Table 3-B provided the material is noncombustible and equal in
17 strength, heat transmission and durability to the materials specified in Table 3-B. A
18 minimum air space of 1 inch (25 mm) is required, regardless of the material used. Openings
19 of at least 1 inch (25 mm) shall be maintained at the top and bottom and the shield shall be
20 terminated 1- 1/2 inches (38 mm) from the floor or ceiling.

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TABLE 3-A—STANDARD INSTALLATION CLEARANCES, IN INCHES, FOR UNLISTED HEAT-PRODUCING APPLIANCES
 See Section 304.

RESIDENTIAL-TYPE APPLIANCES	Fuel	APPLIANCE				
		Above Top of Casing or Appliance	From Top and Sides of Warm-air Bonnet or Plenum	From Front ¹ × 25.4 for mm	From Back	From Sides
Boilers and water heaters Steam boilers—15 psi (103.4 Pa) Water boilers—250°F (121°C) Water heaters—200°F (93°C) All water walled or jacketed	Automatic oil or comb. gas-oil	6		24	6	6
	Automatic gas	6		18	6	6
Furnaces—central; or heaters—electric central Warm-air furnaces Gravity, upflow, downflow, horizontal and duct Warm-air—250°F (121°C) max.	Solid	6		48	6	6
	Automatic oil or comb. gas-oil	6	6	24	6	6
Furnaces—floor For mounting in combustible floors	Automatic gas	6	6	18	6	6
	Solid	182	182	48	18	18
Heat exchanger Steam—15 psi max. (103.4 Pa max.) Hot water—250°F (121°C) max.	Electric	6	6	18	6	6
	Automatic oil or comb. gas-oil	36		12	12	12
Room heaters ³ Circulating type Radiant or other type	Automatic gas	36		12	12	12
	Oil or solid	36		24	12	12
Firespace stove Radiators Steam or hot waters ⁵ Ranges—cooking stoves	Oil or solid	36		24	12	12
	Gas	36		24	12	12
Incinerators Domestic types	Oil or solid	36		36	36	36
	Gas	36		36	18	18
Firespace stove Radiators Steam or hot waters ⁵ Ranges—cooking stoves	Gas with double metal or ceramic back	36		36	12	18
	Solid	48 ⁴		54	48 ⁴	48 ⁴
Incinerators Domestic types	Oil	36		6	6	6
	Gas	306		9		Firing Opp. Side 24 18
Incinerators Domestic types	Solid clay-lined firepot	306		6	6	6
	Solid unlined firepot	306		24	24	18
Incinerators Domestic types	Electric	306		36	36	18
	Electric	367		6	6	6

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TABLE 3-A—STANDARD INSTALLATION CLEARANCES, IN INCHES, FOR UNLISTED HEAT-PRODUCING APPLIANCES—(Continued)
 See Section 304.

COMMERCIAL INDUSTRIAL-TYPE LOW-HEAT APPLIANCES ANY AND ALL PHYSICAL SIZES EXCEPT AS NOTED	Fuel	Above Top of Casing or Appliances ⁵	APPLIANCE			
			From Top and Sides of Warm-air Bonnet or Plenum × 25.4 for mm	From Front ¹	From Back ²	From Sides ³
Boilers and water heaters 100 cu. ft. (2.83 m ³) or less Any psi steam 50 psi (342 Pa) or less Any size	All fuels	18		48	18	18
	All fuels	18		48	18	18
Unit heaters Floor mounted or suspended—any size Suspended—100 cu. ft. (2.83 m ³) or less Suspended—100 cu. ft. (2.83 m ³) or less Suspended—Over 100 cu. ft. (2.83 m ³) Floor mounted—any size	Steam or hot water	1			1	1
	Oil or comb. gas-oil	6		24	18	18
	Gas	6		18	18	18
	All fuels	18		48	18	18
	All fuels	18		48	18	18
Ranges—restaurant-type Floor mounted	All fuels	48		48	18	18
Other low-heat industrial appliances Floor mounted or suspended	All fuels	18	18	48	18	18
COMMERCIAL INDUSTRIAL-TYPE MEDIUM-HEAT APPLIANCES						
Boilers and water heaters Over 50 psi (345 Pa) Over 100 cu. ft. (2.83 m ³)	Fuel	Above Top of Casing or Appliances ⁵	APPLIANCE			
			From Top and Sides of Warm-air Bonnet or Plenum × 25.4 for mm	From Front ¹	From Back ²	From Sides ³
	All fuels	48		96	36	36
Other medium-heat industrial appliances All sizes	All fuels	48	36	96	36	36
Incinerators All sizes		48		96	36	36
INDUSTRIAL-TYPE HIGH-HEAT APPLIANCES						
High-heat industrial appliances All sizes	All fuels	180		360	120	120

¹The minimum dimension shall be that necessary for servicing the appliance, including access for cleaning and normal care, tube removal, etc.

²The dimension may be 6 inches (152 mm) for an automatically stoker-fired forced-warm-air furnace equipped with 250°F (121°C) limit control and with barometric draft control operated by draft intensity and permanently set to limit draft to a maximum intensity of 0.13-inch water gage (32 Pa).

³Approved appliances shall be installed on noncombustible floors and may be installed on protected combustible floors. Heating appliances approved for installation on protected combustible flooring shall be so constructed that flame and hot gases do not come in contact with the appliance base. Protection for combustible floors shall consist of 4-inch (102 mm) hollow masonry covered with sheet metal at least 0.021 inch (0.5 mm) thick (No. 24 manufacturer's standard gage). Masonry shall be permanently fastened in place in an approved manner with the ends unsealed and joints matched so as to provide free circulation of air through the masonry. Floor protection shall extend 12 inches (305 mm) at the sides and rear of the appliance, except that at least 18 inches (457 mm) shall be required on the appliance-opening side or sides measured horizontally from the edges of the opening.

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~~((The 48-inch (1219 mm) clearance may be reduced to 36 inches (914 mm) when protection equivalent to that provided by Items 1 through 8 of Table 3 A is applied to the combustible construction.))~~

⁵Steampipes and hot-water-heating pipes shall be installed with a clearance of at least 1 inch (25 mm) to all combustible construction or material, except that at the points where pipes carrying steam at not over 15 pounds gage pressure (103 kPa) or hot water emerge from a floor, wall or ceiling, the clearance at the opening through the finish floorboards or wall-ceiling boards may be reduced to not less than 1/2 inch (13 mm). Each such opening shall be covered with a plate of noncombustible material.

Such pipes passing through stack shelving shall be covered with not less than 1 inch (25 mm) of approved insulation.

Wood boxes or casings enclosing uninsulated steam or hot-water-heating pipes or wooden covers to recesses in walls in which uninsulated pipes are placed shall be lined with metal or insulating millboard.

Where the temperature of the boiler piping does not exceed 160°F (71°C), the provisions of this table do not apply.

Coverings or insulation used on steam or hot-water pipes shall be of material suitable for the operating temperature of the system. The insulation or jackets shall be of noncombustible materials, or the insulation or jackets and lap-seal adhesives shall be tested as a composite product. Such composite product shall have a flame-spread rating of not more than 25 and a smoke-developed rating not to exceed 50 when tested in accordance with UBC Standard 8-1.

⁶To combustible material or metal cabinets. If the underside of such combustible material or metal cabinet is protected with insulating millboard at least 1/4 inch (6 mm) thick covered with sheet metal of not less than 0.013 inch (0.3 mm) (No. 28 gage), the distance may be reduced to 24 inches (610 mm).

⁷Clearance above charging door must be at least 48 inches (1219 mm).

⁸If the appliance is encased in brick, the 18-inch (457 mm) clearance above and at sides and rear may be reduced to 12 inches (305 mm).

⁹If the appliance is encased in brick, the clearance above may be reduced to 36 inches (914 mm) and at sides and rear may be reduced to 18 inches (457 mm).

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TABLE 3-B—CLEARANCES, IN INCHES, WITH SPECIFIED FORMS OF PROTECTION^{1,2}

TYPE OF PROTECTION Applied to the Combustible Material Unless Otherwise Specified and Covering All Surfaces Within the Distance Specified as the Required Clearance with No Protection (Thicknesses are Minimum)	WHERE THE STANDARD CLEARANCE IN TABLE 5-A WITH NO PROTECTION IS:														
	36 inches				18 inches				12 inches				6 inches		
	× 25.4 for mm		Sides and Rear	Chimney or Vent Connector	× 25.4 for mm		Sides and Rear	Chimney or Vent Connector	× 25.4 for mm		Sides and Rear	Chimney or Vent Connector	× 25.4 for mm		Sides and Rear
1. 1/4" in insulating millboard spaced out 1"3	Above	30	18	30	15	9	12	9	9	6	6	3	2	3	2
2. 0.013" (No. 28 manufacturer's standard gage) steel sheet on 1/4" insulating millboard	Above	24	18	24	12	9	12	9	6	4	4	3	2	2	2
3. 0.013" (No. 28 manufacturer's standard gage) steel sheet spaced out 1"3	Above	18	12	18	9	6	9	6	4	4	2	2	2	2	2
4. 0.013" (No. 28 manufacturer's standard gage) steel sheet on 1/8" insulating millboard spaced out 1"3	Above	18	12	18	9	6	9	6	4	4	2	2	2	2	2
5. 1 1/2" insulating cement covering on heating appliance	Above	18	12	36	9	6	18	6	4	9	2	1	6		
6. 1/4" insulating millboard on 1" mineral fiber bats reinforced with wire mesh or equivalent	Above	18	12	18	6	6	6	4	4	4	2	2	2	2	2
7. 0.027" (No. 22 manufacturer's standard gage) steel sheet on 1" mineral fiber bats reinforced with wire or equivalent	Above	18	12	12	4	3	3	2	2	2	2	2	2	2	2
8. 1/4" insulating millboard	Above	36	36	36	18	18	18	12	12	9	4	4	4	4	4

¹For appliances complying with Sections 304.2 and 304.3.
²Except for the protection described in Item 5, all clearances shall be measured from the outer surface of the appliance to the combustible material, disregarding any intervening protection applied to the combustible material.
³Spacers shall be of noncombustible material.
 NOTE: Insulating millboard is a factory-made product formed of noncombustible materials, normally fibers, and having a thermal conductivity of 1 Btu-inch per square foot per degree Fahrenheit [1.73W/(m.K)] or less.

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TABLE 3-C—CHIMNEY CONNECTOR AND VENT CONNECTOR CLEARANCES FROM COMBUSTIBLE MATERIALS

DESCRIPTION OF APPLIANCE	MINIMUM CLEARANCE (Inches) ¹
	X 25.4 for mm
Residential-type Appliances	
Single-wall Metal Pipe Connectors ²	18
Gas appliances without draft hoods	18
Electric, gas and oil incinerators	18
Oil and solid-fuel appliances	18
Unlisted gas appliances with draft hoods	9
Boilers and furnaces equipped with listed gas burners and with draft hoods	9 ³
Oil appliances listed as suitable for use with Type L venting systems (but only when connected to chimneys)	9
Listed gas appliances with draft hood	6
Type L Venting System Piping Connectors	
Gas appliances without draft hoods	9
Electric, gas and oil incinerators	9
Oil and solid-fuel appliances	9
Unlisted gas appliances with draft hoods	6
Boilers and furnaces equipped with listed gas burners and with draft hoods	6
Oil appliances listed as suitable for use with Type L venting systems	4
Listed gas appliances with draft hoods	5
Type B Gas Vent Piping Connectors	5
Listed gas appliances with draft hoods	5
Commercial-Industrial-type Appliances	
Low-heat Appliances	
Single-wall Metal Pipe Connectors ²	18
Gas, oil and solid-fuel boilers, furnaces and water heaters	18
Ranges, restaurant-type	18
Oil unit heaters	18
Unlisted gas unit heaters	18
Listed gas unit heaters with draft hoods	6
Other low-heat industrial appliances	18
Medium-heat Appliances	
Single-wall Metal Pipe Connectors ²	36
All gas, oil and solid-fuel appliances	36

¹These clearances apply except if the listing of an appliance specifies different clearance, in which case the listed clearance takes precedence.
²The clearances from connectors to combustible materials may be reduced if the combustible material is protected in accordance with Table 3-B.
³The dimension may be 6 inches (152 mm), provided the maximum flue temperatures entering the draft hood do not exceed 550°F (288°C).
⁴If listed Type L venting system piping is used, the clearance may be in accordance with the venting system listing.
⁵If listed Type B or L venting system piping is used, the clearance may be in accordance with the venting system listing.

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TABLE 3-D-1—CAPACITIES OF LISTED METAL APPLIANCE CONNECTORS¹
 For use with gas pressures 8-inch (2 kPa) or more water column.

SEMI-RIGID CONNECTOR O.D. ² (inch)	FLEXIBLE CONNECTOR NOMINAL I.D. ³ (inch)	MAXIMUM CAPACITIES IN THOUSANDS Btu/h (Based on pressure drop of 0.4-inch water column (1 kPa)) NAT. GAS ⁴ OF 1,100 Btu/cu. ft. (41 MJ/m ³)						
		All Gas Appliances			Ranges and Clothes Dryers			
		1'	1 1/2'	2'	2 1/2'	3'	4'	5'
× 25.4 for mm		× 293.07 for W						
3/8	1/4	40	33	29	27	25		
1/2	3/8	93	76	66	62	58		
5/8	1/2	189	155	134	125	116	101	90
—	3/4	404	330	287	266	244		80
—	1	803	661	573	534	500		

¹Gas connectors are certified by the testing agency as complete assemblies including the fittings and valves. Capacities shown are based on the use of fittings and valves supplied with the connector.

²Semi-rigid connector listings are based on outside diameter.

³Flexible connector listings are based on nominal diameter.

⁴For liquefied petroleum gas, use 1.6 times the natural gas capacities shown.

TABLE 3-D-2—CAPACITIES OF LISTED METAL APPLIANCE CONNECTORS¹
 For use with gas pressures less than 8-inch (2 kPa) water column.

SEMI-RIGID CONNECTOR O.D. ² (inch)	FLEXIBLE CONNECTOR NOMINAL I.D. ³ (inch)	CAPACITIES FOR VARIOUS LENGTHS IN THOUSANDS Btu/h (Based on pressure drop of 0.2-inch water column (500 Pa)) NAT. GAS ⁴ OF 1,100 Btu/cu. ft. (41 MJ/m ³)						
		All Gas Appliances			Ranges and Clothes Dryers			
		1'	1 1/2'	2'	2 1/2'	3'	4'	5'
× 25.4 for mm		× 293.07 for W						
3/8	1/4	28	23	20	19	17		
1/2	3/8	66	54	47	44	41		
5/8	1/2	134	110	95	88	82	72	63
—	3/4	285	233	202	188	174		57
—	1	561	467	405	378	353		

¹Gas connectors are certified by the testing agency as complete assemblies including the fittings and valves. Capacities shown are based on the use of fittings and valves supplied with the connector.

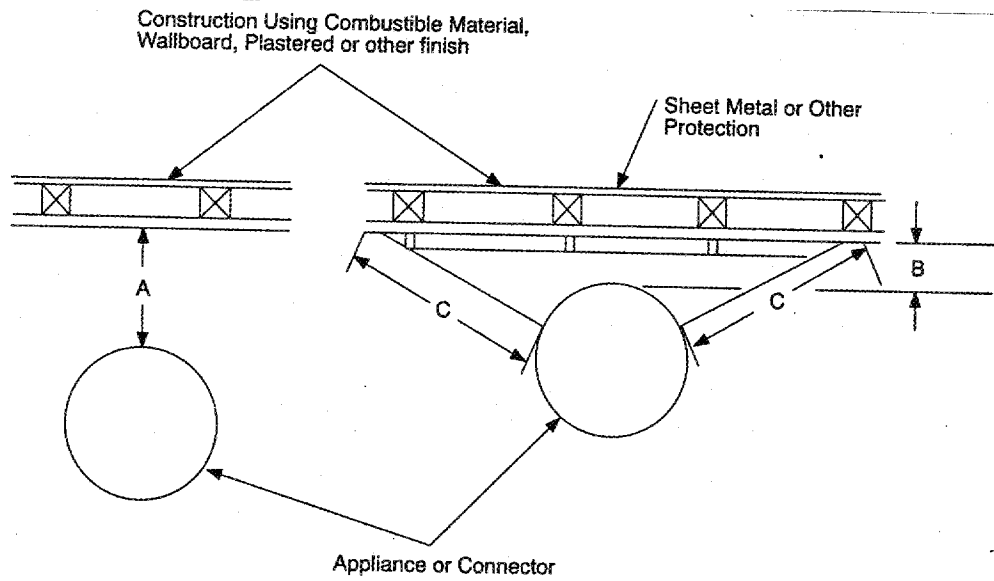
²Semi-rigid connector listings are based on outside diameter.

³Flexible connector listings are based on nominal diameter.

⁴For liquefied petroleum gas, use 1.6 times the natural gas capacities shown.

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- A—Dimension shall not be less than the required clearance with no protection set forth in Tables 3-A and 3-C and in the sections applying to various types of appliances.
- B—Dimension shall not be less than the reduced clearance set forth in Table 3-B.
- C—Dimension shall not be less than the clearance required for dimension A.

FIGURE 3-1—EXTENT OF PROTECTION REQUIRED TO REDUCE CLEARANCES FROM APPLIANCE, CHIMNEY OR VENT CONNECTORS

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Table 3-E-1—Required Clearance with No Protection for Unlisted Appliances (inches)

APPLIANCE	Above top (Ceiling)	From Front (Wall)	From Back (Wall)	From Sides (Wall)		Closest Point 45° Angle
Room Heater, Circulating	42	30	21	21		21
Room Heater, Radiant	42	42	42	42		36
Cook Stove	42	42	42	Firebox Side 42	Opposite Side 24	N/A
Chimney Connector (Stovepipe)	18 inch minimum or 3 times the diameter of the chimney connector (stovepipe)					

* Side with fuel-loading or ash removal door.

**Table 3-E-2
 Reduced Clearance with Wall Shields***

WHERE REQUIRED CLEARANCE ** WITH NO PROTECTION IS:						
	42 inches	36 inches	30 inches	24 inches	18 inches	12 inches
From Wall	21	18	15	12	9	9
From Ceiling	21	18	15	12	9	9

*Does not apply to side with fuel-loading or ash removal door or to appliances installed in closets or alcoves.

**Clearance from appliance or chimney connector (stovepipe).

UNLISTED WALL SHIELDS:

- (a) 4" of solid masonry spaced out 1" from the surface. Joints struck flush on the back surface.
- (b) 7/8" portland cement plaster on expanded metal lath and metal studs spaced out 1" from the surface.
- (c) 1/4" insulating millboard spaced out 1" from the surface.
- (d) 1/4" insulating cement board spaced out 1" from the surface.
- (e) No. 28 standard gage sheet steel spaced out 1" from the surface.
- (f) A wall shield may be approved by the building official when constructed of materials other than those found in Table 3-E-2, provided the material is noncombustible and equal in strength, heat transmission and durability to the materials specified in Table 3-E-2. A minimum air space of 1" is required, regardless of the material used. Maintain the 1" openings at the top and bottom and terminate the shield 1-1/2" from the floor or ceiling.

Section 23. Chapter 4 of the 1997 Uniform Mechanical Code is amended as follows:

Chapter 4
VENTILATION AIR SUPPLY

NOTE: This chapter has been revised in its entirety.

SECTION 401 — SCOPE

401.1 General. Mechanical equipment providing supply air to buildings or portions thereof shall comply with this chapter and other requirements elsewhere in this code.

401.2 Standards of Quality. The standard listed below labeled a "UMC Standard" is listed in Chapter 16, Part II, and is a part of this code.

401.2.1 Test Performance of Air Filter Units. UMC Standard 4-1, Test Performance of Air Filter Units, is UL 900.

SECTION 402 — SUPPLY AIR

402.1 General. Ventilation air supply to a room or space shall be obtained from an approved outside air source or a return air source, or both, and conveyed to the room or space served by ducts complying with Chapter 6 of this code unless the approved equipment does not require duct connections.

402.2 Screened Openings. Inlets and outlets of ventilation air supply systems shall be equipped with screen, grills or louvers to prevent the introduction of foreign materials and to deny vermin admission to the system. Screens, grilles or louvers shall not pass an object larger than a 1/4-inch-diameter (6.4 mm) sphere.

EXCEPTION: An outside-air inlet serving a nonresidential portion of a building may be covered with screen having openings larger than 1/4 inch (6.4 mm) but in no case larger than 1 inch (25 mm).

402.3 Filters. Air filters shall be installed in supply air systems upstream of forward-curved fans, heat exchangers, coils, burners and the like. Filters shall be listed as Class I or II in compliance with UMC Standard 4-1.

EXCEPTIONS: 1. Filters serving a guest room or dwelling units need not be listed.
2. Evaporation pads in an evaporative cooler.

In Group I, Divisions 1.1 and 1.2 Occupancies, ventilation air supply systems serving sensitive areas, including but not limited to operating rooms, delivery rooms, intensive care rooms, recovery rooms, nurseries, isolation rooms and laboratory media preparation rooms, shall be equipped with additional filters having a minimum efficiency of 90 percent downstream of cooling, coils, humidification equipment and the associated supply fans.

Exception: Filters are not required downstream of dry-steam humidifiers.

Interpretation: Efficiency of filters shall be determined by the American Society of Heating, Refrigeration and Air-conditioning Engineers dust-spot method.

402.4 Make-up Air. Ventilation air supply shall be sufficient to provide make-up air for exhaust systems and exfiltration due to stack effect. (~~when required by this code or the Building Code~~). Make-up air systems shall be electrically interlocked with their associated exhaust systems.

Interpretation: For purposes of Section 402.4, "sufficient" means justified by rational design.

Compensating hoods shall meet the airflow requirements specified in Sections 508.7.2 through 508.7.4. Compensating hoods shall extract at least 20 percent of their required exhaust airflow from the kitchen area.

402.5 Duct Size. Ducts in ventilation supply air systems shall be sized as required by the equipment manufacturer's approved installation instructions or approved good engineering practice.

SECTION 403 — OUTSIDE AIR

1 **403.1 General.** Ventilation air supply from outside shall be provided as required in Section
2 406 (~~Chapter 12 of the Building Code. Alternate provisions may be found in Appendix~~
3 ~~Chapter 12 and for Group R, Division 3 Occupancies in Appendix Chapter 3, Division 3 of the~~
4 ~~Building Code~~)).

5 **403.2 Location.** Outside air shall be obtained from an approved location exterior to the
6 building. Outside air shall not be obtained from the following locations:

- 7 1. Closer than 10 feet (3048 mm) from a vent serving fuel-burning equipment.

8 **EXCEPTION:** Listed outdoor appliance equipped with outdoor air inlet and appliance vent.

9 2. Closer than 10 feet (3048 mm) from a plumbing drainage system vent or from an
10 exhaust system outlet, unless the outlet is 3 feet (914 mm) above the outside air inlet.

11 3. Where it will pick up objectionable odors, fumes or flammable vapors; or when it is
12 less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or
13 when it is in a horizontal position in a sidewalk, street, alley or driveway.

- 14 4. A hazardous location.

- 15 5. An insanitary location.

SECTION 404 — RETURN AIR

16 **404.1 Location.** Return air shall be obtained from an approved interior location of the same
17 building. Return air shall not be obtained from the following locations:

- 18 1. Where it will pick up objectionable odors, fumes or flammable vapors.

- 19 2. A hazardous location.

- 20 3. An unsanitary location.

21 4. An area having a volume less than 25 percent of the entire volume served by the
22 supply air system, unless there is a sufficient permanent communicating opening to areas
23 having a volume equal to the required 25 percent. Appropriately sized transfer grills or door
24 undercuts may be used to provide the required opening.

25 **EXCEPTION:** Such opening when used for a warm-air furnace in a dwelling unit may be reduced
26 to no less than 50 percent of the required area, provided the balance of the required return air is taken from a
27 room or hall having at least three doors leading to other rooms served by the furnace.

- 28 5. A refrigeration machinery room.

1. A room or space containing fuel-burning equipment.

EXCEPTIONS: 1. Fireplaces, fireplace appliances, residential cooking appliances, direct-vent
appliances, enclosed furnaces and domestic-type clothes dryers.

2. A listed vented wall furnace.

3. A blower-type system where:

3.1 The return air is taken from a room or space having a volume exceeding 1 cubic foot for each
(10 Btu/h),

3.2 At least 75 percent of the supply air is discharged back into the same room or space, and

3.3 The return-air inlet shall not be located within 10 feet (3048 mm) of any appliance firebox or
draft diverter in the same enclosed room or confined space.

7. A closet, bathroom, toilet room or kitchen.

8. A corridor, exit passageway or exit enclosure required by the Building Code to be of
fire-resistive construction.

Interpretation: Item 8 applies to corridors, exit passageways and exit enclosures required to
be constructed of fire-rated construction by Chapter 10 of the Building Code.

9. A dwelling unit, guest room or patient room other than the unit or room in which the
air originates.

SECTION 405 — DIRECT GAS-FIRED MAKE-UP AIR SYSTEMS

405.1 General. (~~Direct gas-fired make-up air heaters shall not be installed for comfort heating~~
~~in other than Group F and S Occupancies.~~) See Section 303.1.1.

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405.2 Installation. Installation of direct gas-fired make-up air heaters shall comply with their listing and approved manufacturer's installation instructions. A refrigerant containing evaporator coil shall not be located upstream of the burner. Burner operation shall be electrically interlocked with a source of outside air ventilation supplying at least 4 cubic feet per minute per 1,000 Btu/h (0.00644 L/s • W).

Interpretation: Recirculation of room air with an industrial air heater may be hazardous in the presence of flammable solids, liquids and gases; explosive materials (e.g., grain dust, coal dust, aluminum dust, gun powder); and substances that may become toxic when exposed to heat (e.g., refrigerants, aerosols). Recirculation is not recommended in uninsulated buildings where the outside temperature falls below 32°F (0°C).

SECTION 406 — VENTILATION AND INDOOR AIR QUALITY

406.1 Scope and General Requirements

406.1.1 Purpose. The purpose of Section 406 is to provide minimum standards for the design and installation of mechanical ventilation systems.

It is intended that these provisions provide flexibility to permit the use of innovative approaches and techniques. These provisions are structured to permit compliance with the intent of Section 406 by demonstration of performance through on-site testing or through engineered design. Section 406 is not intended to abridge any safety or health requirements required under any other applicable codes or ordinances.

406.1.2 Scope. Section 406 sets forth minimum requirements for ventilation in all occupancies, including the design of new construction.

406.2 Application to Existing Buildings

406.2.1 Additions to Existing Buildings. Additions to existing buildings or structures may be made without making the entire building comply, provided that the new addition shall conform to the provisions of Section 406.

EXCEPTION: Additions with less than 500 square feet of conditioned floor area are exempt from the requirements in Section 406 for whole house ventilation systems.

406.2.2 Alterations and Repairs. All alterations and repairs may be made to existing buildings or moved buildings built or permitted prior to the enforcement of Section 406 without making the entire building comply with the provisions of Section 406, provided the alterations or repairs comply with Section 406.

EXCEPTION: Air handling/conditioning equipment, which is being replaced without alteration or repair of the associated air distribution system is exempt from the requirements of Section 406.

406.2.3 Historic Buildings. Historic buildings or structures, as described in Section 104.6, are exempt from Section 406 only to the extent necessary to preserve those features essential to their historical appearance or function.

406.3 Minimum Ventilation Criteria for All Group R Occupancies

406.3.1 General. Section 406.3 shall apply to all Group R occupancies as defined by the Building Code. For source specific ventilation requirements, see Section 406.3.2.1. Compliance with Section 406 shall be demonstrated through engineering calculations or performance testing. Documentation of calculations shall be submitted to the building official where required. Performance testing shall be conducted in accordance with recognized test methods.

At the discretion of the building official, flow testing may be required to verify that the mechanical system(s) satisfies the requirements of this Section 406. Flow testing may be performed using flow hoods measuring at the intake or exhaust points of the system, in-line pitot tube, or pitot-traverse type measurement systems in the duct, short term tracer gas measurements, or other means approved by the building official.

406.3.2 Minimum Ventilation Performance. Each dwelling unit or guest room shall be equipped with source specific and whole house ventilation systems designed and installed to satisfy the ventilation requirements of Section 406.

EXCEPTION: All public corridors shall meet the ventilation requirements in Section 1203.3 of the Building Code.

1 406.3.2.1 Source Specific Ventilation. Source specific exhaust ventilation shall be required in each kitchen, bathroom, water closet, laundry room, indoor swimming pool, spa, and other rooms where excess water vapor or cooking odor is produced.

2 The minimum source specific ventilation effective exhaust capacity shall be not less than levels specified in Table 4-A.

3 406.3.2.2 Whole House Ventilation Systems. Each dwelling unit shall be equipped with a whole house ventilation system which shall be capable of providing at least 0.35 air changes per hour, but not less than 15 cubic feet per minute (7 L/s) per bedroom plus an additional 15 cubic feet per minute (7 L/s). Whole house ventilation systems shall be designed to limit ventilation to a level no greater than 0.5 air changes per hour under normal operation conditions. Whole house ventilation systems shall supply outside air to all habitable rooms through individual outside air inlets, forced-air heating system, ducting or equivalent means. Doors and operable lites in windows are deemed not to meet the outside air supply intake requirements.

8 EXCEPTION: For dwelling units of no more than 1400 square feet (130 m²), the maximum ventilation rate shall be 0.65 air changes per hour.

9 406.3.3 Controls. All ventilation system controls shall be readily accessible. Controls for whole house ventilation systems shall be capable of operating the ventilation system without energizing other energy-consuming appliances.

11 EXCEPTION: Continuously operated whole house ventilation systems switches shall not be readily accessible by the occupant.

12 406.3.3.1 Source Specific Ventilation Systems. Source specific ventilation systems shall be controlled by manual switches, dehumidistats, timers or other approved means.

13 406.3.3.2 Intermittently Operated Whole House Ventilation Systems. The intermittently operated whole house ventilation systems shall be constructed to have the capability for continuous operation, and shall have a manual control and an automatic control, such as a clock timer. At the time of final inspection, the automatic control timer shall be set to operate the whole house fan for a minimum of eight hours a day.

14 406.3.4 Noise. Whole house fans located four feet (1219 mm) or less from the interior grille shall have a sone rating of 1.5 or less measured at 0.1 inches water gage. Remotely mounted fans shall be acoustically isolated from the structural elements of the building and from attached duct work using insulated flexible duct or other approved material.

19 EXCEPTION: Whole house ventilation systems which are integrated with forced-air heating systems or heat-recovery ventilation systems are exempt from the sone rating requirements of this section.

20 406.3.5 Ventilation Ducts. All ducts shall terminate outside the building. Exhaust ducts in systems which are designed to operate intermittently shall be equipped with back-draft dampers. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4. All supply ducts in the conditioned space shall be insulated to a minimum of R-4. For all other ducts, see the Seattle Energy Code.

23 406.3.6 Outside Air. A mechanical system shall supply outside air as required in Section 406.3.2. The mechanical system may consist of exhaust fans, supply fans, or both.

24 406.3.6.1 Outside Air Inlets. Inlets shall be screened or otherwise protected from entry by insects, leaves, or other material. Outside air inlets shall be located so as not to take air from the following areas:

26 1. Closer than 10 feet (3048 mm) from an appliance vent outlet, unless such vent outlet is 3 feet (914 mm) above the outside air inlet.

27 2. Where it will pick up objectionable odors, fumes or flammable vapors.

28 3. A hazardous or unsanitary location.

4. A room or space having any fuel-burning appliances therein.

5. Closer than 10 feet (3048 mm) from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet (914 mm) above the air inlet.

6. Attics, crawl spaces or garages.

Individual room outside air inlets shall:

1. Have controllable and secure openings;

2. Be sleeved or otherwise designed so as not to compromise the thermal properties of the wall or window in which they are placed;

3. Provide not less than 4 square inches (2581 mm²) of net free area of opening for each habitable space. Any inlet or combination of inlets which provide 10 cfm (5 L/s) at 10 pascals as determined by the Home Ventilating Institute Air Flow Test Standard is deemed equivalent to 4 square inches (2581 mm²) net free area.

406.3.6.2 Ventilation Integrated with Forced-Air Systems. The outside air connection to the return air stream shall be located upstream of the forced-air system blower and shall not be connected directly into a furnace cabinet to prevent thermal shock to the heat exchanger.

406.3.6.3 Distribution. Outside air shall be distributed to each habitable room by individual inlets, separate duct systems, or a forced-air system. Where outside air supplies are separated from exhaust points by doors, provisions shall be made to ensure air flow by installation of distribution ducts, undercutting doors, installation of grilles, transoms, or similar means where permitted by the Building Code. Doors shall be undercut to a minimum of one-half inch above the surface of the finish floor covering.

406.4 Mechanical Ventilation Criteria and Minimum Ventilation Prescriptive Requirements for All Group R Occupancies

406.4.1 General. Section 406.4 establishes minimum prescriptive design requirements for intermittently operated systems. Continuously operated systems shall comply with Section 406.3. System characteristics not addressed in the following sections shall comply with Section 406.3. A system which meets the requirements of Section 406.4 shall be deemed to satisfy the requirements of Section 406.

406.4.2 Source Specific. Exhaust fans providing source specific ventilation shall have a minimum fan flow rating not less than 50 cfm (24 L/s) at 0.25 inches water gage for bathrooms, laundries or similar rooms and 100 cfm (47 L/s) at 0.25 inches water gage for kitchens. Manufacturers' fan flow ratings shall be determined as per HVI Standard No. 916 (July 1989) or AMCA Standard No. 210.

EXCEPTION: Where a range hood or down draft exhaust fan is used to satisfy the source specific ventilation requirements for kitchens, the range hood or down draft exhaust shall not be less than 100 cfm (47 L/s) at 0.10 inches water gage.

406.4.3 Whole House. Whole house ventilation systems may consist of whole house exhaust, integration with forced-air systems or dedicated heat recovery ventilation systems. Whole house ventilation systems shall provide ventilation capacity as specified in Table 4-B and meet the following requirements:

1. Exhaust fans providing whole house ventilation shall have a flow rating at 0.25 inches water gage as specified in Table 4-B. Manufacturers' fan flow ratings shall be determined as per HVI Standard No. 916 (July 1989) or AMCA Standard No. 210. Table 4-B shall not be used for dwelling units with more than five bedrooms.

2. Integrated forced-air ventilation systems shall have an outside air inlet duct connecting a terminal element on the outside of the building to the return air plenum of the forced-air system, at a point within 4 feet (1218mm) upstream of the air handler, and be equipped with one of the following:

2.1 A motorized damper connected to the automatic ventilation control as specified in Section 406.3.3; or

2.2 A damper installed and set to meet measured flow rates as specified in Table 4-B, by either field testing or following manufacturers' installation instructions based on site conditions; or

2.3 An automatic flow regulated device with field measured or field calculated minimum negative pressure differential of 0.07 inches water gage at the point where the outside air duct is connected to the return air plenum.

1 3. All duct work in heat recovery ventilation systems shall be not less than 6 inch
2 (152 mm) diameter. Balancing dampers shall be installed on the inlet and exhaust
3 side. Flow measurement grids shall be installed on the supply and return. System
4 minimum flow rating shall be not less than that specified in Table 4-B. Maximum
5 flow rates in Table 4-B do not apply to heat recovery ventilation systems.

6 **406.4.4 Source Specific and Whole House Exhaust Ducts.** Exhaust ducts shall meet all
7 requirements of Section 406.3.5. Duct diameter, length and number of elbows for exhaust
8 fans shall be as specified in Table 4-C. Terminal elements for exhaust fan duct systems
9 shall have at least the equivalent net free area of the duct work. Duct diameter, length, and
10 number of elbows for integrated forced air systems shall be as specified in Table 4-D.
11 Terminal elements for integrated systems shall be the same size as the connecting ductwork
12 or 8 inches (203 mm) in diameter, whichever is greater.

13 **406.5 Mechanical Ventilation Criteria and Minimum Ventilation Performance for All**
14 **Occupancies Other than Group R**

15 Where a mechanical ventilation system is installed in occupancies other than Group R, the
16 system shall be capable of supplying ventilation air to each zone with the minimum outside
17 air quantities specified in Table 4-E.

18 **EXCEPTION:** Where occupant density is known and documented in the plans, the outside air
19 rate may be based on the design occupant density. Under no circumstance shall the occupancies used
20 result in outside air less than one-half that resulting from application of Table 4-E estimated maximum
21 occupancy values.

22 Outside air shall be ducted in a fully enclosed path directly to every air handling unit
23 in each zone not provided with sufficient openable area for natural ventilation.

24 **EXCEPTION:** Ducts may terminate within 12 inches (305 mm) of the intake to an HVAC unit
25 provided they are physically fastened so that the outside air duct is directed into the unit intake.

26 In all parking garages, other than open parking garages as defined in Building Code
27 Section 311.9, used for storing or handling of automobiles operating under their own power
28 and on all loading platforms in bus terminals, ventilation shall be provided at 1.5 cfm per
29 square foot (.71 L/s per m²) of gross floor area. The building official may approve an
30 alternate ventilation system designed to exhaust a minimum 14,000 cfm (6607 L/s) for each
31 operating vehicle. Such system shall be based on the anticipated instantaneous movement
32 rate of vehicles but not less than 2.5 percent (or one vehicle) of the garage capacity.
33 Automatic carbon monoxide sensing systems may be submitted for approval.

34 In all buildings used for the repair of automobiles, each repair stall shall be equipped
35 with an exhaust extension duct, extending to the outside of the building, which if over 10
36 feet (3048 mm) in length, shall mechanically exhaust 300 cfm (142 L/s). Connecting offices
37 and waiting rooms shall be supplied with conditioned air under positive pressure.

38 To consider higher occupant densities, desires for higher outside air quantities per
39 person, and HVAC systems with a ventilation effectiveness of less than 100%, the
40 maximum total air quantities used as the basis for calculating heating and cooling design
41 loads and for sizing HVAC equipment shall not exceed three times the quantities specified
42 in Table 4-E.

43 **406.6 Solid Fuel Burning Appliances, Fireplaces And Masonry Heaters**

44 **406.6.1 Solid Fuel Burning Appliances.** Solid fuel burning appliances shall be provided
45 with the following:

46 1. Tight fitting metal or ceramic glass doors.

47 2. A source from outside the structure of primary combustion air, connected to the
48 appliance as per manufacturer's specification. The air inlet shall originate at a point below
49 the fire box. The duct shall be 4 inches (102 mm) or greater in diameter, not to exceed 20
50 feet (6096 mm) in length, and be installed as per manufacturer's instructions;

51 or

52 3. The appliance and manufacturer's recommended combustion air supply, as an
53 installed unit, shall be certified by an independent testing laboratory to have passed Test No.

11-Negative Pressure Test, Section 12.3, of ULC S627-M1984 "Space Heaters for Use with Solid Fuels," modified as follows:

1 3.1. Negative pressure of 8 pascal shall be initially established with the chamber sealed and the air supply, if not directly connected to the appliance, closed off.

2 3.2. The air supply, if not directly connected to the appliance, shall then be opened.

3 3.3. The maximum allowable air exchange rate from chamber leakage and intentional air supply for the unit (appliance with combustion air supply) in the test chamber is 3.5 air changes per hour, or 28 cfm (13.2 L/s), whichever is less.

4 EXCEPTION: Combustion air may be supplied to the room in which the solid fuel burning appliance is located in lieu of direct ducting, provided that one of the following conditions is met:

5 i) The solid fuel burning appliance is part of a central heating plant and installed in an unconditioned space in conformance with this code; or

6 ii) The solid fuel burning appliance is installed in existing construction directly on a concrete floor or surrounded by masonry materials as in a fireplace.

7 The combustion air terminus shall be located as close to the solid fuel burning appliance as possible and shall be provided with a barometric damper or equivalent. The combustion air source shall be specified by the manufacturer or no less than 4 inches (102 mm) in diameter or the equivalent in area or as approved.

8 406.6.2 Fireplaces. Fireplaces shall be provided with each of the following:

9 1. Tightly fitting flue dampers, operated by a readily accessible manual or approved automatic control.

10 EXCEPTION: Fireplaces with gas logs shall be installed in accordance with Section 901.

11 2. An outside source for combustion air ducted into the firebox. The duct shall be at least six square inches (3871 mm²), and shall be provided with an operable outside air duct damper.

12 EXCEPTION: Washington certified fireplaces shall be installed with the combustion air systems necessary for their safe and efficient combustion and specified by the manufacturer in accordance with the Washington State UBC Standard 31-2 (WAC 51-40-31200) and UBC Section 3102.5.4 (WAC 51-40-3102).

13 3. Site built fireplaces shall have tight fitting glass or metal doors, or flue draft induction fan or as approved for minimizing back-drafting. Factory built fireplaces shall use doors listed for the installed appliance.

14 406.6.3 Masonry Heaters. Masonry heaters shall be approved by the Department of Ecology and shall contain both of the following:

15 1. Primary combustion air ducted from the outside of the structure to the appliance.

16 2. Tight fitting ceramic glass or metal doors. Flue dampers, when provided, shall have an external control and when in the closed position shall have a net free area of not less than five percent of the flue cross sectional area.

17 **TABLE 4-A**

18 **Minimum Source Specific Ventilation Capacity Requirements**

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	Bathrooms	Kitchens
Intermittently operating	50 cfm	100 cfm
Continuous operation	20 cfm	25 cfm

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TABLE 4-B
Whole House Ventilation Flow Requirements¹

<u>Bedrooms</u>	<u>CFM</u>	
	<u>Minimum</u>	<u>Maximum</u>
<u>2 or less</u>	<u>50</u>	<u>75</u>
<u>3</u>	<u>80</u>	<u>120</u>
<u>4</u>	<u>100</u>	<u>150</u>
<u>5</u>	<u>120</u>	<u>180</u>

¹This table shall not be used for dwelling units containing more than 5 bedrooms.

TABLE 4-C
Prescriptive Exhaust Duct Sizing

<u>Fan Tested</u> <u>CFM</u> <u>@0.25</u> <u>W.G.</u>	<u>Minimum</u> <u>Flex</u> <u>Diameter</u>	<u>Maximum</u> <u>Length</u> <u>Feet</u>	<u>Minimum</u> <u>Smooth</u> <u>Diameter</u>	<u>Maximum</u> <u>Length</u> <u>Feet</u>	<u>Maximum</u> <u>Elbows¹</u>
<u>50</u>	<u>4 inch</u>	<u>25</u>	<u>4 inch</u>	<u>70</u>	<u>3</u>
<u>50</u>	<u>5 inch</u>	<u>90</u>	<u>5 inch</u>	<u>100</u>	<u>3</u>
<u>50</u>	<u>6 inch</u>	<u>No Limit</u>	<u>6 inch</u>	<u>No Limit</u>	<u>3</u>
<u>80</u>	<u>4 inch²</u>	<u>NA</u>	<u>4 inch</u>	<u>20</u>	<u>3</u>
<u>80</u>	<u>5 inch</u>	<u>15</u>	<u>5 inch</u>	<u>100</u>	<u>3</u>
<u>80</u>	<u>6 inch</u>	<u>90</u>	<u>6 inch</u>	<u>No Limit</u>	<u>3</u>
<u>100</u>	<u>5 inch²</u>	<u>NA</u>	<u>5 inch</u>	<u>50</u>	<u>3</u>
<u>100</u>	<u>6 inch</u>	<u>45</u>	<u>6 inch</u>	<u>No Limit</u>	<u>3</u>
<u>125</u>	<u>6 inch</u>	<u>15</u>	<u>6 inch</u>	<u>No Limit</u>	<u>3</u>
<u>125</u>	<u>7 inch</u>	<u>70</u>	<u>7 inch</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.

TABLE 4-D
Prescriptive Integrated Forced Air Supply Duct Sizing

<u>Number of</u> <u>Bedrooms</u>	<u>Minimum</u> <u>Smooth</u> <u>Duct</u> <u>Diameter</u>	<u>Minimum</u> <u>Flexible</u> <u>Duct</u> <u>Diameter</u>	<u>Maximum</u> <u>Length¹</u>	<u>Maximum</u> <u>Number of</u> <u>Elbows²</u>
<u>2 or less</u>	<u>6"</u>	<u>7"</u>	<u>20'</u>	<u>3</u>
<u>3</u>	<u>7"</u>	<u>8"</u>	<u>20'</u>	<u>3</u>
<u>4 or more</u>	<u>8"</u>	<u>9"</u>	<u>20'</u>	<u>3</u>

¹ For lengths over 20 feet increase duct diameter 1 inch.

² For elbows numbering more than 3 increase duct diameter 1 inch.

TABLE 4-E
Outdoor Air Requirements for Ventilation¹
in Occupancies Other than Group R

Application	Estimated Maximum ² Occupancy P/1000 ft ² or 100 m ²	Outdoor Air Requirements cfm/person
Dry Cleaners, Laundries³		
Commercial laundry	10	25
Commercial dry cleaner	30	30
Storage, pick up	30	35
Coin-operated laundries	20	15
Coin-operated dry cleaner	20	15
Dwelling Units In Buildings Greater Than Four Stories or Attached to I-Occupancy Facilities		
Bedrooms & living areas ²⁴		15
Food and Beverage Service		
Dinning rooms	70	20
Cafeteria, fast food	100	20
Bars, cocktail lounges ⁴	100	30
Kitchens(cooking) ²³	20	15
Garages, Repair, Service Stations		
Enclosed parking garage ⁵		1.50 cfm/ft.sq.
Auto repair rooms		1.50 cfm/ft.sq.
Hotels, Motels, Resorts, Congregate Residences with More Than Four Stories⁶		
Bedrooms		30 cfm/room
Living Rooms		30 cfm/room
Bath ⁷		35 cfm/room
Lobbies	30	15
Conference rooms	50	20
Assembly rooms	120	15
Gambling casinos ⁴	120	30
Offices		
Office space ⁸	7	20
Reception area	60	15
Telecommunication centers and data entry areas	60	20
Conference rooms	50	20
Public Spaces		
Corridors and utilities		0.05 cfm/ft.sq.
Public restroom, cfm/wc or urinal ¹⁰		50
Lockers and dressing rooms		0.50 cfm/ft.sq.
Smoking lounge ¹¹	70	60
Elevators ¹²		1.0 cfm/ft.sq.

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TABLE 4-E (continued)
Outdoor Air Requirements for Ventilation¹
in Occupancies Other than Group R

<u>Application</u>	<u>Estimated Maximum² Occupancy P/1000 ft² or 100 m²</u>	<u>Outdoor Air Requirements cfm/person</u>
Retail Stores, Sales Floors, and Show Room Floors		
Basement and street	30	0.30 cfm/ft.sq.
Upper floors	20	0.20 cfm/ft.sq.
Storage rooms	15	0.15 cfm/ft.sq.
Dressing rooms		0.20 cfm/ft.sq.
Malls and arcades	20	0.20 cfm/ft.sq.
Shipping and receiving	10	0.15 cfm/ft.sq.
Smoking lounge ¹¹	70	60
Warehouses	5	0.05 cfm/ft.sq.
Specialty Shops		
Barber	25	15
Beauty	25	25
Reducing salons	20	15
Florists ¹³	8	15
Clothiers, furniture		0.30 cfm/ft.sq.
Hardware, drugs, fabric	8	15
Supermarkets	8	15
Pet shops		1.00 cfm/ft.sq.
Sports and Amusement¹⁴		
Spectator areas	150	15
Game rooms	70	25
Ice arenas(playing areas)		0.50 cfm/ft.sq.
Swimming Pools(pool and deck area) ¹⁵		0.50 cfm/ft.sq.
Playing floor(gymnasium)	30	20
Ballrooms and discos	100	25
Bowling alleys(seating areas)	70	25
Theaters¹⁶		
Ticket booths	60	20
Lobbies	150	20
Auditorium	150	20
Stages, studios	70	15
Transportation¹⁷		
Waiting rooms	100	15
Platforms	100	15
Vehicles	150	15
Workrooms		
Meat processing ¹⁸	10	15
Photo studios	10	15
Darkrooms	10	0.50 cfm/ft.sq.
Pharmacy	20	15
Bank vaults	5	15
Duplicating, printing ¹⁹		0.50 cfm/ft.sq.

TABLE 4-E (continued)
Outdoor Air Requirements for Ventilation¹
in Occupancies Other than Group R

Application	Estimated Maximum ² Occupancy P/1000 ft ² or 100 m ²	Outdoor Air Requirements cfm/person
INSTITUTIONAL FACILITIES		
Education		
Classroom	50	15
Laboratories ²⁰	30	20
Training shop	30	20
Music rooms	50	15
Libraries	20	15
Locker rooms		0.50 cfm/ft.sq.
Corridors		0.10 cfm/ft.sq.
Auditoriums	150	15
Smoking lounges ¹¹	70	60
Hospitals, Nursing and Convalescent Homes		
Patient rooms ²¹	10	25
Medical procedure	20	15
Operating rooms	20	30
Recovery and ICU	20	15
Autopsy rooms ²²		0.50 cfm/ft.sq.
Physical Therapy	20	15
Correctional Facilities		
Cells	20	20
Dining halls	100	15
Guard station	40	15

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TABLE 4-E (continued)
Outdoor Air Requirements for Ventilation¹
in Occupancies Other than Group R

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1. Derived from ASHRAE Standard 62-1989.
2. Net occupiable space.
3. Dry-cleaning process may require more air.
4. Supplementary smoke-removal equipment may be required.
5. Distribution among people must consider worker location and concentration of running engine; stands where engines are run must incorporate systems for positive engine exhaust withdrawal. Contaminant sensors may be used to control ventilation.
6. Independent of room size.
7. Installed capacity for intermittent use.
8. See also food and beverage service, merchandising, barber and beauty shops, garages.
9. Some office equipment may require local exhaust.
10. Mechanical exhaust with no recirculation is recommended.
11. Normally supplied by transfer air, local mechanical exhaust; with no recirculation recommended.
12. Normally supplied by transfer air.
13. Ventilation to optimize plant growth may dictate requirements.
14. When internal combustion engines are operated for maintenance of playing surfaces, increased ventilation rates may be required.
15. Higher values may be required for humidity control.
16. Special ventilation will be needed to eliminate special stage effects.
17. Ventilation within vehicles may require special considerations.
18. Spaces maintained at low temperatures (-10°F. to +50°F.) are not covered by these requirements unless the occupancy is continuous. Ventilation from adjoining spaces is permissible. When the occupancy is intermittent, infiltration will normally exceed the ventilation requirements.
19. Installed equipment must incorporate positive exhaust and control of undesirable contaminants.
20. Special contamination control systems may be required for processes or functions including laboratory animal occupancy.
21. Special requirements or codes and pressure relationships may determine minimum ventilation rates and filter efficiency. Procedures generating contaminants may require higher rates.
22. Air shall not be recirculated into other spaces.
23. Makeup air for hood exhaust may require more ventilating air.
24. Occupant loading shall be based on the number of bedrooms as follows: first bedroom, two persons; each additional bedroom, one person. Where higher occupant loadings are known, they shall be used.

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Section 24. Section 501 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 501 — SCOPE OF PART I

Part I of this chapter applies to environmental air-ventilation systems (~~that are not a part of a heating or cooling system~~) and to product-conveying duct systems. For commercial hood and kitchen ventilation systems, see Part II of this chapter.

Section 25. Section 502 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 502 — DEFINITIONS

For the purposes of Part I, the following definitions apply:

ENVIRONMENTAL AIR DUCT is ducting used for conveying exhaust air at temperatures not exceeding 250 ° F (121 ° C) to or from occupied areas of any occupancy. (~~through other than heating or air conditioning systems, such as~~) Examples of environmental air ducts are those used for ventilation for human usage, domestic kitchen range exhaust, bathroom or restroom exhaust ((ducts)), parking garage exhaust and elevator exhaust and domestic-type clothes dryer exhaust ((ducts)).

FLAMMABLE VAPOR OR FUMES is the concentration of flammable constituents in air that exceeds 10 percent of its lower flammability limit (LFL).

PRODUCT-CONVEYING DUCT is ducting used for conveying solid particulates, such as refuse, dust, fumes and smoke; liquid particulate matter, such as spray residue, mists and fogs; vapors, such as vapors from flammable or corrosive liquids; noxious and toxic gases; and air at temperatures exceeding 250°F (121°C).

Interpretation: Product-conveying ducts include, but are not limited to, those that serve combustion engine, industrial vacuum system, chemical booth, paint booth, paint enclosure and photo lab exhaust.

Section 26. Section 504 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 504 — ENVIRONMENTAL AIR ((DUCTS)) SYSTEMS

504.1 Makeup and Exhaust Air ((Ducts)) Systems. Environmental air ((ducts)) systems not regulated by other provisions of this code shall comply with this section. Ducts shall be substantially airtight and shall comply with the provisions of Chapter 6. Exhaust ((ducts)) systems shall terminate outside the building and shall be equipped with backdraft or motorized dampers.

EXCEPTION: Exhaust from environmental air systems other than garages may be discharged into an open parking garage as defined in Section 311.9 of the Building Code. Environmental air ducts which have an alternate function as a part of an approved smoke-control system do not require design as Class ((F)) 1 product-conveying ducts.

504.2 Domestic Range Vents. Ducts used for domestic kitchen range ventilation shall be of metal and shall have smooth interior surfaces.

EXCEPTIONS: Ducts for domestic kitchen downdraft grill-range ventilation installed under a concrete slab floor may be of approved Schedule 40 PVC provided:

1. The under-floor trench in which the duct is installed shall be completely backfilled with sand or gravel.
2. Not more than 1 inch (25 mm) of 6-inch-diameter (152 mm) PVC coupling may protrude above the concrete floor surface.
3. PVC pipe joints shall be solvent cemented to provide an air- and grease-tight duct.
4. The duct shall terminate above grade outside the building and shall be equipped with a backdraft damper.

Domestic kitchen vent systems shall be exhausted separately from domestic clothes dryer and bathroom vent systems.

504.3 Domestic Dryer Vent. Domestic clothes dryer moisture exhaust ducts shall be of metal and shall have smooth interior surfaces.

EXCEPTION: Approved flexible duct connectors not more than 6 feet (1829 mm) in length may be used in connection with domestic dryer exhausts. Flexible duct connectors shall not be concealed within construction.

504.3.1 Moisture-exhaust ducts. Moisture-exhaust ducts for domestic clothes dryers shall terminate on the outside of the building and shall be equipped with a back-draft damper. Fire dampers shall not be installed in clothes dryer exhaust systems. Screens shall not be installed at the duct termination. Ducts for exhausting clothes dryers shall not be connected or installed with sheet metal screws or other fasteners which will obstruct the flow. Clothes-dryer moisture-exhaust ducts shall not be connected to a gas vent connector, gas vent, kitchen hood vent or chimney. Clothes-dryer moisture-exhaust ducts shall not extend into or through ducts or plenums.

504.3.2 Length limitation. Unless otherwise permitted or required by the dryer manufacturer's installation instructions and approved by the building official, domestic dryer moisture exhaust ducts shall not exceed a total combined horizontal and vertical length of 14 feet (4267 mm), including two 90-degree elbows. Two feet (610 mm) shall be deducted for each 90-degree elbow in excess of two.

504.4 Commercial Dryer Exhaust Systems. Commercial dryer moisture-exhaust ducts shall be installed in accordance with their listing.

504.5 Gypsum Wallboard Ducts. Bathroom and laundry room exhaust ducts may be of gypsum wallboard subject to the limitations of Section 601.1.3.

504.6 Exhaust Outlets. Outlets for exhausts that exceed 600°F (315°C) shall comply with Table 8-D.

The termination point for environmental air duct exhaust((s)) outlets discharging to the atmosphere shall not be less than 3 feet (914 mm) from a property line or from operable openings into a building for all occupancies other than Group U, and 10 feet (3048 mm) from a mechanical air intake. This includes environmental air ducts regulated by Section 504, except for parking garage exhaust outlets.

The termination point for parking garage exhaust outlets shall be 10 feet (3048 mm) from a property line, 10 feet (3048 mm) from operable openings into a building and 10 feet (3048 mm) from mechanical air intake. Exhaust outlets which extend to the roof shall extend 3 feet (914 mm) above the roof.

Interpretation: For the purposes of this section, property line shall include any property line separating one lot from another lot but shall not include any property line separating a lot from a public street or alley right-of-way.

Section 27. Section 505 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 505 — PRODUCT-CONVEYING SYSTEMS

505.1 General. A mechanical ventilation or exhaust system shall be installed to control, capture and remove emissions generated from product use or handling when required by the Building Code or Fire Code and when such emissions result in a hazard to life or property. The design of the system shall be such that the emissions are confined to the area in which they are generated by air currents, hoods or enclosures and shall be exhausted by a duct system to a safe location or treated by removing contaminants. Ducts conveying explosives or flammable vapors, fumes or dusts shall extend directly to the exterior of the building without entering other spaces or be enclosed in a shaft from the point of penetration to outside. The fire rating of the shaft shall be equal to the rating of the structure it penetrates, but not less than one-hour fire-resistive construction. Exhaust ducts shall not extend into or through ducts and plenums.

EXCEPTION: Ducts conveying vapor or fumes having flammable constituents less than 25 percent of their lower flammability limit may pass through other spaces.

505.2 Incompatible Materials. Separate and distinct systems shall be provided for incompatible materials.

505.3 Recirculation. Contaminated air shall not be recirculated to occupied areas unless contaminants have been removed. Air contaminated with explosive or flammable vapors, fumes or dusts; flammable or toxic gases, or radioactive material shall not be recirculated.

505.4 Minimum Velocities and Circulation. The velocity and circulation of air in work areas shall be such that contaminants are captured by an airstream at the area where the emissions are generated and conveyed into a product-conveying duct system. Mixtures within work areas where contaminants are generated shall be diluted below 25 percent of their lower explosive limit or lower flammability limit with air which does not contain other contaminants. The velocity of air within the duct shall not be less than set forth in Table 5-A.

505.5 Design. Systems for removal of vapors, gases and smoke shall be designed by the constant velocity or equal friction methods. Systems conveying particulate matter shall be designed employing the constant velocity method. Systems conveying explosive or radioactive materials shall be prebalanced through duct sizing. Other systems may be designed with balancing devices such as dampers. Dampers provided to balance air flow shall be provided with securely fixed minimum-position blocking devices to prevent restricting flow below the required volume or velocity.

505.6 Makeup Air. Makeup air shall be provided to replenish air exhausted by the ventilation system. Makeup-air intakes shall be located so as to avoid recirculation of contaminated air within enclosures.

505.7 Hoods and Enclosures. Hoods and enclosures shall be used when contaminants originate in a concentrated area. The design of the hood or enclosure shall be such that air currents created by the exhaust systems will capture the contaminants and transport them directly to the exhaust duct. The volume of air shall be sufficient to dilute explosive or flammable vapors, fumes or dusts as set forth in Section 505.4. Hoods of steel shall have a base metal thickness not less than 0.027 inch (0.68 mm) (22 gage) for Class 1 and Class 5 metal duct systems; 0.033 inch (0.84 mm) (20 gage) for hoods serving a Class 2 duct system; 0.044 inch (1.12 mm) (18 gage) for hoods serving a Class 3 duct system; and 0.068 inch (1.73 mm) (14 gage) for hoods serving a Class 4 duct system. Approved nonmetallic hoods and duct systems may be used for Class 5 corrosive systems when the corrosive mixture is nonflammable. Metal hoods used with Class 5 duct systems shall be protected with suitable corrosion-resistant material. Edges of hoods shall be rounded. The minimum clearance between hoods and combustible construction shall be the clearance required by the duct system.

505.8 Small Hobby Kiln Exhaust Systems. The provisions of this section apply to kilns used for firing ceramics, having a maximum interior volume of 20 cubic feet (0.57 m³), used for hobby and other noncommercial purposes.

1 **505.8.1 Hoods.** A canopy-type hood shall be installed directly above each kiln. The face
2 opening area of the hood shall be equal to or greater than the top horizontal surface area of the
3 kiln. The hood shall be constructed of not less than 0.024-inch (0.61 mm) (No. 24 U.S. gage)
4 galvanized steel or equivalent and be supported at a height of between 12 inches and 30 inches
5 (305 mm and 762 mm) above the kiln by noncombustible supports.

EXCEPTION: Electric kilns installed with listed exhaust blowers may be used when marked as
being suitable for the kiln and installed in accordance with manufacturer's instructions.

6 **505.8.2 Gravity ventilation ducts.** Each kiln hood shall be connected to a gravity ventilation
7 duct extending in a vertical direction to outside the building. This duct shall be of the same
8 construction as the hood and shall have a minimum cross-sectional area of not less than one
9 fifteenth of the face opening area of the hood. The duct shall terminate a minimum of 12 inches
10 (305 mm) above any portion of a building within 4 feet (1219 mm) and terminate no less than
11 4 feet (1219 mm) from any openable windows or other openings into the building or adjacent
12 property line. The duct opening to the outside shall be shielded, without reduction of duct area,
13 to prevent entrance of rain into the duct. The duct shall be supported at each section by
14 noncombustible supports.

505.9 Exhaust Outlets. Outlets for exhausts that exceed 600°F (315°C) shall comply with
Table 8-D.

The termination point for exhaust ducts discharging to the atmosphere shall not be less
than the following:

13 1. Duct(s) outlets conveying explosive or flammable vapors, fumes or dusts: 30 feet
14 (9144 mm) from property line, 10 feet (3048 mm) from operable openings into the building, 6
15 feet (1829 mm) from exterior walls or roofs, 30 feet (9144 mm) from combustible walls or
16 operable openings into a building which are in the direction of the exhaust discharge, ((and))
17 10 feet (3048 mm) above adjoining grade, and 10 feet (3048 mm) from mechanical air intake.

Interpretation: Item 1 includes carpentry shop exhaust, industrial chemical lab, paint shop
and sandblasting exhaust systems.

18 2. Other product-conveying outlets: 10 feet (3048 mm) from property line, 3 feet (914
19 mm) from exterior wall or roof, 10 feet (3048 mm) from operable openings into the building,
20 ((and)) 10 feet (3048 mm) above adjoining grade and 10 feet (3048 mm) from mechanical air
21 intake.

Interpretation: Item 2 includes central vacuum system, dry cleaner, photo lab, school
chemical lab and combustion engine exhaust.

22 **Interpretation:** For the purposes of this section, property line shall include any property
23 line separating one lot from another lot but shall not include any property line separating a
24 lot from a public street or alley right-of-way.

25 **Section 28.** Section 507.2 of the 1997 Uniform Mechanical Code is amended as
26 follows:

27 **507.2 Definitions.** For the purpose of Part II, the following definitions shall apply:

28 **COMMERCIAL FOOD HEAT-PROCESSING EQUIPMENT** is equipment used
in a food establishment for heat-processing food or utensils and which produces grease vapors,
steam, fumes, smoke or odors which are required to be removed through a local exhaust
ventilation system.

COMPENSATING HOOD is a hood that has an outside air supply with air delivered below or within the hood. When makeup air is diffused directly into the exhaust within the hood cavity, it becomes a short-circuit hood.

1 **GREASE FILTER** is a device used to capture by entrapment, impingement, adhesion
or similar means, grease and similar contaminants before they enter a duct system.

2 **HOOD** is an air-intake device connected to a mechanical exhaust system for collecting
3 and removing grease, vapors, fumes, smoke, steam, heat or odors from commercial food heat-
processing equipment.

4 **Type I Hood** is a kitchen hood for collecting and removing grease and smoke
generated from equipment such as deep fryers, charbroilers, grills and roasting ovens.

5 **Type II Hood** is a general kitchen hood for collecting and removing steam, vapor, heat
6 or odors generated from equipment such as steamers, pastry ovens, pizza ovens and coffee
7 roaster ovens and roasting ovens of maximum 6 kW (20,000 Bth/h) capacity.

8 **Section 29.** Section 507.6 of the 1997 Uniform Mechanical Code is amended as
9 follows:

10 **507.6 Duct Enclosure.** A grease duct serving a Type I hood which penetrates a fire-rated or
11 nonrated ceiling, wall or floor shall be enclosed in a duct enclosure from the point of
12 penetration. A duct serving a Type II hood which penetrates a fire-rated ceiling, floor or wall
13 shall be enclosed in a duct enclosure from the point of penetration to the outside air. A duct
14 may only penetrate exterior walls at locations where unprotected openings are permitted by
15 Table 5-A of the Building Code. Duct enclosures shall be constructed as the Building Code
16 requires shaft enclosures to be constructed. Duct enclosures shall be of at least one-hour fire-
17 resistive construction in all buildings and shall be of two-hour fire-resistive construction in
18 Types I and II fire-resistive buildings. The duct enclosure shall be sealed around the duct at the
19 point of penetration and vented to the exterior through weather-protected openings. The
20 enclosure shall be separated from the duct by at least 3 inches and not more than 12 inches (at
21 least 76 mm and not more than 305 mm) and shall serve a single grease exhaust duct system.

22 **Section 30.** Section 507.11 of the 1997 Uniform Mechanical Code is amended as
23 follows:

24 **507.11 Exhaust Outlets.** Exhaust outlets for grease ducts serving Type I hoods shall extend
25 through the roof unless otherwise approved by the building official. Such extension shall be at
26 least 2 feet (610 mm) above the roof surface, at least 10 feet (3048 mm) from parts of the same
27 or neighboring buildings, adjacent private property line or air intake opening into any building,
28 and shall be located at least 10 feet (3048 mm) above the adjoining grade level. Exhaust outlets
for ducts serving Type II hoods over heat-processing equipment shall terminate at least 10 feet
(3048 mm) from adjacent private property lines or air intake openings into any building, and
shall be located at least 10 feet (3048 mm) above adjoining grade level.

EXCEPTIONS: 1. Exhaust outlets for grease ducts serving commercial food heat-processing
equipment may terminate not less than 5 feet (1524 mm) from an adjacent building, adjacent property line
or air intake opening into a building if the air from the exhaust outlet is discharged away from such
locations.

2. Upon approval of the building official, the exhaust from any hood serving commercial food heat-
processing equipment may terminate in a properly engineered air-recovery system for recirculation to the
room in which the hood is located.

Section 31. The 1997 Uniform Mechanical Code is amended by adding Section 507.13 to read as follows:

507.13 Makeup Air for Commercial Kitchen Hoods. A separate makeup air system shall be provided for the kitchen which supplies not less than 90 percent of the air to be exhausted.

EXCEPTION: Where the total makeup air for a system is less than 400 cfm.

Makeup diffusers shall be located to prevent a short-circuiting of air furnished to the exhaust system. The makeup air system shall be capable of heating the air supplied to the space to a minimum of 65°F(18°C), if the amount of makeup air exceeds 2500 cfm (1180 L/s) per space. Exterior windows and doors shall not be used for the purpose of providing makeup air. The exhaust and makeup air systems shall be connected by an electric cross-interlocking switch.

Section 32. Section 508 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 508 — COMMERCIAL KITCHEN HOODS

508.1 Where Hoods Are Required. Hoods shall be installed at or above all commercial-type deep fat fryers, broilers, fry grills, steam-jacketed kettles, hot-top ranges, ovens, barbecues, rotisseries, dishwashing machines above 140°F (60°C) maximum water temperature and similar equipment which produce comparable amounts of steam, smoke, grease or heat in a food-processing establishment. For the purpose of this section a food-processing establishment shall include any building or portion thereof used for the processing of food but shall not include a dwelling unit.

EXCEPTION: Residential-type equipment installed in offices, churches, nursing homes, congregate residences, boarding homes and similar occupancies with a capacity of not more than 50 persons and with kitchens and dining rooms designed to serve not more than 150 meals per day.

Interpretation: The table below summarizes the types of hoods which are required for different types of appliances. The building official has determined that the appliances for which no hood is required do not produce amounts of steam, smoke, grease or heat comparable to the equipment listed in Section 508.1.

TYPE OF APPLIANCE ¹	TYPE OF HOOD REQUIRED ²		
	TYPE I	TYPE II	NONE
Baking oven		> 6 kW	≤ 6 kW
Charbroiler	All sizes		
Coffee maker		> 6 kW	≤ 6 kW
Coffee roaster		> 6 kW	≤ 6 kW
Deep-fat fryer	All sizes		
Dishwasher		> 140° F	≤ 140° F
Grill	All sizes		
Hot dog display heater		> 6 kW	≤ 6 kW
Microwave oven			All sizes
Pastry oven		> 6 kW	≤ 6 kW
Pizza oven		> 6 kW	≤ 6 kW
Popcorn maker		> 6 kW	≤ 6 kW
Roasting oven ³	> 6 kW	≤ 6 kW	
Roll warmer		> 6 kW	≤ 6 kW
Solid-fuel-burning appliances	All sizes and all food products		
Soup warmer, soup preparation cooking unit		> 6 kW	≤ 6 kW
Steam reconstitution device		> 6 kW	≤ 6 kW
Steam table		> 6 kW	≤ 6 kW
Steamer		> 6 kW	≤ 6 kW
Toaster		> 6 kW	≤ 6 kW
Warming oven		> 6 kW	≤ 6 kW

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

2 Section 507.2 defines the types of kitchen hoods as follows.

Type I Hood is a kitchen hood for collecting and removing grease and smoke generated from equipment such as deep fryers, charbroilers, grills and roasting ovens.

Type II Hood is a general kitchen hood for collecting and removing steam, vapor, heat or odors generated from equipment such as steamers, pastry ovens, pizza ovens and coffee roaster ovens and roasting ovens of maximum 6 kW (20,000 Btu/h) capacity.

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

508.1.1 Hoods Larger than 5,000 cfm. Individual hoods capable of exhausting more than 5,000 cfm of air shall be canopy-type compensating hoods and shall be provided with makeup air sized for at least 50% of exhaust air volume that is: (a) unheated or heated to no more than 60°F (16°C); and (b) uncooled or cooled without the use of mechanical cooling. See Section 508.11 for additional requirements for compensating hoods.

508.2 Materials and Installation. Types I and II hoods shall be constructed of galvanized steel, stainless steel, copper or other material approved by the building official for the use intended.

508.2.1 Type I hoods. Type I hoods constructed of galvanized steel shall be at least 0.030 inch (0.76 mm) (No. 22 gage) steel.

508.2.2 Type II hoods. Type II hoods shall be constructed of at least 0.024-inch (0.61 mm) (No. 24 gage) steel.

Hoods constructed of copper shall be of copper sheets weighing at least 24 ounces per square foot (7.3 kg/m²). Hoods constructed of stainless steel shall have a minimum thickness of 0.030 inch (0.76 mm).

508.2.3 Supports. Hoods shall be secured in place by noncombustible supports.

508.2.4 Joints and seams. Joints and seams shall be substantially tight. Solder shall not be used except for sealing a joint or seam.

508.3 Cleaning and Grease Gutters. When installed, a hood shall be designed to provide for thorough cleaning of the entire hood. When grease gutters are provided, they shall drain to a collecting receptacle, fabricated, designed and installed to be accessible for cleaning.

508.4 Clearances for Type I Hood. A Type I hood shall be installed with clearance of at least 18 inches (457 mm) from combustible construction. This clearance may be reduced to 3 inches (76 mm), provided the combustible material is protected with materials as specified for one-hour fire-resistive construction on the hood side. Hoods less than 12 inches (305 mm) from the ceiling or wall shall be flashed solidly with materials of the thickness specified in Section 508.2 or materials conforming to one-hour fire-resistive construction.

508.4.1 Hoods penetrating a ceiling. Type I hoods or portions thereof penetrating a ceiling, wall or furred space shall comply with all the requirements of Section 507.6.

508.5 Grease Filters. Type I hoods shall be equipped with approved grease filters designed for the specific purpose. Grease-collecting equipment shall be accessible for cleaning. The lowest edge of a grease filter located above the cooking surface shall be at least the height set forth in Table 5-D.

508.5.1 Criteria. Filters shall be of such size, type and arrangement as will permit the required quantity of air to pass through such units at rates not exceeding those for which the filter or unit was designed or approved. Filter units shall be installed in frames or holders with handles by which they may be readily removed without the use of tools, unless designed and installed to be cleaned in place and the system is equipped for such cleaning in place. They shall be sized and made removable so they may be passed through a dishwashing machine or cleaned in a pot sink and so arranged in place or provided with drip intercepting devices as to avoid grease or other condensate from dripping into food or on food preparation surfaces.

508.5.2 Mounting position. Filters shall be installed at an angle greater than 45 degrees from the horizontal and shall be equipped with a drip tray beneath the lower edge of the filters.

508.6 Canopy Size and Location. For canopy-type commercial cooking hoods the inside edge thereof shall overhang or extend a horizontal distance of not less than 6 inches (152 mm) beyond the edge of the cooking surface on all open sides, and the vertical distance between the lip of the hood and the cooking surface shall not exceed 4 feet (1219 mm).

EXCEPTION: Listed exhaust hoods are to be installed in accordance with the terms of their listing and manufacturer's installation instructions.

508.7 Capacity of Hoods. Type I ((~~C~~))canopy-type ((~~commercial cooking~~)) hoods shall exhaust through the hood a minimum quantity of air determined by application of the following formulas:

WHERE:

- A = the horizontal surface area of the hood, in square feet (m^2).
- D = distance in feet (m) between the lower lip of the hood and the cooking surface.
- P = that part of the perimeter of the hood that is open, in feet (m).
- Q = quantity of air, in cubic feet per minute (m^3/s).

NUMBER OF EXPOSED SIDES

FORMULA

4 (island or central hood)

$Q = 150 A$

3 or less

$Q = 100 A$

Alternate formula

$Q = 100PD$

The minimum quantity of air flow for Type II hoods is 50 percent of that required for Type I hoods.

~~((When cooking equipment is installed back to back and is covered by a common island-type hood, the airflow required may be calculated using the formula for three sides exposed. Type II hood airflow requirements shall be in accordance with the requirements for low-temperature appliance hoods.))~~

508.7.1 Solid fuel. Type I hoods for use over solid-fuel cooking equipment shall be provided with separate exhaust systems. ~~((Undefined cooking equipment other than solid-fuel cooking equipment may be installed under a common hood. The minimum airflow for solid-fuel cooking equipment, grease-burning charboilers, and undefined equipment shall be:~~

Number of Exposed Sides	Formula	
	For SI:	
4 (island or central hood)	$Q = 300A$	$Q = 0.46 A$
3 or less	$Q = 200A$	$Q = 0.31 A$
Alternate formula	$Q = 100PD$	$Q = 0.16 PD$

EXCEPTION: Listed exhaust hoods are to be installed in accordance with the terms of their listing and the manufacturer's installation instructions.)

~~((**508.7.2 High-temperature.** Type I hoods when the cooking equipment includes high-temperature appliances such as deep-fat fryers:~~

Number of Exposed Sides	Formula	
	For SI:	
4 (island or central hood)	$Q = 150A$	$Q = 0.23 A$
3 or less	$Q = 100A$	$Q = 0.16 A$
Alternate formula	$Q = 100PD$	$Q = 0.16 PD$

EXCEPTION: Listed exhaust hoods are to be installed in accordance with the terms of their listing and the manufacturer's installation instructions.

508.7.3 Medium temperature. Type I hoods when the cooking equipment includes medium-temperature appliances such as rotisseries, grills and ranges:

Number of Exposed Sides	Formula	
	For SI:	
4 (island or central hood)	$Q=100A$	$Q=0.16A$
3 or less	$Q=75A$	$Q=0.12A$
Alternate formula	$Q=50PD$	$Q=0.08PD$

EXCEPTION: Listed exhaust hoods are to be installed in accordance with the terms of their listing and the manufacturer's installation instructions.

~~**508.7.4 Low temperature.** Type I hoods where the cooking equipment includes low-temperature appliances such as medium to low temperature ranges, roasters, roasting ovens, pastry ovens and equipment approved for use under a Type II hood, such as pizza ovens:~~

Number of Exposed Sides	Formula	
	For SI:	
4 (island or central hood)	$Q=75A$	$Q=0.12A$
3 or less	$Q=50A$	$Q=0.08A$
Alternate formula	$Q=50PD$	$Q=0.08PD$

EXCEPTION: Listed exhaust hoods are to be installed in accordance with the terms of their listing and the manufacturer's installation instructions.

508.8 Capacity for Noncanopy Hoods. In addition to all other requirements for hoods specified in this section, the volume of air exhausting through a noncanopy-type hood to the duct system shall not be less than 300 cubic feet per minute per lineal foot [$0.046 \text{ m}^3/(\text{s} \cdot \text{m})$] of cooking equipment. Listed noncanopy grease hoods and filters shall be sized and installed in accordance with the terms of their listing and the manufacturer's installation instructions.

508.9 Exhaust Outlet. An exhaust outlet within the hood shall be so located as to optimize the capture of particulate matter. Each outlet shall serve not more than a 12-foot (3658 mm) section of hood.

EXCEPTION: Listed exhaust hoods are to be installed in accordance with terms of their listing and the manufacturer's installation instructions.

508.10 Performance Test. Upon completion and before final approval of the installation of a ventilation system serving commercial food heat-processing equipment, a performance test may be required to verify the rate of airflow and proper operation as specified in this chapter. The permittee shall furnish the necessary test equipment and devices required to perform the tests.

508.11 Compensating Hoods. Compensating hoods shall meet the airflow requirements specified in Section 508.7. Listed compensating hoods and filters shall be sized and installed in accordance with the terms of their listing and the manufacturer's installation instructions. Compensating hoods shall extract at least 20 percent of their required exhaust airflow from the kitchen area.

Section 33. Section 509.5 of the 1997 Uniform Mechanical Code is amended as follows:

509.5 Automatic Power, Fuel and Ventilation Shutoff.

509.5.1 General. Automatic fire-extinguishing systems shall be interconnected to the fuel or current supply for the cooking equipment. The interconnection shall be arranged to automatically shut off all cooking equipment and electrical receptacles which are located under the hood when the system is actuated.

Shutoff valves or switches shall be of a type that requires manual operation to reset.

509.5.2 ((Carbon-dioxide system)) Ventilation Shutoff. In the event of fire, exhaust fans shall start or continue to run and the supply of makeup air shall stop.

- EXCEPTIONS:** 1. Commercial-type cooking equipment protected by an automatic carbon dioxide extinguishing system shall be arranged to shut off the ventilation system upon activation.
2. Where the listing for the equipment requires that exhaust fans be shut off.

Section 34. Section 601 of the 1997 Uniform Mechanical Code is amended as follows:

601.1 Material. Supply air, return air and outside air for heating, cooling or evaporative cooling systems shall be conducted through duct systems constructed of metal as set forth in Tables 6-A, 6-B and 6-C; metal ducts complying with UMC Standard 6-1 with prior approval; or factory-made air ducts complying with UL 181. Ducts, plenums and fittings may be constructed of asbestos cement, concrete, clay or ceramics when installed in the ground or in a concrete slab, provided the joints are tightly sealed.

601.1.1 Use of corridor as plenum. Corridors shall not be used to convey air to or from rooms if the corridor is required to be of fire-resistive construction by Section 1005 of the Building Code.

- EXCEPTIONS:** 1. Where such air is part of an engineered smoke control system.
2. Air may be supplied to corridors serving residential occupancies without specific mechanical exhaust, provided:
2.1 The supply air is 100% outside air, and
2.2 The units served by the corridor have ventilation conforming to the Building Code independent of the air supplied to the corridor, and
2.3 The duct penetration at the corridor walls shall be protected by approved fire and smoke dampers.
2.4. For other than highrise buildings, the supply fan will automatically shut off upon activation of corridor smoke detectors which shall be spaced at no more than 30 feet (9144 mm) on center along the corridor, or
2.5. For highrise buildings corridor smoke detector activation will close required smoke/fire dampers at the supply inlet to the corridor at the floor receiving the alarm.

601.1.2 Use of concealed space as plenum. Concealed building spaces or independent construction within buildings may be used as ducts or plenums.

601.1.3 Gypsum products exposed in ducts. When gypsum products are exposed in ducts or plenums, the air temperature shall be restricted to a range from 50 ° F to 125 ° F (10 ° C to 50 ° C) and moisture content shall be controlled so that the material is not adversely affected. For the purpose of this section, gypsum products shall not be exposed in ducts serving as supply from evaporative coolers, and in other air-handling systems regulated by this chapter when the temperature of the gypsum product will be below the dew point temperature as determined by the design engineer.

See Chapter 8 for limitations on combustion products venting systems extending into or through ducts or plenums.

See Chapter 5 for limitations on environmental air systems exhaust ducts extending into or through ducts or plenums.

601.2 Standards of Quality.

601.2.1 General. The standards listed below labeled "UMC Standards," "UBC Standards" and "UFC Standards" are also listed in Chapter 16, Part II, and are part of this code. The other standards listed below are recognized standards. (See Sections 1601, 1602 and 1603.)

601.2.1.1 Standard for metal ducts. UMC Standard 6-1, Standard for Metal Ducts.

Code Alternate: SMACNA 1995 HVAC Duct Construction Standards, Metal and Flexible, is approved as equivalent to UMC Standard 6-1.

601.2.1.2 Standard for installation of factory-made air ducts. UMC Standard 6-3, Standard for Installation of Factory-Made Air Ducts.

601.2.1.3 Flame spread index. UBC Standard 8-1, Test Method for Surface-burning Characteristics of Building Materials.

601.2.1.4 Test method for fire and smoke characteristics of electrical cable and plastic sprinkler pipe. UMC Standard 6-2, Test Method for Fire and Smoke Characteristics of Electrical Cable and Plastic Sprinkler Pipe.

601.2.1.5 Galvanized sheet metals. UMC Standard 2-2, Galvanized Sheet Metals.

601.2.1.6 Testing procedures for local, auxiliary, remote station and proprietary protective signaling systems. UFC Standard 10-2, Testing Procedures for Local, Auxiliary, Remote Station and Proprietary.

601.3 Contamination Prevention. Exhaust ducts under positive pressure and venting systems shall not extend into or pass through ducts or plenums. For appliance vents and chimneys, see Chapter 8.

EXCEPTION: Exhaust ducts conveying environmental air may pass through a duct or plenum provided that:

1. The duct is maintained under sufficient negative pressure to prevent leakage of the exhaust air to the surrounding duct or plenum; or

2. If maintained under a positive pressure with respect to the surrounding duct or plenum, the exhaust duct will be sealed to prevent leakage; or

3. The surrounding air stream is an exhaust air stream not intended for recirculation to the building and cross contamination of the two air streams will not create a hazardous condition.

601.4 Combustibles within Ducts or Plenums. Materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed rating of not more than 50 when tested in accordance with the test for Surface Burning Characteristics of Building Materials, UBC Standard 8-1.

EXCEPTIONS: 1. Return-air and outside-air ducts, plenums or concealed spaces which serve a dwelling unit may be of combustible construction.

2. Air filters meeting the requirements of Section 403.

3. Water evaporation media in an evaporative cooler.

4. Charcoal filters when protected with an approved fire-suppression system.

5. Electrical wiring and optical fiber raceways in plenums shall comply with the Electrical Code. Flame propagation and smoke production characteristics of exposed electric cables and optical fiber raceways installed in concealed air space used as air plenums shall:

5.1 Exhibit a flame travel of 5 feet (1524 mm) or less, and

5.2 Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with UMC Standard 6-2.

5.3 Wiring meeting these requirements shall be listed and labeled as plenum cable as required by the Electrical Code.

5.4 Optical fiber raceways meeting these requirements shall be listed and labeled as plenum optical fiber raceways as required by the Electrical Code.

6. Nonmetallic fire sprinkler piping in plenums shall be listed and shall meet the following requirements:

6.1 Exhibit flame travel of 5 feet (1524 mm) or less, and

6.2 Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with UMC Standard 6-2.

7. Specialty drains and vents required for hazardous materials.

601.5 Factory-made Air Ducts. Factory-made air ducts shall be approved for the use intended or shall conform to the requirements of UL 181. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with UL 181 and its class designation. These ducts shall be listed and shall be installed in accordance with the terms of their listing, and the requirements of UL 181. Flexible air connectors are not permitted.

601.6 Joints and Seams of Ducts. Joints, seams and fittings of duct systems shall be made substantially airtight by means of tapes, mastics, gasketing or other means.

Note: The Seattle Energy Code contains additional provisions for sealing of duct systems.

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601.6.1 Residential round ducts. Crimp joints for residential round ducts shall have a contact lap of at least 1½ inches (38 mm) and shall be mechanically fastened by means of at least three sheet-metal screws equally spaced around the joint, or an equivalent fastening method.

601.6.2 Residential rectangular ducts. Joints and seams for 0.016-inch (0.41 mm) (No. 28 gage) and 0.013-inch (0.33 mm) (No. 30 gage) residential rectangular ducts shall be as specified in Table 6A for 0.019-inch (0.48 mm) (No. 26 gage) material.

601.6.3 Rectangular ducts. Joints and seams for rectangular duct systems shall be as specified in Table 6-A.

601.6.4 Oval ducts. Joints and seams for flat oval ducts and round ducts in other than single dwelling units shall be as specified in Table 6-B.

601.6.5 Listed ducts. Joints and seams and all reinforcements for factory-made air ducts and plenums shall meet with the conditions of prior approval in accordance with the installation instructions that shall accompany the product. Closure systems for rigid Class 1 air ducts and plenums shall conform to UL 181A, and flexible Class 1 air ducts shall conform to UL 181B.

601.7 Metal. Every duct, plenum or fitting of metal shall comply with Table 6-A or Table 6-B.

- EXCEPTIONS:** 1. Ducts, plenums and fittings for systems serving single dwelling units may comply with Table 6-C.
2. Duct systems complying with UL 181.

601.8 Tinned Steel. Existing tinned steel ducts may be used when cooling coils are added to a heating system, provided the first 10 feet (3048 mm) of the duct or plenum measured from the cooling coil discharge are constructed of metal of the gage thickness set forth in Table 6-A, 6-B or 6-C of this chapter or are of approved material and construction. Tinned ducts completely enclosed in inaccessible concealed areas need not be replaced. All accessible ducts shall be insulated to comply with (~~Table 6-D of this chapter~~) Sections 503.9 and 1414.2 of the Energy Code. For the purpose of this subsection, ducts shall be considered accessible if the access space is 30 inches (762 mm) or greater in height.

601.9 Vibration Isolators. Vibration isolators installed between mechanical equipment and metal ducts (or casings) shall be made of an approved material and shall not exceed 10 inches (254 mm) in length.

Section 35. Section 603.2 of the 1997 Uniform Mechanical Code is amended as follows:

603.2 Factory-made Air Ducts. Approved Class 0 or Class 1 factory-made air ducts may be installed in any occupancy covered by this code. See Appendix A, Standard 6-1.

603.2.1 Used as risers. Factory-made air ducts shall not be used for vertical risers in air-duct systems serving more than two stories. Such ducts shall not penetrate construction where fire dampers are required.

603.2.2 Protection. Factory-made air ducts shall be installed with at least 4 inches (102 mm) of separation from earth, except when installed as a liner inside of concrete, tile or metal pipe; they shall be protected from physical damage.

603.2.3 Temperature. The temperature of the air to be conveyed in any of these classes of ducts shall be less than 251°F (122°C).

Section 36. Section 603.3 of the 1997 Uniform Mechanical Code is amended as follows:

603.3 Protection of Ducts. Ducts installed in locations where they are exposed to mechanical damage by vehicles or from other causes shall be protected by approved barriers. Ducts in pedestrian pathways in parking garages shall not interfere with the headroom requirements specified by Building Code Section 311.

Section 37. Section 603.4 of the 1997 Uniform Mechanical Code is amended as follows:

603.4 Support of Ducts. Installers shall furnish the manufacturer's field fabrication and installation instructions to building officials.

Support spacing and methods shall meet the requirements of UMC Standard 6-3.

Support materials shall be galvanized steel or meet the flame resistance and corrosion requirements of UL 181.

603.4.1 Seismic Bracing of Ducts. Longitudinal and transverse bracing shall be required for all round ducts 28 inches (711 mm) in diameter and larger, for rectangular ducts 6 square feet (.56 m²) and larger and on all duct systems used for life safety and smoke control installed in either the horizontal or vertical position.

603.4.1.1 Transverse Bracing. Transverse bracing shall occur at maximum intervals of 30 feet (9144 mm), at each duct turn and at the end of a duct run. Walls, including non-bearing fixed partitions, which have ducts running through them may replace a transverse brace.

603.4.1.2 Longitudinal Bracing. Longitudinal bracing shall occur at maximum intervals of 60 feet (18 288 mm). Transverse bracing for one duct section may also act as a longitudinal bracing for a duct section connected perpendicular to it, if bracing is installed within four feet (1219 mm) of the intersection and sized and installed on the larger duct.

603.4.2 Grouping of Ducts. Groups of ducts may be combined in a larger size frame using overall dimensions and maximum weight of ducts. At least 2 sides of each duct must be connected to the angles of the brace.

603.4.3 Seismic Loads. Bracing for ducts shall be designed to resist seismic loading, using accepted engineering practices and Chapter 16 of the Building Code.

EXCEPTION: No bracing is required if the duct is suspended by hangers 12 inches (305 mm) or less in length as measured from the top of the duct to the bottom of the support where the hanger is attached. Hangers must be positively attached to the duct within 2 inches (51 mm) of the top of the duct with a minimum of two #10 sheet metal screws.

<p>Interpretation: Duct bracing that complies with the SMACNA guideline "Seismic Restraint Manual Guidelines for Mechanical Systems" shall be deemed to comply with Section 603.4.1.</p>

Section 38. Section 603.8.3 of the 1997 Uniform Mechanical Code is hereby repealed.

Section 39. The 1997 Uniform Mechanical Code is amended by adding Section 603.9 to read as follows:

603.9 Restrictions on Location of Ducts. See Sections 304.10 and 304.11 for restrictions on ducts in elevator hoistways, elevator machine rooms and stairways.

Section 40. Section 604.1 of the 1997 Uniform Mechanical Code is amended as follows:

1 **604.1 Amount of Insulation.** Supply- and return-air ducts and plenums of a heating or cooling
2 system shall be insulated with not less than the amount of insulation set forth in ~~((Table 6-D,~~
3 ~~except for ducts and plenums used exclusively for evaporative cooling systems))~~ Sections
4 503.9 and 1414.2 of the Energy Code.

4 **Section 41.** Section 605.2 of the 1997 Uniform Mechanical Code is amended as
5 follows:

6 **605.2 Fire Dampers.** Fire dampers complying with recognized standards in Chapter 16, Part
7 III, shall be installed in accordance with approved manufacturer's installation instructions when
8 required by Chapter 7 of the Building Code. Fire dampers shall have been tested for closure
9 under airflow conditions and shall be labeled for both maximum airflow permitted and
10 direction of flow. When more than one damper is installed at a point in a single air path, the
11 entire airflow shall be assumed to be passing through the smallest damper area. Fire dampers
12 shall be labeled by an approved agency. Only fire dampers labeled for use in dynamic systems
13 shall be installed in heating, ventilation and air-conditioning systems which are intended to
14 operate with fans "on" during a fire; see UBC Section 713.12.

11 **EXCEPTION:** Fire dampers need not be installed in air ducts passing through the wall, floor, or
12 ceiling separating a Group R, Division 3 Occupancy from a Group U Occupancy, provided such ducts
13 within the Group U Occupancy are constructed of steel having a thickness not less than 0.019 inch (0.48
14 mm) (No. 26 galvanized sheet gage) and have no openings into the Group U Occupancy.

14 Ductwork shall be connected to damper sleeves or assemblies in such a way that
15 collapse of the ductwork will not dislodge the damper or impair its proper operation.

16 **Section 42.** Section 605.5 of the 1997 Uniform Mechanical Code is amended as
17 follows:

18 **605.5 Access and Identification.** Dampers shall be provided with an approved means of
19 access, large enough to permit inspection and maintenance of the damper and its operating
20 parts. The access shall not impair fire-resistive construction. Access shall not require the use of
21 tools, keys or special knowledge. Access points shall be permanently identified on the exterior
22 of the duct by a label with letters not less than 1/2 inch (13 mm) in height reading: SMOKE
23 DAMPER or FIRE DAMPER. Access doors in ducts shall be tightfitting and suitable for the
24 required duct construction.

23 **Section 43.** Section 607 of the 1997 Uniform Mechanical Code is amended as
24 follows:

24 **SECTION 607 — UNDER-FLOOR SPACE USED AS PLENUMS**

25 An under-floor space may be used as a supply plenum, provided that, in Group R, Division 3
26 Occupancies:

27 1. The use of under-floor space shall be limited to dwelling units not more than two
28 stories in height. Except for the floor immediately above the under-floor plenum, supply ducts
shall be provided extending from the plenum to registers on other floor levels.

2. Such spaces shall be cleaned of all loose combustible scrap material and shall be
tightly and substantially enclosed.

3. The enclosing material of the under-floor space, including the sidewall insulation, shall not be more flammable than 1-inch (25 mm) (nominal) wood boards (flame-spread index of 200). Installation of foam plastics is regulated by the Building Code.

4. Access shall be through an opening in the floor and shall not be less than 24 inches by 24 inches (610 mm by 610 mm).

5. A furnace supplying warm air to under-floor space shall be equipped with an automatic control which will start the air-circulating fan when the air in the furnace bonnet reaches a temperature not higher than 150°F (65°C). Such control shall be one that cannot be set higher than 150°F (65°C).

6. A furnace supplying warm air to such space shall be equipped with an approved temperature limit control that will limit outlet air temperature to 200°F (93°C).

7. A noncombustible receptacle shall be placed below each floor opening into the air chamber, and such receptacle shall conform to the following:

7.1 The receptacle shall be securely suspended from the floor members and shall not be more than 18 inches (457 mm) below the floor opening.

7.2 The area of the receptacle shall extend 3 inches (76 mm) beyond the opening on all sides.

7.3 The perimeter of the receptacle shall have a vertical lip at least 1 inch (25 mm) high at the open sides if it is at the level of the bottom of the joists, or 3 inches (76 mm) high if the receptacle is suspended.

8. Floor registers shall be designed for easy removal in order to give access for cleaning the receptacles.

9. Exterior walls and interior stud partitions shall be fire blocked at the floor.

10. Each wall register shall be connected to the air chamber by a register box or boot.

11. A duct conforming with Section 601.1 shall extend from the furnace supply outlet at least 6 inches (152 mm) below combustible framing.

12. The entire ground surface of the under-floor space shall be covered with a vapor barrier having a minimum thickness of 4 mils (0.1 mm) and a flame-spread index of 200 or less.

13. Fuel-gas lines and plumbing waste cleanouts are not located within the space.

Section 44. Table 6-D of the 1997 Uniform Mechanical Code is hereby repealed.

Section 45. Section 701 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 701 — GENERAL

701.1 Air Supply. Fuel-burning equipment shall be assured a sufficient supply of combustion air. The methods of providing combustion air in this chapter do not apply to direct-vent appliances, appliances listed as having separated combustion systems, listed cooking appliances, refrigerators and domestic clothes dryers. Fireplaces and solid fuel-burning appliances shall comply with Section 406.

701.2 Unusually Tight Construction. In buildings of unusually tight construction, combustion air shall be obtained from outside.

701.3 Ordinary Construction. In existing buildings of ordinary tightness insofar as infiltration is concerned, all or a portion of the combustion air for fuel-burning appliances may be obtained from infiltration when the requirement for 50 cubic feet per 1,000 Btu/h (4.831 L/W) input is met. See Section 703.4.1

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701.4 Existing Buildings. When fuel-burning appliances are installed in an existing building containing other fuel-burning ~~((appliances))~~ equipment, the room or space shall be provided with sufficient combustion air ~~((as required by this chapter for all fuel-burning appliances contained therein))~~.

Section 46. Section 702.1 of the 1997 Uniform Mechanical Code is amended as follows:

702.1 Location. One opening shall be located within the upper 12 inches (304 mm) of the enclosure and one opening shall be located within the lower 12 inches (304 mm) of the enclosure.

EXCEPTIONS: 1. When all air is taken from the outdoors for an appliance with a minimum clearance of 1 inch (25 mm) on the sides and back and 6 inches (152 mm) on the front, one opening shall be permitted and located within the upper 12 inches (305 mm) of the enclosure.

2. Where existing equipment is being replaced with other equipment of equal or smaller size and the room is not being remodeled, one opening location may be provided.

Section 47. Section 703.2 of the 1997 Uniform Mechanical Code is amended as follows:

703.2 Under-floor Supply. Lower combustion air openings may connect with under-floor areas conforming to the following requirements:

1. Under-floor spaces having unobstructed openings to the exterior at least twice the area of the required equipment combustion air openings.

2. The height of the under-floor space shall comply with the requirements of the Building Code and be without obstruction to the free flow of air.

Section 48. Section 801.1 of the 1997 Uniform Mechanical Code is amended as follows:

801.1 Venting System Required. Appliances designed to be vented shall be connected to a venting system as specified in Section 802 and the venting system shall comply with the provisions of this chapter, except as provided in this section.

See Building Code Section 3016.6 for hoistway venting requirements.

Venting systems shall consist of approved chimneys, Type B vents, Type BW vents, Type L vents, plastic pipe recommended by the manufacturer of listed condensing appliances for use with specified models, or a venting assembly which is an integral part of a listed appliance.

Section 49. Section 802 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 802 — TYPES OF VENTING SYSTEMS REQUIRED

802.1 General. The type of venting system required to serve various classifications of appliances shall be as set forth in Tables 8-B and 8-C.

802.2 Limitations.

802.2.1 Type B vents. Type B vents shall not be used for venting the following:

1. Appliances which may be converted readily to the use of solid or liquid fuels;

2. Combination gas-oil-burning appliances; and
3. Appliances listed for use with chimneys only.

802.2.2 Single-wall connectors and stove pipe. Single-wall connectors and stove pipe shall not be used outdoors or in unconditioned spaces such as crawl spaces, cold basements, garages or any other concealed area where condensation may invite venting failure.

EXCEPTION: Single-wall connectors may be used for domestic water heater vents.

802.3 Vent Connector. Connectors used for gas appliances having draft hoods for listed conversion-burner-equipped appliances having draft hoods may be constructed of materials having resistance to corrosion and heat not less than that specified in Section 816 or they may be of Type B or Type L vent material.

802.4 Solid Fuel. Solid-fuel-burning appliances shall not be connected to a venting system which serves gas- or oil-burning appliances. For solid-fuel-burning appliances, see Section 406.

802.5 Plastic Venting Systems for Use with Listed Condensing Appliances. Condensing appliances which cool flue gases nearly to the dewpoint within the appliance resulting in low vent gas temperatures may use plastic venting materials and vent configurations unsuitable for noncondensing appliances. Listed condensing appliances shall be considered properly vented when installed in accordance with the terms of listing and the manufacturer's installation instructions.

Section 50. Section 804 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 804 — LOCATION AND SUPPORT OF VENTING SYSTEMS, INCLUDING MASONRY VENTING SYSTEMS

804.1 Penetrations into Air Ducts and Plenums. A combustion products venting system(~~(; vent connector, chimney or chimney connector)~~) shall not extend into or through an air duct or plenum.

EXCEPTION: A combustion products venting system may pass through a combustion air duct.

804.2 Enclosure and Support. Portions of venting systems which extend through occupied and storage spaces shall be enclosed or protected to avoid contact with or damage to the installation or contact with combustible material.

The base of a vent which extends to the ground shall rest on a solid masonry or concrete base at least 2 inches (51 mm) in thickness. The base of a vent which does not extend to the ground and is not self-supporting shall rest on a firm metal or masonry support.

Venting systems shall be adequately supported for the weight and the design of the material used.

804.3 Venting into a Fireplace Chimney. Appliances shall not be vented into a fireplace or into a chimney serving a fireplace.

Section 51. Section 806.6 of the 1997 Uniform Mechanical Code is amended as follows:

806.6 Vent Terminals. Venting systems shall terminate not less than 4 feet (1219 mm) below or 4 feet (1219 mm) horizontally from, and not less than 1 foot (305 mm) above a door, an openable window or a gravity air inlet into a building.

EXCEPTION: Vent terminals of direct-vent appliances with inputs of 50,000 Btu/h (14.7 kW) or less shall be located at least 9 inches (229 mm) from an opening through which combustion products could enter a building. Appliances with inputs exceeding 50,000 Btu/h (14.7 kW) but not exceeding 65,000 Btu/h

(19 kW) shall require 12-inch (305 mm) vent termination clearances. The bottom of the vent terminal and the air intake shall be located at least 12 inches (305 mm) above grade.

806.6.1 Separation from inlets. Venting systems shall terminate at least 3 feet (914 mm) above an outside- or makeup-air inlet located within 10 feet (3048 mm) and at least 4 feet (1219 mm) from a property line except a public way. Vent terminations shall also comply with Building Code requirements for opening protection.

EXCEPTION: Vent terminations of direct-vent appliances with inputs not exceeding 50,000 Btu/h (19 kW) shall be permitted to terminate at least 2 feet (610 mm) from a property line except a public way.

Section 52. Section 812.1 of the 1997 Uniform Mechanical Code is amended as follows:

812.1 Factory-built Chimneys. Factory-built chimneys shall be installed in accordance with the terms of their listing, the manufacturer's installation instructions and the applicable requirements of this code. Factory-built chimneys shall terminate as required for unlisted single-wall metal chimneys in Table 8-D.

~~((Chimneys used with fireplaces or heating appliances in which solid or liquid fuel is used shall be maintained with a spark arrester as required for incinerators.~~

~~**EXCEPTION:** Chimneys which are located more than 200 feet (61 m) from any mountainous, brush-covered or forest-covered land or land covered with flammable material and are not attached to a structure having less than a Class C roof covering, as set forth in the Building Code.)~~

Section 53. Section 814.1 of the 1997 Uniform Mechanical Code is amended as follows:

814.1 Prohibited Use.

814.1.1 Limitations. Unlisted single-wall metal chimneys (smokestacks) shall not be installed within a dwelling unit of a Group R Occupancy.

814.1.2 Location. Metal chimneys shall not be carried up inside ventilating ducts unless such ducts are constructed and installed as required by this code for chimneys and are used solely for exhaust of air from the room or space in which the appliances served by the metal chimneys are located.

814.1.3 Design. Metal chimneys shall have a minimum thickness of 0.127 inch (3.23 mm) (No. 10 manufacturer's standard gage) steel and shall be designed and constructed as specified in this chapter and Chapters 16 and 22 of the Building Code.

814.1.4 Construction. Unlisted metal chimneys shall be riveted or welded and, unless structurally self-supporting, shall be guyed securely or firmly anchored to or otherwise supported by the building or structure served thereby. All joints shall be liquid tight or of such a design that liquid will drain to the interior of the chimney.

814.1.5 Lining. Metal chimneys shall be lined as required by Table 8-D.

814.1.6 Termination. Metal chimneys shall terminate as required by Table 8-D.

814.1.7 Clearance. Clearance from combustible construction shall be in accordance with Table 8-D and the applicable requirements for each classification of chimney as required by this chapter.

When a metal chimney passes through a ceiling or roof constructed of combustible materials, it shall be protected by an approved ventilating thimble extending not less than 9 inches (229 mm) below and 9 inches (229 mm) above the ceiling or roof construction. Thimbles shall be of a size to provide a clearance on all sides of the chimney at least 18 inches (457 mm), except that for chimneys of low-heat appliances the clearance may be reduced to at least 6 inches (152 mm).

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814.1.8 Support. Metal chimneys shall be supported on properly designed foundations of masonry or reinforced concrete or on noncombustible material having a fire-resistance rating of not less than three hours, provided such supports are independent of the building construction and the load is transferred to the ground.

814.1.9 Enclosure required for interior chimneys. Metal chimneys or parts thereof in a building exceeding one story in height shall be enclosed above the story in which the appliance served is located, in walls of noncombustible construction having a fire-resistive rating of not less than one hour if the building is less than ~~((four))~~ five stories in height, and not less than two hours if the building is ~~((four))~~ five stories or more in height, with a space on all sides between the chimney and the enclosing walls sufficient to render the entire chimney accessible for examination and repair. The enclosing walls shall be without openings.

EXCEPTION: Doorways equipped with a fire assembly having a one-hour fire-resistive rating may be permitted at each floor level for inspection purposes.

Section 54. Section 814.8 of the 1997 Uniform Mechanical Code is amended as follows:

814.8 Enclosures. Metal chimneys serving flue-fed, chute-fed, commercial or industrial-type incinerators, extending through any story of a building above that in which the incinerator is located, shall be enclosed in the upper stories within a continuous enclosure constructed of materials which are not combustible, such as masonry. The enclosure shall extend from the ceiling of the incinerator room to or through the roof so as to retain the integrity of the fire separations as required by applicable Building Code provisions. The enclosure shall have a fire-resistance rating of not less than one hour if the building is less than ~~((four))~~ five stories in height, and not less than two hours if the building is ~~((four))~~ five or more stories in height. All openings into the enclosing walls shall be protected with a self-closing fire assembly having a fire-resistive rating of not less than one and one-half hours.

Section 55. Section 817.5 of the 1997 Uniform Mechanical Code is amended as follows:

817.5 Exit Terminals. The exit terminals of forced-draft and induced-draft systems shall be located not less than 12 inches (305 mm) from any opening through which combustion products could enter the building, nor less than 2 feet (610 mm) from an adjoining building, and not less than ~~((7 feet (2134 mm)))~~ 10 feet (3048 mm) above grade when located adjacent to public walkways.

Section 56. The 1997 Uniform Mechanical Code is amended by adding Section 818.3 to read as follows:

818.3 Interlock Controls. When the ventilating hood or exhaust system is equipped with a power means of exhaust, the appliance control system shall be interlocked so as to permit appliance operation only when the power means of exhaust is in operation.

Section 57. Section 901 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 901 — ((VENTED)) DECORATIVE APPLIANCES, DECORATIVE GAS APPLIANCES FOR INSTALLATION IN SOLID-FUEL-BURNING FIREPLACES AND GAS-FIRED LOG LIGHTERS

901.1 ((Vented)) Decorative Appliances. Vented decorative appliances shall be installed in accordance with the manufacturer's installation instructions.

Note: Unvented decorative appliances are not approved for use in Seattle.

901.2 Decorative Gas Appliances for Installation in Solid-fuel-burning Fireplaces. In addition to the general requirements specified in Section 309, approved gas logs may be installed in solid-fuel-burning fireplaces, provided:

1. The gas log is installed in accordance with the manufacturer's installation instructions.

2. If the fireplace is equipped with a damper, it shall be permanently blocked open to a sufficient amount to prevent spillage of combustion products into the room.

3. The minimum flue passageway shall be not less than 1 square inch per 2,000 Btu/h input (1.09 mm²/W).

4. Gas logs, when equipped with a pilot, shall have a listed safety shutoff valve.

901.3 Gas-fired Log Lighters. Approved gas-fired log lighters shall be installed in accordance with the manufacturer's installation instructions.

Section 58. Section 903.1 of the 1997 Uniform Mechanical Code is amended as follows:

903.1 Construction. Incinerators in which no fuel other than normal refuse, except a gas flame or similar means to accomplish ignition, is used for combustion, and in which the chute and smoke flue are identical, shall not be installed. ~~((have the enclosing walls of the combustion chamber constructed of clay or shale brickwork not less than 4 inches (102 mm) thick when there is a horizontal grate area of not more than 9 square feet (0.8 m²) and not less than 8 inches (203 mm) thick when there is a horizontal grate area exceeding 9 square feet (0.8 m²) and, in each case, a lining of firebrick not less than 4 inches (102 mm) thick, with an air space, in the case of the thicker wall, between the clay or shale brick and the firebrick sufficient to provide for expansion and contraction.~~

~~The combined chute and flue shall be constructed as required for incinerator chimneys in Chapter 31 of the Building Code. The chute and flue shall be constructed straight and plumb, and finished smooth on the inside. All flues shall terminate in a substantially constructed spark arrestor having a mesh not exceeding ¹/₂ inch (13 mm).~~

~~Firebrick shall be laid in fireclay mortar.~~

~~**903.2 Service Openings.** Service openings into the chute shall be equipped with approved self-closing hoppers so constructed that the openings are closed off while the hopper is being charged and no part will project into the chute or flue. The area of the service opening shall not exceed one-third of the area of the chute or flue.))~~

Section 59. Section 904.6 of the 1997 Uniform Mechanical Code is amended as follows:

904.6 Chutes. Refuse chutes shall not feed directly to the combustion chamber but shall discharge into a room or bin enclosed and separated from the incinerator room by floors, ceilings and walls of not less than two-hour fire-resistive construction. The opening through

which material is transferred from such room or bin to the incinerator room shall be equipped with a fire assembly having a three-hour fire-resistive rating.

Refuse chutes shall rest on substantial noncombustible foundations. The enclosing walls of such chutes shall consist of clay or shale brickwork not less than 8 inches (203 mm) thick or of reinforced concrete not less than 6 inches (152 mm) thick or metal ducts enclosed in shafts meeting the requirements of Section 711.1 of the Building Code. Such chutes shall extend at least 4 feet (1219 mm) above the roof and shall be covered by a metal skylight glazed with single thick plain glass.

Section 60. Section 1101.2 of the 1997 Uniform Mechanical Code is amended as follows:

1101.2 Standards of Quality. The standards listed below labeled "UMC Standards" are also listed in Chapter 16, Part II, and are a part of this code.

1101.2.1 Standard test method for concentration limits of flammability of chemicals. UMC Standard 11-1, Standard Test Method for Concentration Limits of Flammability of Chemicals.

1101.2.2 Methods for system identification. UMC Standard 11-2, Methods for System Identification.

Note: Other nationally-recognized standards for refrigeration systems are ASHRAE 15-94, Safety Code for Mechanical Refrigeration, and IAR 2-92, Equipment, Design, and Installation of Ammonia Mechanical Refrigeration Systems.

Section 61. Section 1102 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 1102 — REFRIGERANTS

The refrigerant used shall be of a type listed in Table 11-A.

EXCEPTION: Lithium bromide absorption systems using water as the refrigerant.

Refrigerants not listed in Table 11-A shall be approved before use.

Refrigerant shall be of a type for which the equipment was designed or to which the equipment was converted with approval.

1102.1 Safety Classification. Refrigerants shall be classified into groups according to toxicity and flammability in accordance with ANSI/ASHRAE Standard 34-1992 and addenda thereto. The classification shall consist of an uppercase letter followed by a number. The letter indicates the toxicity classification and the number denotes the flammability. Blends shall be assigned the group designation of the blend composition at the worst case of fractionation.

1102.2 Refrigerant Purity. New and reclaimed refrigerants are allowed to be used in refrigeration systems in accordance with this section. When requested, the installer shall furnish a declaration identifying the refrigerant by standard "R-" designation and stating that it meets the requirements of either Section 1102.2.1 or 1102.2.2.

EXCEPTION: The refrigerant used shall meet the purity specifications set by the manufacturer of the equipment in which it is used when that specification is different from Section 1102.2.1 or 1102.2.2.

1102.2.1 New and reclaimed refrigerants. New and reclaimed refrigerants shall meet ARI Standard 700-93 in purity.

1102.2.2 Recovered refrigerants. Reuse of recovered refrigerant that shows no sign of contamination is allowed in equipment belonging to the same owner as the equipment from which it was removed, provided that it has been filtered and dried with a listed or approved recovery machine. Recovered refrigerants shall not be used in a different owner's equipment unless the refrigerant has been analyzed and found to meet the purity requirements of ARI 700.

1102.3 Toxicity Classification. Refrigerants shall be assigned to one of two classes, A or B, based on allowable exposures.

1. Class A signifies refrigerants with a low degree of toxicity as indicated by a Permissible Exposure Limit (PEL) or measurement consistent therewith of 400 ppm or greater.

2. Class B signifies refrigerants with a PEL or measurement consistent therewith of less than 400 ppm.

1102.4 Flammability Classification. Refrigerants shall be assigned to one of three classes, 1, 2 or 3, based on flammability. Tests shall be made in accordance with UMC Standard 11-1.

1. Class 1 indicates refrigerants that do not show flame propagation when tested in air at 70°F (18°C) and 14.7 psia (101 kPa).

2. Class 2 indicates refrigerants having a lower flammability limit (LFL) of more than 0.00625 pound per cubic foot (0.10 kg/m³) at 70°F (18°C) and 14.7 psia (101 kPa).

3. Class 3 indicates refrigerants that are highly flammable, as defined by an LFL of less than or equal to 0.00625 pound per cubic foot (0.10 kg/m³) at 70°F (18°C) and 14.7 psia (101 kPa).

Section 62. Section 1104.2 of the 1997 Uniform Mechanical Code is amended as follows:

1104.2 Volume of Occupied Space. The quantity of refrigerant in a single, independent circuit of a high-probability system shall not exceed the amounts shown in Table 11-A based on the volume of the normally occupied space. The volume of the smallest, enclosed, normally occupied space shall be used to determine the permissible quantity of refrigerant in a system which is located in, serves or passes through such space.

EXCEPTIONS: 1. If the airflow to any enclosed space served by a portion of an air-duct system cannot be shut off or reduced below one quarter of its maximum, the cubical contents of the entire space served by that portion of the air-duct system shall be used to determine the permissible quantity of refrigerant in the system.

2. Refrigerated process or storage areas meeting the requirements of Section 1104.3.

Interpretation: Where the space above a suspended ceiling is continuous and part of the supply or return air plenum system, this space shall be included in calculating the volume of the occupied space.

Section 63. Section 1106.1 of the 1997 Uniform Mechanical Code is amended as follows:

1106.1 When Required. Refrigeration systems inside a building shall be provided with a refrigeration machinery room when any of the following conditions exist:

1. The quantity of refrigerant in a single system exceeds Table 11-A amounts.

2. Direct-fired absorption equipment.

EXCEPTION: Direct- and indirect-fired lithium bromide absorption systems using water as the refrigerant.

3. A Group A1 system having an aggregate compressor horsepower of 100 ((351.6 kW)) or more.

4. The system contains other than a Group A1 refrigerant.

EXCEPTIONS: 1. Lithium bromide absorption systems using water as the refrigerant.

2. Ammonia-water absorption unit systems installed outdoors, provided that the quantity of refrigerant in a single system does not exceed Table 11-A amounts and the discharge is shielded and dispersed.

3. Systems containing less than 300 pounds (136 kg) of refrigerant R-123 and located in an approved exterior location.

4. Systems containing less than 35 pounds (16 kg) of refrigerant R-717 and located in an approved exterior location.

1 **Section 64.** Section 1106.4 of the 1997 Uniform Mechanical Code is amended as
2 follows:

3 **1106.4 Refrigerant-vapor Alarms.** Machinery rooms shall have approved refrigerant-vapor
4 detectors, located in an area where refrigerant from a leak is likely to concentrate, and shall
5 activate visual and audible alarms. Alarms shall be activated at a value not greater than one
6 half the immediately dangerous to life or health (IDLH), or measurement consistent therewith;
7 the PEL, or measurement consistent therewith; or 25 percent of the LFL, whichever is less.
8 See Table 11-A for IDLH, PEL and LFL.

9 **Section 65.** Section 1106.5 of the 1997 Uniform Mechanical Code is amended as
10 follows:

11 **1106.5 Separation.** Refrigeration machinery rooms shall be separated from other portions of
12 the building as required in the special hazards provisions of the Building Code. Doors shall be
13 tight-fitting and shall have the fire-resistance required by the Building Code. Openings in
14 exterior walls of refrigeration machinery rooms shall not be located under any exit, stairway or
15 exit discharge. Penetrations shall be sealed to inhibit the passage of refrigerant vapor.

16 **Section 62** Section 1106.7 of the 1997 Uniform Mechanical Code is amended as
17 follows:

18 **1106.7 Special Requirements.** Open flames or devices having an exposed surface exceeding
19 800°F (427°C) are prohibited in refrigeration machinery rooms.

20 **EXCEPTIONS:** 1. Momentary temperature excursions such as electrical contacts in Groups A1 and
21 B1 systems.

22 2. Refrigeration machinery rooms used exclusively for direct-fired absorption equipment.

23 3. Existing nonconforming installations may be allowed if approved by the building official when
24 the combustion system is interlocked with the refrigerant detection system to shut off at the PEL and the
25 risks to the equipment life arising from dissociation products are acknowledged in writing by the owner.
26 For B2 refrigerants, the shutoff may occur at the IDLH.

27 **Section 66.** The 1997 Uniform Mechanical Code is amended by adding Section
28 1106.8 to read as follows:

29 **1106.8 Flammable refrigerants.** Where refrigerants of Groups A2, A3, B2 and B3 are
30 used, the machinery room shall conform to the Class 1, Division 2 hazardous location
31 classification requirements of the Electrical Code.

32 **EXCEPTION:** Ammonia machinery rooms.

33 **Section 67.** Section 1107.1 of the 1997 Uniform Mechanical Code is amended as
34 follows:

35 **1107.1 General.** Refrigeration machinery rooms shall be provided with a continuous source of
36 outside air for ventilation and removal of rejected heat.

37 **Interpretation:** The requirement for a continuous source of outside air means that fire
38 dampers are not allowed on ventilation ducts.

Section 68. Section 1107.9 of the 1997 Uniform Mechanical Code is amended as follows:

1107.9 Ventilation Intake. Makeup-air intakes to replace the exhaust air shall be provided to the refrigeration machinery room directly from outside the building. Intakes shall be located as required by other sections of the code (~~and fitted with backdraft dampers or similar approved flow control means to prevent reverse flow~~). Distribution of makeup air shall be arranged to provide thorough mixing within the refrigeration machinery room to prevent short circuiting of the makeup air directly to the exhaust.

Air supply and exhaust ducts to the machinery room shall serve no other area and shall be covered with corrosion-resistant screen of not less than 1/2 inch (13 mm) mesh. The supply air shall be taken from directly outside the building.

Section 69. Section 1108.4 of the 1997 Uniform Mechanical Code is amended as follows:

1108.4 Emergency Control. A clearly identified switch of the break-glass type providing off-only control of electrically energized equipment and devices within the refrigeration machinery room shall be provided immediately adjacent to and outside of each refrigeration machinery room exit. In addition, emergency shutoff shall also be automatically activated when the concentration of refrigerant vapor exceeds 25 percent of the LFL. A sign containing the information specified in Section 1121 shall be located adjacent to the emergency control switch.

Section 70. Section 1109.2 and 1109.3 of the 1997 Uniform Mechanical Code are amended as follows:

1109.2 Nonferrous Materials. Copper and brass refrigeration piping, valves, fittings and related parts used in the construction and installation of refrigeration systems shall be approved for the intended use.

Standard iron-pipe size, copper and red brass (not less than 80 percent copper) pipe shall conform to ASTM B 42 and ASTM B 43.

Copper tube used for refrigerant piping erected on the premises shall be seamless copper tube of Type ACR (hard or annealed) complying with ASTM B 280. Where approved, copper tube for refrigerant piping erected on the premises shall be seamless copper tube of Type K or L (drawn or annealed) in accordance with ASTM B 88. Annealed temper copper tube shall not be used in sizes larger than a 2-inch (51 mm) nominal size. Mechanical joints shall not be used on annealed temper copper tube in sizes larger than 7/8 inch (22 mm) OD size.

Copper tubing joints used in refrigerating systems containing Group A2, A3, B2 or B3 refrigerants shall be brazed. Soldered joints shall not be used in such refrigerating systems.

Type 3003-0 aluminum tubing with high-pressure fittings shall not be used with methyl chloride and other refrigerants known to attack aluminum.

1109.3 Ferrous Materials. Iron and steel refrigeration piping valves, fittings and related parts shall be approved for the intended use. Pipe more than 2 inches (51 mm) iron pipe size shall be electric-resistance welded or seamless pipe. Carbon steel pipe with a wall thickness not less than Schedule 80 shall be used for Group A2, A3, B2 or B3 refrigerant liquid lines for sizes 1 1/2 inches (38 mm) and smaller. Carbon steel pipe with a wall thickness not less than Schedule 40 shall be used for Group A1 or B2 refrigerant liquid lines 6 inches (152 mm) and smaller, Group A2, A3, B2 or B3 refrigerant liquid lines sizes 2 inches (51 mm) through 6 inches (152 mm) and all refrigerant suction and discharge lines 6 inches (152 mm) and smaller. Type F steel pipe shall not be used for refrigerant lines having an operating temperature less than -20°F (-29°C).

Section 71. The 1997 Uniform Mechanical Code is amended by adding Section 1109.4 to read as follows:

1109.4 Liquid Receivers. Ammonia systems shall be provided with liquid receivers designed for pumpdown that have sufficient capacity to assure that the liquid does not occupy more than 90% of the volume of the receiver at 90°F.

Section 72. Section 1110.5 of the 1997 Uniform Mechanical Code is amended as follows:

1110.5 Prohibited Locations. Refrigerant piping shall not be located within a required exit.

Refrigerant piping shall not be placed in any elevator or dumbwaiter hoistway or other shaft containing a moving object, or in any shaft which has openings to living quarters or to main exit corridors.

Refrigerant piping shall not be placed in public corridors, lobbies or stairways.

EXCEPTION: Refrigerant piping may pass across a public corridor, provided there shall be no joints in the section in the public corridor, and further provided nonferrous tubing of 1-1/8 inch outside diameter and smaller shall be contained in a rigid metal pipe.

Refrigerant piping shall not be installed vertically through floors from one story to another.

EXCEPTIONS: 1. Refrigerant piping may be installed from the basement to the first floor, from the top floor to a machinery penthouse or to the roof, or between two adjacent floors served by the refrigerating system, provided continuous penetrations of more than one floor/ceiling or roof/ceiling assembly shall comply with Section 711 of the Building Code.

2. Piping which interconnects separate pieces of equipment may be carried in approved rigid and tight continuous fire-resisting pipe duct or shaft. The pipe duct or shaft may not have openings into floors not served by the refrigerating system. It may be carried on the outer wall of the building, but may not be located in an air shaft, closed court, or in other similar spaces enclosed within the outer walls of the building. The pipe duct or shaft shall be vented to the outside.

3. Piping of direct systems containing Group A1 refrigerants, classified according to Section 1102, need not be enclosed where it passes through space served by that system.

Section 73. Section 1111.1 of the 1997 Uniform Mechanical Code is amended as follows:

1111.1 Location. Stop valves shall be installed in the refrigerant piping of a refrigeration system at the following locations:

1. At the inlet and outlet of a positive-displacement-type compressor, compressor unit or condensing unit.

2. At the refrigerant inlet and outlet from a liquid receiver.

3. At the refrigerant inlet and outlet of a pressure vessel containing liquid refrigerant and having an internal gross volume exceeding 3 cubic feet (85 L).

EXCEPTIONS: 1. Systems with nonpositive-displacement compressors.

2. Systems having a pump-out receiver for storage of the charge.

3. Systems containing less than 110 pounds (50 kg) of Group A1 refrigerant.

4. Self-contained systems do not require a stop valve at the inlet of the receiver.

Section 74. Table 11-B of the 1997 Uniform Mechanical Code is amended as follows:

**TABLE 11-B
 PERMISSIBLE REFRIGERATION SYSTEMS¹ AND REFRIGERANTS**

OCCUPANCY GROUP AND DIVISION	HIGH-PROBABILITY SYSTEM	LOW-PROBABILITY SYSTEM	MACHINERY ROOM
A-1	Group A1 only	Any	Any
A-2.1	Group A1 only	Any	Any
A-3	Group A1 only	Any	Any
A-4	Group A1 only	Any	Any
B	Group A1 only ²	Any	Any
E-1	Group A1 only	Any	Any
E-2	Group A1 only	Any	Any
E-3	Group A1 only	Any	Any
F-1	Group A1 only ²	Any	Any
F-2	Group A1 only ²	Any	Any
H-1	Any	Any	Any
H-2	Any	Any	Any
H-3	Any	Any	Any
H-4	Group A1 only	Any	Any
H-5	Group A1 only	Any	Any
H-6	Group A1 only	Any	Any
H-7	Any	Any	Any
I-1.1	None	Any	Any
I-1.2	Group A1 only	Any	Any
I-2	Group A1 only	Any	Any
I-3	None	Any	Any
M	Group A1 only ²	Any	Any
R-1	Group A1 only	Any	Any
R-2	Group A1 only	Any	Any
R-3	Group A1 only	Any	Any
S-1	Group A1 only ²	Any	Any
S-2	Group A1 only ²	Any	Any
S-3	Group A1 only	Any	Any
S-4	Group A1 only	Any	Any
S-5	Group A1 only	Any	Any
U-1	Any	Any	Any
U-2	N/A	N/A	N/A

¹See Section 1104.

Interpretation: For purposes of Table 11-B, uses which are accessory to other occupancies shall be considered as separate occupancies.

Section 75. Table 11-E of the 1997 Uniform Mechanical Code is amended as follows:

TABLE 11-E—CONDENSATE WASTE SIZE

EQUIPMENT CAPACITY	MINIMUM CONDENSATE PIPE DIAMETER
Up to 20 tons (70.3 kW) of refrigeration	$\frac{3}{4}$ inch (19 mm) ¹
Over 20 (70.3 kW) to 40 tons (141 kW) of refrigeration	1 inch (25 mm)
Over 40 (141 kW) to 90 tons (317 kW) of refrigeration	1 $\frac{1}{4}$ inches (32 mm)
Over 90 (317 kW) to 125 tons (440 kW) of refrigeration	1 $\frac{1}{2}$ inches (38 mm)
Over 125 (440 kW) to 250 tons (879 kW) of refrigeration	2 inches (51 mm)

¹ Runs of condensate drains over 15 feet in length shall be at least 1 inch (25 mm) pipe.

Section 76. Section 1301.1 of the 1997 Uniform Mechanical Code is amended as follows:

1301.1 Scope. The regulations of this chapter shall govern the installation of fuel-gas piping in or in connection with a building or structure or within the property lines of premises, other than service pipe.

The Director of Public Health is responsible for the administration and enforcement of this chapter and for this purpose has all of the powers of the building official. Whenever the words "building official" are used in this chapter, such words shall mean "Director of Public Health."

Section 77. Section 1302 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 1302 — PERMIT

A permit shall be obtained prior to installation, removal, alteration or repair of fuel-gas piping systems as required by the provisions of Chapter 1 of this code.

EXCEPTION: Minor installation of additional gas piping by the serving gas supplier incidental to the relocation of a gas meter.

Fees shall be as required by the Fee Subtitle.

All gas piping systems for which a permit is required shall be inspected by the Director of Public Health as specified in Section 1306 of this chapter.

Section 78. Section 1311 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 1311 — MATERIAL FOR GAS PIPING

1311.1 General. Pipe and tubing used for the installation, extension, alteration or repair of gas piping shall be standard weight wrought iron or steel (galvanized or black), yellow brass (~~(containing not more than 75 percent copper, or)~~), seamless copper tubing, threaded copper, brass, internally tinned copper tubing or (~~(equivalently treated copper of iron pipe size)~~), listed Corrugated Stainless Steel Tubing (CSST). Seamless copper tubing may be used for gas piping

1 provided that it conforms with ASTM B 88 (Type K or Type L), ASTM B 280 (Type ACR),
2 or ASTM B 837 (Type G). Copper tubing, copper and brass pipe shall not be used if the gas
3 contains more than an average of 0.3 grains of hydrogen sulfide per 100 standard cubic feet of
4 gas. Corrugated stainless steel tubing may be permitted provided that it is part of a system
5 listed by an approved agency as complying with the reference standard listed in Chapter 16,
6 Part III. Approved PE pipe may be used in exterior buried piping systems.

7 **1311.2 Reused Pipe.** Gas pipe shall be new or shall have been used previously for no purpose
8 other than conveying gas; it shall be in good condition, clean and free from internal
9 obstructions. Burred ends shall be reamed to the full bore of the pipe.

10 **1311.3 Fittings.** All fittings shall be approved for gas piping systems. The fittings shall be
11 compatible with or shall be of the same material as the pipe or tubing. Fittings used in
12 connection with the piping shall be of malleable iron, ((yellow)) brass, bronze, copper
13 ((containing not more than 75 percent copper)) or approved plastic fittings. All fittings and
14 components used with Corrugated Stainless Steel Tubing (CSST) shall be of the same listed
15 system. Fittings used with copper or brass pipe shall be copper, brass, bronze or 45 degree
16 flare fittings.

17 **1311.4 Valves and Appurtenances.** Valves and appurtenances for gas piping shall be of a
18 type designed and approved for use with fuel gas.

19 **1311.5 Corrugated Stainless Steel Tubing (CSST).** Corrugated Stainless Steel Tubing
20 (CSST) may be used for gas piping provided that it is part of a system that has been tested
21 and listed to the ANSI/AGA Standard LC-1 and is installed in accordance with the
22 manufacturers installation instructions.

23 **Section 79.** Section 1312.1 of the 1997 Uniform Mechanical Code is amended as
24 follows:

25 **1312.1 Joints.** Joints in the piping system, unless welded, brazed or flared, shall be threaded
26 joints having approved standard threads. The threaded joints shall be made with approved pipe
27 joint material, insoluble in fuel gas and applied to the male threads only. Welded joints in a
28 gas-supply system shall be made by an approved, qualified welder. See Section 203. Brazing
material shall have a melting point in excess of 1,000°F (520°C) and shall not contain more
than 0.05 percent phosphorous.

Section 80. Section 1312.3 of the 1997 Uniform Mechanical Code is amended as
follows:

1312.3 Piping through Foundation Wall. Underground piping, where installed below grade
through the outer foundation or basement wall of a building, shall be encased in a protective
pipe. The annular space between the gas piping and the sleeve shall be sealed at the foundation
or basement wall to prevent entry of gas or water.

Existing walls shall be core drilled and sealed with an approved mechanical seal.

Section 81. Sections 1312.6 of the 1997 Uniform Mechanical Code is amended as
follows:

1312.6 Corrosion and Covering Protection. ((Ferrous)) Metallic gas piping installed
underground in exterior locations shall be protected from corrosion by approved coatings or
wrapping materials applied in an approved manner, and cathodically protected in accordance
with NACE RP-01-69. Horizontal metallic piping shall have at least 12 inches (305 mm) of
earth cover or equivalent protection. Plastic gas piping shall have at least 18 inches (457 mm)

1 of earth cover or equivalent protection. Risers, including prefabricated risers inserted with
2 plastic pipe, shall be metallic and shall be protected in an approved manner to a point at least 6
3 inches above grade. When a riser connects to plastic pipe underground, the horizontal metallic
4 portion underground shall be at least 30 inches (762 mm) in length before connecting to the
5 plastic service pipe. An approved transition fitting or adaptor shall be used where the plastic
6 joins the metallic riser.

7 **EXCEPTION:** Listed one-piece 90-degree transition fittings or risers may have less than 30 inches
8 (762 mm) of horizontal metallic piping.

9
10 **Section 82.** Sections 1312.7 of the 1997 Uniform Mechanical Code is amended as
11 follows:

12 **1312.7 Electrical Isolation of Fuel Gas Piping.** Underground (~~ferrous~~) metallic gas piping
13 shall be electrically isolated from (~~the rest of the gas system~~) other metallic structures or
14 utilities with listed or approved isolation fittings installed a minimum of 6 inches (152 mm)
15 above grade.

16
17 **Section 83.** Section 1312.14 of the 1997 Uniform Mechanical Code is amended as
18 follows:

19 **1312.14 Barbecue or Fireplace Outlets.** Gas outlets in a barbecue or fireplace shall be
20 controlled by an approved operating valve located in the same room and outside the fireplace
21 but not more than 4 feet (1219 mm) from the outlets. If piping on the discharge side of the
22 control valve is standard weight brass or galvanized steel, the piping may be embedded in or
23 surrounded by not less than 2 inches (51 mm) of concrete or masonry.

24 Where it is impractical to locate the operating valve outside the hearth it may be
25 installed just inside the hearth within 2 inches (51 mm) of the outside edge of the hearth on
26 either side of the fire box.

27
28 **Section 84.** Section 1312.17 of the 1997 Uniform Mechanical Code is amended as
29 follows:

30 **1312.17 Directional Changes.** Changes in direction of gas piping shall be made by use of
31 appropriate fittings, except (~~that~~) copper tubing, which may change direction by bending, and
32 polyethylene gas piping and tubing, which may be bent to a radius not less than 20 times the
33 nominal diameter of the pipe or tube.

34
35 **Section 85.** The 1997 Uniform Mechanical Code is amended by adding Section
36 1312.18 to read as follows:

37 **1312.18 Marking and labeling.** Copper tubing carrying fuel gas shall be identified by
38 yellow labels marked in black letters, "Fuel Gas". The label shall state the pressure on
39 tubing carrying gas at pressures of more than 1 psig. Labels shall be visible from all
40 directions. They shall be affixed to the pipe at intervals of not more than 20 feet. There
41 shall be at least one label in each concealed cavity that is not readily accessible, and at least
42 one in each room and story traversed by the tubing.

Section 86. The 1997 Uniform Mechanical Code is amended by adding Section 1312.19 to read as follows:

1312.19 Piping in concealed locations. Portions of gas piping systems installed in concealed locations shall not have unions or running threads. Concealed tubing joints shall be brazed in accordance with Section 1312.1.

Section 87. The 1997 Uniform Mechanical Code is amended by adding Section 1312.20 to read as follows:

1312.20 Hangers and supports. Hangers and supports shall be of sufficient strength to support the piping, and shall be fabricated of materials compatible with the piping material. Piping shall be supported at intervals not exceeding the spacings specified below.

Rigid pipe, 3/4 inch diameter and under	not more than 10 foot spacing
Rigid pipe, one inch diameter and over	not more than 12 foot spacing
Tubing, 1-1/2 inch diameter and under	not more than 6 foot spacing

Section 88. The 1997 Uniform Mechanical Code is amended by adding Section 1312.21 to read as follows:

1312.21 Metallic tubing bends. Metallic tubing shall conform with the following:

1. Bends shall be made with bending equipment and procedures intended for that purpose.
2. All bends shall be smooth and free from buckling, cracks, and other mechanical damage.
3. The inside radius of bends shall not be less than six times the outside diameter of the tubing.

Section 89. The 1997 Uniform Mechanical Code is amended by adding Section 1312.22 to read as follows:

1312.22 Shielding concealed tubing. Concealed tubing that penetrates a stud, joist or framing member shall be protected from puncture by shielding the area of penetration and within 5 inches (127 mm) of each side of the penetration, as appropriate. Concealed tubing at support points and points of penetration 2 to 3 inches (51 to 76 mm) from any edge of a stud, joist or framing member shall be shielded throughout the area of support. Shielding devices shall be constructed from 16 gage steel plate. Unsupported sections within a wall or ceiling cavity need not be shielded.

Section 90. Section 1319.1 of the 1997 Uniform Mechanical Code is amended as follows:

1319.1 General. Approval by the building official and verification from the serving gas supplier of the availability of the desired pressure shall be obtained before any medium- or high-pressure gas piping system is installed.

1319.1.1 Pressure Limits. Gas pressure inside structures shall be limited to a maximum of 5 psig.

EXCEPTION: Applications with pre-approved drawings bearing a professional engineer's stamp.

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Section 91. The Director of the Department of Construction and Land Use shall for a period of 60 days following the effective date of this ordinance, approve applications that comply with either the requirements of this Ordinance or with the requirements of Ordinance 117722 as amended by Ordinances 117863 and 118101.

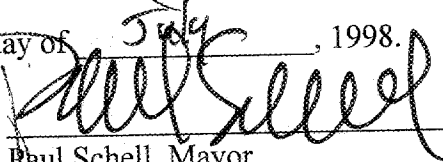
Section 92. This ordinance shall take effect and be in force thirty (30) days from and after its approval by the Mayor, but if not approved and returned by the Mayor within ten (10) days after presentation, it shall take effect as provided by Municipal Code Section 1.04.020.

Section 93. Severability. The several provisions of this ordinance are declared to be separate and severable and the invalidity of any clause, sentence, paragraph, subdivision, section, subsection, or portion of this ordinance, or the invalidity of the application thereof to any person or circumstance, shall not affect the validity of the remainder of this ordinance or the validity of its application to other persons or circumstances.

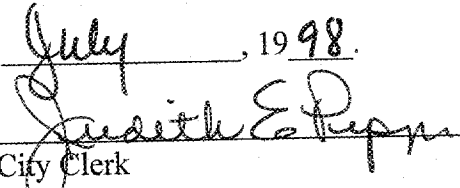
Passed by the City Council the 13th day of July, 1998, and signed by me in open session in authentication of its passage this 13th day of July, 1998.



President of the City Council

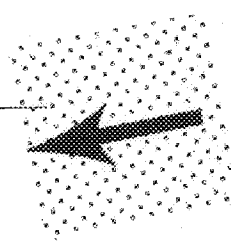
Approved by me this 16th day of July, 1998.


Paul Schell, Mayor

Filed by me this 16 day of July, 1998.


City Clerk

(SEAL)



SIGN HERE



City of Seattle

Paul Schell, Mayor

Department of Construction and Land Use

R. F. Krochalis, Director

MEMORANDUM

TO: Sue Donaldson, President, City Council

FROM: 
Rick Krochalis, Director

Contact Staff: Maureen Traxler
Code Development Analyst Supervisor

DATE: May 29, 1998

RE: Proposed 1997 Seattle Mechanical Code

Attached for your consideration is the proposed 1994 Seattle Mechanical Code. These proposals are the result of extensive development by Department staff and a thorough review by the Construction Codes Advisory Board's Mechanical Code Committee and approval by the full Board.

BACKGROUND

Washington State law requires that each local jurisdiction enforce the Uniform Building Code (UBC) and the Uniform Mechanical Code (UMC) (RCW 19.27). These model codes are promulgated and revised by the International Conference of Building Officials (ICBO) every three years. The most recent editions were published in February 1997. The Washington State Mechanical Code takes effect on July 1, 1998.

Over the past several years the Department has worked extensively with ICBO and the State Building Code Council to encourage these organizations to adopt and incorporate Seattle's amendments into the Uniform Codes. As a result, many former Seattle amendments are now contained in the uniform codes, or in the State adoption of those codes. However, many local amendments still remain to respond to changing technologies, to provide flexibility, and to inform applicants of common code alternates and interpretations.

The 1997 editions of the Uniform Codes will be the last. ICBO is working with the two other model code groups to develop a single set of model codes, the International Codes. The International Mechanical Code was the first to be published in 1996—the second edition was published this year. During the next three years, DCLU will be participating

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in development of the International Codes, and in efforts by the State Building Code Council to compare the International Codes to the Uniform Codes.

PUBLIC REVIEW

The primary avenue of public review of the Code is the Construction Codes Advisory Board (CCAB). The Board is composed of 13 representatives from the development community and the general public. The Board established a committee to review the Mechanical Code, which included mechanical engineers, contractors, utility representatives, staff of the Seattle Fire Marshal's office and the Seattle-King County Department of Public Health and others. Lists of the members serving on the Board and the Mechanical Code Committee are attached.

We published announcements about the development of the Code and made available copies of the draft Code to the general public. We received and responded to several comments from the public.

DCLU worked with the Board and committees to reach agreement on all the issues in the Code. The Board recommends adoption of the codes as proposed.

MAJOR CHANGES AND IMPROVEMENTS

A section-by-section detailed analysis and summary of changes to the Seattle amendments is attached to this memorandum. Changes in the State and Uniform Codes were minor. We would like to bring your attention to the following major changes:

Format. In the 1994 Building Code, Seattle began a formatting innovation. We identified some "amendments" as standard code alternates or interpretations, and enclosed them in boxes. Requirements from the State Building Code and other sources are also identified using the box format. This format has been well-received by the users of the code, so we extended it to the 1997 Mechanical Code.

Residential Ventilation. In 1991, the State developed a Ventilation and Indoor Air Quality Code (VIAQ) which requires simple mechanical ventilation systems in residential buildings of four and fewer stories. Based on experience of the designers of mechanical systems and experience of staff of DCLU and City Light, we are proposing to apply the same ventilation standards to all residential buildings. The purpose of the ventilation requirements is to address indoor air quality in the more tightly-constructed modern buildings.

Commercial Cooking Hoods. The Mechanical Code Committee formed a subcommittee on commercial cooking hoods. The committee revised the requirements for makeup air for hoods, and added a new requirement aimed at improving the energy conservation performance of larger hoods. In addition, the committee recommended that we add the

substance of an existing Director's Rule to the Code. The Rule provides guidance for determining when hoods are required for small food-service operations.

Combustible Materials in Ducts and Plenums. We are proposing to remove an amendment that made the Seattle Code more lenient than the State and Uniform codes with regard to the fire characteristics of pipes and wiring allowed in ventilation ducts. The other codes require that materials used in ducts provide a minimum level of resistance to the production of flame and smoke. In the past, Seattle has substituted a local amendment that waived the limitations on smoke and flame production for electrical wiring and plastic fire sprinkler, HVAC and plumbing pipe. This year, the Committee and CCAB recommend that we delete the amendment, and apply the same provisions as the rest of the State.

Refrigeration. The 1994 Uniform Mechanical Code responded to the Clean Air Act Amendments of 1990 requiring phase-out of chlorofluorocarbon refrigerants with extensive revisions to its refrigeration regulations. After the 1994 Code was adopted, the State Building Code Council changed the State Mechanical Code, adopting refrigeration regulations based on the International Mechanical Code (IMC). The CCAB Mechanical Code Committee compared both sets of regulations, and is recommending adoption of refrigeration regulations based on UMC Chapter 11 with some amendments, several of which are taken from the State Code.

COST IMPACTS OF ADOPTION

DCLU considers the cost of adopting these codes as part of its normal operation and budget. The costs include the purchase and distribution to staff of the uniform codes, printing of the City's amendments to the codes, training of staff, providing information to the public, updating forms, client assistance memoranda and director's rules as needed.

ENVIRONMENTAL (SEPA) REVIEW

Adoption of the Mechanical Code is categorically exempt from environmental review per Section 25.05.800U of the Seattle Municipal Code.

TRANSITION

The ordinance includes a section allowing a 60-day period after the effective date. During the grace period, applicants may choose whether their application will be reviewed under the 1994 or 1997 Code. Recognizing that changes in codes can have a significant impact on a design, we use this grace period to accommodate the long lead times involved in the design and development process. A similar transition period was allowed when the last three editions were adopted in 1987, 1991 and 1995.

DETAILED LIST OF CHANGES IN 1997 SEATTLE MECHANICAL CODE

1. **Section 116.** Language is added to require applicants to submit proof of a refrigeration contractor's license before a permit for a refrigeration system will be issued.
2. **Sections 204 and 304.5.** An interpretation is added that clarifies the distinction between bathrooms and rest rooms. The interpretation is consistent with the Plumbing Code.
3. **Chapters 3 and 4.** These chapters were totally reorganized in the Uniform Code. Several amendments consist of language from the 1994 Code that is restored to the Code for clarity.
4. **Section 303.1.1.** An exception from the State Code is adopted to make the Code internally consistent with regard to the use of direct gas-fired makeup air heaters. Language from Section 327.7 of the 1994 UMC is added to expand the permissible uses of unvented overhead radiant heaters.
5. **Section 303.3.** Language from Section 316 of the 1994 UMC is added to restore specific regulations for heat exchangers and cooling coils mounted in furnaces.
6. **Section 304.1.** A cross reference to Fire Code regulations is added.
7. **Section 304.5.** An interpretation is added to assist in identifying "hazardous locations."
8. **Section 304.6.** Provisions from Sections 325.1.1 and 325.1.2 of the 1994 UMC are restored to provide prescriptive requirements for clearances between heat-producing equipment and combustible materials.
9. **Section 304.10.** Exception 1 is amended to clarify that all fluid-containing pipes are prohibited in elevator hoistways and machine rooms. This is consistent with the elevator chapter of the Building Code.
10. **Section 304.11.** This section and Chapter 10 of the Building Code are modified to be consistent. Both codes are clarified to allow certain types of heaters in stairways only when necessary for freeze protection for required fire protection devices, such as standpipes.
11. **Section 309.** Language is added to specify inappropriate locations for discharge of waste from cooling coils, and to require traps and vents for condensate drains.

12. **Section 310.3.** An interpretation is added that clarifies the type of label DCLU will accept to identify equipment.

13. **Section 313.** References to unlisted equipment are removed from requirements for construction surrounding solid-fuel-burning equipment. State law no longer allows installation of unlisted fireplaces.

14. **Section 402.2.** An exception is added increasing the size of mesh that may be used on screens for ventilation openings in exterior walls in nonresidential buildings. This provision is taken from the 1994 UMC.

15. **Section 402.3.** Language is added that limits requirements for air filters to situations where they would be effective, and specifies the standard to be used to determine their efficiency.

16. **Section 402.4.** This section is amended to require that ventilation air is provided in amounts sufficient to replace the air that leaves the building because of pressure differences caused by stack effect.

17. **Section 404.1.** An interpretation is added that coordinates the Mechanical Code reference to corridors with the use of the term in the Building Code.

18. **Section 405.2.** Aluminum dust is added to a list of explosive materials that are not to be recirculated.

19. **Section 406.** The provisions of Section 406 are based on the State Ventilation and Indoor Air Quality Code (VIAQ). The VIAQ and past editions of the Seattle Mechanical Code have required simple mechanical ventilation systems in residential buildings of four or five stories and less. The CCAB Mechanical Code Committee believes that mechanical ventilation should also be required in taller residential buildings, and so this ordinance applies the same ventilation requirements to all residential buildings.

The Committee also recommended reformatting these provisions to place them in Chapter 4, "Ventilation Air," instead of a separate chapter.

20. **Section 406.6.** An exception from the State Code is added which refers to a new standard developed by the State that governs particulate emissions from fireplaces.

21. **Sections 501 and 502.** The definition of "environmental air systems" is amended to include systems that are part of heating and cooling systems.

22. **Sections 504.2 and 504.3.1.** Amendments taken from the 1991 Mechanical Code, but not found in the 1994, are replaced. One of the amendments requires kitchen exhaust to be kept separate from clothes dryer and bathroom vents. The other prohibits dampers

on clothes dryer exhaust vents.

23. **Sections 507.13, 508 and 509.5.** These sections were revised by a subcommittee of the CCAB Mechanical Code Committee. The subcommittee added a new requirement aimed at improving the energy conservation performance of larger hoods, taken from a draft standard being developed by the American Society of Heating, Refrigeration and Air-conditioning Engineers. In addition, the committee recommended that we add the substance of an existing Director's Rule to the Code. The Rule provides guidance in determining when hoods are required for small food-service operations.
24. **Sections 601.2 and 603.4.** Interpretations are added that specify that SMACNA (Sheet Metal and Air Conditioning Contractors National Association) standards on duct construction and seismic restraint of equipment are acceptable alternatives to the standard specified in the Code. This provision is currently found in a Director's Rule.
25. **Section 601.4.** Amendments are deleted which allowed more generous use of plastic materials in ducts and plenums. This change makes the Seattle Code consistent with the State Code. Plastics will still be allowed in ducts and plenums, but they must comply with flame spread and smoke production standards.
26. **Section 607.** Language is added, consistent with a UMC interpretation, clarifying that this section only applies to one- and two-family dwellings.
27. **Section 802.** Single-wall connectors and stove pipe are prohibited in areas subject to condensation.
28. **Section 901.** Seattle did not adopt a 1994 State Code provision allowing unvented decorative gas appliances. In the 1997 Code, the Committee recommended that the Code state that such appliances are not allowed.
29. **Section 1101.2.2.** References to additional standards applicable to refrigeration systems are given.
30. **Section 1102.** A statement is added that refrigerants not listed in the Code may be used with DCLU's approval.
31. **Section 1104.2.** A provision from Section 1104.3.3 of the International Mechanical Code (IMC) is added that clarifies how to calculate the volume of a room for purposes of determining the permissible quantity of refrigerant in a system.
32. **Section 1106.1.** Language is added to clarify that this section does not require machinery rooms for equipment located outside a building.

33. **Section 1106.5.** Provisions from Sections 1106.4 and 1106.6 of the IMC, requiring protection of doors and other openings into refrigeration machine rooms, are added.
34. **Section 1106.7.** An amendment is added to the provision which allows open flame devices in existing installations when there is an automatic shutoff that is triggered by refrigerant detection. The amendment raises the threshold for B2 refrigerants.
35. **Section 1106.8.** A provision from Section 1106.9 of the IMC is added which specifies additional requirements for refrigeration machine rooms containing certain refrigerants.
36. **Section 1107.1.** Language is added which specifies that the UMC requirement for continuous ventilation in refrigeration machine rooms means that fire dampers are not allowed on ventilation ducts.
37. **Section 1107.9.** A requirement that backdraft dampers be provided on makeup air intakes for refrigeration machinery rooms is deleted. Requirements for supply and exhaust air taken from IMC Section 1107.9 are added.
38. **Section 1108.4.** This amendment requires a sign near the emergency refrigeration system shutoff switch.
39. **Sections 1109.2 and 1109.3.** Language from IMC Section 1107.4 is added that provides prescriptive requirements for installation of refrigerant piping.
40. **Section 1109.4.** A requirement for liquid receivers on ammonia systems is added.
41. **Section 1110.5.** Restrictions on the installation of refrigerant, taken from the 1991 Seattle Mechanical Code, are restored.
42. **Section 1111.1.** Provisions requiring stop valves at inlets and outlets of certain refrigeration equipment are added.
43. **Table 11-A.** An amendment is added to clarify that uses accessory to other occupancies may be considered as separate occupancies for the purpose of determining what type of refrigerant may be used.
44. **Table 11-E.** A minimum pipe size is specified for long runs of condensate drain pipe.
45. **Sections 1311 and 1312.** State amendments regulating the materials and installation of fuel-gas piping are added.

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46. **Section 1312.18.** A State amendment requiring labels on fuel-gas piping is modified to be somewhat less restrictive.

47. **Sections 1312.19-1312.22.** Prescriptive standards for installation of fuel-gas piping are borrowed from the CABO One- and Two-family Dwelling Code.

48. **Section 1319.1.1.** Gas pressure inside buildings is limited to 5 psig unless an engineer approves the design.

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1997 Mechanical Code
May 29, 1998

1997 SEATTLE MECHANICAL CODE CCAB REVIEW COMMITTEE ROSTER

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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:ORD 119080

was published on

07/28/98

The amount of the fee charged for the foregoing publication is the sum of \$ _____, which amount has been paid in full.

[Handwritten Signature]

Subscribed and sworn to before me on

07/28/98

[Handwritten Signature]

Notary Public for the State of Washington
residing in Seattle

appeals or if a different schedule is agreed upon in writing before the end of the sixty day period. If the permit application is canceled, the site may be inspected to verify that no work has taken place. The application and any accompanying plans and specifications shall be destroyed. If the application is being reviewed concurrently with a master use permit application, and is for a project vested in a prior Land Use Code, and the project does not conform with the codes in effect while it is being reviewed, cancellation of the building permit application under this provisions of this section shall cause the concurrent cancellation of the Master Use Permit application.

117.3 RETENTION OF PLANS One set of approved plans, which may be on microfilm, shall be retained by the building official. One set of approved plans shall be returned to the applicant, and shall be kept at the site of the building or work at all times during which the work authorized is in progress for use by the inspection personnel.

117.3 VALIDITY OF PERMIT The issuance of granting of a permit or approval of plans shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or other pertinent laws and ordinances. No permit purporting to give authority to violate or cancel the provisions of this code shall be valid, except insofar as the work or use which it authorizes is lawful.

The issuance of a permit based upon plans shall not prevent the building official from thereafter requiring the correction of errors in said plans, or from preventing building operations being carried on thereunder when in violation of this code or of other pertinent laws and ordinances of the City.

The issuance of a mechanical permit shall not prevent the building official from requiring correction of conditions found to be in violation of this code or other pertinent laws of the City, nor shall the period of time for which any such permit is issued be construed to extend or otherwise affect any period of time for compliance specified in any notice or order issued by the building official or other administrative authority requiring the correction of any such conditions.

117.4 PERMIT EXPIRATION AND RENEWAL

117.4.1 EXPIRATION Permits and renewed permits shall expire eighteen months from the date of issuance.

EXCEPTIONS 1. Initial permits for major construction projects that require more than eighteen months to complete, according to a construction schedule submitted by the applicant, may be issued for a period that provides reasonable time to complete the work but in no case longer than three years.

2. Permits which expire in less than eighteen months may be issued where the building official determines a shorter period is appropriate.

117.4.2 RENEWAL Permits may be renewed and renewed permits may be further renewed by the building official, provided the following conditions are met:

1. Application for renewal shall be made within the thirty-day period immediately preceding the date of expiration of the permit.

2. The work authorized by the permit has been started and is progressing at a rate approved by the building official. Progress justifying renewal of a permit, except as specified by item 3, shall include, but is not limited to, requesting of a required inspection, the arranging of financing, selection of contractors and subcontractors, securing other necessary permits and licenses, site preparation such as demolition, clearing and excavation, soils investigation and work done to overcome unusual construction difficulties.

3. If an application for renewal is made either more than eighteen months after the date of mandatory compliance with a new or revised edition of this code or after the effective date of an amendment to applicable provisions of the Land Use Code, the permit shall not be renewed unless:

(a) The building official determines that the permit complies, or is modified to comply with the code or codes in effect on the date of application renewal; or

(b) The work authorized by the permit is substantially underway and progressing at a rate approved by the building official. Progress justifying renewal of the permit shall be evidenced by notification by the permit holder that a construction step is ready for an inspection required by Section 119.4 of this code.

Permits may also be renewed where concurrent completion of the work and

the provisions of this code and other laws and ordinances which are enforced by the building official.

Where work for which any permit or approval is required is commenced or performed prior to making formal application and receiving the building official's permission to proceed, the building official may make a special investigation inspection before a permit may be issued for such work. Where a special investigation is made, a special investigation fee may be assessed in accordance with the Fee Schedule.

119.3 REINSPECTIONS The building official may require a reinspection when work for which inspection is called is not complete, corrections called for are not made, the inspection record is not properly posted on the work site, the approved plans are not readily available to the inspector, for failure to provide access on the date for which inspection is requested, or when deviations from plans which require the approval of the building official have been made without proper approval.

For the purpose of determining compliance with Section 104.4, Maintenance, the building official or the Fire Chief may cause any structure to be reinspected.

The building official may assess a reinspection fee as set forth in the Fee Schedule for any action listed above for which reinspection may be required, whether or not a reinspection is actually performed. A reinspection fee shall not be assessed the first time the work subject to inspection is rejected for failure to comply with the requirements of this code.

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

SECTION 120 — CONNECTION APPLIANCE

120.1 ENERGY CONNECTIONS No person shall make connections from a source of energy fuel to a mechanical system or equipment regulated by this code and for which a permit is required until approved by the building official.

120.2 TEMPORARY CONNECTIONS The building official may authorize temporary connection of the mechanical equipment to the source of energy fuel for the purpose of testing the equipment, or for use under a temporary certificate of occupancy.

SECTION 121 — REFRIGERATION LICENSES

No one shall perform any of the services or activities related to refrigeration systems as regulated by Chapter 11 without a license as required by Chapter 6.42 of the Seattle Municipal Code, or under the direct supervision of a person, firm, associate or corporation holding a required license.

SECTION 122 — OPERATING PERMITS FOR REFRIGERATION SYSTEMS

122.1 An operating permit issued by the building official shall be required to operate any refrigeration system meeting any one of the following criteria:

1. Any system over 80 horsepower, or
2. Any system over 50 tons of refrigerant effect, or
3. Any system which contains over 150 pounds of refrigerant, or
4. Any system which includes a refrigerant containing a pressure vessel over six inches in diameter with a capacity of more than 5 cubic feet and a design working pressure under 250 psig, or
5. Any system which includes a refrigerant containing a pressure vessel over six inches in diameter having a capacity of one and one-half cubic feet and a design working pressure over 250 psig.

122.2 The operating permit shall not be issued until the system has been inspected and approved by the building official as to its safe operation and compliance with the provisions of this code. Such permit shall be valid for a period of one year, renewable annually. Such permit shall be displayed in a conspicuous place adjacent to the refrigeration system.

SECTION 4. Section 203 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 203 — A

ABSORBER (ABSORBER) is that part of the low side of an absorption system used for absorbing (adsorbing) vapor refrigerant.

ABSORPTION UNIT is an absorption refrigeration system which has been factory assembled and tested prior to its installation.

ACCESSIBLE is having access to but which first may require the removal of an access panel, door or similar obstruction covering the item described.

BOILER, HIGH PRESSURE, is a boiler furnishing steam at pressures exceeding 15 pounds per square inch (103 kPa) or hot water at temperatures exceeding 250 degrees F (121 degrees C) or at pressures exceeding 150 pounds per square inch (1100 kPa).

BOILER ROOM is a room containing a (steam or hot water) boiler.

BREECHING is a metal connector for medium- and high-heat appliances. Breechings should have a thimble or liner of 3/8 or heavy steel, at least 24 gage.

BRINE is a liquid used for the transmission of heat without a change in its state, having no flash point or a flash point above 150 degrees F (65.5 degrees C), as determined by the requirements of UMC Standard 2-3.

BTUH is the listed maximum capacity of an appliance, absorption unit or burner expressed in British thermal units input per hour, unless otherwise noted.

BUILDING CODE is the (Uniform Building Code promulgated by the International Conference of Building Officials, as adopted by this jurisdiction) Seattle Building Code.

BUILDING OFFICIAL is the (officer charged with the administration and enforcement of this code, or a regularly authorized deputy) Director of the Department of Construction and Land Use. As used in this code, the term includes authorized representatives of the Director of the Department of Construction and Land Use.

(BURNER, AUTOMATIC BOILER, is a burner for an automatic boiler used to convert fuel into the combustion chamber in proximity to its combustion air supply so as to permit a stable controlled heat release compatible with the burner design and which is equipped with an ignition system to reliably ignite the entire heat release surface of the burner assembly.)

SECTION 6. Section 205 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 205 — C

CAS NUMBER is the Chemical Abstract System registry number.

CATEGORY, VENTED GAS APPLIANCE, is vented gas utilization equipment classified for venting purposes into four categories as follows:

CATEGORY I: An appliance that operates with a nonpositive vent pressure and with a flue loss not less than 17 percent.

CATEGORY II: An appliance that operates with a nonpositive vent pressure and with a flue loss less than 17 percent.

CATEGORY III: An appliance that operates with a positive vent pressure and with a flue loss not less than 17 percent.

CATEGORY IV: An appliance that operates with a positive vent pressure and with a flue loss less than 17 percent.

CENTRAL HEATING PLANT OR HEATING PLANT is environmental heating equipment installed in a manner to supply heat by means of ducts or pipes to areas other than the room or space in which the equipment is located.

CHIMNEY is a vertical shaft enclosing one or more flues for conveying flue gases to the outside atmosphere.

FACTORY-BUILT CHIMNEY is a listed chimney.

MASONRY CHIMNEY is a chimney of solid masonry units, bricks, stones, listed masonry units or reinforced concrete, lined with suitable flue liners.

METAL CHIMNEY is a chimney constructed of metal with a minimum thickness not less than 0.127-inch (No. 10 manufacturer's standard gage) (3.2 mm) steel sheet.

CHIMNEY CLASSIFICATIONS

CHIMNEY, HIGH-HEAT APPLIANCE-TYPE, is a factory-built, masonry or metal chimney suitable for removing the products of combustion from fuel-burning high-heat appliances producing combustion gases exceeding 2,000 degrees F (1093 degrees C) measured at the appliance flue outlet.

CHIMNEY, LOW-HEAT APPLIANCE-TYPE, is a factory-built, masonry or metal chimney suitable for removing the products of combustion from fuel-burning low-heat appliances producing combustion gases not exceeding 1,000 degrees F (538 degrees C) under normal operating conditions but capable of producing combustion gases of 1,400 degrees F (762 degrees C) during intermittent forced firing for periods up to one hour. All temperatures are measured at the appliance flue outlet.

CHIMNEY, MEDIUM-HEAT APPLIANCE-TYPE, is a factory-built, masonry or

Uniform Building Code is amended as follows:

SECTION 206 — D

DAMPERS shall be defined as follows:

CEILING DAMPER is an automatic-closing assembly complying with UL Standard 555C.

CHIMNEY DAMPER is a movable valve or plate within the chimney connector for controlling the draft or flow of combustion gases.

FIRE DAMPER is an automatic-closing metal assembly of one or more louvers, blades, slats or vanes complying with recognized standards.

LEAKAGE RATED DAMPER See "smoke damper."

SMOKE DAMPER is a damper arranged to seal off airflow automatically through a part of an air-duct system so as to restrict the passage of smoke.

VOLUME DAMPER is a device which, when installed, will restrict, retard or direct the flow of air in a duct, or the products of combustion in heat-producing equipment, its vent connector, vent or chimney therefrom.

DECORATIVE APPLIANCES, VENTED, are appliances whose only function lies in the aesthetic effect of the flames.

DECORATIVE APPLIANCES FOR INSTALLATION IN SOLID-FUEL-BURNING FIREPLACES are self-contained, freestanding, fuel-gas-burning appliances designed for installation only in a vented solid-fuel-burning fireplace and whose primary function lies in the aesthetic effect of the flames.

DIRECT GAS-FIRED MAKEUP AIR HEATER is a heater in which all the products of combustion generated by the gas-burning device are released into the outside airstream being heated.

DIRECT-VENT APPLIANCES are appliances which are constructed and installed so that all air for combustion is derived from the outside atmosphere and all flue gases are discharged to the outside atmosphere.

DISTRICT HEATING PLANT is a power boiler plant designed to distribute hot water or steam to users located off the premises.

DRAFT HOOD is a device built into an appliance or made a part of the vent connector from an appliance, which is designed to:

1. Ensure the ready escape of the flue gases in the event of no draft, backdraft or stoppage beyond the draft hood.
2. Prevent a back draft from entering the appliance.
3. Neutralize the effect of stack action of the chimney or gas vent upon the operation of the appliance.

DUCT is a tube or conduit for transmission of air. This definition shall not include:

1. A vent, a vent connector or a chimney connector.
2. A tube or conduit where in the pressure of the air exceeds 1 pound per square inch (5.9 Pa).
3. The air passages of listed self-contained systems.

DUCT FURNACE is a warm-air furnace normally installed in an air-distribution duct to supply warm air for heating. This definition shall apply only to a warm-air heating appliance which depends for air circulation on a blower not furnished as part of the furnace.

DUCT SYSTEMS are all ducts, duct fittings, plenums and fans assembled to form a continuous passageway for the distribution of air.

DWELLING is a building or portion thereof which contains not more than four dwelling units.

DWELLING UNIT is a building or portion thereof which contains living facilities, including provisions for sleeping, eating, cooking and sanitation, as required by this code, for not more than one family, or a separate residence for 10 or fewer persons.

SECTION 5. Section 207 of the 1997 Uniform Mechanical Code is amended as follows:

SECTION 207 — E

ELECTRIC HEATING APPLIANCE is a device which produces heat energy to create a warm environment by the application of electric power to resistance elements, refrigerant compressors or dissimilar material junctions.

ELECTRICAL CODE is the (National