

ORDINANCE No.

116011

COUNCIL BILL No.

108854

The City of

Honorable President:

Your Committee on

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

COMPTROLLER FILE No.

Introduced:	By:
DET 7 1991	SMITH
Referred:	To:
DET 7 1991	Utilities
Referred:	To:
Referred:	To:
Reported:	Second Reading:
DEC 1 8 1991	DEC 1 8 1991
Third Reading:	Signed:
DEC 1 8 1991	DEC 1 8 1991
Presented to Mayor:	Approved:
DEC 1 7 1991	DEC 1 8 1991
Returned to City Clerk:	Published:
DEC 2 3 1991	
Vetoed by Mayor:	Veto Published:
Passed over Veto:	Veto Sustained:



Full Council

Law Department

The City of Seattle--Legislative Department

REPORT OF COMMITTEE

Date Reported
and Adopted

President:

Committee on

Public Safety & Env.

was referred to within Council Bill No.

108854

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

12/12/91 1-0 Pass

All Council Vote 8-0

Chris Melord

Committee Chair

ORDINANCE 116011

AN ORDINANCE relating to the Seattle Mechanical Code, repealing Section 22.400.010 (Ordinances 113702 and 113703), and adding a new Section 22.400.010 to adopt Chapters 4 through 20 of the 1991 Uniform Mechanical Code, the Uniform Mechanical Code Standards and Uniform Building Code Standards contained in Appendix A of the 1991 Uniform Mechanical Code, Chapters 21, 22 and 23 contained in Appendix B of the 1991 Uniform Mechanical Code; amending the adopted Uniform Mechanical Code and Standards by: adding new Chapters 1, 2 and 3 related to administration, permitting and enforcement; amending Chapter 4, Definitions; amending certain provisions of Chapter 5 regulating mechanical equipment; amending certain provisions of Chapter 6 regulating the provision of combustion air to appliances; amending certain provisions of Chapters 7 and 8 regulating heating systems; amending Chapters 9, 10 and 11 regulating the venting of mechanical equipment; amending certain provisions of Chapters 12 and 15 regulating cooling and refrigeration equipment systems; amending certain provisions of Chapter 18 regulating incinerators; amending certain provisions of Chapter 19 regulating miscellaneous heat producing appliances; amending certain provisions of Chapter 20 regulating commercial kitchen equipment systems; amending certain provisions of Chapter 21 regulating boilers; amending certain provisions of Chapter 22 regulating the installation of fuel-gas piping; repealing Table No. 10-D regulating the insulation of ducts; and adding a new Chapter 10.1, establishing minimum ventilation standards as required by State law, and Chapter 25, establishing minimum standards for water heaters as required and allowed by the State Building Code Act, Chapter 19.27 of the Revised Code of Washington.

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. Section 22.400.010 of the Seattle Municipal Code adopting the 1985 Uniform Mechanical Code (Ordinance 113702 as amended by Ordinance 113703) is hereby repealed, and a new Section 22.400.010 is added to the Seattle Municipal Code to read as follows:

22.400.010 Adoption of Uniform Mechanical Code

The Uniform Mechanical Code, 1991 Edition, published by the International Conference of Building Officials, and International Association of Plumbing and Mechanical Officials, one copy of which is filed with the City Comptroller in C.F. 298634, except for Chapters 1 through 3, the Uniform Fire Code Standard contained in Appendix A, Appendix C and Appendix D is hereby adopted and by this reference made a part of this subtitle. The Uniform Mechanical Code, 1991 Edition Chapters 4-20, and the Uniform Mechanical Code Standards and Uniform Building Code Standards contained in Appendix A, and Chapters 21, 22, 23 of Appendix B together with the amendments and additions thereto adopted shall constitute the Seattle Mechanical Code.

1 Section 2. The Uniform Mechanical Code, 1991 Edition,
2 (Seattle Municipal Code Section 22.400.010), is amended by adding
3 new Chapters 1, 2, and 3 as follows:

4 **ADMINISTRATIVE**

5 **Chapter 1**

6 **TITLE, SCOPE AND GENERAL**

7 **TITLE**

8 **Sec. 101.** This subtitle shall be known as the "Seattle
Mechanical Code," may be so cited, and is referred to herein as
"this mechanical code" or "this code."

9 **PURPOSE**

10 **Sec. 102.** The purpose of this mechanical code is to provide
11 minimum standards to safeguard life or limb, health, property and
public welfare by regulating and controlling the design,
12 construction, installation, quality of materials, location,
operation, and maintenance or use of heating, ventilating,
cooling, refrigeration systems, incinerators and other miscella-
13 neous heat-producing appliances within the City.

14 The purpose of this mechanical code is not to create or other-
wise establish or designate any particular class or group of per-
15 sons who will or should be especially protected or benefited by
the terms of this mechanical code.

16 **SCOPE OF THIS MECHANICAL CODE**

17 **Sec. 103. (a) Applicability.** The provisions of this mechani-
cal code shall apply to the erection, installation, alteration,
18 repairs, relocation, replacement, addition to, use or maintenance
of any heating, ventilating, cooling, refrigeration systems,
incinerators or other miscellaneous heat-producing appliances
19 within the City.

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

22 **(b) Internal Consistency.** Where in any specific case, differ-
ent sections of this mechanical code specify different materials,
23 methods of construction or other requirements, the most restric-
tive shall govern. Where there is a conflict between a general
24 requirement and a specific requirement, the specific requirement
shall be applicable.

25 The Uniform Mechanical Code Standards and Uniform Building Code
26 Standards contained in Appendix A shall be considered as part of
this mechanical code.

27 Appendix B containing Chapter 21, "Steam and Hot-Water Boilers,
Steam and Hot Water Piping (Hydronics)," Chapter 22, "Fuel Gas
28 Piping," and Chapter 25, "Water Heaters," shall be considered as
part of this Mechanical Code.

1 Appendix C contains gas-venting tables and a list of recom-
2 mended equipment standards and is included and intended to serve
3 only as a guide. The design and testing of equipment regulated
4 by this mechanical code shall be subject to the approval of the
5 building official.

6 Appendix D contains unit conversion tables and is intended to
7 serve only as a guide.

8 APPLICATION TO EXISTING MECHANICAL SYSTEMS

9 **Sec. 104. (a) Standards for Additions, Alterations or**
10 **Repairs.** Additions, alterations, renovations or repairs may be
11 made to any mechanical system without requiring the existing
12 mechanical system to comply with all the requirements of this
13 mechanical code, provided the addition, alteration/renovation or
14 repair conforms to that required for a new mechanical system.
15 Additions, alterations, renovations or repairs shall not cause an
16 existing system to become unsafe, unhealthy or overloaded.

17 Minor additions, alterations, renovations and repairs to exist-
18 ing mechanical systems may be installed in accordance with the
19 law in effect at the time the original installation was made,
20 when approved by the building official.

21 (b) **Existing Installations.** Mechanical systems lawfully in
22 existence at the time of the adoption of this mechanical code may
23 have their use, maintenance or repair, conversion of fuel, or
24 component replacement continued if the use, maintenance, repair,
25 conversion of fuel, or component replacement is in accordance
26 with the basic original design and location, and no hazard to
27 life, health or property has been created by such mechanical
28 system.

(c) **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 mechanical code which may be appli-
cable to the new use or occupancy.

(d) **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 mechanical code
shall be maintained in conformance with the code edition under
which installed. The owner or his/her authorized agent shall be
responsible for maintenance of mechanical systems and equipment.
To determine compliance with this subsection, the building offi-
cial may cause any 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 require-
ments of this section where all or a portion of the building
is unoccupied.

(e) **Moved Buildings.** Buildings or structures moved into or
within the city shall comply with standards adopted by the build-
ing 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

1 agreed to correct all deficiencies found and has been issued a
2 building permit for the work. A bond or cash deposit in an
3 amount sufficient to abate or demolish the building shall be
4 posted prior to issuance of a permit. See Section 302 for infor-
5 mation required on plans. Any moved building that is not in com-
6 plete compliance with standards for moved buildings within
7 eighteen months from the date of of permit issuance and is found
8 to be a public nuisance may be abated.

5 (f) **Historic Buildings and Structures.** The building official
6 may modify the specific requirements of this mechanical code as
7 it applies to buildings and structures designated as landmarks of
8 historical or cultural importance and require in lieu thereof
9 alternate requirements which in the opinion of the building offi-
10 cial will result in a reasonable degree of safety to the public
11 and the occupants of those buildings.

9 A historic building or structure is one which has been desig-
10 nated for preservation by City Council or the State of
11 Washington, has been listed, or has been determined eligible to
12 be listed, on the National Register of Historic Places, has been
13 officially nominated for such status, or is a structure contrib-
14 uting to the character of a designated landmark or historic
15 district.

12 **ALTERNATE MATERIALS AND METHODS OF CONSTRUCTION AND DESIGN**

13 **Sec. 105.** The provisions of this mechanical code are not
14 intended to prevent the use of any material or method of con-
15 struction not specifically prescribed by this mechanical code,
16 provided any alternate has been approved and its use authorized
17 by the building official.

16 The building official may approve any such alternate, provided
17 he/she finds that the proposed design is satisfactory and com-
18 plies with the provisions of this mechanical code and that the
19 material, method or work offered is, for the purpose intended,
20 at least the equivalent to that prescribed in this mechanical
21 code in suitability, strength, effectiveness, fire resistance,
22 durability, safety and sanitation.

19 The building official may require that sufficient evidence or
20 proof be submitted to substantiate any claims that may be made
21 regarding the use of alternate materials or methods of
22 construction. The details of any action granting approval of an
23 alternate shall be recorded and entered in the files of the
24 building official.

22 **MODIFICATIONS**

23 **Sec. 106.** Whenever there are practical difficulties involved
24 in carrying out the provisions of this code, the building offi-
25 cial may grant modifications for individual cases, provided the
26 building official shall first find that a special individual rea-
27 son makes the strict letter of this code impractical and that the
28 modification is in conformity with the intent and purpose of this
29 code. The details of any action granting modifications shall be
30 recorded and entered in the files of the building official.

27 **TESTS**

28 **Sec. 107.** Whenever there is insufficient evidence of compli-
ance with any of the provisions of this mechanical code or evi-
dence that any material or construction does not conform to the

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

3 Test methods shall be as specified by this mechanical code or
4 by other recognized test standards. If there are no recognized
and accepted test methods for the purposed alternate, the build-
ing official shall determine the test procedures.

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

7 Chapter 2

8 ORGANIZATION AND ENFORCEMENT

9 DEPARTMENT OF CONSTRUCTION AND LAND USE - JURISDICTION

10 Sec. 201. The "Department of Construction and Land Use"
shall be the code enforcement agency in the City of Seattle for
11 this mechanical code. The Department shall be under the admini-
stration and operational control of the Director of the
Department of Construction and Land Use who shall be the building
12 official.

13 POWERS AND DUTIES OF BUILDING OFFICIAL

14 Sec. 202. (a) General. The building official is authorized
and directed to enforce this mechanical code, except that
15 enforcement of Chapters 22 and 25 shall be the primary responsi-
bility of the Director of Public Health and enforcement authority
as provided in this mechanical code to the building official
16 shall also be vested in the Director of Public Health or the Fire
Chief. Compliance with the requirements of this mechanical code
shall be the obligation of the owner of the building, structure
17 or premises, the duly authorized agent of the owner, or other
person responsible for the condition or work, and not of the City
18 or any of its officers or employees.

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

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

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

1 (e) **Authority to Disconnect Utilities in Emergencies.** The
2 building official shall have the authority to disconnect fuel-gas
3 utility service, or energy supplies to a building, structure,
4 premises or equipment regulated by this mechanical code in case
5 of emergency where necessary to eliminate an immediate hazard to
6 life or property. The building official may enter any building
7 or premises to disconnect utility service. The building official
8 shall, whenever possible, notify the serving utility, the owner
9 and occupant of the building, structure or premises of the deci-
10 sion to disconnect prior to taking such action, and shall notify
11 such serving utility, owner and occupant of the building, struc-
12 ture or premises in writing of such disconnection immediately
13 thereafter.

14 (f) **Authority to Condemn Equipment.** Whenever the building
15 official ascertains that any equipment, or portion thereof, regu-
16 lated by this mechanical code has become hazardous to life,
17 health or property, he/she shall order in writing that such
18 equipment may either be removed or restored to a safe or sanitary
19 condition, as appropriate. The written notice itself shall fix a
20 time limit for compliance with such order. It shall be unlawful
21 for any person to use or maintain defective equipment after
22 receiving such notice.

23 When equipment is to be disconnected prior to removal or
24 restoration, written notice of such disconnection and causes
25 therefor shall be given within 24 hours to the serving utility,
26 the owner and occupant of the building, structure or premises.
27 When any equipment is maintained in violation of this mechanical
28 code, and in violation of any notice issued pursuant to the pro-
visions of this section, the building official shall institute
any appropriate action to prevent, restrain, correct or abate the
violation.

1 (g) **Connection After Order to Disconnect.** No person shall
2 make connections from any energy, fuel or power supply nor supply
3 energy or fuel to any equipment regulated by this mechanical code
4 which has been disconnected or ordered to be disconnected by the
5 building official or the use of which has been ordered to be dis-
6 continued by the building official until the building official
7 authorizes the reconnection and use of such equipment.

8 (h) **Liability.** Nothing contained in this mechanical code is
9 intended to be nor shall be construed to create or form the basis
10 for any liability on the part of the City, or its officers,
11 employees or agents, for any injury or damage resulting from the
12 failure of equipment to conform to the provisions of this mechan-
13 ical code, or by reason or in consequence of any inspection,
14 notice, order, certificate, permission or approval authorized or
15 issued or done in connection with the implementation or enforce-
16 ment of this mechanical code, or by reason of any action or inac-
17 tion on the part of the City related in any manner to the
18 enforcement of this mechanical code by its officers, employees or
19 agents.

20 Neither the building official nor any employee charged with the
21 enforcement of this code shall be personally liable for any dam-
22 age that accrues to persons or property as a result of any act or
23 omission committed in the discharge of their duties, provided
24 that the building official or employee acted in good faith and
25 without malice. Any suit brought against the building official
26 or an employee because of an act or omission performed in the
27 enforcement of any provisions of this code shall be defended by
28 the City.

1 This code shall not be construed to relieve from or lessen the
2 responsibility of any person owning, operating or controlling
3 any building or structure for any damages to persons or property
4 caused by defects, nor shall Department of Construction and Land
5 Use or the City of Seattle be held to have assumed any such lia-
6 bility by reason of the inspections authorized by this code or
7 any permits or certificates issued under this code.

8 (i) **Cooperation of Other Officials and Officers.** The build-
9 ing official may request, and shall receive so far as is required
10 in the discharge of his/her duties, the assistance and coopera-
11 tion of other officials of the City of Seattle.

12 **UNSAFE EQUIPMENT AND HAZARD CORRECTION ORDER**

13 **Sec. 203. (a) Unsafe Equipment.** Any equipment regulated by
14 this mechanical code, which constitutes a fire or health hazard
15 or is otherwise dangerous to human life is, for the purpose of
16 this section, unsafe. Any use of equipment regulated by this
17 mechanical code constituting a hazard to safety, health or public
18 welfare by reason of inadequate maintenance, dilapidation,
19 obsolescence, fire hazard, disaster, damage or abandonment is,
20 for the purpose of this section, an unsafe use. Any such unsafe
21 equipment is hereby declared to be a public nuisance and may be
22 abated.

23 (b) **Hazard Correction Order.** Whenever the building official
24 finds that unsafe equipment exists, the building official may
25 issue a hazard correction order specifying the conditions caus-
26 ing the equipment to be unsafe and directing the owner or other
27 person responsible for the unsafe equipment to correct the condi-
28 tion. In lieu of correction, the owner may submit a report or
analysis to the building official analyzing said conditions and
establishing that the equipment is, in fact safe. The building
official may require that the report or analysis be prepared by a
licensed engineer. It shall be unlawful for any person to fail
to comply with a hazard correction order as specified in this
subsection.

29 **APPEALS**

30 **Sec. 204.** Appeals from decisions or actions pertaining to the
31 administration and enforcement of this mechanical code shall be
32 addressed to the building official. The appellant may request a
33 review by three or more members of the Construction Code Advisory
34 Board, convened by the Chair. The issue of the appeal shall be
35 taken into account by the Chair when selecting members to hear an
36 appeal. The results of this appeal shall be advisory only.

37 **VIOLATIONS AND PENALTIES**

38 **Sec. 205. (a). Violations.** It shall be a violation of this
39 code for any person, firm or corporation to install, erect,
40 construct, enlarge, alter, repair, replace, remodel, move, improve,
41 remove, convert, demolish, equip, occupy, inspect, use or main-
42 tain any mechanical systems or equipment or cause or permit the
43 same to be done in the City, contrary to or in violation of any
44 of the provisions of this mechanical code.

45 It shall be a violation of this code for any person, firm or
46 corporation to use any material or to install any device, appli-
47 ance or equipment which does not comply with the applicable stan-
48 dards of this code or which has not been approved by the building
official.

1 (b) **Notice of Violation.** If after investigation the building
2 official determines that standards or requirements of this
3 mechanical code have been violated, the building official may
4 serve a notice of violation upon the owner or other person
5 responsible for the action or condition. The notice of violation
6 shall state the standards or requirements violated, shall state
7 what corrective action, if any, is necessary to comply with the
8 standards or requirements, and shall set a reasonable time for
9 compliance. The notice shall be served upon the owner or other
10 responsible person by personal service, certified mail with
11 return receipt requested, or registered mail addressed to the
12 last known address of such person. The notice of violation shall
13 be considered an order of the building official. Nothing in this
14 subsection shall be deemed to limit or preclude any action or
15 proceeding pursuant to Sections 202 or 203 of this mechanical
16 code, and nothing in this section shall be deemed to obligate or
17 require the building official to issue a notice of violation
18 prior to the imposition of civil or criminal penalties in this
19 section.

20 (c) **Civil Penalties.** Any person, firm or corporation failing
21 to comply with the provisions of this building code shall be sub-
22 ject to a cumulative civil penalty in an amount not to exceed
23 \$500 per day for each violation from the date the violation
24 occurs or begins until compliance is achieved. In cases where
25 the building official has issued a notice of violation, the vio-
26 lation will be deemed to begin, for purposes of determining the
27 number of days of violation, on the date compliance is required
28 by the notice of violation.

1 (d) **Criminal Penalty.** 1. Anyone violating or failing to com-
2 ply with any order issued by the building official pursuant to
3 this code shall, upon conviction thereof, be punished by a fine
4 of not more than \$1,000 or by imprisonment for not more than 360
5 days, or by both such fine and imprisonment. Each day's viola-
6 tion or failure to comply shall constitute a separate offense.

7 2. Anyone violating or failing to comply with any of the pro-
8 visions of this mechanical code and who within the past five
9 years has had a judgment against them pursuant to Sec. 205 (c),
10 shall upon conviction thereof, be fined in a sum not to exceed
11 \$500 or by imprisonment for not more than 180 days, or by both
12 such fine and imprisonment. Each day's violation or failure to
13 comply shall constitute a separate offense.

14 (e) **Additional Relief.** The building official may seek legal or
15 equitable relief to enjoin any acts or practices and abate any
16 condition which constitutes a violation of this mechanical code
17 when civil or criminal penalties are inadequate to effect
18 compliance.

23 NOTICES

24 **Sec. 206.** It shall be unlawful for any person to remove,
25 mutilate, destroy or conceal any lawful notice issued or posted
26 by the building official pursuant to the provisions of this
27 mechanical code.

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

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

RULES OF THE BUILDING OFFICIAL

Sec. 207. (a) 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 mechanical code.
3. "Product Approvals" to approve a specific building construction material or product, or a particular component fabricator which has been found acceptable as meeting required performance criteria. See Section 306 of the Seattle Building Code.
4. Any other rule necessary for the administration of the purpose and intent of this code.

(b) 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.

CONSTRUCTION CODES ADVISORY BOARD (MECHANICAL CODE COMMITTEE)

Sec. 208. A committee of the Construction Codes Advisory Board may examine proposed administrative rules, appeals and amendments relating to the mechanical code and related provisions of other codes and make recommendations to the building official and to the City Council for changes in the mechanical code. The committee will be called on an as-needed basis by the Construction Codes Advisory Board.

Chapter 3

PERMITS AND INSPECTIONS

PERMITS

Sec. 301. (a) Permits Required. It shall be unlawful to make any installation, alteration, repair, replacement or to remodel any mechanical system regulated by this code, except as permitted in Subsections (b) and (c) of this Section, 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 mechanical code, even where no permit is required.

(b) Exempted Work. (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 heating capacity of these portable appliances shall not exceed 40 percent of the cumulative heating or cooling 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 mechanical 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 mechanical code.

(c) **Exempted Work. (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 refrigeration system which does not exceed three horsepower rating.

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

(d) **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 Insurance Study for King County, Washington and Incorporated Areas" and the accompanying Flood Insurance Rate Maps and filed in C.F. 295948, is subject to additional standards and requirements, including floodplain development approval or a Floodplain Development License, as set forth in chapter 25.06, the Seattle Floodplain Development Ordinance.

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

APPLICATION FOR PERMIT AND INFORMATION ON PLANS AND SPECIFICATIONS

Sec. 302. (a) Application. To obtain a permit, the applicant shall first file an application in writing on a form furnished by the Department of Construction and Land Use for that purpose. Every such application shall:

1. Identify and describe the work to be covered by the permit for which application is made.
2. Describe the land on which the proposed work is to be done by legal description, property address or similar description that will readily identify and definitely locate the proposed building or work.
3. Provide contractor's state license number (required if permit is to be issued to the contractor).

4. Be accompanied by plans, diagrams, computations and specifications, equipment schedule, and other data as required in Subsection (b) and (c) of this section.
5. State the valuation of the mechanical work to be. The value or valuation of the mechanical work shall be the estimated current value of all labor and material, whether actually paid for or not, for which the permit is issued.
6. Be signed by the owner of the property or building, or his/her authorized agent, who may 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.

(b) 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 \$25,000 or larger shall require a mechanical engineering stamp and signature on each sheet.

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

(c) Information on Plans and Specifications. 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 card-board will not be accepted. The plans shall be of microfilm quality and limited to a minimum size of 18 inches by 18 inches and maximum size of 41 inches by 54 inches.

2. **Fire-resistive notes.** Plans for buildings more than two stories in height of other than Groups R, Division 3 and M Occupancies shall 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.

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

- A. Layout for each floor with dimensions of all working spaces and a legend of all symbols used.
- B. Location, size, and material of all piping.
- C. Location, size and materials of all air ducts, air inlets and air outlets.

- 1 D. Location of all fans, warm-air furnaces, boilers, absorption
2 units, refrigerant compressors and condensers and the weight
3 of all pieces of such equipment weighing 200 pounds or more.
4
5 E. Rated capacity or horsepower and efficiency rating of all
6 boilers, warm-air furnaces, heat exchangers, blower fans,
7 refrigerant compressors and absorption units. See also the
8 Seattle Energy Code.
9
10 F. Location, size and material of all combustion products vents
11 and chimneys.
12
13 G. Location and area of all ventilation and combustion air open-
14 ings and ducts.
15
16 H. Location of all air dampers and fire shutters.
17
18 I. The first sheet of each set of plans and specifications shall
19 show the address of the proposed work and the name and
20 address of the owner or lessee of the premises.
21
22 J. Plans and specifications shall be of sufficient clarity to
23 show that the proposed installation will conform to the pro-
24 visions of this mechanical code and to the provisions of all
25 applicable laws, ordinances, rules, regulations and orders.
26
27 K. Architectural drawings, typical envelope cross sections and
28 other drawings or data may be required to support system siz-
ing calculations or other thermal requirements of this
mechanical code or the Seattle Energy Code.

PERMIT ISSUANCE

15 **Sec. 303. (a) Issuance. 1. General.** The application, plans,
16 specifications and other data filed by an applicant for permit
17 shall be reviewed by the building official. Such plans may be
18 reviewed by other departments of the City to check compliance
19 with the laws and ordinances under their jurisdiction. If the
20 building official finds that the work as described in an
application for permit and the plans, specifications and other
data filed therewith substantially conforms to the requirements
of this mechanical code and other pertinent laws and ordinances
and that the fees specified in the Permit Fee Ordinance have been
paid, he/she shall issue a permit therefor to the applicant who
becomes the permit holder or authorized agent.

21 **EXCEPTION:** The building official may issue a permit for
22 the construction of part of a building or structure before
23 complete plans for the whole building or structure have been
24 submitted or approved, provided that the proposed project
25 complies with the State Environmental Policy Act as adopted
26 by the City (Chapter 25.05 Seattle Municipal Code) and as
27 amended and the Land Use and Zoning Ordinances as amended;
28 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 build-
ing or structure will be granted.

2. **Compliance with Approved Plans and Permit.** When the building
official issues a permit, he/she shall endorse the permit in writ-
ing and endorse in writing or stamp the plans "APPROVED." Such

1 approved plans and permit shall not be changed, modified or
2 altered without authorization from the building official, and all
3 work shall be done in accordance with the approved plans and per-
4 mit except as the building official may require during field
5 inspection to correct errors or omissions.

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

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

26 **4. Cancellation of Permit Application.** An application shall
27 be deemed abandoned and void if a permit is not issued after a
28 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 cancelled, 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 prior Land Use Code or Zoning
Ordinance provisions, and the project does not conform with the
codes in effect while it is being reviewed, cancellation of the
Building Permit application under the provision of this section
shall cause the concurrent cancellation of the Master Use Permit
application.

(b) **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.

(c) **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
mechanical code or other pertinent laws and ordinances. No per-
mit presuming to give authority to violate or cancel the provi-
sions of this mechanical code shall be valid, except insofar as
the work or use which it authorizes is lawful.

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

6 The issuance of a mechanical permit shall not prevent the
7 building official from requiring correction of conditions found
8 to be in violation of this mechanical code or other pertinent
9 laws of the City, nor shall the period of time for which any such
10 permit is issued be construed to extend or otherwise affect any
11 period of time for compliance specified in any notice or order
12 issued by the building official or other administrative authority
13 requiring the correction of any such conditions.

14 (d) **Expiration and Renewal.** 1. **Expiration.** Permits and renewed
15 permits shall expire eighteen months from the date of issuance.

16 **EXCEPTIONS:** 1. Initial permits for major construction
17 projects that require more than eighteen months to complete,
18 according to a construction schedule submitted by the
19 applicant, may be issued for a period that provides rea-
20 sonable time to complete the work but in no case longer than
21 three years.

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

25 2. **Renewal.** Permits may be renewed and renewed permits may be
26 further renewed by the building official provided the following
27 conditions are met:

28 A. Application for renewal shall be made within the thirty-
day period immediately preceding the date of expiration
of the permit;

B. 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 speci-
fied by Item C, may 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 prepa-
ration such as demolition, clearing and excavation, or
soils investigation and work done to overcome unusual
construction difficulties;

C. 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 the mechanical code or
after the effective date of an amendment to applicable
provisions of the Land Use or Zoning Codes, the permit
shall not be renewed unless:

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

(ii) The work authorized by the permit is substantially
underway and progressing at a rate approved by the
building official. Progress justifying renewal of the

1 permit shall be evidenced by notification by the per-
2 mit holder that a construction step is ready for an
inspection required by Section 305(d) of this code.

3 Permits may also be renewed where commencement or completion of
4 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.

5 **3. Reestablishment.** A new permit shall be required to complete
work where a permit has expired and was not renewed.

6 **EXCEPTION:** A permit which has been expired for less than
7 one year may be reestablished upon approval of the building
official provided it complies with Items B and C of
8 Subsection 2, above.

9 (e) **Suspension or Revocation.** The building official may, by
written order, suspend or revoke a permit issued under the provi-
10 sions of this mechanical 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
mechanical code.

11 **FEES**

12 **Sec. 304.** A fee for each mechanical permit and for other
13 activities related to the enforcement of this code shall be paid
as set forth in the Permit Fee Ordinance.

14 **INSPECTIONS**

15 **Sec. 305. (a) General.** All construction or work for which a
16 permit is required shall be subject to inspection by the building
official, and certain types of construction shall have special
17 inspections by registered special inspectors as specified in
Section 306 of the Seattle Building Code.

18 (b) **Inspection Requests.** It shall be the duty of the owner of
19 the property or his/her authorized agent, or the person desig-
nated by the owner/agent to do the work authorized by a permit, to
20 notify the building official that work requiring inspection as
specified in this section and Section 306, is ready for
inspection.

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

25 (c) **Inspection Record.** Work requiring a mechanical permit shall
26 not be commenced until the permit holder or his/her agent has
posted an inspection record in a conspicuous place on the premises
and in a position which allows the building official to conven-
27 iently make the required entries thereon regarding inspection of
the work. This record shall be maintained in such a position by
28 the permit holder until final approval has been granted by the
building official.

1 (d) **Approvals Required.** No work shall be done on any part of
2 the building or structure beyond the point indicated in each suc-
3 cessive inspection without first obtaining the written approval of
4 the building official. Such written approval shall be given only
5 after an inspection has been made of each successive step in the
6 construction as indicated by each of the inspections required in
7 this section.

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

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

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

(f) **Testing of Equipment.** Refrigeration equipment regulated by
this mechanical code shall be tested and approved as required by
Section 1520.

Where applicable (see Section 103), steam and hot-water boilers
and piping shall be tested and approved as required by Sections
2123 and 2127 of Appendix B of this mechanical code.

Where applicable (see Section 103), fuel-gas piping shall be
tested and approved as required by Section 2208 of Appendix B of
this mechanical code.

(g) **Other Inspections.** In addition to the called inspections
required by this mechanical code, the building official may make
or require any other inspections of any mechanical work to ascer-
tain compliance with the provisions of this mechanical code and
other pertinent 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 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 Permit Fee Ordinance.

(h) **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

1 are not readily available to the inspector, for failure to provide
2 access on the date for which inspection is requested, or when
3 deviations from plans which require the approval of the building
4 official have been made without proper approval.

5 For the purpose of determining compliance with Section 104(c)
6 Maintenance, the building official or the Fire Chief may cause
7 any structure to be reinspected.

8 The building official may assess a reinspection fee as set forth
9 in the Permit Fee Ordinance for any action listed above for which
10 reinspection may be required, whether or not a reinspection is
11 actually performed. A reinspection fee shall not be assessed the
12 first time the work subject to inspection is rejected for failure
13 to comply with the requirements of this mechanical code.

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

17 CONNECTION APPROVAL

18 **Sec. 306. (a) Energy Connections.** No person shall make connec-
19 tions from a source of energy fuel to any mechanical system or
20 equipment regulated by this mechanical code for which a permit
21 is required until approved by the building official.

22 (b) **Temporary Connections.** The building official may authorize
23 temporary connection of the mechanical equipment to the source of
24 energy fuel for the purpose of testing the equipment, or for use
25 under a temporary certificate of occupancy.

26 LICENSES

27 **Sec. 307. Refrigeration Licenses.** No one shall perform any of
28 the services or activities related to refrigeration systems as
regulated by Part IV of this mechanical code 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 corpora-
tion holding a required license.

29 Section 3. Section 403 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

30 A

31 **Sec. 403. ABSORBER (ADSORBER) is that part of the low side of**
32 **an absorption system used for absorbing (adsorbing) vapor refrigerant.**

33 **ABSORPTION UNIT** is an absorption refrigerating system which has
34 been factory assembled and tested prior to its installation.

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

38 **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.

1 ADDITION is an extension or increase in floor area or height
2 of a building or structure.

3 **AIR, COMBUSTION.** See COMBUSTION AIR, Section 405.

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

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

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

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

14 **AIR, RETURN,** is air from the conditioned area that is returned
15 to the conditioning equipment for reconditioning.

16 **AIR SHUTTER OR DRAFT VALVE** is an adjustable air intake valve
17 for regulating the volume of combustion air admitted to the
18 combustion chamber. Such a valve may be manually or
19 automatically operated.

20 **AIR, SUPPLY,** is air being conveyed to a conditioned area
21 through ducts or plenums from a heat exchanger of a heating,
22 cooling, absorption or evaporative cooling system.

23 **AIR, TRANSFER** is the movement of indoor air from one space to
24 another.

25 **AIR, VENTILATION** is that portion of supply air that is outdoor
26 air plus any recirculated air that has been treated for the
27 purpose of maintaining acceptable indoor air quality.

28 **AIRTIGHT** is any solid fuel burning appliance that is designed
29 to operate with all openings closed except for air shutter or
30 draft intake valves which may also be closed to control the rate
31 of combustion.

32 **AMCA** is Air Movement and Control Association, Inc.

33 **APPLIANCE** is a device which utilizes fuel or other forms of
34 energy to produce light, heat, power, refrigeration or air
35 conditioning. This definition also shall include a vented deco-
36 rative appliance.

37 **APPROVED,** as to materials, equipment and method of construc-
38 tion, refers to approval by the building official as the result
39 of investigation and tests by the building official, or by
40 reason of accepted principles or tests by national authorities,
41 technical or scientific organizations.

42 **APPROVED AGENCY** is an established and recognized agency regu-
43 larly engaged in conducting tests or furnishing inspection
44 services, when such agency has been approved by the building
45 official.

46 **ASHRAE** is American Society of Heating, Refrigeration, and Air
47 Conditioning Engineers, Inc.

1
2 **ASSEMBLY BUILDING** is a building or a portion of a building used
3 for the gathering together of 50 or more persons for such pur-
4 poses as deliberation, education, instruction, worship,
5 entertainment, amusement, drinking or dining or awaiting
6 transportation.

7 **AUTOMATIC** is self-acting, operating by its own mechanism when
8 actuated by some impersonal influence, as for example, a change
9 in current strength, pressure, temperature or mechanical configu-
10 ration (see "Manual").

11 Section 4. Section 404 of the Uniform Mechanical Code, 1991
12 Edition, is amended as follows:

13 B

14 **Sec. 404. BACK-DRAFT DAMPER** is a damper installed to restrict
15 introduction of unconditioned air from an unconditioned space to
16 a conditioned space.

17 **BAROMETRIC DAMPER** is any listed non-manual device that freely
18 allows the flow of air in one direction, but does not allow
19 conditioned air to escape. Any installed combustion air damper
20 shall meet the installation requirements of the manufacturer.

21 **BOILER, HIGH PRESSURE**, is a boiler furnishing steam at pres-
22 sures in excess of 15 pounds per square inch or hot water at tem-
23 peratures in excess of 250°F. or at pressures in excess of 160
24 pounds per square inch.

25 **BOILER ROOM** is any room containing a ((steam or hot-water))
26 boiler.

27 **BRAZED JOINT** is any joint obtained by joining of metal parts
28 with alloys which melt at temperatures higher than 800°F. but
lower than the melting temperature of the parts to be joined.

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

BRINE is any liquid used for the transmission of heat without a
change in its state, having no flash point or a flash point above
150°F., as determined by the requirements of U.F.C. Standard No.
9-2.

Btu is the abbreviation for British thermal unit. The quantity
of heat required to raise the temperature of 1 pound of water 1
degree F.

Btu/h is the listed maximum capacity of any appliance, absorp-
tion 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 administra-
tion and enforcement of this code, or a regulary authorized

1 deputy)) Director of the Department of Construction and Land Use.
2 As used in this code, the term includes authorized
3 representatives of the Director of the Department of Construction
4 and Land Use.

5 Section 5. Section 405 of the Uniform Mechanical Code, 1991
6 Edition, is amended as follows:

7 C

8 **Sec. 405. CENTRAL HEATING PLANT or HEATING PLANT** is environ-
9 mental heating equipment installed in a manner to supply heat by
10 means of ducts or pipes to areas other than the room or space in
11 which the equipment is located.

12 CFM is cubic feet per minute.

13 **CHIMNEY** is a vertical shaft enclosing one or more flues for
14 conveying flue gases and smoke to the outside atmosphere.

15 **Factory-built Chimney** is a ((listed)) chimney composed of
16 listed factory-built components assembled in accordance with the
17 terms of listing to form the completed chimney.

18 **Masonry Chimney** is a chimney of solid masonry units, a field-
19 constructed chimney of solid masonry units, bricks, stones,
20 listed masonry chimney units or reinforced portland cement
21 concrete, lined with suitable chimney flue liners built in
22 accordance with applicable code requirements.

23 **Metal Chimney** is a chimney constructed of metal with a minimum
24 thickness not less than 0.127-inch (No. 10 manufacturer's stan-
25 dard gage) steel sheet.

26 **CHIMNEY CLASSIFICATIONS:**

27 **Chimney, Residential Appliance-type,** is a factory-built or
28 masonry chimney suitable for removing products of combustion from
residential-type appliances producing combustion gases not in
excess of 1000°F., measured at the appliance flue outlet.
Factory-built Type HT chimneys have high-temperature thermal
shock resistance.

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 in excess of 1000°F. under normal operating conditions but
capable of producing combustion gases of 1400°F. during intermit-
tent 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 in excess of 2000°F. measured at the appli-
ance flue outlet.

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
in excess of 2000°F. measured at the appliance flue outlet.

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

2 **CHIMNEY FIRE** is the burning of creosote/soot deposits inside a
chimney or chimney connector.

3 **CIRCULATING ROOM HEATER** is an appliance with an outer jacket
4 surrounding the heat exchanger with openings at the top and
bottom so that air can circulate between the heat exchanger and
5 the outer jacket.

6 **CLEARANCE** is the distance between an appliance, chimney,
chimney connector, vent, vent connector, or plenum, and other
7 surfaces.

8 **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
9 air that enters the combustion chamber.

10 **CLOSET.** See **CONFINED SPACE.**

11 **COMBUSTIBLE MATERIAL** is any material not meeting the definition
of noncombustible material including material made of or surfaced
12 with wood, compressed paper, plant fibers, plastics, or other
material that will ignite and burn, whether flameproofed or not,
13 or whether plastered or unplastered.

14 **COMBUSTION** is the rapid oxidation of fuel accompanied by the
production of heat and light.

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

17 **COMBUSTION CHAMBER** is that portion of an appliance within which
combustion occurs.

18 **COMPANION OR BLOCK VALVES** are pairs of mating stop valves,
19 valving off sections of systems and arranged so that these sec-
tions may be joined before opening these valves or separated
20 after closing them.

21 **COMPRESSOR** is a specific machine, with or without accessories,
for compressing a given refrigerant vapor.

22 **COMPRESSOR UNIT** is a compressor with its prime mover.

23 **CONDENSER** is a vessel or arrangement of piping or tubing in
which vaporized refrigerant is liquefied by the removal of heat.

24 **CONDENSER COIL** is a condenser constructed of pipe or tubing
other than a shell and tube or shell and coil type.

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

27 **CONDENSING UNIT** is a specific refrigerating machine combination
for a given refrigerant, consisting of one or more power-driven
compressors, condensers, liquid receivers (when required) and the
28 regularly furnished accessories.

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

4 **CONFINED SPACE** is a room or space having a volume less than 50
5 cubic feet per 1000 Btu/h of the aggregate input rating of all
6 fuel-burning appliances installed in that space.

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

9 **COOK STOVE** is a wood or coal-burning appliance with a closed
10 fire chamber, which is intended primarily for cooking and
11 includes an oven.

12 **COOLING** is air cooling to 50°F. or above.

13 **COOLING SYSTEM** is all of that equipment intended or installed
14 for the purpose of cooling air by mechanical means and discharg-
15 ing such air into any room or space. This definition shall not
16 include any evaporative cooler.

17 **COOLING UNIT** is a self-contained refrigerating system which has
18 been factory assembled and tested, installed with or without con-
19 ditioned air ducts and without connecting any refrigerant-
20 containing parts. This definition shall not include a portable
21 cooling unit or an absorption unit.

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

27 Section 6. Section 406 of the Uniform Mechanical Code, 1991
28 Edition, is amended as follows:

D

Sec. 406. DAMPERS shall be defined as follows:

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 UBC Standard
No. 43-7.

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

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

DEHUMIDISTAT is an automatic control device which measures
changes in humidity and controls a device(s) for maintaining a
maximum specified humidity range or level.

1 **DESIGN PRESSURE** is the maximum allowable pressure for which a
specific part of a system is designed.

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

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

6 **DISTRICT HEATING PLANT** is a power boiler plant designed to dis-
tribute hot water or steam to users located off the premises.

7 **DRAFT** is the pressure differential which causes the upward flow
8 of air or gases through an exhaust or venting system.

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

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

13 **DRAFT REGULATOR.** See **AIR SHUTTER OR DRAFT VALVE.**

14 **DUCT** is any tube or conduit for transmission of air. This def-
inition shall not include:

- 15 1. A vent, a vent connector or a chimney connector.
16 2. Any tube or conduit wherein the pressure of the air exceeds
1 pound per square inch.
17 3. The air passages of listed self-contained systems.

18 **DUCT, PIPE** is a tube or conduit used for encasing pipe.

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

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

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

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

26 Section 7. Section 407 of the Uniform Mechanical Code, 1991
27 Edition, is amended as follows:

28 E

1 **Sec. 407. ELECTRIC HEATING APPLIANCE** is a device which pro-
2 duces heat energy to create a warm environment by the application
3 of electric power to resistance elements, refrigerant compressors
4 or dissimilar material junctions.

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

8 **EQUIPMENT** is a general term including materials, fittings,
9 devices, appliances and apparatus used as part of or in connec-
10 tion with installations regulated by this code.

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

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

18 **EVAPORATOR** is that part of a refrigerating system in which liq-
19 uid refrigerant is vaporized to produce refrigeration.

20 **EVAPORATOR COIL** is an evaporator constructed of pipe or tubing
21 other than a shell and tube or shell and coil type.

22 Section 8. Section 408 of the Uniform Mechanical Code, 1991
23 Edition, is amended as follows:

24 **F**

25 **Sec. 408. FIRE CODE** is the ((Uniform Fire Code promulgated
26 jointly by the Western Fire Chiefs Association and the
27 International Conference of Building Officials, as adopted by
28 this jurisdiction)) Seattle Fire Code.

29 **FIREPLACE.** (See SOLID FUEL BURNING APPLIANCE).

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

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

35 **FLOOR FURNACE** is a completely self-contained furnace suspended
36 from the floor of the space being heated, taking air for combus-
37 tion from outside such space and with means for observing flames
38 and lighting the appliance from such space.

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

41 Appliance Flue is the flue passage within an appliance.

42 Chimney Flue is the passage in a chimney conveying the flue
43 gases to the outside atmosphere.

1 FLUE GASES are the gases in an operating venting system
2 consisting of combustion products plus whatever air is mixed with
3 them. Flue gases are essentially synonymous with "smoke" and
4 "stack gases".

5 **FORCED-AIR-TYPE CENTRAL FURNACE** is a central furnace equipped
6 with a fan or blower which provides the primary means for circu-
7 lation of air.

8 **Horizontal-type Central Furnace** is a furnace designed for low
9 headroom installations with air flow through the appliance in a
10 horizontal path.

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

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

17 **Enclosed Furnace** is a specific heating or heating and ventilat-
18 ing furnace incorporating an integral total enclosure and using
19 only outside air for combustion.

20 **FUSIBLE PLUG** is a device arranged to relieve the pressure in a
21 container by operation of a fusible member at a predetermined
22 temperature.

23 Section 9. Section 410 of the Uniform Mechanical Code, 1991
24 Edition, is amended as follows:

25 H

26 **Sec. 410. HABITABLE SPACE (ROOM).** Space in a structure for
27 living sleeping, eating or cooking. Bathrooms, toilet compart-
28 ments, closets, halls, storage or utility space and similar areas,
29 are not considered habitable space. For the purpose of this
30 code, a single habitable space may consist of adjoining rooms
31 when one half of the area of the common wall is open and
32 unobstructed and provides an opening of not less than one-tenth
33 of the floor area of the interior room or twenty five square
34 feet, whichever is greater.

35 **HAZARDOUS LOCATION** is any area or space where combustible dust,
36 ignitable fibers or flammable, volatile liquids, gases, vapors or
37 mixtures are or may be present in the air in quantities suffi-
38 cient to produce explosive or ignitable mixtures.

39 **HEARTH** is the floor area within the combustion chamber of a
40 fireplace, a fireplace stove, or a room heater.

41 **HEARTH EXTENSION** is the noncombustible surfacing applied to the
42 floor area extending in front of and at the sides of the hearth
43 opening of a solid fuel burning appliance; usually a part of the
44 required floor protection.

45 **HEAT RECOVERY VENTILATION SYSTEM** is a device or combination of
46 devices applied to provide the outdoor air for ventilation in
47 which energy is transferred between the intake and exhaust
48 airstream.

1 **HEATING DEGREE DAY** is a unit, based upon temperature difference
2 and time, used in estimating fuel consumption and specifying nom-
3 inal annual heating load of a building. For any one day when the
mean temperature is less than 65°F., there exist as many degree
days as there are Fahrenheit degrees difference in temperature
between mean temperature for the day and 65°F.

4 **HEATING EQUIPMENT.** Includes all warm-air furnaces, heat pumps,
5 warm-air heaters, combustion products vents, heating air-
6 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.

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

10 **HEAT PUMP** is an appliance having heating or heating-cooling
11 capability and which uses refrigerants to extract heat from air,
liquid or earth sources.

12 **HIGH SIDE** is any portion of a refrigerating system under con-
denser pressure.

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

16 **HVAC** is heating, ventilating and air conditioning.

17 **HVI** is Home Ventilating Institute of America, Inc.

18 Section 10. Section 411 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

19
20 **I**

21 **Sec. 411. INDUSTRIAL HEATING EQUIPMENT** is an appliance, device
22 or equipment used, or intended to be used, in an industrial,
manufacturing or commercial occupancy for applying heat to any
23 material being processed, but shall not include water heaters,
boilers or portable equipment used by artisans in pursuit of a
trade.

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

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

1 Section 11. Section 414 of the Uniform Mechanical Code, 1991
2 Edition, is amended as follows:

3 L

4 **Sec. 414. LIMITED CHARGE SYSTEM** is a system in which, with the
5 compressor idle, the internal volume and total refrigerant charge
6 are such that the design pressure will not be exceeded by
7 complete evaporation of the refrigerant charge.

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

12 **LIQUEFIED PETROLEUM GAS, or LPG (LP Gas)** shall mean and include
13 a material composed predominantly of any of the following hydro-
14 carbons or mixtures of them: propane, propylene, butanes (normal
15 butane or isobutane) and butylenes.

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

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

21 **LISTED AND LISTING** are terms referring to equipment and materi-
22 als which are shown in a list published by an approved testing
23 agency, qualified and equipped for experimental testing and main-
24 taining an adequate periodic inspection of current productions
25 and which listing states that the material or equipment complies
26 with accepted national standards which are approved, or standards
27 which have been evaluated for conformity with approved standards.

28 **LOW-PRESSURE HOT-WATER-HEATING BOILER** is a boiler furnishing
hot water at pressures not exceeding 160 pounds per square inch
and at temperatures not exceeding 250°F.

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

LOW SIDE refers to the parts of a refrigeration system under
evaporator pressure.

 Section 12. Section 415 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

24 M

25 **Sec. 415. MACHINERY ROOM.** See REFRIGERATION MACHINERY ROOM.

26 **MANUAL.** Capable of being operated by human intervention.

27 **MANUFACTURER'S INSTALLATION INSTRUCTIONS** are printed instruc-
tions included with equipment as part of the conditions of
listing.

28 **MECHANICAL JOINT** is a gas-tight joint obtained by the joining
of metal parts through a positive-holding mechanical
construction.

Section 13. Section 416 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

N

Sec. 416. NONCOMBUSTIBLE, as applied to building construction material, means a material which in the form in which it is used is either one of the following:

1. Material of which no part will ignite and burn when subjected to fire. Any material conforming to U.B.C. Standard No. 4-1 shall be considered noncombustible within the meaning of this section.

2. Material having a structural base of noncombustible material as defined in Item No. 1 above, with a surfacing material not over 1/8 inch thick which has a flame-spread index not higher than 50.

"Noncombustible" does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to Item No. 1. No material shall be classed as noncombustible which is subject to increase in combustibility or flame-spread index beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.

Flame-spread index as used herein refers to results obtained according to tests conducted as specified in U.B.C. Standard No. 42-1.

NONPOSITIVE DISPLACEMENT COMPRESSOR is a compressor in which increase in vapor pressure is attained without changing the internal volume of the compression chamber.

Section 14. Section 417 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

O

Sec. 417. OCCUPANCY is the purpose for which a building or part thereof is used or intended to be used.

Specific occupancies shall, for the purpose of this code, be defined as set forth in the Seattle Building Code.

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

Group A Occupancies:

Division 1.1 Any assembly building or portion of a building with a stage and an occupant load of 1000 or more.

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. Any building or portion of a building having an assembly room with an occupant load of less than 1000 and a legitimate stage.

Division 2.1. Any 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 E or Group B, Division 2 Occupancy.

Division 3. Any 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 E or Group B, Division 2 Occupancy.

Division 4. Stadiums, reviewing stands and amusement park structures not included within Group A Occupancies.

Group B Occupancies:

Division 1. Repair garages where work is limited to exchange of parts and maintenance requiring no open flame, welding or the use of Class I, II or III-A liquids, motor vehicle fuel-dispensing stations and parking garages not classified as Group B, Division 3 open parking garages or Group M, Division 1 private garages.

Division 2. Drinking and dining establishments having an occupant load of less than 50, wholesale and retail stores, office buildings, printing plants, police and fire stations, factories and workshops using materials not highly flammable or combustible, storage and sales rooms for combustible goods, paint stores without bulk handling.

Buildings or portions of buildings having rooms used for educational purposes beyond the 12th grade with less than 50 occupants in any room.

Division 3. Aircraft hangars where no repair work is done except exchange of parts and maintenance requiring no open flame, welding or the use of Class I or II flammable liquids.

Open parking garages.

Helistops.

Division 4. Ice plants, power plants, pumping plants, cold storage and creameries.

Factories and workshops using noncombustible and nonexplosive materials.

Storage and sales rooms containing only noncombustible and nonexplosive materials that are not packaged or crated in or supported by combustible material.

Group E Occupancies:

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.

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

4 **Division 3.** Any building or portion thereof used for day care
5 purposes for more than six persons.

6 **Group H Occupancies:**

7 **General.** For definitions, identification and control of haz-
8 ardous materials, display of nonflammable solid and nonflammable
9 or noncombustible liquid hazardous materials in Group B, Division
10 2 Occupancies, see the Fire Code. For application and use of
11 control areas, see Footnote No. 1 of Tables Nos. 9-A and 9-B.

12 **Division 1.** Occupancies with a quantity of material in the
13 building in excess of those listed in Table No. 9-A which
14 present a high explosion hazard, including but not limited to:

- 15 1. Explosives, blasting agents, fireworks and black powder.

16 **EXCEPTION:** Storage and the use of pyrotechnic special
17 effect materials in motion picture, television, theatrical
18 and group entertainment production when under permit as
19 required in the Fire Code. The time period for storage
20 shall not exceed 90 days.

- 21 2. Unclassified detonatable organic peroxides.

- 22 3. Class 4 oxidizers.

- 23 4. Class 4 or Class 3 detonatable unstable (reactive)
24 materials.

25 **Division 2.** Occupancies with a quantity of material in the
26 building in excess of those listed in Table No. 9-A which present
27 a moderate explosion hazard or a hazard from accelerated burning,
28 including but not limited to:

1. Class I organic peroxides.

2. Class 3 nondetonatable unstable (reactive) materials.

3. Pyrophoric gases.

4. Flammable or oxidizing gases.

5. Class I, II or III-A flammable or combustible liquids which
are used in normally open containers or systems or in closed
containers pressurized at more than 15-pounds-per-square-inch
gage.

EXCEPTION: Aerosols.

6. Combustible dusts in suspension or capable of being put into
suspension in the atmosphere of the room or area.

EXCEPTIONS: 1. Rooms or areas used for woodworking
where no more than three woodworking appliances having an
aggregate exhaust requirement of less than 1,000 cubic
feet per minute are utilized may be classified as Group
B, Division 2 Occupancies, provided appliances are
equipped with dust collectors sufficient to remove the
dust generated by the appliances.

1 2. Lumberyards and similar retail stores utilizing
2 only power saws may be classified as Group B, Division
3 2 Occupancies.

4 The building official may revoke the use of these exceptions
5 for due cause.

6 7. Class 3 oxidizers.

7 Division 3. Occupancies with a quantity of material in the
8 building in excess of those listed in Table No. 9-A which present
9 a high fire or physical hazard, including but not limited to:

10 1. Class II, III or IV organic peroxides.

11 2. Class 1 or 2 oxidizers.

12 3. Class I or Class II or III-A flammable liquids or
13 combustible liquids which are utilized or stored in normally
14 closed containers or systems and containers pressurized at
15 15-pounds-per-square-inch gage or less, and aerosols.

16 4. Class III-B combustible liquids.

17 5. Pyrophoric liquids or solids.

18 6. Water reactives.

19 7. Flammable solids, including combustible fibers or dusts,
20 except for dusts included in Division 2.

21 8. Flammable or oxidizing cryogenic fluids (other than inert).

22 9. Class 1 or 2 unstable (reactive) materials.

23 Division 4. Repair garages not classified as Group B,
24 Division 1.

25 Division 5. Aircraft repair hangars and heliports not
26 classified as Group B, Division 3.

27 Division 6. Semiconductor fabrication facilities and
28 comparable research and development areas when the facilities in
29 which hazardous production materials (HPM) are used and
30 aggregate quantity of materials are in excess of those listed in
31 Table No. 9-A or 9-B.

32 Division 7. Occupancies having quantities of materials in
33 excess of those listed in Table No. 9-B that are health hazards,
34 including:

35 1. Corrosives.

36 2. Highly toxic materials.

37 3. Irritants.

38 4. Sensitizers.

39 5. Other health hazards.

40 Group I Occupancies:

1 **Division 1.** Nurseries for the full-time care of children under
2 the age of six (each accommodating more than five persons).

3 Hospitals, sanitariums, nursing homes with nonambulatory
4 patients and similar buildings (each accommodating more than
5 five persons).

6 **Division 2.** Nursing homes for ambulatory patients, homes for
7 children six years of age or over (each accommodating more than
8 five persons).

9 **Division 3.** Mental hospitals, mental sanitariums, jails,
10 prisons, reformatories, and buildings where personal liberties
11 of inmates are similarly restrained.

12 **EXCEPTION:** Group I Occupancies shall not include buildings
13 used only for private residential purposes or for a family
14 group.

15 **Group M Occupancies:**

16 **Division 1.** Private garages, sheds and agricultural buildings
17 when not over 1000 square feet in area.

18 **Division 2.** Fences, over 6 feet high tanks and towers.

19 **Group R Occupancies:**

20 **Division 1.** Hotels and apartments. Congregate residences
21 (each accommodating more than 10 persons).

22 **Division 2.** Not used.

23 **Division 3.** Dwellings and lodging houses.

24 Congregate residences (each accommodating 10 persons or less).))

25 Section 15. Section 418 of the Uniform Mechanical Code, 1991
26 Edition, is amended as follows:

27 P

28 **Sec. 418.** PLENUM is an air compartment or chamber including
29 uninhabited crawl spaces, areas above a ceiling or below a floor,
30 including air spaces below raised floors of computer/data proc-
31 essing centers, or attic spaces, to which one or more ducts are
32 connected and which forms part of either the supply-air, return-
33 air or exhaust-air system, other than the occupied space being
34 conditioned.

35 PLUMBING CODE is the ((Uniform Plumbing Code promulgated by the
36 International Association of Plumbing and Mechanical Officials as
37 adopted by this jurisdiction)) Seattle Plumbing Code.

38 PORTABLE COOLING UNIT is a self-contained refrigerating system,
39 not over three horsepower rating, which has been factory assem-
40 bled and tested, installed without supply-air ducts and without
41 connecting any refrigerant-containing parts. This definition
42 shall not include an absorption unit.

1 **PORTABLE EVAPORATIVE COOLER** is an evaporative cooler which dis-
2 charges 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.

3 **PORTABLE HEATING APPLIANCE** is a heating appliance designed for
4 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.

5 **PORTABLE VENTILATING EQUIPMENT** is ventilating equipment that
6 can be readily transported from place to place without disman-
tling a portion thereof and which is not connected to a duct.

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

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

10 **PRESSURE-IMPOSING ELEMENT** is a device or portion of the equip-
11 ment used for the purpose of increasing the refrigerant vapor
pressure.

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

14 **PRESSURE-RELIEF DEVICE** is a pressure-actuated valve or rupture
15 member designed to automatically relieve excessive pressure.

16 **PRESSURE-RELIEF VALVE** is a pressure-actuated valve held closed
by a spring or other means and designed to automatically relieve
pressure in excess of its setting.

17 **PRESSURE VESSEL-REFRIGERANT** is a any refrigerant-containing
18 receptacle ((which is a portion)) of a ((refrigeration))
refrigerating system ((but shall not include)) other than evapo-
19 rators, (each separate section of which does not exceed 1/2 cu ft
of refrigerant containing volume), evaporator coils, compressors,
condenser coils, controls, headers, pumps, ((and)) or piping.

20
21 Section 16. Section 420 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

22 **R**

23 **Sec. 420. R VALUE.** (See THERMAL RESISTANCE (R)).

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

26 **REFRACTORY** is a lightweight, noncombustible material used as a
hearth within some stoves, fireplace stoves and zero clearance
fireplaces.

27 **REFRIGERANT** is a substance used to produce refrigeration by its
28 expansion or vaporization.

1 **REFRIGERATING SYSTEM** is a combination of parts in which a
2 refrigerant is circulated for the purpose of extracting heat.
3 For refrigerating system ratings one horsepower, one ton or
4 12,000 Btu/h shall mean the same quantity.

5 **Absorption Refrigerating System**, also an **Absorption System**, is
6 a refrigerating system in which the gas evolved in the evaporator
7 is taken up by an absorber or adsorber.

8 **Mechanical Refrigerating System** is one in which the gas evolved
9 in the evaporator is compressed by mechanical means.

10 **Absorption or Mechanical Refrigerating Systems**, for the purpose
11 of this Code, are classified as follows:

12 **Direct Refrigerating System** is one in which the refrigerant
13 evaporator is in direct contact with the material or space to be
14 refrigerated or is located in air-circulating passages communi-
15 cating with such spaces. See Figure 4-1.

16 **Double Direct System** is one in which an evaporative refrigerant
17 is used in a secondary circuit to condense or cool a refrigerant
18 in a primary circuit. For the purpose of this code, each system
19 enclosing a separate body of an evaporative refrigerant shall be
20 considered as a separate direct system. See Figure 4-2.

21 **Indirect Refrigerating System** is one in which a fluid cooled by
22 a refrigerating system is circulated to the material or space to
23 be refrigerated or is used to cool air so circulated. See Figure
24 4-3.

25 Indirect systems which are distinguished by the type or method
26 of application are as given in the following paragraphs:

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

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

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

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

43 **REFRIGERATION MACHINERY ROOM.** See Sec. 1507.

44 **REFRIGERATOR** is a room or space in which an evaporator or brine
45 coil is located for the purpose of reducing or controlling the
46 temperature below 50°F.

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

1 **RISER HEAT PIPE** is a duct which extends at an angle of more
2 than 45 degrees from the horizontal.

3 This definition shall not include any boot connection.

4 **ROOM HEATER** is a freestanding, nonrecessed, environmental heat-
5 ing appliance installed or placed in the space being heated and
6 not connected to ducts systems.

7 **ROOM HEATER, CIRCULATING.** A room heater with an outer jacket
8 surrounding the heat exchanger with openings at top and bottom so
9 that air circulates between the heat exchanger and the outer
10 jacket. Heat is transferred by convection.

11 **ROOM HEATER, RADIANT.** A room heater with the heat exchanger
12 exposed sufficiently to transfer heat primarily by direct
13 radiation.

14 **ROOM LARGE IN COMPARISON WITH SIZE OF EQUIPMENT** is one having a
15 volume of at least 12 times the total volume of a furnace or air-
16 conditioning appliance and at least 16 times the total volume of
17 a boiler. Total volume of the appliance is determined from exte-
18 rior dimensions and includes fan compartments and burner vesti-
19 bles when used. When the actual ceiling height of a room is
20 greater than 8 feet, the volume of the room is figured on the
21 basis of a ceiling height of 8 feet.

22 **RUPTURE MEMBER** is a pressure-relief device that operates by the
23 rupture of a diaphragm within the device.

24 Section 17. Section 421 of the Uniform Mechanical Code, 1991
25 Edition, is amended as follows:

26 S

27 **Sec. 421. SATURATION PRESSURE** of a refrigerant is the pressure
28 at which there is stable coexistence of the vapor and liquid or
29 the vapor and solid phase.

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

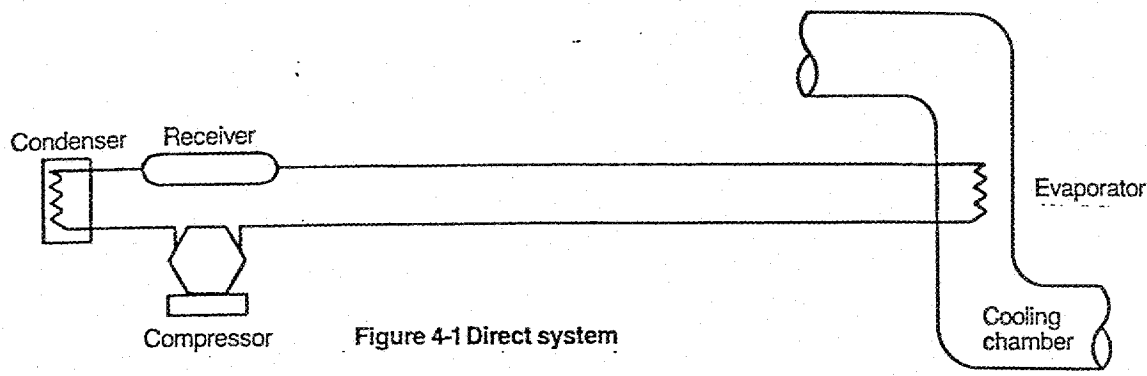


Figure 4-1 Direct system

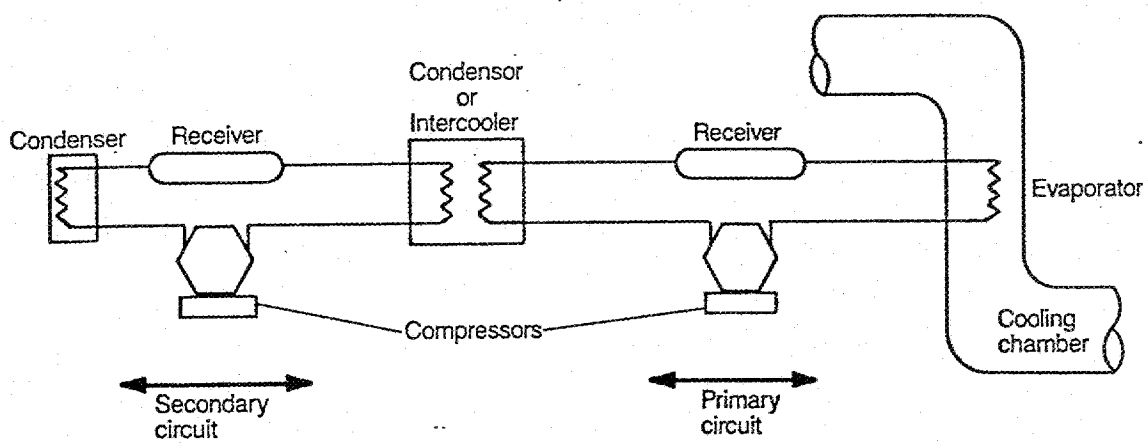


Figure 4-2 Double direct system

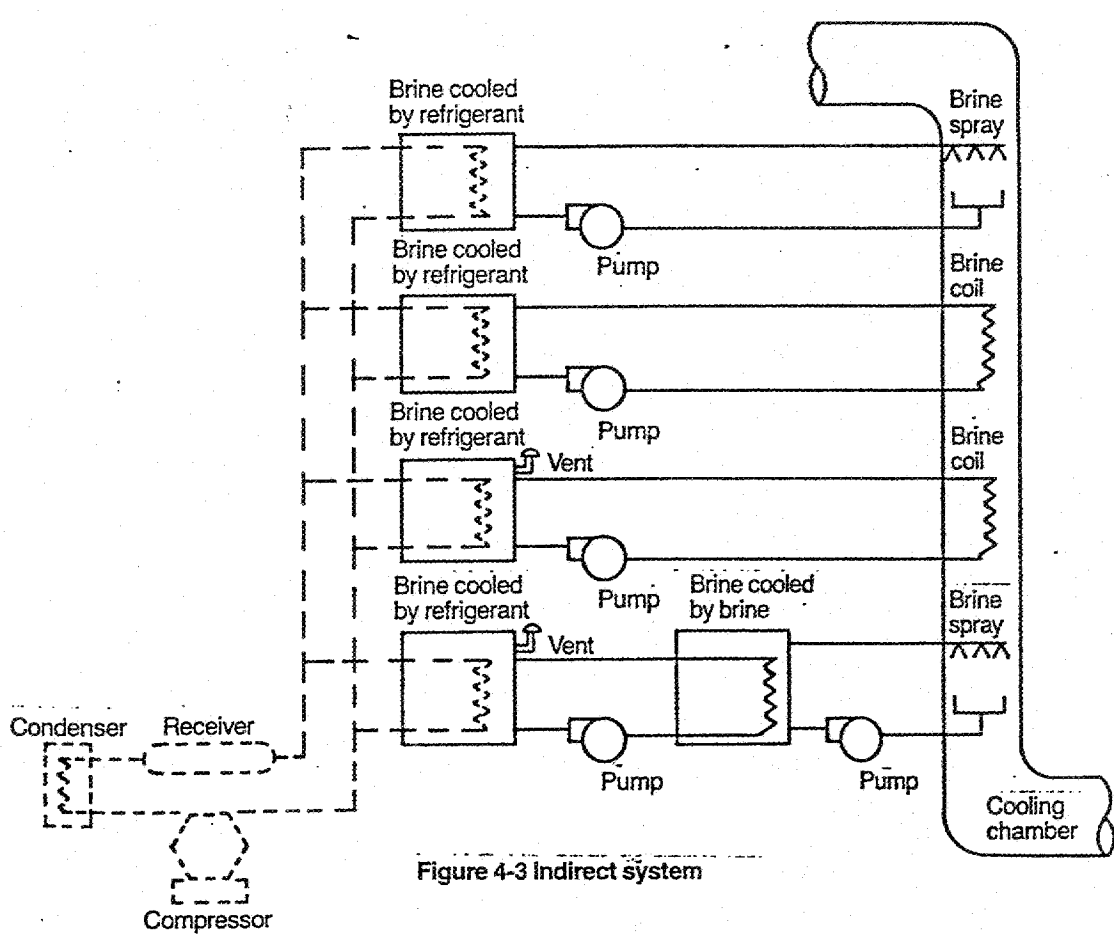


Figure 4-3 Indirect system

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

6 **SHAFT ENCLOSURE** is the walls or construction forming the bound-
7 aries of a shaft.

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

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

13 **SOLDERED JOINT** is a gas-tight joint obtained by the joining of
14 metal parts with metallic mixtures or alloys which melt at a tem-
15 perature below 800°F. and above 400°F.

16 **SOLID FUEL BURNING APPLIANCE** is any factory-built or site built
17 appliance designed to provide heat for a structure by burning
18 solid fuels.

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

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

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

27 **SYSTEM** is a combination of equipment and/or controls, accesso-
28 ries, interconnecting means, and terminal elements by which air
is transferred.

Section 18. Chapter 4 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

T
Sec. 422. No definitions.

TERMINAL ELEMENT is the means by which the
transferred air from a system is finally delivered; i.e.,
registers diffusers, through-the-wall vents, roofs caps, etc.

THERMAL RESISTANCE (R) is the resistance of a material to heat
flow, measured as the inverse of heat flow per unit area, per
unit time, per unit temperature difference across the thickness
of material considered. In this Code, R has units of sq.ft./hr./
°F/Btu.

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

1 Section 19. Section 423 of the Uniform Mechanical Code, 1991
2 Edition, is amended as follows:

3 U

4 Sec. 423. U.B.C. STANDARDS is the Uniform Building Code
5 Standards 1991 Edition. ((promulgated by the International
6 Conference of Building Officials, as adopted by this
7 jurisdiction.))

8 UNCONDITIONED SPACE. (See CONDITIONED SPACE).

9 UNCONFINED SPACE is a room or space having a volume equal to at
10 least 50 cubic feet per 1000 Btu/h of the aggregate input rating
11 of all fuel-burning appliances installed in that space. Rooms
12 communicating directly with the space in which the appliances are
13 installed, through openings not furnished with doors, are consid-
14 ered a part of the unconfined space.

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

18 UNIT REFRIGERATION SYSTEM is a refrigerating unit ((not to
19 exceed three-horsepower rating and)) which has been factory
20 assembled and tested prior to its installation. Such unit shall
21 not be connected to any ductwork. The unit shall be a complete
22 one-unit package without remote parts.

23 UNLISTED, AS TO APPLIANCES, EQUIPMENT AND MATERIALS are those
24 products which are not listed as having been tested for
25 compliance with nationally recognized safety standards. Used,
26 antique and homemade appliances are included in this definition.

27 UNPROTECTED TUBING is tubing which is not protected by
28 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 permitted on or
after October 26, 1986 where:

(a) Walls and ceilings exposed to the outside atmosphere have a
continuous water vapor retarder with a rating of one perm or less
with any openings gasketed or sealed, and

(b) Weatherstripping on openable windows and doors, and

(c) 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 penetra-
tions for plumbing, electrical and gas lines and at other
openings.

Section 20. Section 424 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

V

Sec. 424. VENT is a listed factory-made vent pipe and vent
fittings for conveying flue gases to the outside atmosphere.

1 **Type B Gas Vent** is a factory-made gas vent listed by a nation-
2 ally recognized testing agency for venting listed or approved
3 appliances equipped to burn only gas.

4 **Type BW Gas Vent** is a factory-made gas vent listed by a nation-
5 ally recognized testing agency for venting listed or approved
6 gas-fired vented wall furnaces.

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

10 **VENT CONNECTOR, GAS**, is that portion of a gas-venting system
11 which connects a listed gas appliance to a gas vent.

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

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

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

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

27 **VENTILATION EFFECTIVENESS** is the fraction of the outdoor air
28 delivered to the space that reaches the occupied zone.

29 **VENTILATION, MECHANICAL** is the introduction and distribution of
30 outdoor air and the removal of indoor air by mechanical means.

31 **VENTILATION, NATURAL** is ventilation other than by mechanical
32 means.

33 **VENTILATION SYSTEM** is all of that equipment intended or
34 installed for the purpose of supplying air to, or removing air
35 from, any room or space by mechanical means, other than equipment
36 which is a portion of an environmental heating, cooling, absorp-
37 tion or evaporative cooling system.

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

40 **VENTING SYSTEM** is the vent or chimney and its connectors assem-
41 bled to form a continuous open passageway from an appliance to
42 the outside atmosphere for the purpose of removing products of
43 combustion. This definition also shall include a venting assem-
44 bly which is an integral part of an appliance.

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

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

4 Section 21. Section 425 of the Uniform Mechanical Code, 1991
5 Edition, is amended as follows:

6 W

7 Sec. 425. WALL HEATER. See definition of Vented Wall
8 Furnace.

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

11 This definition shall not include a unit heater.

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

17 WELDED JOINT OR SEAM is any gas-tight joint or seam obtained by
18 the joining of metal parts in the plastic or molten state.

19 WHOLE HOUSE VENTILATION SYSTEM is a mechanical ventilation sys-
20 tem, including fans, controls, and ducts, which replaces, by
21 direct or indirect means, air from the habitable rooms with
22 outdoor air.

23 WOOD STOVE. (See SOLID FUEL BURNING APPLIANCE).

24 Section 22. Chapter 4 of the Uniform Mechanical Code, 1991
25 Edition, is amended by adding a new section 426 as follows:

26 Z

27 Sec. 426. ZONE is a space or group of spaces within a building
28 with heating and/or cooling requirements sufficiently similar so
29 that comfort conditions can be maintained throughout by a single
30 controlling device.

31 Section 23. Section 501 of the Uniform Mechanical Code, 1991
32 Edition, is amended as follows:

33 SCOPE

34 Sec. 501. Equipment shall conform to the requirements of this
35 code.

36 Equipment shall not be installed or altered in violation of
37 this code nor shall the fuel input rate to any such equipment be
38 increased in excess of the approved Btu/h rating at the altitude
39 where it is being used.

1 Defective material or parts shall be replaced in such a manner
2 as not to invalidate any approval.

3 Section 24. Section 502 of the Uniform Mechanical Code, 1991
4 Edition, is amended as follows:

5 **APPROVAL**

6 **Sec. 502. (a) How Obtained.** Each appliance shall be approved
7 by the building official for safe use or comply with applicable
8 nationally recognized standards as evidenced by the listing and
9 label of an approved agency. Appendix C, Reference Standards,
provides guidance as to available nationally recognized
standards. Where no such standards exist, approval by the
building official shall be obtained before installation of the
appliance or accessory.

10 (b) **Complying Design of Equipment.** Installers shall furnish
11 satisfactory evidence that the appliance is constructed in con-
formity with the requirements of this code. The permanently
attached label of an approved agency may be accepted as such
evidence.

12 (c) **Gas Appliances.** All gas-fired, automatically controlled
13 water heating, space heating, air conditioning and refrigeration
14 equipment, cooking equipment, directly fired air heaters and
clothes dryers shall have a nationally recognized label.

15 **EXCEPTION:** When the appliances, or an individual unit
16 thereof, are over 400,000 Btu per hour total input rating
17 and supervised by an individual pilot, a main burner supply
18 shutoff shall be provided. In the case of an appliance
utilizing liquified petroleum gas as a fuel, a pilot supply
shutoff shall also be provided. Mainburner and pilot supply
shutoffs shall shut off the supply of fuel two to four
seconds after the supervised flame is extinguished.

19 Section 25. Subsection 504(a) of the Uniform Mechanical
20 Code, 1991 Edition, is amended as follows:

21 **INSTALLATION**

22 **Sec. 504. (a) Listed Appliances.** Except as otherwise pro-
23 vided in the code, the installation of appliances regulated by
24 this code shall conform to the conditions of listing. The appli-
25 ance installer shall leave the manufacturer's installation and
operating instructions attached to the appliance. Clearances of
listed appliances from combustible materials shall be as speci-
fied in the ((listing)) manufacturer's installation instructions
or on the rating plate.

26 Section 26. Subsection 504(d) of the Uniform Mechanical
27 Code, 1991 Edition, is amended as follows:

1 (d) **Anchorage of Appliances.** Appliances designed to be fixed
2 in position shall be securely fastened in place. Supports for
3 these appliances shall be designed and constructed to sustain
4 vertical and horizontal loads within the stress limitations spec-
5 ified in the Building Code.

6 Section 27. Section 505 of the Uniform Mechanical Code, 1991
7 Edition, is amended as follows:

8 **ACCESS**

9 **Sec. 505.** Appliances shall be accessible for inspection,
10 service, repair and replacement without removing permanent
11 construction. Equipment installed on a roof or a exterior wall
12 of a building shall comply with the requirements of Section 710
13 of this mechanical code.

14 Unless otherwise specified, not less than 30 inches of working
15 space and platform shall be provided to service the appliance.

16 **EXCEPTION:** Unit heaters and room heaters may be installed
17 with an 18-inch minimum working space. A platform shall not
18 be required for unit heaters or room heaters.

19 The operating instructions must be attached to the appliance
20 where they can be read easily.

21 Section 28. Section 508 of the Uniform Mechanical Code, 1991
22 Edition, is amended as follows:

23 **LOCATION**

24 **Sec. 508. (a) General.** Appliances installed in garages, ware-
25 houses or other areas where they may be subjected to mechanical
26 damage shall be suitably guarded against such damage by being
27 installed behind protective barriers or by being elevated or
28 located out of the normal path of vehicles.

((Heating and cooling)) All mechanical equipment covered under
this code, located in a garage and which generates a glow, spark
or flame capable of igniting flammable vapors shall be installed
with the pilots and burners or heating elements, motors and
switches located at least 18 inches above the floor level.

Where such appliances installed within a garage are enclosed in
a separate, approved compartment having access only from outside
of the garage such appliances may be installed at floor level,
provided the required combustion air is taken from and discharged
to the exterior of the garage.

Heating equipment located in rooms where cellulose nitrate
plastic is stored or processed shall comply with ((the Fire Code))
U.B.C. Standard No. 48-2.

Mechanical equipment covered under this code shall not be
located within hoistways, elevator machine rooms or machinery
spaces. See also Sections 1004(f), 1104 and 1105.

EXCEPTION: Heating, cooling and ventilation equipment,
other than steam equipment, may be located in hoistways,

1 machine rooms and spaces provided they are designed to serve
2 only the hoistway, room or space.

3 (b) Special Hazards. The following requirements apply to all
4 occupancies other than Group R, Division 3 Occupancies.

5 Ducts in parking garages shall have an unobstructed headroom
6 clearance as required by Sec.702(b) of the Building Code. Return
7 air ducts for conditioned space shall be not less than 48 inches
8 above the level of the garage floor.

9 No heating or ventilating fans, motors or other related
10 equipment shall be installed in any stair enclosure, elevator
11 shaft or dumbwaiter shaft.

12 EXCEPTIONS: 1. Unfired heaters used for heating stair
13 enclosures.

14 2. Life safety equipment serving only that space.

15 3. Approved equipment required by Sec.1807 of the Building
16 Code.

17 Section 29. Section 509 of the Uniform Mechanical Code, 1991
18 Edition, is amended as follows:

19 ELECTRICAL CONNECTIONS

20 Sec. 509. All electrical wiring and equipment shall be
21 installed in accordance with the Seattle Electrical Code.
22 Equipment regulated by this code requiring electrical connections
23 of more than 50 volts shall have a positive means of disconnect
24 adjacent to and in sight from the equipment served. A 120-volt
25 receptacle shall be located within 25 feet of the equipment on
26 the same building level for service and maintenance purposes.
27 ((The receptacle need not be located on the same level as the
28 equipment.)) Low-voltage wiring of 50 volts or less within a
29 structure shall be installed in a manner to prevent physical
30 damage.

31 Section 30. Chapter 5 of the Uniform Mechanical Code, 1991
32 Edition, is amended by adding a new section 512 as follows:

33 FLOOR PROTECTION FOR SOLID FUEL BURNING APPLIANCES

34 Sec. 512. Floor protection for listed appliances shall be
35 installed in accordance with the terms of the listing.

36 For unlisted appliances and for listed appliances where no
37 instructions for floor protection exist in the terms of the
38 listing, floor protection shall be provided in the following
39 manner:

40 (a) Dimensions:

- 41 1. 18 inches beyond the door or opening in front of
- 42 the appliance.
- 43 2. 12 inches beyond the rear.
- 44 3. 12 inches beyond the sides.

1 (b) **Methods:** Floor coverings shall be continuous (no holes or
2 cracks) and sufficiently strong not to crack, tear or
3 puncture with normal use. Floor protections may be cov-
4 ered with a noncombustible material for decorative appear-
5 ance. Protection shall be provided, as applicable, in one
6 of the following methods:

- 7 1. If there is 6 inches or more clearance between the
8 bottom of the appliance and the floor, the floor shall
9 be protected by a sheet of insulating millboard at
10 least 1/4 inch thick or cement insulating board at
11 least 1/2 inch thick or equivalent material, covered
12 with a continuous sheet of at least 0.024-inch (No. 24
13 gage) sheet metal.
- 14 2. Where there is less than 6 inches of open air space the
15 floor shall be protected with hollow masonry units at
16 least 4 inches thick arranged with the holes aligned to
17 allow free air circulation through the floor protector.

18 The hollow masonry shall be covered with at least 24 gage
19 sheet metal. All unlisted appliances shall have at least 2
20 inches of clearance between the bottom of the appliance and the
21 floor.

22 Section 31. Chapter 5 of the Uniform Mechanical Code, 1991
23 Edition, is amended by adding a new section 513 as follows:

24 WALL PROTECTION

25 **Sec. 513.** For listed appliances, wall clearances and protec-
26 tion shall be as specified in the terms of the listing. For
27 unlisted appliances and for listed appliances where no
28 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, 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
horizontally beyond the sides, 18 inches vertically above
the top and 30 inches beyond the opening to the fire
chamber for a wall perpendicular to the side containing the
opening when closer than 36 inches to the wall. (See also
Tables No. 5-E-1 and No. 5-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:
 - A. A listed wall shield may be installed in accordance
with the terms of the listing. This will normally
include an air space between the wall and the shield.
 - B. Listed appliances shall be installed with the clear-
ances specified in the terms of the listing. If a
reduced clearance provision using a protective shield
is not specified in the terms of the listing Table No.
5-B shall be used, starting with the listed clearance.

1 If the listed clearance is not found in Table No. 5-B,
2 the next more restrictive clearance shall be used.

- 3 C. A noncombustible wall may be constructed of masonry
4 units or metal studs provided it is spaced out from the
5 existing wall at least 1 inch and the framing below is
6 adequate to carry the additional weight. Wall ties
7 must be used to hold the masonry wall in place.
8 Vertical joints shall be left open at the top and bot-
9 tom for air circulation.
- 10 D. A heat shield may be constructed using the clearances
11 and materials specified in Table No. 5-B. A minimum
12 air space of 1 inch is required regardless of the
13 material used. Final clearances are measured from the
14 outer surface of the appliance to the original wall.
15 Openings shall be provided at the top and bottom for air
16 circulation.
- 17 E. A heat shield may be approved by the building official
18 when constructed of materials other than those found in
19 Table No. 5-B provided the material is noncombustible
20 and equal in strength, heat transmission and durability
21 to the materials specified in Table No. 5-B. A minimum
22 air space of 1 inch is required, regardless of the
23 material used. Openings of at least 1 inch shall be
24 maintained at the top and bottom and the shield shall
25 be terminated 1-1/2 inches from the floor or ceiling.

26 Section 32. Table 5-A of the Uniform Mechanical Code, 1991
27 Edition, is amended as follows:
28

TABLE NO. 5-A—STANDARD INSTALLATION CLEARANCES IN INCHES FOR UNLISTED HEAT-PRODUCING APPLIANCES
SEE SECTION 504

RESIDENTIAL-TYPE APPLIANCES		APPLIANCE				
		ABOVE TOP OF CASING OR APPLIANCE	FROM TOP AND SIDES OF WARM- AIR BONNET OR PLENUM	FROM FRONT ¹	FROM BACK	FROM SIDES
BOILERS AND WATER HEATERS Steam Boilers—15 psi Water Boilers—250°F Water Heaters—200°F All Water Walled or Jacketed	Automatic Oil or Comb. Gas-Oil	6		24	6	6
	Automatic Gas	6		18	6	6
	Solid	6		48	6	6
FURNACES—CENTRAL: OR HEATERS—ELECTRIC CENTRAL WARM-AIR FURNACES Gravity, Upflow, Downflow, Horizontal and Duct Warm-air—250°F. Max.	Automatic Oil or Comb. Gas-Oil	6 ²	6 ²	24	6	6
	Automatic Gas	6 ²	6 ²	18	6	6
	Solid	18 ³	18 ³	48	18	18
	Electric	6 ²	6 ²	18	6	6
FURNACES—FLOOR For Mounting in Combustible Floors	Automatic Oil or Comb. Gas-Oil	36		12	12	12
	Automatic Gas	36		12	12	12
HEAT EXCHANGER Steam—15 psi Max. Hot Water—250°F. Max.		1	1	1	1	1
ROOM HEATERS ⁴ Circulating Type	Oil or Solid	36		24	12	12
	Gas	36		24	12	12
ROOM HEATERS ⁴ (cont.) Radiant or Other Type	Oil or Solid	36		36	36	36
	Gas	36		36	18	18
	Gas with double metal or ceramic back	36		36	12	18
Fireplace Stove	Solid	48 ³		54	48 ³	48 ³

(Continued)

TABLE NO. 5-A—STANDARD INSTALLATION CLEARANCES IN INCHES FOR UNLISTED HEAT-PRODUCING APPLIANCES
SEE SECTION 504—(Continued)

RESIDENTIAL-TYPE APPLIANCES		APPLIANCE					
		FROM TOP AND SIDES ABOVE TOP OF CASING OR APPLIANCE	FROM TOP AND SIDES OF WARM-AIR BONNET OR PLENUM	FROM FRONT ¹	FROM BACK	FROM SIDES	
FUEL							
RADIATORS Steam or Hot Water ⁶		36		6	6	6	
RANGES—COOKING STOVES						Firing Side	Opp. Side
Oil		30 ⁷			9	24	18
Gas		30 ⁷			6	6	6
Solid Clay-lined Firepot		30 ⁷			24	24	18
Solid Unlined Firepot		30 ⁷			36	36	18
Electric		30 ⁷			6	6	
INCINERATORS Domestic Types		36 ⁸		48	36	36	
COMMERCIAL INDUSTRIAL-TYPE LOW-HEAT APPLIANCES ANY AND ALL PHYSICAL SIZES EXCEPT AS NOTED		APPLIANCE					
		ABOVE TOP OF CASING OR APPLIANCE ⁹	FROM TOP AND SIDES OF WARM-AIR BONNET OR PLENUM	FROM FRONT ¹	FROM BACK ⁹	FROM SIDES ⁹	
FUEL							
BOILERS AND WATER HEATERS 100 cu. ft. or less Any psi Steam		18		48	18	18	
50 psi or less Any Size		18		48	18	18	

(Continued)

TABLE NO. 5-A—STANDARD INSTALLATION CLEARANCES IN INCHES FOR UNLISTED HEAT-PRODUCING APPLIANCES
SEE SECTION 504—(Continued)

COMMERCIAL INDUSTRIAL-TYPE LOW-HEAT APPLIANCES ANY AND ALL PHYSICAL SIZES EXCEPT AS NOTED		APPLIANCE				
		ABOVE TOP OF CASING OR APPLIANCE	FROM TOP AND SIDES OF WARM- AIR BONNET OR PLENUM	FROM FRONT ¹	FROM BACK	FROM SIDES
UNIT HEATERS		FUEL				
Floor Mounted or Suspended—Any Size		Steam or Hot Water	1		1	1
Suspended—100 cu. ft. or less		Oil or Comb. Gas-Oil	6	24	18	18
Suspended—100 cu. ft. or less		Gas	6	18	18	18
Suspended—Over 100 cu. ft.		All Fuels	18	48	18	18
Floor Mounted—Any Size		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

(Continued)

COMMERCIAL INDUSTRIAL-TYPE MEDIUM-HEAT APPLIANCES		APPLIANCE				
		ABOVE TOP OF CASING OR APPLIANCE ¹⁰	FROM TOP AND SIDES OF WARM- AIR BONNET OR PLENUM	FROM FRONT ¹	FROM BACK ¹⁰	FROM SIDES ¹⁰
		FUEL				
BOILERS AND WATER HEATERS						
Over 50 psi		All Fuels	48	96	36	36
Over 100 cu. ft.						
OTHER MEDIUM-HEAT INDUSTRIAL APPLIANCES						
All Sizes		All Fuels	48	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

FOOTNOTES TO TABLE NO. 5-A

- 1 The minimum dimension shall be that necessary for servicing the appliance, including access for cleaning and normal care, tube removal, etc.
- 2 For a listed oil, combination gas-oil, gas or electric furnace this dimension may be 2 inches if the furnace limit control cannot be set higher than 250°F., or this dimension may be 1 inch if the limit control cannot be set higher than 200°F., or the appliance shall be marked to indicate that the outlet air temperature cannot exceed 200°F.
- 3 The dimension may be 6 inches for an automatically stoker-fired forced-warm-air furnace equipped with 250°F. 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.
- 4 Approved 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 hollow masonry covered with sheet metal at least 0.021 inch 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 at the sides and rear of the appliance, except that at least 18 inches shall be required on the appliance-opening side or sides measured horizontally from the edges of the opening.
- 5 ((The 48-inch clearance may be reduced to 36 inches when protection equivalent to that provided by Items (a) through (g) of Table No. 5-B is applied to the combustible construction.)) For solid fuel appliances, see Sections 512, 513 and Chapter 10.1 and Tables No. 5-E-1 and No. 5-E-2.
- 6 Steampipes and hot-water heating pipes shall be installed with a clearance of at least 1 inch to all combustible construction or material, except that at the points where pipes carrying steam at not over 15 pounds gage pressure 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 $\frac{1}{2}$ inch. Each such opening shall be covered with a plate of noncombustible material.

Such pipes passing through stock shelving shall be covered with not less than 1 inch of approved insulation.

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

Where the temperature of the boiler piping does not exceed 160°F., the provisions of this table shall not apply.

Coverings or insulation used on steam or hot-water pipes shall be of material suitable for operating temperature of the

1 system. The insulation or jackets shall be of noncombustible
2 materials, or the insulation or jackets and lap-seal adhesives
3 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 U.B.C. Standard No. 42-1.

4 7 To combustible material or metal cabinets. If the underside
5 of such combustible material or metal cabinet is protected
6 with insulating millboard at least 1/4 inch thick
coverd with sheet metal of not less than 0.013 inch (No. 28
gage), the distance may be reduced to 24 inches.

7 8 Clearance above charging door shall be at least 48 inches.

8 9 If the appliance is encased in brick, the 18-inch clearance
above and at sides and rear may be reduced to 12 inches.

9 10 If the appliance is encased in brick, the clearance above may
10 be reduced to 36 inches and at sides and rear may be reduced to
11 18 inches.

Section 33. Chapter 5 of the Uniform Mechanical Code, 1991 Edition, is amended by adding a new Table 5-E-1 as follows:

**TABLE 5-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	Opposite Side	N/A
				42	24	
Chimney Connector (Stovepipe)	18" minimum or 3 times the diameter of the chimney connector (stovepipe)					

* Side with fuel-loading or ash removal door.

Section 34. Chapter 5 of the Uniform Mechanical Code, 1991 Edition, is amended by adding a new Table 5-E-2 as follows:

**TABLE 5-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:

- 4" of solid masonry spaced out 1" from the surface. Joints struck flush on the back surface.
- 7/8" portland cement plaster on expanded metal lath and metal studs spaced out 1" from the surface.

- 1 (c) 1/4" Insulating millboard spaced out 1" from the surface.
- 2 (d) 1/4" Insulating cement board spaced out 1" from the surface.
- 3 (e) No. 28 standard gage sheet steel spaced out 1" from the
- 4 surface.
- 5 (f) A wall shield may be approved by the building official when
- 6 constructed of materials other than those found in Table
- 7 5-E-2, provided the material is noncombustible and equal in
- 8 strength, heat transmission and durability to the materials
- 9 specified in Table 5-E-2. A minimum air space of 1 inch is
- 10 required, regardless of the material used. Maintain the 1
- 11 inch openings at the top and bottom and terminate the shield
- 12 1-1/2 inches from the floor or ceiling.

13 Section 35. Section 601 of the Uniform Mechanical Code, 1991

14 Edition, is amended as follows:

15 **GENERAL**

16 **Sec. 601. (a) Air Supply.** Fuel-burning equipment shall be

17 assured a sufficient supply of combustion air. The methods of

18 providing combustion air in this chapter do not apply to direct

19 vent appliances, appliances listed as having separated combustion

20 systems, enclosed furnaces, listed cooking appliances, refrigera-

21 tors and domestic clothes dryers. Fireplaces and solid fuel-

22 burning appliances shall comply with Chapter 10.1 of this code.

23 In new construction and existing buildings of unusually tight

24 construction, combustion air shall be obtained from outside. In

25 existing buildings of ordinary tightness insofar as infiltration

26 is concerned, all or a portion of the combustion air for fuel-

27 burning appliances may be obtained from infiltration when the

28 requirements for 50 cubic feet per 1000 Btu/h input ((is)) of

603(d)1 are met.

(b) **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 36. Section 602 of the Uniform Mechanical Code, 1991

Edition, is amended as follows:

COMBUSTION AIR OPENINGS

Sec. 602. (a) Location. One opening shall be located within the

upper 12 inches of the enclosure and one opening shall be located

within the lower 12 inches of the enclosure.

EXCEPTION: 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.

1 (b) **Dampers Prohibited.** Combustion air ducts or plenums shall
2 not be installed so as to require openings in or penetrations
3 through construction where fire dampers are required. Manually-
4 operated dampers shall not be installed in combustion air
5 openings. With prior approval, power-actuated movable louvers
6 admitting combustion air may be used and, if installed, shall be
7 electrically interlocked with the main burner fuel-supply valve
8 so as to prevent fuel delivery unless the louvers are in the
9 fully open position.

10 **EXCEPTION:** Fireplace and solid fuel burning appliances
11 shall comply with Chapter 10.1 of this code.

12 (c) **Louvers, Grilles and Screens.** Combustion air openings
13 shall be covered with corrosion-resistant screen of 1/4-inch
14 mesh, except as provided in Section 604(c). In calculating the
15 free area, consideration shall be given to the blocking effect of
16 louvers, grilles and screens protecting openings. The free area
17 through louvers, grilles and screens shall be used in calculating
18 the size of opening required to provide the free area specified.

19 Section 37. Subsection 603(b) of the Uniform Mechanical
20 Code, 1991 Edition, is amended as follows:

21 SOURCES OF COMBUSTION AIR

22 (b) **Under-floor Supply.** Lower combustion air openings may con-
23 nect with under-floor areas conforming to the following
24 requirements:

25 1. Under-floor spaces having unobstructed openings to the ex-
26 terior at least twice the area of the required equipment
27 combustion air openings.

28 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 38. Subsection 603(d) of the Uniform Mechanical
Code, 1991 Edition, is amended as follows:

(d) **Interior Spaces.** In buildings of ordinary tightness, com-
bustion air provided by infiltration may be obtained from freely
communicating interior spaces, provided the combined volume in
cubic feet complies with the ~~((following conditions:))~~ volume
criteria in No.1 below. Insufficient volume is addressed in No.2
below.

1. **Adequate volume - gas and liquid.** If the volume of the room
or space in which fuel-burning appliances are installed is equal
to or greater than 50 cubic feet per 1000 Btu/h of aggregate
input rating of appliances, infiltration may be regarded as ade-
quate to provide combustion air. Exclude from the calculation
the input ratings of listed direct vent appliances, enclosed
furnaces, cooking appliances, refrigerators and domestic clothes
dryers.

1 2. **Insufficient volume - gas and liquid.** Rooms or spaces con-
2 taining gas- or liquid-fuel-burning appliances which do not have
3 the volume as specified above shall be provided with minimum
4 unobstructed combustion air openings as specified in Section 607
5 and arranged as specified in Section 602.

6 Section 39. Subsection 604(b) of the Uniform Mechanical Code,
7 1991 Edition, is amended as follows:

8 **COMBUSTION AIR DUCTS**

9 (b) **Dampers.** Combustion air ducts shall not be installed so as
10 to pass through construction where fire dampers are required.
11 Volume dampers shall not be installed in combustion air ducts.
12 Combustion air for fireplaces shall be provided as in Chapter 10.1
13 of this code.

14 Section 40. Table 6-A of the Uniform Mechanical Code, 1991
15 Edition, is amended as follows:

TABLE NO. 5-A
SIZE OF COMBUSTION-AIR OPENINGS OR DUCTS¹

COLUMN I Existing Buildings of Ordinary Tightness		COLUMN II New Construction and Existing Buildings of Unusually Tight Construction ^{2,6}	
Condition	Size of Openings or Ducts	Condition	Size of Openings or Ducts
Appliance in unconfined((2)) ³ space:	May rely on infiltration alone.	Appliance in unconfined((2)) ³ space: Obtain combustion air from outdoors or from space freely communicating with outdoors.	Provide two openings, each having 1 sq. in. per 5,000 Btu/h input. Ducts admitting outdoor air may be connected to the cold-air return.
Appliance in confined((4)) ⁵ space: 1. All air from inside building	Provide two openings into enclosure each having one square inch per 1000 Btu/h input freely communicating with other unconfined interior spaces. Minimum 100 sq. in. each opening.((3)) ⁴	Appliance in confined((4)) ⁵ space: Obtain combustion air from outdoors or from space freely communicating with outdoors.	1. Provide two vertical ducts or plenums; 1 sq. in. per 4,000 Btu/h input each duct or plenum
2. Part of air from inside building.	Provide two openings into enclosure((3)) ⁴ from other freely communicating unconfined((2)) ³ interior spaces each having an area of 100 sq. in. plus one duct or plenum opening to outdoors having an area of 1 sq. in. per 5,000 Btu/h input rating. The outdoor duct or plenum opening may be connected to the cold air return.		2. Provide two horizontal ducts or plenums; 1 sq. in. per 2,000 Btu/h input each duct or plenum.
3. All air from outdoors. Obtain from outdoors or from space freely communicating with outdoors.	Use any of the methods listed for confined space in unusually tight construction as indicated in Column II.		3. Provide two openings in an exterior wall of the enclosure; each opening 1 sq. in. per 4,000 Btu/h input.
			4. Provide one ceiling opening to ventilated attic and one vertical duct to attic; each opening 1 sq. in. per 4,000 Btu/h input.
			5. Provide one opening in enclosure ceiling to ventilated attic and one opening in enclosure floor to ventilated crawl space; each opening 1 sq. in. per 4,000 Btu/h input.

¹ For location of openings see Section 602.

² New equipment in semi-heated space may rely on infiltration alone.

³ ((As defined in Section 423-)) See Chapter 4.

⁴ When the total input rating of appliances in enclosure exceeds 100,000 Btu/h, the area of each opening into the enclosure shall be increased 1 square inch for each 1,000 Btu/h over 100,000.

⁵ As defined in Section 405.

⁶ Buildings permitted on or after October 26, 1986 are considered to be unusually tight construction.

1 Section 41. Section 704 of the Uniform Mechanical Code, 1991
2 Edition, is amended as follows:

3 **PROHIBITED INSTALLATIONS**

4 **Sec. 704.** Warm-air furnaces shall not be installed:

5 1. In a closet or alcove less than 12 inches wider than the
6 furnace or furnaces installed therein with a minimum clear working
7 space less than 3 inches along the sides, back and top of the
8 furnace. (See also Section 711.)

9 **EXCEPTION:** Replacement forced-air furnaces or air-
10 conditioning cooling coils may be installed in an existing
11 closet or alcove with lesser width and depth when approved by
12 the building official and provided that such width and depth
13 is in compliance with conditions of listing. Combustion air
14 openings at the rear or side of the closet shall meet the
15 requirements of Chapter 6.

16 2. In a hazardous location.

17 3. In a surgical operating room or medical treatment room.

18 4. In an occupancy, unless separated by fire-resistive construc-
19 tion from the rest of the building as required by the special haz-
20 ards sections (Sections 608, 708, 808, 908, 1008 and 1213) of Part
21 III of the Building Code.

22 5. In a room used or designed to be used as a bedroom, bathroom,
23 closet or in any enclosed space with access only through such room
24 or space.

25 **EXCEPTION:** Direct vent furnaces, enclosed furnaces, and
26 electric heating furnaces. Access to furnaces located in an
27 attic or under-floor crawl space may be through a closet.

28 6. Outside of a building unless listed for exterior installation
or enclosed in a weatherproof housing complying with Section 710.

 7. With clearance along the combustion chamber opening side of
less than 6 inches or working space along the entire front or
firebox side less than specified in Section 703.

 Section 42. Section 705 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

INSTALLATION

Sec. 705. 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.

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 static pressure and
conforms

1 with Part IV of this code. Conversion of existing furnaces for
2 use with cooling coils is permissible if authorized by the
3 manufacturer and approved by the building official.

4 A furnace supported from the ground shall rest on a concrete
5 slab or other approved material extending not less than 3 inches
6 above the adjoining ground level.

7 Section 43. Subsection 706(b) of the Uniform Mechanical Code,
8 1991 Edition, is amended as follows:

9 **RETURN AND OUTSIDE AIR**

10 (b) **Separation.** Except as provided in ((permitted by the excep-
11 tions to Subsection (f) of)) this section, there shall be a posi-
12 tive separation between combustion air and outside or return air
13 for blower-type heating systems. The combustion-chamber opening
14 shall be separated from a fan plenum by an airtight separation
15 without openings therein, except through an air lock at least 16
16 square feet in area, equipped with tight-fitting doors arranged to
17 close automatically. A fan plenum access not exceeding 24 by 30
18 inches may be equipped with a tight-fitting panel or door.

19 Section 44. Subsection 706(f) of the Uniform Mechanical Code,
20 1991 Edition, is amended as follows:

21 (f) **Prohibited Sources.** Outside or return air for a heating
22 system shall not be taken from the following locations:

23 1. Closer than 10 feet from an appliance vent outlet, a vent
24 opening or a plumbing drainage system or the discharge outlet of
25 an exhaust fan, unless the outlet is 3 feet above the outside-air
26 inlet.

27 2. Where it will pick up objectionable odors, fumes or flammable
28 vapors; or where it is less than 10 feet above the surface of any
abutting public way or driveway; or where it is in a horizontal
position in a sidewalk, street, alley or driveway.

3. A hazardous or insanitary location or a refrigeration machin-
ery room as defined in this code.

4. From an area the volume of which is less than 25 percent of
the entire volume served by such system, unless there is a perma-
nent opening to an area the volume of which is equal to 25 percent
of the entire volume served. This permanent opening when used to
provide return air to a warm-air furnace shall be of sufficient
area to comply with Subsection (c) of this section.

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

5. From a room or space having any fuel-burning appliances
therein.

1 **EXCEPTIONS:** This shall not apply to:

2 1. Fireplaces, fireplace appliances, residential cooking
3 appliances, direct vent appliances, enclosed furnaces and
4 domestic-type clothes dryers installed within the room or
5 space.

6 2. A gravity-type or listed vented wall furnace.

7 3. A blower-type system complying with the following
8 requirements:

9 Where the return air is taken from a room or space having
10 a volume exceeding 1 cubic foot for each 10 Btu/h fuel input
11 rate of all fuel-burning appliances therein.

12 At least 75 percent of the supply air is discharged back
13 into the same room or space.

14 Return-air inlet shall not be located within 10 feet of
15 any appliance firebox or draft diverter in the same
16 enclosed room or confined space.

17 6. A closet, bathroom, toilet room or kitchen.

18 7. Less than 10 feet above the surface of any abutting public
19 way, gangway or driveway unless adequate means is provided for the
20 removal of dust, noxious gas and odor from the air.

21 8. From a horizontal position in any sidewalk, street, alley or
22 driveway, or level with any other surrounding grade nor from the
23 lower level of any two-level street or similar construction.

24 Section 45. Section 706 of the Uniform Mechanical Code, 1991
25 Edition, is amended by adding a new subsection (i) as follows:

26 (i) **Exhaust Outlets.** Every exhaust system shall terminate at a
27 point outside of the building not less than 3 feet from any
28 operable opening nor less than 10 feet from a mechanical air
29 intake and shall be located at a point where it will not cause a
30 public nuisance or hazard.

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

33 2. Air which is suitable for recirculation may be dis-
34 charged into a boiler room in such quantity as is required
35 to supply the needs of combustion.

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

38 Section 46. Subsection 707(a) of the Uniform Mechanical Code,
39 1991 Edition, is amended as follows:

40 **AIR SUPPLY**

41 **Sec. 707. (a) Duct Size.** The minimum unobstructed total area of
42 the supply-air ducts or openings from a blower-type warm-air fur-
43 nace shall be not less than 2 square inches per 1000 Btu/h
44 approved

1 output rating of the furnace, and the minimum unobstructed total
2 area of the supply-air ducts or openings from a gravity-type warm-
3 air furnace shall be not less than 7 square inches per 1000 Btu/h
4 approved output rating or as specified by the conditions of list-
5 ing of the furnace. Any warm-air heating unit having a bonnet or
6 supply temperature below 140°F. shall have ducts or supply
7 openings sized not less than 2 square inches for every 1000 Btu/h
8 approved rating of the unit multiplied by a factor to be
9 determined as follows:

$$\text{Factor} = \frac{70^{\circ}\text{F}}{\text{Design bonnet temp } ^{\circ}\text{F} - 70^{\circ}\text{F.}}$$

7 Branch ducts shall have a cross sectional area proportional to
8 the heating load of the space serviced by the duct(s).

8 Rigid fiberglass duct areas shall be increased by a factor of
9 1.15. Flexible duct areas shall be increased by a factor of 1.25.

10 The total area of the supply-air ducts or openings need not
11 exceed the ((area of the furnace outlet plenum collar)) minimum-
12 sized air-supply opening or openings as indicated by the
13 conditions of listing of the furnace.

12 For the purpose of this section a volume damper, grille, or reg-
13 ister installed to control airflow shall not be considered an
14 obstruction.

14 The minimum unobstructed total area of the supply-air ducts from
15 a heat pump shall be not less than 6 square inches per 1000 Btu/h
16 nominal output rating or as indicated by the conditions of the
17 listing of the heat pump.

16 Section 47. Section 709 of the Uniform Mechanical Code, 1991
17 Edition, is amended as follows:

18 **WARM-AIR FURNACES LOCATED IN UNDER-FLOOR SPACES**

18 **Sec. 709.** A warm-air furnace installed in the under-floor area
19 of a building shall comply with the following requirements:

20 1. Clearance from combustibles shall be as specified in Section
21 504.

21 2. An access opening and passageway of a height and width suffi-
22 cient to permit removal of the furnace, but in no case less than
23 30 inches by 30 inches, shall be provided to the working space in
24 front of the furnace. The access opening to the passageway shall
25 be through an opening in an exterior wall of the building or
26 through a trap door within the building. The distance from the
27 passageway access to the center line of the working space in
28 front of the furnace burner shall not exceed 20 feet measured
along the center line of the passageway.

26 3. A furnace supported from the ground shall rest on a concrete
27 slab or other approved material extending not less than 3 inches
28 above the adjoining ground level.

27 4. The lowest portion of a suspended furnace shall have a clear-
28 ance of at least 6 inches from the ground. Excavation necessary
to install a furnace shall extend to a depth of 6 inches below
and 12 inches on all sides of the furnace except the control
side, which

1 shall have 30 inches. If the depth of the excavation for either
2 furnace or passageway exceeds 12 inches, walls of the excavation
3 shall be lined with concrete, ~~((or))~~ masonry or other approved
4 methods acceptable to the building official, extending 4 inches
5 above the adjoining ground level. In floodplain areas the entire
6 crawl space grade or height shall provide 12-inch clearance
7 between the bottom of the furnace and the ground.

8 5. A permanent electric outlet and lighting fixture, controlled
9 by a switch located at the passageway opening, shall be provided
10 at or near the furnace.

11 6. A furnace designed to burn any liquefied petroleum gas shall
12 not be installed in an under-floor space unless such space is
13 provided with an approved means for the removal of unburned gas.

14 Section 48. Chapter 7 of the Uniform Mechanical Code, 1991
15 Edition, is amended by adding a new section 711 as follows:

16 CONVERSION BURNERS

17 **Sec. 711.** Installation of conversion burners shall conform to
18 American National Standards Institute standards and manufacturer's
19 instructions.

20 Section 49. Subsection 807(c) of the Uniform Mechanical Code,
21 1991 Edition, is amended as follows:

22 ROOM HEATERS

23 (c) **Unvented.** Unvented fuel-burning room heaters shall not be
24 installed, used, maintained or permitted to exist in a Group I
25 ~~((or R))~~ Occupancy nor shall an unvented heater be installed in
26 any building, whether as a new or as a replacement installation,
27 unless permitted by this section. This subsection shall not
28 apply to portable oil-fired unvented heating appliances used as
supplemental heating in Groups B, ~~((and))~~ M or R Occupancies and
regulated by the Fire Code.

Approved, unvented portable oil-fueled heaters may be used as a
supplemental heat source in any Group M, R, B-2 or B-4 Occupancy
provided that such heaters shall not be located in any sleeping
room or bathroom. For the purpose of this section "portable oil-
fueled heater" and "oil" shall be defined as follows:

A. Portable oil-fueled heater means any nonflue-connected, self-
contained, self-supporting, oil-fueled, heating appliance
equipped with an integral reservoir, designed to be carried
from one location to another.

B. Oil means any fuel with a flash point of greater than 100°F.,
including, but not limited to, kerosene.

Section 50. Section 901 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

1 **GENERAL**

2 **Sec. 901.** Appliances designed to be vented shall be connected
3 to a venting system as specified in Section 902 and the venting
4 system shall comply with the provisions of this chapter except as
5 provided in this section.

6 **EXCEPTIONS: 1. Listed ranges.**

7 **2. Built-in domestic cooking units listed and marked as**
8 **unvented units.**

9 **3. Listed hot plates and listed laundry stoves, provided**
10 **that those installed in sleeping rooms shall be equipped with**
11 **a pilot flame for each burner and an automatic device to shut**
12 **off the gas supply when the pilot flame is extinguished.**

13 **4. Listed Type 1 clothes dryers.**

14 **5. Approved make-up air heaters provided that such heaters**
15 **are installed in accordance with Section 1904 of this code.**

16 ***6. A single listed booster type (automatic instantane-**
17 **ous) water heater when designed and used solely for the**
18 **sanitizing rinse requirements of a National Sanitation**
19 **Foundation Class 1, 2 or 3 dishwashing machine provided that**
20 **the input is limited to 50,000 Btu/h, the storage capacity is**
21 **limited to 12.5 gallons, and the heater is installed in a**
22 **commercial kitchen having an approved mechanical exhaust**
23 **system.**

24 ***7. Listed refrigerators, provided that gas refrigerators**
25 **shall not be installed in bedrooms.**

26 ***8. Counter appliances.**

27 ***9. Other appliances, except room heaters, listed for**
28 **unvented use and not provided with flue collars.**

***10. Specialized equipment of limited input such as**
laboratory burners or gas lights.

When any or all of the appliances starred above (*) are
installed so that the aggregate input rating exceeds 30 Btu/h per
cubic foot of room or space in which they are installed, one or
more of them shall be provided with a venting system or other
approved means for removing the vent gases to the outside
atmosphere so that the aggregate input rating of the remaining
unvented appliances does not exceed the 30 Btu/h per cubic foot
of room or space. When the room or space in which such starred
appliances are installed is directly connected to another room or
space by a doorway, archway or other opening of comparable size
which cannot be closed, the volume of such adjacent room or space
may be included in the calculations.

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.

1 Venting systems shall be designed and constructed so as to
2 develop a positive flow adequate to convey all combustion prod-
3 ucts to the outside atmosphere.

4 ((Venting systems may be designed in accordance with accepted
5 engineering methods when the design method has been approved by
6 the building official.))

7 A venting system which is an integral part of the vented appli-
8 ance and plastic pipe recommended by the manufacturer in instal-
9 lation instructions as suitable for use with listed condensing
10 appliances shall be installed in accordance with the appliance
11 listing, manufacturer's installation instructions and applicable
12 requirements of this code.

13 Gas venting systems serving appliances equipped with draft
14 hoods and appliances listed for use with Type B vents may be
15 designed in accordance with tables in Appendix C, Chapter 9 when
16 the design method has been approved by the building official.

17 Section 51. Subsection 902 of the Uniform Mechanical Code,
18 1991 Edition, is amended to add a new subsection (f) as follows:

19 TYPE OF VENTING SYSTEMS REQUIRED

20 (f) Venting for Solid Fuel Burning Appliances. All solid fuel
21 burning appliances must be vented through an approved masonry
22 chimney built in compliance with requirements of Chapter 37 of
23 the Building Code or a listed all-fuel factory-built chimney.

24 Section 52. Subsection 903(a) of the Uniform Mechanical Code,
25 1991 Edition, is amended as follows:

26 INSTALLATION AND CONSTRUCTION REQUIREMENTS

27 Sec. 903. (a) General. Factory-built chimneys, Type L vents,
28 Type B gas vents or Type BW gas vents shall be installed in
accordance with the manufacturer's installation instructions, the
terms of listing and the applicable requirements of this
code.

29 Metal chimneys shall be installed according to the applicable
30 requirements of Section 914. For Masonry Chimneys, see Section
31 913.

32 Baffles shall be installed around the vent or chimney to
33 maintain the required clearance from combustible materials and
34 insulation.

35 Section 53. Section 904 of the Uniform Mechanical Code, 1991
36 Edition, is amended as follows:

37 LOCATION AND SUPPORT OF VENTING SYSTEMS OTHER THAN MASONRY 38 CHIMNEYS

39 Sec. 904. A combustion products venting system ((vent
40 connector chimney, or chimney connector)) shall not extend into
or through any air duct or plenum.

1 **EXCEPTION:** A combustion products venting system may pass
2 through a combustion air duct.

3 Portions of venting systems which extend through occupied
4 spaces shall be enclosed or protected to avoid personal contact
5 with, or damage to the installation or contact with combustible
6 material.

7 The base of a vent which extends to the ground shall rest on a
8 solid masonry or concrete base at least 2 inches in thickness.
9 The base of a vent which does not extend to the ground and is not
10 self-supporting shall rest on a firm metal or masonry support.

11 Appliances shall not be vented into a fireplace or into a chim-
12 ney serving a fireplace.

13 Venting systems shall be adequately supported for the weight
14 and the design of the materials used.

15 Section 54. Section 917 of the Uniform Mechanical Code,
16 1991 Edition, is amended to add a new subsection (c) as follows:

17 **VENTING THROUGH VENTILATING HOODS AND EXHAUST SYSTEMS**

18 **(c) Interlock Controls.** When the ventilating hood or exhaust
19 system is equipped with a power means of exhaust, the appliance
20 control system shall be interlocked so as to permit appliance
21 operation only when the power means of exhaust is in operation.

22 Section 55. Subsection 1002(a) of the Uniform Mechanical
23 Code, 1991 Edition, is amended as follows:

24 **MATERIAL**

25 **Sec. 1002. (a) General.** Supply air, return air and outside
26 air for heating, cooling or evaporative cooling systems shall be
27 conducted through duct systems constructed of metal as set forth
28 in Tables Nos. 10-A, 10-B and 10-C; metal ducts complying with
U.M.C. Standard No. 10-2 with prior approval; or factory-made air
ducts complying with U.M.C. Standard No. 10-1. Ducts, plenums,
and fittings may be constructed of asbestos cement, concrete,
clay or ceramics or other approved non-metallic materials when
installed in the ground or in a concrete slab, provided the
joints are tightly sealed.

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 3305(g) of the Building Code.

EXCEPTIONS: 1. Where such air is part of an engineered
smoke control system.

 2. Corridors conforming to Section 3320 (c) 3 of the
Seattle Building Code in Group I occupancies.

 3. Corridors serving residential occupancies may be sup-
plied without specific mechanical exhaust subject to the
following:

1 A. The supply air is 100% outside air, and

2 B. The units served by the corridor have conforming
3 ventilation independent of the air supplied to the corridor,
4 and

5 C. For other than highrise buildings, the supply fan
6 will automatically shut off upon activation of corridor
7 smoke detectors which shall be spaced at no more than 30
8 feet on center along the corridor, or

9 D. For highrise buildings, corridor smoke detector
10 activation will close required smoke/fire dampers at the
11 supply inlet to the corridor at the floor receiving the
12 alarm.

13 Concealed building spaces or independent construction within
14 buildings may be used as ducts or plenums.

15 When gypsum products are exposed in ducts or plenums, the air
16 temperature shall be restricted to a range from 50°F. to 125°F.
17 and moisture content shall be controlled so that the material is
18 not adversely affected. For the purpose of this section, gypsum
19 products shall not be exposed in ducts serving the direct exhaust
20 from evaporative coolers and in other air handling systems
21 regulated by this chapter where the design engineer determines
22 that the temperature of the gypsum product will be below the dew
23 point temperature under normal operating conditions.

24 ((Venting systems and exhaust ducts shall not extend into or
25 through ducts or plenums.))

26 See Section 904 for limitations on combustion products venting
27 systems extending into or through ducts or plenums.

28 See Section 1104 for limitations on environmental air system
exhaust ducts extending into or through ducts or plenums.

Section 56. Subsection 1002(b) of the Uniform Mechanical
Code, 1991 Edition, is amended as follows:

(b) **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, U.B.C.
Standard No. 42-1.

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 serving a dwelling unit.

3. Air filters listed by an approved testing agency as
complying with reference standards included in Appendix C.

4. Air filters used as water evaporation medium in an
evaporative cooler.

5. Charcoal filters when protected with an approved fire
suppression system.

6. Electrical wiring in plenums shall comply with the Electrical Code. ((Flame propagation and smoke production characteristics of exposed electric cables installed in concealed space used as air plenums shall:

A. Exhibit a flame travel of 5 feet or less, and

B. 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 U.M.C. Standard No. 10-3.

C. Wiring meeting these requirements shall be listed and labeled as plenum cable as required by the electrical code.

7. Nonmetallic fire sprinkler piping in plenums shall be listed and shall meet the following requirements:

A. Exhibit flame travel of 5 feet or less, and

B. 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 U.M.C. Standard No. 10-3.)

7. Plastic piping for sprinkler, HVAC or plumbing in ceiling plenums used for return air.

Section 57. Subsection 1002(f) of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

((e))(f) Tin. Existing tin ducts may be used when cooling coils are added to a heating system, provided the first 10 feet of the duct or plenum measured from the cooling coil discharge are constructed of metal of the gage thickness set forth in Table No. 10-A, No. 10-B or No. 10-C of this chapter or are of approved material and construction. Tin ducts completely enclosed in inaccessible concealed areas need not be replaced. All accessible ducts shall be insulated to comply with ((Table No. 10-D of this chapter)) Section 503.9 of the Seattle Energy Code. For the purpose of this subsection, ducts shall be considered accessible where the access space is 30 inches or greater in height.

Section 58. Section 1004 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

INSTALLATION OF DUCTS

Sec. 1004. (a) Metal Ducts. Ducts shall be securely fastened in place at every change of direction and as set forth in Table No. 10-E. Vertical rectangular ducts and vertical round ducts shall be supported as set forth in Table No. 10-E, Part I. Riser ducts shall be held in place by means of metal straps or angles and channels to secure the riser to the structure.

Metal ducts shall be installed with at least 4 inches separation from earth. Metal ducts when installed in or under concrete slabs, shall be encased in at least 2 inches of concrete.

Ducts shall not be built into or installed in a building in such a way as to impair the effectiveness of the fire-proofing around steel or iron structural members. Ducts shall not be placed between the fire-proofing and the members protected.

1 Supports for rectangular ducts as set forth in Table No. 10-E
2 when suspended from above shall be installed on two opposite
3 sides of each duct and shall be riveted, bolted or metal screwed
4 to each side of the duct at not more than the intervals specified.

5 Horizontal round ducts 40 inches or less in diameter when sus-
6 pended from above shall be supported at intervals not more than
7 as set forth in Table No. 10-E with one hanger installed to com-
8 ply with the requirements listed below:

9 1. Ducts shall be equipped with tight-fitting circular bands
10 extending around the entire perimeter of the duct at each speci-
11 fied support interval.

12 2. Circular bands shall be not less than 1 inch wide nor less
13 than equivalent to the gage of the duct material it supports.

14 **EXCEPTION:** Ducts 10 inches and less in diameter may be sup-
15 ported by No. 18 gage galvanized steel wire.

16 3. Each circular band shall be provided with a suitable means
17 of connecting to the suspending support.

18 4. Ducts shall be braced and guyed to prevent lateral or hori-
19 zontal swing. For seismic bracing, see Section 1004(e).

20 5. In other than Group R and M Occupancies where warm air ducts
21 pass through concealed ceiling spaces of combustible construction
22 or are located inside combustible partitions or walls, either the
23 ducts or the interior surfaces of such concealed ceiling space,
24 partitions or walls shall be protected with 1/2-inch drywall or
25 other approved insulating material, or a clearance of 1/2 inch
26 shall be maintained between ducts and all combustible
27 construction. The integrity of fire-stopping shall not be
28 destroyed. The spaces between the ducts and the firestopping
shall be filled solidly with brick, mineral wool or other
approved noncombustible material. The space around ducts passing
through walls, floors or partitions shall be fire-stopped with
mineral wool or other noncombustible materials.

(b) **Factory-made Air Ducts.** Approved Class 0 or Class 1
factory-made air ducts may be installed in any occupancy covered
by this code. Approved Class 2 air ducts may be installed only
in dwellings or apartment houses where the duct system serves not
more than one dwelling unit.

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.

Factory-made air ducts shall be installed with at least 4
inches of separation from earth except when installed as a liner
inside of concrete, tile or metal pipe; they shall be protected
from physical damage.

Class 2 air ducts shall be installed with at least 3 feet of
separation from ((a)) the heating ((exchanger)) equipment.

The temperature of the air to be conveyed in any of these
classes of duct shall be less than 251°F.

1 (c) **Protection of Ducts.** Ducts installed in locations where
2 they are exposed to mechanical damage by vehicles or from other
causes shall be protected by approved barriers. See also Section
508(b).

3 (d) **Support of Ducts.** Installers shall furnish the manu-
4 facturer's field fabrication and installation instructions to
building officials.

5 In the absence of specific supporting materials and spacing,
6 approved factory-made air ducts may be installed as set forth in
Table No. 10-F.

7 (e) **Bracing for Ducts.** Longitudinal and transverse bracing
8 shall be required for all round ducts 28 inches in diameter and
9 larger, for rectangular ducts 6 square feet and larger and on all
10 duct systems used for life safety and smoke control installed in
11 either the horizontal or vertical position.

12 1. Transverse bracing shall occur at maximum intervals of 30
13 feet, at each duct turn and at the end of a duct run.

14 2. Longitudinal bracing shall occur at maximum intervals of 60
15 feet. Transverse bracing for one duct section may also act as
16 longitudinal bracing for a duct section connected perpendicular
17 to it, if bracing is installed within four feet of the
18 intersection and sized and installed on the larger duct.

19 3. Groups of ducts may be combined in a larger size frame using
20 overall dimensions and maximum weight of ducts. At least 2 sides
21 of each duct must be connected to the angles of the brace.

22 4. Walls, including non-bearing fixed partitions, which have
23 ducts running through them may replace a transverse brace.

24 Bracing for ducts shall be designed to resist seismic loading,
25 using accepted engineering practices and Chapter 23 of the
26 Building Code.

27 (f) **Installation of Ducts in Hoistways, Elevator Machine rooms**
28 **and Elevator Machinery Spaces.** Ducts or pipes shall not be
located in hoistways, elevator machine rooms and elevator
machinery spaces. Steam and hot water pipes are not permitted to
be installed in hoistways, elevator machine rooms and machinery
spaces.

EXCEPTIONS: 1. Ducts and pipes used only in the operation
or service of the elevator.

2. Ducts and pipes used to heat or cool a hoistway may be
located in the hoistway. Ducts and pipes used to heat or
cool an elevator machine room or machinery space may be
located in that room or space.

Section 59. Section 1005 of the Uniform Mechanical Code,
1991 Edition, is amended as follows:

INSULATION OF DUCTS

Sec. 1005. Supply- and return-air ducts and plenums of a heat-
ing or cooling system shall be insulated with not less than the

1 amount of insulation set forth in ((Table No. 10-D, except for
2 ducts and plenums used exclusively for evaporative cooling
systems)) Section 503.9 of the Seattle Energy Code.

3 Approved materials shall be installed within ducts and plenums
4 for insulating, sound deadening or other purposes. Materials
5 shall have a mold-, humidity- and erosion-resistant face that
6 meets the requirements of U.M.C. Standard No. 10-1. Duct liners
in systems operating with air velocities exceeding 2,000 feet per
minute shall be fastened with both adhesive and mechanical
fasteners, and exposed edges shall have adequate treatment to
withstand the operating velocity.

7 Insulation applied to the exterior surface of ducts located in
8 buildings shall have a flame spread of not more than 25 and a
smoke-density not exceeding 50 when tested as a composite
installation, including insulation, facing materials, tapes and
adhesives as normally applied.

9 **EXCEPTION:** Insulation having a flame-spread index not
10 exceeding 50 and a smoke-density not greater than 100
may be installed in dwellings or apartment houses where
the duct system serves not more than one dwelling unit.

11 Faced insulations intended for installation on the exterior of
12 ducts shall be legibly printed with the name of the manufacturer,
13 nominal thickness of insulation and flame-spread and smoke-
developed ratings of the composite material.

14 Section 60. Subsection 1006(b) of the Uniform Mechanical
15 Code, 1991 Edition, is amended as follows:

16 **FIRE DAMPERS**

17 **(b) Access Openings.** Suitable openings with tightly fitted cov-
18 ers shall be provided to make fire dampers accessible for inspec-
19 tion and shall be large enough to permit maintenance and
resetting of the damper. When a fire damper is installed in an
air duct, a tight-fitting hinged, sash locked or sliding access
door shall be provided on the duct and the door shall comply with
all of the following requirements:

20 1. The door shall be constructed of metal which is equal to or
21 greater in thickness than the duct and of the same material.

22 2. Each access door shall have a label with letters not less
than ½-inch in height reading "FIRE DAMPER."

23 3. External duct insulation may conceal a fire damper access
24 door where there is a label attached to the insulation indicating
the exact location of the door.

25 Section 61. Section 1009 of the Uniform Mechanical Code,
26 1991 Edition, is amended as follows:

27 **((AUTOMATIC)) SHUTOFFS**

28 **Sec. 1009. (a) Automatic shutoffs - When Required.** Each single
system providing heating, ((or)) cooling, or ventilation air in
excess of ((2000)) 10,000 cubic feet per minute in Group A,

Divisions 1, 2, and 2.1; Group B, Division 2; Group E; Group I; and Group R, Division 1 Occupancies, or where such system penetrates or connects more than one floor and is in excess of 2,000 cubic feet per minute, shall be equipped with an automatic shutoff activated by smoke detectors. When the system serves more than one occupancy, automatic shutoff shall be provided.

EXCEPTIONS: 1. Automatic shutoffs need not be installed when all rooms have direct exit to the exterior of the building.

2. Automatic shutoffs need not be installed in systems specifically designed for smoke control.

(b) Manual Shutoffs - Exhaust fans in the above categories located in highrise buildings (Section 1807 of the Building Code) shall be equipped with manual on-off switches located in the central control station for fire department operation.

(c) Smoke Detection. Smoke detectors required by Subsection (a) shall be installed in the main return-air duct ahead of any outside-air inlet or they may be installed in each room or space served by the return-air duct. Detectors shall also be installed in the supply duct, downstream of the filters. Activation of any detector shall cause the air-moving equipment to automatically shut down.

Systems without return-air ducts, may locate smoke detectors at the exhaust or relief. Activation of any detector shall cause the air-moving equipment to automatically shut down. This requirement shall not apply to life safety pressure systems.

Section 62. Table 10-D of the Uniform Mechanical Code, 1991, Edition, is repealed.

Section 63. The Uniform Mechanical Code, 1991 Edition, is amended by adding a new chapter 10.1 as follows:

CHAPTER 10.1

VENTILATION AND INDOOR AIR QUALITY

SCOPE AND GENERAL REQUIREMENTS

Sec. 10.101 (a) Purpose. The purpose of this chapter 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 this chapter by demonstration of performance through on-site testing or through engineered design. This chapter is not intended to abridge any safety or health requirements required under any other applicable codes or ordinances.

1 (b) **Scope.** This chapter sets forth minimum requirements for
2 ventilation in all occupancies, including the design of new
3 construction.

4 **APPLICATION TO EXISTING BUILDINGS**

5 **Sec. 10.102 (a) Additions to Existing Buildings.** Additions to
6 existing buildings or structures may be made without making the
7 entire building comply, provided that the new addition shall con-
8 form to the provisions of this chapter.

9 **EXCEPTION:** Additions that do not include kitchens,
10 bathrooms, water closets, indoor swimming pools, spas and
11 other areas where excess water vapors are produced and are
12 less than 500 square feet are exempt from Sections 10.103
13 and 10.104.

14 (b) **Alterations and Repairs.** All substantial alterations and
15 repairs may be made to existing buildings or moved buildings
16 built or permitted prior to the enforcement of this Chapter with-
17 out making the entire building comply with the provisions of this
18 Chapter, provided the alterations or repairs comply with this
19 Chapter.

20 (c) **Historic Buildings.** Buildings which are designated as his-
21 torical landmarks are exempt from this Chapter only to the extent
22 necessary to preserve those features essential to their histori-
23 cal appearance or function.

24 **MINIMUM VENTILATION CRITERIA FOR ALL GROUP R OCCUPANCIES**

25 **Sec. 10.103 (a).** This section shall apply to all Group R occu-
26 pancies as defined by the Building Code. Compliance with this
27 section shall be demonstrated through engineering calculations or
28 performance testing. Documentation of calculations shall be sub-
mitted to the building official where required. Performance
testing shall be conducted in accordance with recognized test
methods.

(b) **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 venti-
lation requirements of this chapter.

EXCEPTION: All public corridors shall meet the ventila-
tion requirements in Section 1205 of the Building Code.

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

The minimum source specific ventilation effective exhaust
capacity shall be not less than levels specified in Table
No.10.1-A.

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 per bedroom plus an additional
15 cubic feet per minute. Whole house ventilation systems shall
be designed to limit ventilation

1 to a level no greater than 0.5 air changes per hour under
2 normal operation conditions. Whole house ventilation sys-
3 tems shall supply outside air to all habitable rooms through
4 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.

5 (c) **Controls.** All ventilation system controls shall be readily
6 accessible. Controls for whole house ventilation systems shall
be capable of operating the ventilation system without energizing
other energy-consuming appliances.

7 **EXCEPTION:** Continuously operated whole house ventilation
8 system switches shall not be readily accessible by the
occupant.

9 1. **Source Specific Ventilation Systems.** Source specific
10 ventilation systems shall be controlled by manual switches,
dehumidistats, timers, or other approved means.

11 2. **Intermittently Operated Whole House Ventilation Systems.**
The intermittently operated whole house ventilation systems shall
12 be constructed to have the capability for continuous
operation, and shall have a manual control and an automatic
control, such as a clock timer.

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

16 **EXCEPTION:** Whole house ventilation systems which are
17 integrated with forced-air heating systems or heat-recovery
ventilation systems are exempt from the sone rating require-
ments of this section.

18 (e) **Ventilation Ducts.** All ducts shall terminate outside the
19 building. Exhaust ducts in systems which are designed to operate
intermittently shall be equipped with back-draft dampers. All
20 exhaust ducts in unconditioned spaces shall be insulated to a
minimum of R-4. All supply ducts in the conditioned space shall
21 be insulated to meet a minimum of R-4. For all other ducts, see
the Seattle Energy Code, Table 5-11.

22 (f) **Outside Air.** A mechanical system shall supply outside air
23 as required in subsection (b). The mechanical system may consist
of exhaust fans, supply fans, or both.

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

26 A. Closer than 10 feet from an appliance vent outlet, unless
such vent outlet is 3 feet above the outside air inlet.

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

1 C. A hazardous or unsanitary location.

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

3 E. Closer than 10 feet from a vent opening of a plumbing
4 drainage system unless the vent opening is at least 3 feet above
the air inlet.

5 F. Attics, crawl spaces or garages.

6 2. **Individual Room Outside Air Inlets.** Individual room outside
air inlets shall have a controllable and secure opening and be
7 capable of a total opening area of not less than four square
inches and tested by a nationally recognized standard or approved
agency and located to avoid drafts.

8 3. **Ventilation Integrated with Forced-Air Systems.** The out-
9 side air connection to the return air stream shall be located to
prevent thermal shock to the heat exchanger.

10 4. **Distribution.** Outside air shall be distributed to each
habitable room by individual inlets, separate duct systems, or a
11 forced-air system. Where outside air supplies are separated
from exhaust points by doors, provisions shall be made to ensure
12 air flow by undercutting doors, installation of grilles,
transoms, or similar means where permitted by the Building Code.

13 **MECHANICAL VENTILATION CRITERIA AND MINIMUM VENTILATION**
14 **PRESCRIPTIVE REQUIREMENTS FOR ALL GROUP R OCCUPANCIES**

15 **Sec. 10.104 (a) General.** This section establishes minimum pre-
scriptive design requirements for intermittently operated
16 systems. Continuously operated systems shall comply with Section
10.103. System characteristics not addressed in the following
17 sections shall comply with Section 10.103. A system which meets
the requirements of this section shall be deemed to satisfy the
requirements of this chapter.

18 (b) **Source Specific.** Exhaust fans providing source specific
19 ventilation shall have minimum fan flow rating not less than 50
CFM at 0.25 inches water gage for bathrooms, laundries or similar
20 rooms and 100 CFM 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.

21 (c) **Whole House.** Whole house ventilation systems may consist
22 of whole house exhaust, integration with forced-air systems or
dedicated heat recovery ventilation systems. Whole house exhaust
23 systems shall meet the following requirements.

24 1. Exhaust fans providing whole house ventilation shall have
flow rating at 0.25 inches water gage as specified in Table No.
10.1-B. Manufacturer's fan flow ratings shall be determined as
25 per HVI Standard No. 916 (July 1989) or AMCA Standard No. 210.
Table No. 10.1-B shall not be used for dwelling units with more
26 than four bedrooms.

27 2. Integrated forced-air ventilation systems shall have a 6
inch diameter or equipment outside air inlet duct connecting a
terminal element on the outside of the building to the return
28 plenum of the forced-air system. The outside air inlet duct

1 shall be equipped with a damper or other device that regulates
2 air flow to a minimum of 0.35 air changes per hour but not
greater than 0.50 air changes per hour under normal operating
conditions.

3 3. All duct work in heat recovery ventilation systems shall be
4 not less than 6 inch diameter. Balancing dampers shall be
5 installed on the inlet and exhaust side. Flow measurement grids
6 shall be installed on the supply and return. System minimum
flow rating shall be not less than that specified in Table No.
10.1-B. Maximum flow rates in Table No. 10.1-B do not apply to
heat recovery ventilation systems.

7 (d) **Source Specific and Whole House Exhaust Ducts.** Exhaust
8 ducts shall meet all requirements of Section 10.103(g). Duct
diameter, length and number of elbows shall be as specified in
Table No. 10.1-C. Terminal elements shall have at least the
equivalent net free area of the duct work.

9 **MECHANICAL VENTILATION CRITERIA AND MINIMUM VENTILATION**
10 **PERFORMANCE FOR ALL OTHER OCCUPANCIES**

11 **Sec. 10.105. Outside Air Requirements for Ventilation.** Where a
12 mechanical ventilation system is installed in lieu of natural
13 ventilation as required by Sections 605, 705, 805, 905 and 1005
of the Building Code, the system shall be capable of supplying,
14 or exhausting where allowed by Table No. 10.1-D, the rate of out-
side air specified in Table No. 10.1-D to the occupied zone dur-
ing all times that the space is occupied. Occupant density shall
be taken from Table No. 10.1-D.

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

17 **EXCEPTION:** Ducts may terminate within 12 inches of the
intake to the HVAC unit provided they are physically fastened
so that the outside air duct is directed into the unit intake.

18 To consider higher occupant densities, desires for higher outside
19 air quantities per person, and HVAC systems with a ventilation
effectiveness of less than 100%, the maximum total air quantities
20 used as the basis for calculating heating and cooling design
loads and for sizing HVAC equipment shall not exceed three times
the quantities specified in Table No. 10.1-D.

21 **SOLID FUEL BURNING APPLIANCES AND FIREPLACES**

22 **Sec. 10.106 (a) General.** Solid fuel burning appliances and
23 fireplaces shall satisfy one of the following criteria:

24 (b) **Solid Fuel Burning Appliances.** Solid fuel burning appli-
25 ances shall be provided with each of the following:

26 1. Tight fitting glass or metal doors.

27 2. An outside source of combustion air directly connected to
28 the firebox, or tested and listed to the performance
requirements of the carbon monoxide test required by the
Department of Housing and Urban Development Mobile Home
Construction and Safety Standards.

EXCEPTION: If existing construction prohibits the introduction of outside combustion air directly to the appliance or the solid fuel burning appliance is part of the central heating system and is installed in an unconditioned space, combustion air may be supplied to the room in which the solid fuel burning appliance is located in lieu of direct ducting. 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 no less than four inches in diameter or the equivalent in area or as approved.

(c) **Fireplaces.** Fireplaces shall be provided with each of the following:

1. Tightly fitting flue dampers, operated by a readily accessible manual or approved automatic control.
2. An outside source for combustion air ducted into the firebox. The duct shall be at least six square inches, and shall be provided with an operable outside air duct damper.
3. Tightly fitting glass or metal doors, or flue draft induction fan or as approved for minimizing back-drafting.

EXCEPTION: Fireplaces with gas logs shall be installed in accordance with Chapter 8.

MINIMUM SOURCE SPECIFIC VENTILATION CAPACITY REQUIREMENTS
TABLE 10.1-A

	<u>Bathrooms</u>	<u>Kitchens</u>
Intermittently operating	50 cfm	100 cfm
Continuous operation	20 cfm	25 cfm

WHOLE HOUSE EXHAUST FAN PRESCRIPTIVE REQUIREMENTS
TABLE 10.1-B

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

PRESCRIPTIVE EXHAUST DUCT SIZING
TABLE 10.1-C

<u>Tested</u> <u>CFM @0.25 W.G.</u>	<u>Flex</u>		<u>Smooth</u>		<u>Elbows</u> ¹
	<u>Diameter</u>	<u>Maximum</u> <u>Length</u> <u>Feet</u>	<u>Diameter</u>	<u>Maximum</u> <u>Length</u> <u>Feet</u>	
50	4 inch	25	4 inch	70	3
50	5 inch	90	5 inch	100	3
50	6 inch	No limit	6 inch	No limit	3
80	4 inch ²	NA	4 inch	20	3
80	5 inch	15	5 inch	100	3
80	6 inch	90	6 inch	No limit	3
100	5 inch ²	NA	5 inch	50	3
100	6 inch	45	6 inch	No limit	3
125	6 inch	15	6 inch	No limit	3
125	7 inch	70	7 inch	No limit	3

¹For each additional elbow subtract 10 feet from length.

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

TABLE 10.1-D
OUTSIDE AIR REQUIREMENTS FOR VENTILATION¹

Application	Estimated Maximum Occupancy, persons per 1000 ft ² of net occupiable space	Outside Air Requirements
COMMERCIAL		
Dry Cleaners, Laundries³		cfm/person
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
Food and Beverage Service		
Dining rooms	70	20
Cafeteria, fast food	100	20
Bars, cocktail lounges ⁴	100	30
Kitchens (cooking) ⁵	20	15
Garages, Repair, Service Stations⁶		cfm/ft² floor
Enclosed parking garage		1.50
Auto repair rooms		1.50
Hotels, Motels, Resorts, Dormitories⁷		
For Group R Occupancy, see requirements in Sections 10.103 and 10.104		
		cfm/person
Lobbies	30	15
Conference rooms	50	20
Assembly rooms	120	15
Dormitory sleeping areas	20	15
Gambling casinos ⁴	120	30
Offices¹⁰		
Office space	7	20
Reception areas	60	15
Telecommunication centers and data entry areas	60	20
Conference rooms ⁴	50	20
Public Spaces		cfm/ft²
Corridors and utilities		0.05
		cfm/wc or urinal
Public restrooms ¹¹		50
		cfm/ft²
Locker and dressing rooms		0.5
		cfm/person
Smoking lounge ¹²	70	60
		cfm/ft²
Elevators ¹³		1.00
Retail Stores, Sales Floors, and Show Room Floors		
		cfm/ft²
Basement and street	30	0.30
Upper floors	20	0.20

TABLE 10.1-D (continued)
OUTSIDE AIR REQUIREMENTS FOR VENTILATION¹

Application	Estimated Maximum Occupancy, persons per 1000 ft ² of net occupiable space	Outside Air Requirements
COMMERCIAL (cont.)		
Storage rooms	15	0.15
Dressing rooms		0.20
Malls and arcades	20	0.20
Shipping and receiving	10	0.15
Warehouses	5	0.05
Smoking lounge ¹²	70	cfm/person 60
Specialty Shops		
Barber	25	15
Beauty	25	25
Reducing salons	20	15
Florists ¹⁴	8	15
Clothiers, furniture		cfm/ft ² 0.30
Hardware, drugs, fabric	8	15
Supermarkets	8	15
Pet shops		cfm/ft ² 1.00
Sports and Amusements¹⁵		
Spectator areas	150	cfm/person 15
Game rooms	70	25
Ice arenas (playing areas)		cfm/ft ² 0.50
Swimming pools (pool & deck area) ¹⁶		0.50
Playing floors (gymnasium)	30	cfm/person 20
Ballrooms and discos	100	25
Bowling alleys (seating areas)	70	25
Theaters¹⁷		
Ticket booths	60	20
Lobbies	150	20
Auditorium	150	15
Stages, studios	70	15
Transportation¹⁸		
Waiting rooms	100	15
Platforms	100	15
Vehicles	150	15
Workrooms		
Meat processing ¹⁹	10	15
Photo studios	10	15
Darkrooms	10	cfm/ft ² 0.50
Pharmacy	20	cfm/person 15
Bank vaults	5	15
Duplicating, printing ²⁰		cfm/ft ² 0.50

TABLE 10.1-D (continued)
OUTSIDE AIR REQUIREMENTS FOR VENTILATION¹

Application	Estimated Maximum Occupancy, persons per 1000 ft ² of net occupiable space	Outside Air Requirements
INSTITUTIONAL		
Education		cfm/person
Classroom	50	15
Laboratories ²¹	30	20
Training shop	30	20
Music rooms	50	15
Libraries	20	15
		cfm/ft ²
Locker rooms		0.50
Corridors		0.10
		cfm/person
Auditoriums	150	15
Smoking lounges ¹²	70	60
Hospitals, Nursing and Convalescent Homes²²		cfm/person
Patient rooms	10	25
Medical procedure	20	15
Operating rooms	20	30
Recovery and ICU	20	15
		cfm/ft ²
Autopsy rooms		0.50
		cfm/person
Physical Therapy	20	15
Correctional Facilities		
Cells	20	20
Dining halls	100	15
Guard stations	40	15

- 1 From ASHRAE Standard 62-1989. This table prescribes supply rates of acceptable outside air required for acceptable indoor air quality. These values have been chosen to control CO₂ and other contaminants with an adequate margin of safety and to account for health variations among people, varied activity levels, and a moderate amount of smoking. Rationale of CO₂ control is presented in ASHRAE Standard 62-1989.
- 2 Independent of room size; installed capacity for intermittent use.
- 3 Dry-cleaning processing may require more air.
- 4 Supplementary smoke-removal equipment may be required.
- 5 Makeup air for hood exhaust may require more ventilating air. The sum of the outside air and transfer air of acceptable quality from adjacent spaces shall be sufficient to provide an exhaust rate of not less than 1.5 cmf/ft².
- 6 Distribution among people must consider worker location and concentration of running engines; stands where engines are

TABLE 10.1-D (continued)
OUTSIDE AIR REQUIREMENTS FOR VENTILATION¹

run must incorporate systems for positive engine exhaust withdrawal. Contaminant sensors may be used to control ventilation.

7 See also food and beverage services, merchandising, barber and beauty shops, garages.

8 Independent of room size.

9 Installed capacity for intermittent use.

10 Some office equipment may require local exhaust.

11 Mechanical exhaust with no recirculation.

12 Normally supplied by transfer air, local mechanical exhaust with no recirculation recommended.

13 Normally supplied by transfer air.

14 Ventilation to optimize plant growth may dictate requirements.

15 When internal combustion engines are operated for maintenance of playing surfaces, increased ventilation rates may be required.

16 Higher values may be required for humidity control.

17 Special ventilation will be needed to eliminate special stage effects (e.g., dry ice vapors, mists, etc.)

18 Ventilation within vehicles may require special considerations.

19 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 requirement.

20 Installed equipment must incorporate positive exhaust and control (as required) of undesirable contaminants (toxic or otherwise).

21 Special contaminant control systems may be required for processes or functions including laboratory animal occupancy.

22 Special requirements or codes and pressure relationships may determine minimum ventilation rates and filter efficiency. Procedures generating contaminants may require higher rates.

23 Air shall not be recirculated into other spaces.

1 Section 64. Section 1101 of the Uniform Mechanical Code,
2 1991 Edition, is amended as follows:

3 **SCOPE**

4 **Sec. 1101.** This chapter applies to environmental air ventila-
5 tion systems that are not a part of a heating or cooling system
6 and to product-conveying duct systems. For commercial hood and
7 kitchen ventilation systems, see Chapter 20. For ventilation
8 (outdoor air quantities) see Seattle Mechanical Code Chapter 10.1.

9 Section 65. Section 1102 of the Uniform Mechanical Code,
10 1991 Edition, is amended as follows:

11 **DEFINITIONS**

12 **Sec. 1102.** For the purposes of this chapter, the following def-
13 initions apply:

14 **ENVIRONMENTAL AIR DUCT** is ducting used for conveying air at
15 temperatures not exceeding 250°F. to or from occupied areas of
16 any occupancy through other than heating or air-conditioning
17 systems, such as ventilation for human usage, domestic kitchen
18 range exhaust, bathroom or restroom exhaust ((ducts)), parking
19 garage exhaust, and domestic-type clothes dryer exhaust ((ducts)).

20 **FLAMMABLE VAPOR OR FUMES** is the concentration of flammable con-
21 stituents in air that exceeds 10 percent of its lower
22 flammability limit (LFL).

23 **PRODUCT-CONVEYING DUCT** is ducting used for conveying solid
24 particulates, such as refuse, dust, fumes and smoke; liquid par-
25 ticulate matter, such as spray residue, mists and fogs; vapors,
26 such as vapors from flammable or corrosive liquids; noxious and
27 toxic gases; and air at temperatures exceeding 250°F. These
28 include, but are not limited to, combustion engine, industrial
vacuum system, chemical booth, paint booth, paint enclosure or
photo-lab exhaust.

29 Section 66. Section 1104 of the Uniform Mechanical Code, 1991
30 Edition, is amended as follows:

31 **ENVIRONMENTAL AIR DUCT((S)) SYSTEMS**

32 **Sec. 1104.** Environmental air duct((s)) systems not regulated
33 by other provisions of this code shall comply with this section.
34 Ducts shall be substantially airtight and shall comply with the
35 provisions of Chapter 10. Exhaust ventilation duct((s)) systems
36 shall terminate outside the building and shall be equipped with
37 back-draft or motorized dampers. Environmental air ducts which
38 have an alternate function as a part of an approved smoke-control
39 system do not require design as Class 1 product-conveying ducts.

40 Ducts used for domestic kitchen range ventilation and domestic
41 clothes dryers shall be of metal and shall have smooth interior
42 surfaces. Commercial dryer exhaust ducts shall be installed in
43 accordance with their listing. For additional requirements for
44 domestic dryer exhaust systems, see Section 1903.

1
2 **EXCEPTION:** Approved flexible duct connectors not more
3 than 6 feet in length may be used in connection with domes-
tic dryer exhausts. Flexible duct connectors shall not be
concealed within construction.

4 ((Bathroom and laundry room exhaust ducts may be of gypsum wall-
board subject to the limitations of Section 1002 (a)-))

5 When gypsum products are exposed in ducts and plenums, the air
6 temperature shall be restricted to a range from 50°F to 125°F and
7 moisture content shall be controlled so that the material is not
8 adversely affected. For the purpose of this section, gypsum
9 products shall not be exposed in ducts serving exhaust from pub-
10 lic showers, swimming pools, jacuzzi rooms, and in other air
11 handling systems where the design engineer determines that the
12 temperature of the gypsum product will be below the dew point
13 temperature under normal operating conditions.

14 Exhaust ducts shall not extend into or through ducts or plenums.

15 **EXCEPTION:** Exhaust ducts conveying environmental air may
16 pass through a duct or plenum provided that:

- 17 1. The duct is maintained under sufficient negative
18 pressure to prevent leakage of the exhaust air to the
19 surrounding duct or plenum; or
- 20 2. If maintained under a positive pressure with respect to
21 the surrounding duct or plenum, the exhaust duct will be
22 sealed to prevent leakage; or
- 23 3. The surrounding air stream is an exhaust air stream not
24 intended for recirculation to the building and cross
25 contamination of the two air streams will not create a
26 hazardous condition.

27 Domestic kitchen vent systems shall be exhausted separately from
28 domestic dryer and bathroom vent systems. Fire dampers shall not
be installed in dryer or kitchen exhaust duct systems.

1 All duct systems used in life safety pressurization in
2 accordance with Section 1706(d) and 1807 of the Seattle Building
3 Code shall be of noncombustible materials. Gypsum products shall
4 be included as noncombustible material for the purpose of this
5 requirement.

6 Unless specifically installed to serve that space only,
7 environmental air systems and pressurization systems shall not be
8 located in hoistways, elevator mechanical rooms and elevator
9 machinery spaces.

10 **EXCEPTIONS:** 1. Pressurization ducts serving a hoistway
11 which are separated from the machinery room or space by a
12 construction equal to the rated construction of the
13 hoistway and so located that all required clearances are
14 maintained.

15 2. Pressurization duct openings, dampers and grilles may
16 be located in hoistways shaft walls provided the pressuri-
17 zation air does not impair the operation of the elevator.

1 Section 67. Subsection 1105(a) of the Uniform Mechanical
2 Code, 1991 Edition, is amended as follows:

3 **DESIGN OF PRODUCT-CONVEYING VENTILATION SYSTEMS**

4 **Sec. 1105. (a) General.** A mechanical ventilation or exhaust
5 system shall be installed to control, capture and remove emis-
6 sions generated from product use or handling when required by the
7 Building Code or Fire Code and when such emissions result in a
8 hazard to life or property. The design of the system shall be
9 such that the emissions are confined to the area in which they
10 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 construc-
tion. Exhaust ducts shall not extend into or through ducts and
plenums.

11 **EXCEPTION:** Ducts conveying vapor or fumes having flamma-
12 ble constituents less than 25 percent of their lower
flammability limit (LFL) may pass through other spaces.

13 Separate and distinct systems shall be provided for incompati-
ble materials.

14 Contaminated air shall not be recirculated to occupied
15 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.

16 Product conveying ventilation systems shall not be located in
17 hoistways, elevator mechanical rooms and elevator machinery space.

18 Section 68. Subsection 1105(c) of the Uniform Mechanical
19 Code 1991 Edition, is amended as follows:

20 **(c) Makeup Air.** Makeup air shall be provided to replenish air
exhausted by the ventilation system. Makeup-air intakes shall be
21 located so as to avoid recirculation of contaminated air within
enclosures. See Section 706(f) for prohibited sources. See
22 Sections 906(f)(g) for vent termination locations. See Section
1107(j) for exhaust outlet termination location.

23 Section 69. Section 1107 of the Uniform Mechanical Code, 1991
24 Edition, is amended as follows:

25 **PRODUCT-CONVEYING DUCTS**

26 **Sec. 1107. (a) Classification.** Product-conveying ducts shall be
classified according to their use, See Tables No. 11B, No. 11C
27 and Standard No. 10-2 as follows:

28 **Class 1.** Ducts conveying nonabrasives, such as smoke, spray,
mists, fogs, noncorrosive fumes and gases, light fine dusts or
powders.

1 **Class 2.** Ducts conveying moderately abrasive particulate in
2 light concentrations, such as sawdust and grain dust, buffing and
3 polishing dust.

4 **Class 3.** Ducts conveying Class 2 materials in high concentra-
5 tions and highly abrasive materials in low concentrations, such
6 as manganese, steel chips and coke.

7 **Class 4.** Ducts conveying highly abrasive material in high
8 concentrations.

9 **Class 5.** Ducts conveying corrosives, such as acid vapors.

10 **(b) Materials.** Materials used in product-conveying duct systems
11 shall be suitable for the intended use and shall be of metal.

12 **EXCEPTIONS:** 1. ((Asbestos-cement,)) concrete, clay or
13 ceramic materials may be used when it is shown that these
14 materials will be equivalent to metal ducts installed in
15 accordance with this chapter.

16 2. Ducts serving a Class 5 system may be constructed of
17 approved nonmetallic material when the corrosive character-
18 istics of the material being conveyed make a metal system
19 unsuitable and when the mixture being conveyed is
20 nonflammable.

21 Approved nonmetallic material shall be either a listed
22 product having a flame-spread index of 25 or less and a
23 smoke-developed rating of 50 or less on both inside and out-
24 side surfaces without evidence of continued progressive
25 combustion, or shall have a flame-spread index of 25 or less
26 and shall be installed with an automatic fire-sprinkler pro-
27 tection system inside the duct.

28 3. Ducts used in central vacuum-cleaning systems within a
dwelling unit may be of Schedule 40 PVC pipe. Penetrations
of fire walls, floor-ceiling or roof-ceiling assemblies
shall comply with Sections 4304 and 4305 of the Building
Code. Copper or ferrous pipes or conduits extending from
within the separation between a garage and dwelling unit to
the central vacuuming unit may be used.

Aluminum ducts shall not be used in systems conveying flammable
vapors, fumes or explosive dusts nor in Class 2, 3, or 4 systems.
Galvanized steel and aluminum ducts shall not be used when the
temperature of the material being conveyed exceeds 400°F.

Metal ducts used in Class 5 systems that are not resistant to
the corrosiveness of the product shall be protected with
appropriate corrosion-resistant materials.

(c) Construction. Ducts used for conveying products shall be of
substantial airtight construction and shall not have openings
other than those required for operation and maintenance of the
system. Ducts constructed of steel shall comply with Table No.
11-B or Table No. 11-C.

EXCEPTIONS: 1. Class 1 product-conveying ducts that
operate at less than 4 inches water column negative pressure
and convey noncorrosive, nonflammable and nonexplosive mate-
rials at temperatures not exceeding 250°F. may be con-
structed in accordance with the Table Nos. 10-A, 10-B, 10-E
or, with prior approval, UMC Standard No. 10-2, or may be a
concrete duct.

1 2. Ducts used in central vacuuming systems within a dwelling
2 unit may be constructed of Schedule 40 PVC pipe.

3 Penetrations of fire-resistive walls, floor-ceiling or roof-
4 ceiling assemblies shall comply with Sections 4304 and 4305
of the Building Code. Copper or ferrous pipes or conduit
extending from within the separation between a garage and
dwelling unit to the central vacuum unit may be used.

5 The use of rectangular ducts conveying particulates shall be
6 subject to approval of the building official. The design of rec-
tangular ducts shall consider the adhesiveness and buildup of
products being conveyed within the duct.

7 Aluminum construction may be used in Class 1 duct systems only.
8 The thickness of aluminum ducts shall be at least two Brown and
Sharpe gages thicker than the gages required for steel ducts set
forth in Tables No. 11-B and 11-C.

9 (d) **Fittings.** Fittings in Class 2, 3 and 4 systems shall be
10 not less than two gages thicker than the thickness required for
straight runs. Flexible metallic duct may be used for connecting
11 ductwork to vibrating equipment. Duct systems subject to wide
temperature fluctuations shall be provided with expansion joints.

12 Branches shall connect to main ducts at the large end of transi-
tions at an angle not exceeding 45 degrees.

13 Except for ducts used to convey noncorrosive vapors with no
14 particulate, accessible cleanouts shall be provided at 10-foot
intervals and at changes in direction. Access openings shall also
15 be provided for access to sprinklers and other equipment within
the duct which requires servicing.

16 (e) **Explosion Venting.** Ducts conveying explosive dusts shall
17 have explosion vents, openings protected by ant flashback swing
valves or rupture diaphragms. Openings to relieve explosive
18 forces shall be located outside the building. When relief
devices cannot provide sufficient pressure relief, ductwork shall
be designed to withstand an internal pressure of not less than
100 pounds per square inch.

19 (f) **Supports.** Spacing of supports for ducts shall not exceed
20 12 feet for 8-inch ducts nor 20 feet for larger ducts unless jus-
tified by the design. The design of supports shall assume that
21 50 percent of the duct is full of the particulate being conveyed.

22 (g) **Fire Protection.** Sprinklers or other fire-protection
23 devices shall be installed within ducts having a cross-sectional
dimension exceeding 10 inches when the duct conveys flammable
24 vapors or fumes. Sprinklers shall be installed at 12-foot inter-
vals in horizontal ducts and at changes in direction. In vertical
runs, sprinklers shall be installed at the top and at alternate
floor levels.

25 (h) **Clearances.** Ducts conveying flammable or explosive vapors,
26 fumes or dusts shall have a clearance from combustibles of not
less than 18 inches. This clearance may be reduced when the com-
27 bustible construction is protected in accordance with Table No.
5-B.

28 Ducts conveying products at temperatures exceeding 125°F. shall
have a clearance to combustible materials not less than the
following: 125°F. to 250°F.--1 inch; 251°F. to 600°F.--8 inches.
For temperatures exceeding 600°F., the clearance shall be not less
than required for chimneys in Table No. 9-C.

1 (i) **Protection from Physical Damage.** Ducts installed in loca-
2 tions where they are subject to physical damage shall be protected
by suitable guards. See also Section 508(b).

3 (j) **Exhaust Outlets.** Outlets for exhausts that exceed 600°F
4 shall be in accordance with Table No. 9-C.

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

6 1. Duct((s)) outlets conveying explosive or flammable vapors,
fumes, or dusts: 30 feet from property line; 10 feet from
7 operable openings into the building; 6 feet from exterior walls
or roofs; 30 feet from combustible walls or operable openings
8 into the building which are in the direction of the exhaust
discharge; 10 feet above adjoining grade and 10 feet from
9 mechanical air intake into the building which is in the direction
of the exhaust discharge. This includes carpentry shop exhaust,
industrial chemical lab, paint shop, and sandblasting exhaust
system.

10 2. Other product-conveying outlets: 10 feet from property line;
11 3 feet from exterior wall or roof; 10 feet from operable openings
into the building; 10 feet above adjoining grade and 10 feet from
12 mechanical air intake. This includes central vacuum system, dry
cleaner, photo lab, school chemical lab, and combustion engine
13 exhaust.

14 3. Environmental air duct exhaust outlets: 3 feet from property
line; 3 feet from operable openings into the building for all
15 occupancies other than Groups R and M; and 10 feet from a
mechanical air intake. This includes environment air ducts
16 regulated by Section 1104, except for parking garage exhaust out-
lets.

17 4. Parking garage exhaust outlets: 10 feet from a property
line; 10 feet from operable openings into a building, and 10 feet
18 from mechanical air intake. Exhaust outlets which extend to the
roof shall extend 3 feet above the roof.

19 (For the purpose of this section, property line shall include
any property line separating one lot from another lot but shall
20 not include any property line separating a lot from a public
street or alley right-of-way.)

21 Section 70. Subsection 1201(b) of the Uniform Mechanical
22 Code, 1991 Edition, is amended as follows:

23 **GENERAL**

24 (b) **Cooling Coils with Furnaces.** Cooling coils installed as a
portion of or in connection with a warm-air furnace shall also be
25 arranged to comply with the provisions of Chapter 7 and the
Seattle Energy Code.

26 Section 71. Subsection 1202(b) of the Uniform Mechanical Code,
27 1991 Edition, is amended as follows:

ACCESS

(b) **Filters, Fuel Valves and Air Handlers.** An unobstructed access space not less than 24 inches in width and 30 inches in height shall be provided to filters, fuel-control valves, and air-handling units. ((Refrigerant and brine piping control v)) Valves shall be accessible.

EXCEPTION: An access opening from the unobstructed access space which opens directly to such equipment may be reduced to 15 inches in the least dimension if the equipment can be serviced, repaired and replaced from this opening without removing permanent construction.

Section 72. Section 1202 of the Uniform Mechanical Code, 1991 Edition, is amended by adding a new subsection (f) as follows:

(f) **Vent Collar.** An unobstructed access space not less than 24 inches in width and 18 inches in height shall be provided to every cooling unit vent collar unless the vent collar is accessible from an access panel approved with the unit.

Section 73. Section 1205 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

CONDENSATE CONTROL

Sec. 1205. When a cooling coil or cooling unit is located in an attic or furred space where structural damage may result from condensate overflow, an additional watertight pan of corrosion-resistant metal shall be installed beneath the cooling coil or unit to catch the overflow condensate due to a clogged primary condensate drain, or one pan with a standing overflow and a separate secondary drain may be provided in lieu of the secondary drain pan. The additional pan or the standing overflow shall be provided with a drain pipe, minimum 3/4-inch nominal pipe size, discharging at a point which can be readily observed. This requirement is in addition to the requirements for condensate waste piping set forth in Section 510 of this code.

Section 74. Section 1206 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

RETURN AIR AND OUTSIDE AIR

Sec. 1206. (a) Source. A cooling unit shall be provided with outside air, return air, or both. Cooling systems regulated by this code and designed to replace required ventilation shall be arranged to discharge into the conditioned space not less than the amount of outside air specified in the Building Code.

(b) **Prohibited Sources.** The outside and return air for a cooling system or cooling unit shall not be taken from the locations specified in Section 706(f) as a prohibited source of air for a heating system.

1 (c) **Return-air Limitation.** Return air from one dwelling unit
2 shall not be discharged into another dwelling unit through the
3 cooling system.

4 ((d) **Air Velocity.** Cooling systems shall be designed and
5 constructed so that air velocity through filters does not exceed
6 the filter manufacturer's recommendations. Filters shall be
7 installed in other than portable cooling units.

8 (e)) (d) **Screen.** Required outside-air inlets shall be covered
9 with screen having 1/4-inch openings.

10 **EXCEPTION:** An outside-air inlet serving a nonresidential
11 portion of a building may be covered with screen having open-
12 ings larger than 1/4-inch but not larger than 1-inch.

13 (e) **Exhaust Outlets.** Every exhaust system shall terminate at a
14 point outside of the building not less than 3 feet from any
15 operable opening nor less than 10 feet from a outside air intake
16 and shall be located at a point where it will not cause a public
17 nuisance or hazard.

18 **EXCEPTIONS:** 1. Air which is to be used for return may be
19 discharged to a supply system.

20 2. Air which is suitable for return may be discharged
21 into a boiler room in such quantity as is required to
22 supply the needs of combustion.

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

25 4. Air for a conditioning unit condenser fan outlet may be
26 closer than 10 feet to an outside air intake or operable
27 building opening.

28 (f) **Duct Size.** Ducts for cooling systems shall be sized on the
29 basis of 1000 feet per minute maximum velocity for trunk ducts and
30 500 feet per minute for branch ducts unless otherwise approved.
31 The size of rigid fiberglass duct areas shall be increased by a
32 factor of 1.15. The size of flexible duct areas shall be
33 increased by a factor of 1.25.

34 Section 75. Section 1502 of the Uniform Mechanical Code, 1991
35 Edition, is amended as follows:

36 REFRIGERANTS

37 **Sec. 1502.** The refrigerant used shall be of a type listed in
38 Section 1503 unless the building official finds that a proposed
39 refrigerant is no more hazardous to life, limb, health or property
40 than the type listed.

41 Substitution of the kind of refrigerant in a system shall not be
42 made without the permission of the building official, the user,
43 and the makers of the original equipment, and due observance of
44 safety requirements.

45 Section 76. Section 1503 of the Uniform Mechanical Code,
46 1991 Edition, is amended by adding a new subsection (c) as
47 follows:

1 **CLASSIFICATION OF REFRIGERANTS**

2 (c) **Group 3.** The following shall be classified as Group 3
3 refrigerants.

4

REFRIGERANT DESIGNATION	NAME	CHEMICAL FORMULA
R-170	Ethane	C ₂ H ₆
R-290	Propane	C ₃ H ₈
R-600	Butane	C ₄ H ₁₀
R-600a	Isobutane	CH(CH ₃) ₃
R-1150	Ethylene	C ₂ H ₄
R-1270	Propylene	C ₃ H ₆

11

12 Section 77. Subsection 1504 (c) of the Uniform Mechanical
13 Code, 1991 Edition, is amended as follows:

14 **GENERAL**

15 (c) **Prohibited Locations.** Refrigerating systems and portions
16 thereof shall not be located in an elevator shaft, dumbwaiter
shaft or a shaft having moving objects therein, nor in a location
17 where it will be subject to mechanical damage((-)), nor in a
stairway, required exit, corridor or lobby.

18 EXCEPTION: Unit systems containing not more than a maximum
19 quantity of a Group 1 refrigerant specified in Table No. 15-A
may be located in a corridor or lobby provided they shall be
in a location which shall not interfere with free passage
through those areas nor reduce required exit width.

20 Electrically energized components of refrigerating systems shall
21 not be placed in a hazardous location unless listed for such
location.

22 Section 78. Section 1504 of the Uniform Mechanical Code, 1991
23 Edition, is amended by adding new subsection(s) (g) and (h) as
24 follows:

25 (g) **Pressure Vessels.** Pressure vessels which are a part of a
26 refrigeration system shall conform to the construction
requirements of Chapter 21, Appendix B, of this mechanical code.

27 (h) **Design Pressure.** 1. Design pressures shall be selected
28 high enough for all operating and standby conditions. When
selecting the design pressure, consideration shall be given to
allowances for setting pressure-limiting devices and pressure-

1 relief devices sufficiently above operating conditions to avoid
2 nuisance shutdowns and for shipping conditions.

3 Minimum design pressure shall not be less than 15 psig, and,
4 except as noted in Items 2, 3, and 4, shall not be less than the
5 saturation pressure of the refrigerant at the following tempera-
6 tures:

7 A. Low sides of all systems - +80F (26.5°C).

8 B. High sides of water or evaporatively cooled systems - +105F
9 (40.5°C).

10 C. High sides of air-cooled systems - +125F (51.5°C).

11 Corresponding pressures are given in Table No. 15-F for the
12 refrigerants in common use.

13 For the purpose of this section:

14 A. All operating conditions are intended to cover maximum
15 pressures attained under any anticipated normal operating
16 conditions.

17 B. Standby conditions are intended to include conditions which
18 may be attained in the system when not operating, including
19 pressure developed in the low side of the system resulting
20 from equalization after the system has stopped.

21 C. Shipping conditions are intended to include consideration of
22 maximum pressures attainable due to anticipated environmental
23 conditions during transit.

24 2. The design pressure for either the high or low side need not
25 exceed the critical pressure of the refrigerant unless the system
26 is intended to operate at these conditions.

27 3. When a part of a limited charged system is protected by a
28 pressure-relief device, the design pressure of that part need not
exceed the setting of the pressure-relief device.

4. When a compressor is used as a booster to obtain a low
pressure and it discharges into the suction side of another sys-
tem, the booster compressor shall be considered a part of the low
side. A low pressure stage compressor of the positive
displacement type must be protected by a pressure-relief device.
(See Sec. 1515.)

5. Any components connected to pressure vessels shall have a
design pressure equal to or greater than the pressure vessels._

Section 79. Section 1505 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

GROUP 1 REFRIGERANTS

Sec. 1505. (a) General. Condensing units or combinations of
refrigerant interconnected condensing units totaling 100 or more
horsepower rating which contain a Group 1 refrigerant shall be
enclosed in a refrigeration machinery room.

1 **EXCEPTIONS:** The requirement shall not apply to: 1. A con-
2 densing unit located outside of a building or on the roof of
3 a building and not less than 20 feet from a door, window or
4 ventilating air opening in a building.

5 2. A condensing unit located in a building used exclus-
6 ively for ice making or cold storage together with the usual
7 accessory rooms in connection therewith.

8 3. A Group B, Division 2 or 4 Occupancy, if the quantity
9 of refrigerant does not exceed 30 pounds for each 1000 cubic
10 feet of space in the room in which the condensing unit is
11 located.

12 A Group 1 refrigerant, other than carbon dioxide, shall be
13 classed in Group 2 if: (1) it is used in a Group E or I
14 occupancy; and (2) the room in which any portion of the system is
15 located contains an apparatus for producing an open flame; and
16 (3) more than 1 pound of a Group 1 refrigerant other than carbon
17 dioxide is used in the system.

18 **EXCEPTION:** The flame-producing apparatus is provided with
19 a hood and flue capable of removing the products of
20 combustion to the open air.

21 (b) **Direct Systems.** The maximum quantity of a Group 1 refrig-
22 erant in a direct system in occupancies other than Group I shall
23 not exceed that set forth in Table No. 15-A.

24 Direct systems in Group I Occupancies shall be limited to sys-
25 tems each containing not more than 50 percent of the permissible
26 quantities of Group 1 refrigerants set forth in Table No. 15-A.
27 When the refrigerant-containing parts of a system are located in
28 one or more enclosed spaces, the cubical content of the smallest
29 enclosed humanly occupied space other than the room in which the
30 refrigeration equipment is located, shall be used to determine
31 the permissible quantity of refrigerant in the system. When a
32 refrigerating system has evaporator coils serving individual sto-
33 ries of a building, the story having the smallest volume shall be
34 used to determine the maximum quantity of refrigerant in the
35 entire system.

36 When the evaporator is located in an air-duct system, the cub-
37 ical content of the smallest humanly occupied enclosed space
38 served by the air-duct system shall be used to determine the per-
39 missible quantity of refrigerant in the system. Return air space
40 above a suspended ceiling may be included in calculating the
41 cubical content of the humanly occupied space when it is one
42 continuous space and is not an enclosed air duct in which the
43 return air is confined.

44 **EXCEPTION:** If the air flow to any enclosed space served by
45 a portion of an air-duct system cannot be shut off or reduced
46 below one-quarter of its maximum, the cubical contents of the
47 entire space served by that portion of the air-duct system
48 may be used to determine the permissible quantity of refrig-
49 erant in the system.

50 A system containing more than the quantity of a Group 1 refrig-
51 erant permitted by the foregoing provisions shall be of the indi-
52 rect type.

53 Section 80. Section 1506 of the Uniform Mechanical Code,
54 1991 Edition, is amended as follows:

1 **GROUP 2 AND GROUP 3 REFRIGERANTS**

2 **Sec. 1506. (a) General.** A mechanical refrigerating system or
3 unit refrigerating system containing a Group 2 or Group 3
4 refrigerant shall not be located within a building unless all
5 refrigerant-containing portions of the system are enclosed in a
6 refrigeration machinery room. Such systems when installed out-
7 side of a building shall be located at least 20 feet from an exit
8 door, window or ventilating-air inlet in a building.

9 **EXCEPTION:** This shall not apply to a building used exclu-
10 sively for ice making, cold storage or for the manufacturing
11 or processing of food or drink, provided the occupant load
12 does not exceed one person per 100 square feet of floor area
13 served by such system. Portions of refrigerating systems
14 containing Group 2 or Group 3 refrigerants shall not be
15 located in an exit.

16 Direct refrigeration systems containing Group 2 or Group 3
17 refrigerants shall not serve an air-cooling or air-conditioning
18 system used for human comfort.

19 Group 3 refrigerants shall not be used in any Group A, E, I, R
20 or B, Division 2 occupancies.

21 **EXCEPTION:** Group 3 refrigerants may be used in
22 laboratories classified as Group B, Division 2 Occupancies
23 if: (1) the number of persons does not exceed one person
24 per 100 square feet of laboratory floor area; and (2) the
25 refrigerants are used in a unit system which does not
26 contain more than 6 pounds of refrigerants.

27 When the quantity of flammable refrigerant in any one
28 refrigerating system exceeds the maximum in Table 15-E for each
29 1000 cubic feet of room volume, the room where the system is
30 installed shall be considered a Class I, Division 2 location by
31 the Electrical Code. All electrical equipment in the room shall
32 conform to the requirements of Class I, Division 2 of the
33 Electrical Code. Flame-producing devices and surfaces hotter
34 than 800 degrees F shall not be permitted within the room.

35 **EXCEPTION:** Refrigeration machinery rooms which contain
36 more than the maximum amount of refrigerant in Table 15-E
37 will not be considered Class I, Division 2 locations.

38 Where ammonia is used in a refrigeration system, parts that
39 contain refrigerant shall be installed in a refrigeration
40 machinery room that meets the provisions of Sections 1507, 1508
41 and 1509. Flame-producing apparatus shall not be permanently
42 installed or operated in the machinery room.

43 **EXCEPTION:** Refrigeration machinery rooms are not required
44 for piping, evaporators and refrigerant-containing
45 components which are installed outside the building.

46 **(b) Masks or Helmets.** At least two masks or helmets shall be
47 provided at a location convenient to any refrigeration machinery
48 room where the amount of a Group 2 refrigerant exceeds 100 lbs.
49 Only complete helmets or masks marked as approved by the Bureau
50 of Mines of the United States Department of the Interior and
51 suitable for the refrigerant employed shall be used. They shall
52 be kept in a suitable cabinet immediately outside the
53 refrigeration machinery room or other approved accessible loca-
54 tion. Canisters or

1 cartridges of helmets or masks shall be renewed immediately after
2 having been used or the seal broken and, if unused, the canisters
3 shall be renewed not later than the date noted on the canister
4 labels.

5 (c) Refrigerated Work Areas. Areas through which piping for a
6 Group 2 or Group 3 refrigerant is run shall be considered a
7 refrigerated work area.

8 In refrigerated work areas where refrigerants in Table No. 15-E
9 are used, the area shall be considered a Class I, Division 2
10 location as defined in the Electrical Code, and all electrical
11 equipment in the room shall conform to the requirements for a
12 Class I, Division 2 location. When any refrigerant other than
13 those listed in Table No. 15-E is used, the area shall be
14 considered a "Non-Hazardous (Unclassified) Location" in
15 accordance with the Electrical Code.

16 When any Group 2 or Group 3 refrigerant is used, means shall be
17 taken to adequately safeguard piping, controls, and other
18 refrigeration equipment in working areas to minimize the
19 possibility of accidental damage or rupture from external sources.

20 Section 81. Section 1507 of the Uniform Mechanical Code, 1991
21 Edition, is amended as follows:

22 REFRIGERATION MACHINERY ROOMS

23 **Sec. 1507.** Required refrigeration machinery rooms shall be of
24 at least one-hour fire-resistive construction, provided with doors
25 complying with the ((Uniform)) Building Code Section 3305(h) and
26 having no other openings that will permit the passage of escaping
27 refrigerant to other parts of the building.

28 No open flame, spark-producing device or heating surface hotter
29 than 800 degrees F shall be located within a refrigeration
30 machinery room, where a refrigerant other than carbon dioxide is
31 used.

32 **EXCEPTION:** The flame is enclosed so that the products of
33 combustion are vented to the open air.

34 There shall be no direct opening between a machinery room
35 containing Group 2 or 3 refrigerant and a room or space in which
36 there is an open flame, spark-producing device or heating surface
37 hotter than 800°F. A refrigeration machinery room containing
38 Group 2 or Group 3 refrigerants shall have at least two means of
39 egress located at least one-fifth the perimeter of the room
40 apart. Exit doors shall be at least 3 feet by 6 feet 8 inches.

41 Refrigeration machinery rooms containing Group 1 refrigerants
42 shall have an exit door at least 3 feet by 6 feet 8 inches.

43 A refrigeration machinery room door shall open in the direction
44 of egress.

45 A refrigeration machinery room shall have an area of at least 50
46 square feet.

47 An unobstructed working space at least 2 feet 6 inches in width
48 and at least 7 feet in height shall be provided around two adja-
cent sides of all moving machinery in a refrigeration machinery
room.

Section 82. Section 1508 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

((EMERGENCY)) REFRIGERATION MACHINERY ROOM VENTILATION

Sec. 1508. Refrigeration machinery rooms shall be provided with means of ~~((emergency))~~ ventilation to the outside of the building. Such ventilation shall ~~((be either of the following:))~~ also incorporate provision for emergency ventilation. The following requirements 1 and 2 may be combined in one system.

1. ~~((A separate and individual))~~ An emergency exhaust system ((of ventilation)) serving no other area and having the capacity to provide a complete change of air in such room at least once every five minutes and discharge to the outside of the building at a location not less than 20 feet from any ~~((exterior door, window or ventilation air inlet))~~ operable opening or mechanical air intake in any building. Provisions shall be made for makeup air to replace that being exhausted. Each exhaust ventilation system shall be controlled by a readily accessible emergency ventilation switch located within 2 feet of the switch specified in Section 1509, and the switch shall be labeled to comply with Section 1519.

2. A mechanical ventilation system or gravity ventilation openings to the outside of the building shall be sized in accordance with Table No. 15-B based on accumulated horsepower in the rooms with refrigeration units.

Gravity openings shall be so installed that approximately one half of the required area is located within 12 inches of the ceiling and one half of the required area is located within 12 inches of the floor of the room. Every portion of the lower opening shall be horizontal or slope downward from the opening in the refrigeration machinery room to the exterior of the building at or above the adjacent ground level.

Equipment and components located in a refrigeration machinery room shall be protected from freezing or other low temperature damage.

3. Where gravity ventilation is not provided, operation of the mechanical ventilation shall occur anytime space is occupied or operations or maintenance personnel are present.

Section 83. Section 1509 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

EQUIPMENT IN A REFRIGERATION MACHINERY ROOM

Sec. 1509. Combustion air shall not be taken from a refrigeration machinery room. [See Section 603(c).]

No open flames or apparatus to produce an open flame shall be installed in a refrigeration machinery room where any refrigerant other than carbon dioxide is used unless the flame is enclosed so that the products of combustion are vented to the open air.

Electrical equipment or electrical control or control panel other than listed below shall not be located in a refrigeration machinery room:

1. Lights and receptacles.
2. Machinery room exhaust fans and blowers.
3. A refrigerating condensing unit or portion thereof.
4. Circulating pumps for condensers, cooling towers or cooling coils.
5. Air compressors serving only automatic controls within the refrigerating or cooling system.
6. Electrically operated valves for the control of a refrigerant or for the control of the circulation of a cooling fluid.
7. Blowers and fans for cooling towers or for condensers.
8. An electric control or control panel for the above items.

A readily accessible single emergency refrigeration control switch shall be provided to shut off electrically operated machinery in a refrigeration machinery room, except the exhaust ventilation system complying with Section 1508. Such switch shall be controlled from a point outside of, and within 10 feet of, the required exit from the refrigeration machinery room it serves, and the switch shall be labeled to comply with Section 1519. For other requirements concerning the location of this switch, see the Electrical Code.

EXCEPTION: For refrigeration machinery rooms containing Group 1 refrigerants, the main disconnect may serve as the emergency control switch.

Section 84. Section 1510 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

REFRIGERANT PIPING, CONTAINERS AND VALVES

Sec. 1510. Materials used in the construction and installation of refrigerating systems shall be suitable for the refrigerant in the system, and no material or equipment shall be installed which will deteriorate due to the chemical action of the refrigerant or the oil, or combination of both.

Copper and brass refrigerant piping valves, fittings and related parts used in the construction and installation of refrigerating systems shall be approved for such use. (See "Refrigeration Piping" in the list of reference standards in Appendix C of this code.)

Aluminum, zinc, or magnesium shall not be used in contact with methyl chloride in a refrigerating system. Magnesium alloys shall not be used in contact with any halogenated refrigerant.

Iron and steel refrigerant piping shall comply with the requirements of U.M.C. Standard No. 15-1. Pipe more than 2 inches iron pipe size shall be electric resistance welded, or seamless pipe. Butt welded steel, other than open hearth type which is not rephosphorized, or wrought iron pipe shall not be used for evaporator or condenser coils.

1 Pipe subject to working pressure in excess of 300 pounds per
2 square inch shall have a minimum wall thickness not less than that
specified in U.M.C. Standard No. 15-1; Table No. 15-1-A for
Schedule 80 pipe.

3 Iron or steel refrigerant piping 1-1/2-inch nominal size and
4 smaller and containing liquid refrigerant shall have a minimum
5 wall thickness not less than that specified in U.M.C. Standard
No. 15-1; Table No. 15-1-A for Schedule 80 pipe, or Schedule 40
pipe if all field joints are welded.

6 Brass pipe, copper pipe and copper tubing shall conform to the
7 requirements of U.M.C. Standard No. 15-2. Brass pipe and copper
8 pipe subject to working pressures exceeding 250 pounds per square
inch shall be at least extra-strong pipe. Copper water tubing
used for refrigerant piping shall be Type K or L and shall be
free from scale and dirt.

9 Soft annealed copper tubing regulated by this section shall be
10 limited to 1-3/8-inch nominal size. No mechanical joint shall be
made on material larger than 3/4-inch nominal size.

11 Soft annealed copper tubing conveying refrigerant shall be
12 enclosed in iron or steel piping and fittings or in conduit, mold-
ing or raceway which will properly protect such tubing against
mechanical injury from an exterior source.

13 **EXCEPTIONS:** The requirements of this section shall not
14 apply to: 1. Tubing entirely within a refrigerator or tub-
ing within 5 feet of a refrigerant compressor where so
located that it is not subject to external injury.

15 2. Tubing serving a dwelling unit, when such tubing con-
16 tains Group 1 refrigerant and is placed in locations not
subject to damage from an external source.

17 Joints and all refrigerant-containing parts of a refrigerating
18 system located in an air duct carrying conditioned air to and
from a humanly occupied space shall be constructed to withstand a
temperature of 700°F without leakage into the air stream.

19 Section 85. Section 1511 of the Uniform Mechanical Code, 1991
20 Edition, is amended as follows:

21 **ERECTION OF REFRIGERANT PIPING**

22 **Sec. 1511.** Piping and tubing shall be installed so as to pre-
vent excessive vibration and strains at joints and connections.

23 Piping and tubing shall be securely fastened to a permanent sup-
24 port within 6 feet following the first bend in such tubing from
the compressor, and within 2 feet of each other bend or angle.
25 Piping and tubing shall be supported at points not more than 15
feet apart.

26 Refrigerant piping crossing an open passageway in a building
27 shall be at least 7-1/2 feet above the floor unless against the
ceiling of such space.

28 Refrigerant piping and tubing shall be installed so that it is
not subject to damage from an external source.

1 Refrigerant piping and joints connected and installed in the
2 field shall be exposed to view for visual inspection and accep-
tance by the building official prior to being covered or
enclosed.

3 **EXCEPTION:** This shall not apply to soft annealed copper
4 tubing enclosed in iron or steel piping conduit, molding or
raceway, provided there are no fittings or joints concealed
therein.

5 ((Copper tubing containing other than a Group 1 refrigerant shall
6 not be located in a public hallway, lobby or stairway of a
building unless enclosed in iron or steel piping and fittings or
in metal rigid conduit.

7 **EXCEPTION:** This section shall not apply to hard-drawn
8 copper tubing installed in locations where not subject to
injury from an external source.))

9 Refrigerant piping shall not be placed in any elevator or dumb-
10 waiter, hoistway or other shaft containing a moving object, or in
11 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.

12 **EXCEPTION:** Refrigerant piping may pass across a public
13 corridor, provided there shall be no joints in the section
14 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.

15 Refrigerant piping shall not be installed vertically through
floors from one story to another.

16 **EXCEPTIONS:** 1. It may be installed from the basement to
17 the first floor, from the top floor to a machinery penthouse
18 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 Chapter 17 of the Building Code.

19 2. Piping which interconnects separate pieces of
20 equipment may be carried in approved rigid and tight
21 continuous fire-resisting pipe duct or shaft. The pipe duct
22 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.

23 3. Piping of direct systems containing Group 1
24 refrigerants as regulated by Sec. 1505(b), need not be
25 enclosed where it passes through space served by that sys-
tem.

26 Iron or steel refrigerant piping placed underground shall be
coated with sufficient asphalt paint or equal to inhibit
corrosion.

27 Iron or steel pipe joints shall be threaded, flanged or welded.
28 Threaded joints shall be of an approved type. (See Pipe Threads
in Reference Standards, Appendix C of this code.) Exposed
threads shall be tinned or otherwise coated to inhibit corrosion.

1 Welds shall be of an approved type. (See Refrigeration Piping
in Reference Standards, Appendix C of this code.)

2 Copper or brass pipe of iron pipe size shall be threaded,
3 flanged or brazed.

4 Tubing joints and connections shall be flared, lapped or swagged
brazed joints.

5 **EXCEPTION:** Soldered joints may be used to connect a valve
located outside of an air-conditioning duct or plenum to
6 adjoining tubing in a refrigerating system containing Group 1
refrigerant other than carbon dioxide.

7 Section 86. Section 1512 of the Uniform Mechanical Code, 1991
8 Edition, is amended as follows:

9 **REFRIGERANT CONTAINERS AND RECEIVERS**

10 **Sec. 1512.** A refrigerant container or evaporator which is not a
part of listed equipment shall be constructed in accordance with
11 approved standards.

12 Liquid receivers or parts of a system designed to receive the
refrigerant charge during pumpdown shall have sufficient capacity
to receive the charge without the liquid occupying more than 80%
13 of the volume when the temperature of the refrigerant is 90°F.

14 Section 87. Section 1513 of the Uniform Mechanical Code, 1991
15 Edition, is amended as follows:

16 **REFRIGERANT CONTROL VALVES**

17 **Sec. 1513.** Stop valves shall be installed in the refrigerant
piping of refrigerating systems at the following locations:

18 1. At each inlet and outlet of every positive-displacement-type
19 compressor.

20 **EXCEPTIONS:** Group 1 systems containing less than 100
pounds of refrigerant.

21 2. At each refrigerant outlet from a receiver.

22 3. At each refrigerant inlet of a pressure vessel containing
liquid refrigerant and having an internal gross volume exceeding
23 3 cubic feet, which vessel is a portion of a refrigerating system
equipped with a positive-displacement-type of compressor.

24 Stop valves installed in refrigerant lines composed of copper
tubing 3/4-inch or less outside diameter shall be securely and
25 independently supported by tubing or piping connected to such
valve.

26 Stop valves shall be suitably labeled if it is not obvious what
they control. Numbers may be used to label the valves provided a
27 key to the numbers is located near the valves.

28 Liquid level gage glasses, except those of the bull's-eye or
reflex type, shall have automatic closing shut-off valves, and
such glasses shall be protected against damage.

1 Section 88. Section 1514 of the Uniform Mechanical Code, 1991
2 Edition, is amended as follows:

3 **PRESSURE-LIMITING DEVICE**

4 **Sec. 1514.** A pressure-limiting device shall be installed on a
5 positive displacement refrigerant compressor which is a portion
6 of:

7 1. A refrigerating system containing Group 2 refrigerant.

8 2. An air-cooled refrigerating system containing Group 1
9 refrigerant((7)) either of 10 horsepower or more rating((7)) or
10 containing 20 pounds or more of refrigerant.

11 3. A water-cooled refrigerating system containing Group 1
12 refrigerant((7)) either of three horsepower or more rating((7)) or
13 containing 3 pounds or more of refrigerant.

14 A pressure-limiting device shall stop the action of the compres-
15 sor it serves at a pressure not exceeding that indicated in Table
16 No. 15-C for the refrigerant.

17 A stop or shutoff valve shall not be placed between a pressure-
18 limiting device required by this section and the compressor it
19 serves.

20 Section 89. Section 1515 of the Uniform Mechanical Code, 1991
21 Edition, is amended as follows:

22 **PRESSURE-RELIEF VALVES - COMPRESSORS**

23 **Sec. 1515.** The following compressors of the positive-
24 displacement type shall be equipped with a pressure relief valve:

25 1. A Group 1 refrigerant compressor of 20 or more horsepower
26 rating which is a portion of a refrigerating system operating at
27 a pressure exceeding 15 pounds per square inch in the high-
28 pressure side of the system.

29 2. A compressor which is a portion of a refrigerating system
30 containing Group 2 refrigerant.

31 **EXCEPTION:** The requirements of this section shall not
32 apply to a compressor listed without such relief valve.

33 A pressure-relief valve shall be connected to the refrigerant
34 discharge side of the compressor it serves, between such compres-
35 sor and a stop valve.

36 A pressure-relief valve required by this section shall discharge
37 into the low-pressure side of the refrigerating system it serves
38 or discharge to the outside of the building as required by this
39 code. A pressure-relief device that discharges from the high-
40 pressure side of the refrigerating system into the low-pressure
41 side must be of a type that is not appreciably affected by back
42 pressure.

43 A pressure-relief valve required by this section shall be set to
44 function at a pressure not exceeding the pressure set forth in
45 Table No. 15-C corresponding to the portion of the refrigerating
46 system in which such valve is located and the kind of refrigerant
47 contained in the system.

1 A stop or shutoff valve shall not be installed between a
2 pressure-relief valve required by this section and the compressor
it serves.

3 A pressure-relief valve required by this section that termi-
4 nates outdoors, shall discharge at a location not less than 15
feet above the adjoining ground level and not less than 20 feet
from any operable window, ventilation opening or exit from a
building.

5 Section 90. Section 1516 of the Uniform Mechanical Code, 1991
6 Edition, is amended as follows:

7 **PRESSURE-RELIEF DEVICES - PRESSURE VESSELS**

8 **Sec. 1516.** A pressure vessel over 6 inches in diameter which
9 may be shut off by valves from other parts of the system shall be
equipped with a pressure-relief device or devices complying with
10 requirements of this code.

11 Pressure vessels of 3 cubic feet or less gross volume containing
liquid refrigerant shall be equipped with either a pressure-relief
12 valve, fusible plug or rupture member, provided, however, that a
fusible plug is permitted only on the high-pressure side of the
refrigerating system.

13 Pressure vessels having a gross volume greater than 3 cubic feet
14 shall be equipped with a pressure-relief valve or rupture member.

15 In systems with pressure vessels having a gross volume of more
than 10 cubic feet which employ a pressure-relief valve, a relief
16 device system consisting of a pressure-relief valve in parallel
with a second pressure-relief valve as described in Section 1517
shall be provided.

17 In Group A, E or I Occupancies, direct expansion coils or
18 evaporators used for air conditioning and located downstream from,
and in proximity to, a heating coil, or located upstream within 18
19 inches of a heating coil, shall be fitted with a pressure relief
device discharging to the outside of the building in an approved
manner.

20 **EXCEPTION:** A relief device shall not be required on unit
21 or self-contained systems if the internal volume of the low
22 side of the system which may be shut off by valves, divided
23 by the total weight of refrigerant in the system less the
weight of refrigerant vapor contained in the other parts of
the system at 110°F (43.5°C) exceeds the specific volume of
the refrigerant at critical conditions of temperature and
pressure.

24
25 Section 91. Section 1517 of the Uniform Mechanical Code, 1991
Edition, is amended as follows:

26 **PRESSURE-RELIEF DEVICE REQUIREMENTS**

27 **Sec. 1517. (a) Pressure Setting.** Except as provided in this
28 section, a pressure-relief device for a refrigerant vessel shall
be set to function at a pressure not exceeding that set forth in
Table

No. 15-C for the portion of the system to which the device is connected and for the refrigerant in the container.

Pressure-relief devices may be set to start to function at a pressure not to exceed the design working pressure of the pressure vessel as determined by the manufacturer and stamped on the pressure vessel.

(b) Discharge Capacity. 1. The minimum required rated discharge capacity of the pressure-relief device or fusible plug for a refrigerant-containing vessel shall be determined by the following:

$$C = f \times D \times L$$

WHERE:

C = minimum required discharge capacity of the relief device in pounds of air per minute.

D = outside diameter of the vessel in feet.

L = outside length of the vessel in feet.

f = factor depending upon kind of refrigerant as follows:

Kind of Refrigerant	Value of f
Ammonia	0.5
R-12, R-22 and R-500	1.6
R-502	2.2
Other refrigerants	1.0

2. The rated discharge capacity of a rupture member or fusible plug discharging to atmosphere under critical flow conditions in pounds of air per minute shall be determined by the following formulas:

$$C = 0.8 P_1 d_2$$

$$d = 1.12 C/P_1$$

WHERE C = rated discharge capacity in pounds of air per minute.
d = smallest of the internal diameter of the inlet pipe, retaining flanges, fusible plug, or rupture member in inches.

WHERE for rupture members

$P_1 = (\text{Rated pressure PSIG} \times 1.10) + 14.7, \text{ PSIA}$
for fusible plugs

$P_1 =$ absolute saturation pressure, corresponding to the stamped temperature melting point of the fusible plug or the critical pressure of the refrigerant used, whichever is smaller, PSIA

(c) Labeling. A pressure-relief device shall bear thereon:

1. Name or trademark of the manufacturer of such device.

2. The discharge or bursting pressure setting of the device expressed in pounds per square inch gage.

3. The minimum nominal diameter of the discharge outlet or opening of such valve.

1 4. The discharge capacity of the pressure-relief device in
2 pounds of air per minute.

3 5. Fusible plugs shall be marked with the melting temperature
4 in degrees F.

5 A pressure-relief valve shall be set and sealed by the
6 manufacturer of the valve or such valve may be set and sealed in a
7 laboratory approved by the building official, provided such valve
8 is properly relabeled.

9 (d) Discharge Location. A pressure-relief device required by
10 this section for a pressure vessel of 3 cubic feet gross volume or
11 more containing Group 1 refrigerant or a pressure vessel contain-
12 ing any Group 2 or Group 3 refrigerant shall discharge to the
13 atmosphere at a location not less than 15 feet above the adjoin-
14 ing ground level and at least 20 feet from a operable window,
15 ventilation opening or exit from a building.

16 (e) Discharge Device - Design and Installation. A pressure-
17 relief device required by this section shall be connected as close
18 as practicable to the refrigerant container or evaporator it
19 serves and above the refrigerant level in such container or
20 evaporator.

21 ((A stop or shutoff valve shall not be placed between a pressure-
22 relief device required by this section and the pressure vessel it
23 serves.))

24 Stop valves shall not be located between the means of pressure
25 relief and the part or parts of the system protected thereby,
26 except when the parallel relief devices mentioned in Section 1516
27 are so arranged that only one can be rendered inoperative at a
28 time for testing or repair purposes.

 The discharge pipe from pressure-relief devices shall be not
less than the size of the relief-device outlet. The discharge
from more than one relief device may be run into a common header,
the area of which shall be at least the sum of the areas of the
pipes connected thereto. When the length of the discharge piping
exceeds 50 feet, such piping shall be increased one pipe size.

 Piping and fittings used as relief-device discharge piping shall
conform to Section 1510 of this code.

 Section 92. Subsection 1518(a) of the Uniform Mechanical
Code, 1991 Edition, is amended as follows:

MANUAL DISCHARGE OF CARBON DIOXIDE OR GROUP 2 REFRIGERANTS

Sec. 1518. (a) Discharge to Atmosphere. ((A)) Where parallel
pressure relief valves are not provided, a refrigerating system
located in a building and containing carbon dioxide or a Group 2
refrigerant shall be equipped with means for manual discharge of
the refrigerant to the atmosphere. Such discharge system shall
comply with the following requirements:

1. A discharge pipe shall be provided above the liquid refriger-
ant level from both the high- and low-pressure sides of the system
and the pipes shall extend into an emergency refrigerant control
box complying with this section. Each discharge pipe shall have a
minimum nominal diameter of 1 inch.

1 2. A readily accessible stop valve and a high-pressure gage
2 shall be installed on each discharge pipe within the emergency
3 refrigerant control box. The gage shall be located ahead of each
4 stop valve and the valves shall have the same capacity as the
discharge pipe it serves. A permanent label shall be attached to
each valve reading "Discharge Valve to Atmosphere," and shall
indicate the side of the system to which it is connected.

5 3. Each discharge pipe shall extend from the discharge side of
6 the valve to a common pipe having a minimum nominal diameter of 1
7 inch. This common pipe shall terminate outside the building, not
8 less than 6 feet above the highest structure on the building and
at least 20 feet from any window, ventilation opening or exit
from a building. The outlet opening shall be capped with a low-
pressure rupturable diaphragm, such as a heavy foil disk in a pair
of flanges, or equivalent.

9 4. A stop valve, which could prevent manual discharge of the
10 refrigerant to the atmosphere, shall not be located between the
emergency refrigerant discharge valves and the sides of the sys-
tem they are serving.

11 Section 93. Section 1520 of the Uniform Mechanical Code, 1991
12 Edition, is amended as follows:

13 **Testing of Refrigerating Equipment**

14 **Sec. 1520.** Refrigerant-containing portions of a field-assembled
15 refrigerating system intended or installed to operate at a pres-
16 sure in excess of atmospheric pressure shall be subjected to a
test pressure equal to or greater than the pressure set forth in
Table No. 15-D for the kind of refrigerant in the system.

17 Pressure tests required by this section shall be equal to or
18 greater than the lowest setting of a pressure-relief device
installed in the side of the system it is protecting.

19 The requirements of this section shall not apply to:

- 20 1. A refrigerating system which does not exceed three horsepower
rating and containing ((20 pounds or less of)) Group 1
refrigerant.
- 21 2. Safety devices, pressure gages, compressors and control
22 mechanisms which have been factory tested.
- 23 3. Pressure vessels constructed in accordance with approved
standards.

24 The test pressure applied to a refrigerant container shall not
25 exceed two and one half times the design working pressure stamped
on the container.

26 The high-pressure test for a refrigerating system intended to
27 contain a refrigerant not listed in Table No. 15-C shall be equal
to or greater than the saturated vapor pressure of such refriger-
ant at a temperature of 150°F. The test pressure shall be at
least 30 pounds-per-square-inch gage.

28 A refrigerating system installed to operate at a pressure below
atmospheric pressure shall maintain a partial vacuum in the sys-

tem equal to the pressure of a column of mercury at least 20 inches in height.

A refrigerating system shall sustain the test pressure specified in this section for a period of at least 10 minutes after the pressure-imposing equipment has been cut off or disconnected.

A pressure test for those portions of a refrigerating system to contain ammonia or carbon dioxide shall be made with air or dry gas.

The means used to build up the test pressure shall have either a pressure-limiting device or a pressure-reducing device with a pressure-relief device and a gage on the outlet side. The pressure-relief device shall be set above the test pressure but low enough to prevent permanent deformation of the system components. Pressure gages shall be checked for accuracy prior to test either by comparison with master gages or by setting the pointer as determined by a dead weight pressure gage tester.

Refrigerating systems shall not be tested with oxygen.

Brine piping may be tested with air, water or dry gas.

Brine piping which is a portion of a refrigerating system shall be tested at 100 psi for a period of 10 minutes.

Additional tests of a refrigerating system may be demanded by the building official when deemed necessary to ensure the safety of such system.

A test required by this section shall be conducted by the owner or contractor in the presence of the building official.

Section 94. Chapter 15 of the Uniform Mechanical Code, 1991 Edition, is amended by adding a new section 1521 as follows:

SYSTEM OPERATION AND MAINTENANCE

Sec. 1521. (a) System Operation - Responsibility. It shall be the duty of the person in charge of the premises on which a refrigerating system containing more than 50 pounds of refrigerant is installed, to place a card conspicuously as near as practicable to the refrigerant compressor giving directions for the operation of the system, including precautions to be observed in case of a breakdown or leak as follows:

1. Instruction for shutting down the system in case of emergency;
2. The name, address, and day and night telephone numbers for obtaining service;
3. The name, address, and telephone number of the Department of Construction and Land Use, and instructions to notify the Department immediately in case of emergency.

(b) Pressure gages. Pressure gages shall be checked for accuracy immediately after every occasion of unusually high pressure, equal to full scale reading, either by comparison with master gages or by setting the pointer as determined by a dead weight pressure gage tester.

1 (c) **Charging and Discharging Refrigerants.** When refrigerant is
2 added to a system, except a unit system requiring less than 6
3 pounds of refrigerant it shall be charged into the low pressure
4 side of the system. Any point on the downstream side of the main
liquid line stop valve shall be considered as part of the low
pressure side when operating with said top valve in the closed
position. No service container shall be left connected to a
system except while charging or withdrawing refrigerant.

5 The charging or removal of any refrigerant from any
6 refrigeration system or plant shall be performed by, or under the
7 direct supervision of a person licensed under Chapter 6.82 of the
Seattle Municipal Code, provided that in the case of fire or
other emergency the refrigerant may be removed by the Fire Chief
or his authorized representative.

8 Where ammonia is used, the discharge may be into a tank of water
9 which shall be used for no purpose except ammonia absorption. At
10 least one gallon of fresh water shall be provided for each pound
11 of ammonia in the system. The water used shall be prevented from
12 freezing without the use of salt or chemicals. The tank shall be
13 substantially constructed of not less than 1/8 inch or No. 11
U.S. gage iron or steel. No horizontal dimension of the tank
shall be greater than one half the height. The tank shall have
hinged cover, or, if of the enclosed type, shall have a vent hole
at the top. All pipe connections shall be through the top of the
tank only. The discharge pipe from the pressure-relief valves
shall discharge the ammonia in the center of the tank near the
bottom.

14 Where sulphur dioxide is used, the discharge may be into a tank
15 of absorptive brine which shall be used for no purpose except
16 sulphur dioxide absorption. There shall be one gallon of standard
17 dichromate brine (2-1/2 lb.) sodium dichromate per gallon of water
18 for each pound of sulphur dioxide in the system. Brines made with
19 caustic soda or soda ash may be used in place of sodium dichromate
20 provided the quantity and strength give the equivalent sulphur
dioxide absorbing power. The tank shall be substantially
constructed of not less than 1/8 inch or No. 11 U.S. gage iron or
steel. The tank shall have a hinged cover, or, if of the enclosed
type, shall have a vent hole at the top. All pipe connections
shall be through the top tank only. The discharge pipe from the
pressure-relief valve shall discharge the sulphur dioxide in the
center of the tank near the bottom.

21 (d) **Maintenance.** All refrigerating systems shall be maintained
22 by the user in a clean condition, free from accumulations of oil,
dirt, waste and other debris, and shall be kept readily accessible
at all times.

23 (e) **Transport Containers.** Containers used for refrigerants
24 withdrawn from a refrigerating system shall be carefully weighed
25 each time they are used for this purpose, and the containers shall
not be filled in excess of the permissible filling weight for such
containers and such refrigerants as are prescribed in the
pertinent regulations of the Department of Transportation.

26 Section 95. Chapter 15 of the Uniform Mechanical Code, 1991
27 Edition, is amended by adding a new section 1522 as follows:

28 **OPERATING PERMIT**

Sec. 1522. (a) 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 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 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.

(b) 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 mechanical 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 96. Chapter 15 of the Uniform Mechanical Code, 1991 Edition, is amended by adding a new Table 15-E as follows:

TABLE 15-E
MAXIMUM PERMISSIBLE QUANTITIES OF FLAMMABLE REFRIGERANTS

Refrigerant	Group	Name	Maximum Quantity in lb per 1000 cu ft of Room Volume	Maximum Quantity in kg per 100 cu meters of Room Volume
R-40	2	Methylchloride	10	15.9
R-611	2	Methylformate	7	11.3
R-170	3	Ethane	2-1/2	3.9
R-290	3	Propane	2-1/2	3.9
R-600	3	Butane	2-1/2	3.9
R-600a	3	Isobutane	2-1/2	3.9
R-1150	3	Ethylene	2	3.2
R-1270	3	Propylene	2	3.2

Section 97. Chapter 15 of the Uniform Mechanical Code, 1991 Edition, is amended by adding a new Table 15-F as follows:

TABLE 15-F
MINIMUM* DESIGN PRESSURES
*Selection of Higher Design Pressures May be Required to Satisfy Actual Shipping, Operating or Standby Conditions

Refrigerant	Name	Minimum Design Pressures, PSIG		
		Low Side	High Side	
			Evap. or Water Cooled	Air Cooled
R-11	Trichlorofluoromethane	15	15	21
R-12	Dichlorodifluoromethane	85	127	169
R-13	Chlorotrifluoromethane	521	547	547
R-13B1	Bromotrifluoromethane	230	321	410
R-14	Tetrafluoromethane	544	544	544
R-21	Dichlorofluoromethane	15	29	46
R-22	Chlorodifluoromethane	144	211	278
R-30	Methylene Chloride	15	15	15
R-40	Methyl Chloride	72	112	151
R-113	Trichlorotrifluoroethane	15	15	15
R-114	Dichlorotetrafluoroethane	18	35	53
R-115	Chloropentafluoroethane	152	194	252
R-170	Ethane	616	709	709
R-290	Propane	129	188	244
R-C318	Octafluorocyclobutane	34	59	85
R-500	Dichlorodifluoromethane, 73.8% and Ethylidene Difluoride, 26.2%	102	153	203
R-502	Chlorodifluoromethane, 48.8% and Chloropenta- fluoroethane, 51.2%	162	232	302
R-503	Trifluoromethane 40.1%, Chlorotri- fluoromethane 59.9%	617	617	617
R-600	N-Butane	23	42	61
R-600a	Isobutane	39	63	88
R-611	Methyl Formate	15	15	15
R-717	Ammonia	139	215	293
R-744	Carbon Dioxide	955	1058	1058
R-764	Sulfur Dioxide	45	78	115
R-1150	Ethylene	732	732	732
R-1270	Propylene	160	228	294

Section 98. Section 1803 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

Incinerators Using the Flue as a Refuse Chute

Sec. 1803. 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

1 the enclosing walls of the combustion chamber constructed of clay
2 or shale brickwork not less than 4 inches thick when there is a
3 horizontal grate area of not more than 9 square feet and not less
4 than 8 inches thick when there is a horizontal grate area
5 exceeding 9 square feet and, in each case, a lining of firebrick
6 not less than 4 inches thick, with an air space, in the case of
7 the thicker wall, between the clay or shale brick and the
8 firebrick sufficient to provide for expansion and contraction.

9 The combined chute and flue shall be constructed as required
10 for incinerator chimneys in chapter 37 of the Building Code. The
11 chute and flue shall be constructed straight and plumb, and fin-
12 ished smooth on the inside. All flues shall terminate in a sub-
13 stantially constructed spark arrester having a mesh not exceeding
14 1/2 inch.

15 Firebrick shall be laid in fireclay mortar.

16 Service openings into the chute shall be equipped with
17 approved self-closing hoppers so constructed that the openings
18 are closed off while the hopper is being charged and no part will
19 project into the chute or flue. The area of the service opening
20 shall not exceed one third of the area of the chute or flue.

21 Section 99. Section 1804 of the Uniform Mechanical Code,
22 1991 Edition is amended as follows:

23 Commercial and Industrial Types

24 Sec. 1804. Commercial- and industrial-type incinerators
25 designed to burn not more than 250 pounds of refuse per hour and
26 having a horizontal grate area not exceeding 9 square feet shall
27 have enclosing walls of the combustion chamber constructed of
28 clay or shale brick not less than 8 inches thick, with a lining
of firebrick not less than 4 inches thick, provided that the
outer 4 inches of clay or shale brickwork may be replaced by a
steel plate casing not less than 3/16 inch in thickness.

Commercial and industrial types of incinerators of a size
designed to burn more than 250 pounds of refuse per hour and hav-
ing a grate area exceeding 9 square feet shall have enclosing
walls of the combustion chamber constructed of clay or shale
brick not less than 8 inches thick with a lining of firebrick not
less than 8 inches thick, provided that the outer 4 inches of
clay or shale brickwork may be replaced by a steel plate casing
not less than 3/16 inch in thickness.

Incinerators with their waste material bins or containers shall
be located in a room or compartment used for no other purpose, or
in a room devoted exclusively to boilers and heating plant. In
either case such room shall be separated from the rest of the
building by a one-hour fire-resistive occupancy separation.

The flue connections or breechings from the combustion chamber
shall be constructed of 0.055-inch-thick (No. 16 U.S. gage) steel
when they do not exceed 12 inches in diameter or greater dimen-
sion and of 0.097-inch thick (No. 12 U.S. gage) steel when they
exceed 12 inches in diameter or greatest dimension. In addition
they shall be lined with firebrick laid in fireclay mortar not
less than 2½ inches thick when they are between 12 inches and 18
inches in diameter or greatest dimension, and not less than 4½
inches thick when they are larger. If they lead into and combine
with flue connections or breechings from other appliances, such

1 other connections or breechings shall also be lined as required
2 for direct flue connections, unless the cross-sectional area of
the connection into which they lead is at least four times the
area of the incinerator connection.

3 The clearance to woodwork or other combustible material or
4 construction on all sides of flue connections or breechings shall
be not less than 36 inches, provided that clearances may be
reduced as set forth in Table No. 5-B.

5 Refuse chutes shall not feed directly to the combustion cham-
6 ber but shall discharge into a room or bin enclosed and separated
from the incinerator room by floors, ceilings and walls of not
7 less than two-hour fire-resistive construction. The opening
through which material is transferred from such room or bin to
8 the incinerator room shall be equipped with a fire assembly hav-
ing a three-hour fire-resistive rating.

9 Refuse chutes shall rest on substantial noncombustible
foundations. The enclosing walls of such chutes shall consist of
10 clay or shale brickwork not less than 8 inches thick or of rein-
forced concrete not less than 6 inches thick or metal ducts
11 enclosed in shafts meeting the requirement of Section 1706(a) of
the Building Code. Such chutes shall extend at least 4 feet
12 above the roof and shall be covered by a metal skylight glazed
with single thick plain glass or be vented to the exterior
through a vent cap.

13 Service openings for chutes shall be located, constructed and
14 protected as required by the Building Code. Refuse chutes
require automatic sprinkler systems for protection.

15 Section 100. Section 1902 of the Uniform Mechanical Code,
16 1991 Edition, is amended as follows:

17 **OPEN-TOP BROILER UNITS**

18 **Sec. 1902.** Listed domestic open-top broiler units and hoods
shall be installed in accordance with their listing and the
19 manufacturer's installation instructions.

20 A((n)) metal exhaust duct complying with the provisions of
Chapter 11 and fan having a minimum capacity of 100 cfm per square
21 foot of hood intake area shall be installed for a barbecue unit
and, when the duct penetrates a ceiling or a floor, it shall be
22 enclosed in a fire-resistive shaft covered on one side as required
for a one-hour fire-resistive construction with no combustible
23 material used inside the fire protection. The shaft shall be
separated from the duct by a minimum 1-inch air space vented to
24 the outside air, and the duct shall terminate not less than 18
inches above the roof surface. A minimum clearance of 24 inches
shall be maintained between the cooking top and the combustible
25 material and the hood shall be as wide as the open-top broiler
and be centered over the unit.

26 Section 101. Subsection 1903(a) of the Uniform Mechanical
27 Code, 1991 Edition is amended as follows:

1 **CLOTHES DRYERS**

2 **Sec. 1903. (a) Moisture Exhaust Ducts.** Moisture exhaust ducts
3 shall terminate on the outside of the building and shall be
4 equipped with a back-draft damper. Screens shall not be installed
5 at the duct termination. Ducts for exhausting clothes dryers
6 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.

7 Section 102. Subsection 1904(c) of the Uniform Mechanical
8 Code, 1991 Edition, is amended as follows:

9 **DIRECT GAS-FIRED MAKEUP AIR HEATERS AND INDUSTRIAL AIR HEATERS**

10 (c) **Approval.** Each appliance shall ((be approved by the building
11 official for safe use or)) comply with applicable nationally
12 recognized standards as determined by an approved testing agency.

13 Section 103. Section 1905 of the Uniform Mechanical Code,
14 1991 Edition, is amended as follows:

15 **SMALL CERAMIC KILNS**

16 **Sec. 1905. (a) General.** The provisions of this section apply to
17 kilns used for ceramics that have a maximum interior volume of 20
18 cubic feet and are used for hobby or noncommercial purposes.
19 Commercial kilns shall be installed according to manufacturer's
recommendations.

20 (b) **Installation.** Kilns shall be installed in accordance with
21 the manufacturer's instructions and the provisions of this code.

22 (c) **Fuel-gas Controls.** Fuel-gas controls shall comply with
23 Sections 503 and 506. Standing pilots shall not be used with
24 gas-fired kilns.

25 (d) **Electrical Equipment.** All electrical equipment used as part
26 of, or in connection with, the installations of a kiln shall com-
27 ply with the requirements set forth in the Electrical Code.

28 (e) **Installations Inside Buildings.** In addition to other
requirements specified in this section, interior installations
shall meet the following requirements:

1. **Kiln clearances.** The sides and tops of kilns shall be located
a minimum of 18 inches from any noncombustible wall surface and 3
feet from any combustible wall surface. Kilns shall be installed
on noncombustible flooring consisting of at least 2 inches of
solid masonry or concrete extending at least 12 inches beyond the
base or supporting members of the kiln.

EXCEPTION: These clearances may be reduced, provided the
kiln is installed in accordance with its listing or to
acceptable conclusions of testing reports submitted to the
building official.

In no case shall the clearance on the gas or electrical control
side of a kiln be reduced to less than 30 inches.

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

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

12 3. **Gravity ventilation ducts.** Each hood shall be connected to a
13 gravity ventilation duct extending in a vertical direction to out-
14 side the building. This duct shall be of the same construction as
15 the hood and shall have a minimum cross-sectional area of not less
16 than one fifteenth of the face opening area of the hood. The duct
17 shall terminate a minimum of 12 inches above any portion of a
18 building within 4 feet and terminate no less than 4 feet from any
19 openable windows or other openings into the building or adjacent
20 property line. The duct opening to the outside shall be shielded,
21 without reduction of duct area, to prevent entrance of rain into
22 the duct. The duct shall be supported at each section by
23 noncombustible supports.

24 4. **Make-up air.** Provisions shall be made for air to enter the
25 room in which a kiln is installed at a rate at least equal to the
26 air being removed through the kiln hood or provide an opening
27 equal to twice the area of hood exhaust duct.

28 5. **Hood and duct clearances.** Every hood and duct serving a
29 fuel-burning kiln shall have a clearance from combustible con-
30 struction of at least 18 inches. This clearance may be reduced
31 in accordance with Table No. 5-B.

32 (f) **Exterior Installations.** Kilns shall be installed with min-
33 imum clearances as specified in Subsection (e)1 of this section.
34 Wherever a kiln is located under a roofed area and is partially
35 enclosed by more than two vertical wall surfaces, a hood and
36 gravity ventilation duct shall be installed to comply with
37 Subsections (e)2, (e)3 and (e)5 of this section.

38 (g) **Combustion Air.** Fuel burning kilns shall be provided with
39 combustion air and shall comply with Chapter 6.

40 Section 104. Chapter 19 of the Uniform Mechanical Code, 1991
41 Edition, is amended by adding a new section 1906 as follows:

42 **GAS APPLIANCES**

43 **Sec. 1906.** Gas appliances and equipment not specifically
44 referred to in this chapter shall be constructed and installed so
45 as to conform to applicable provisions of this chapter and
46 nationally recognized standards of safety, including but not
47 limited to ANSI Standard Z223.1-1074, National Fuel Gas Code,
48 Sections 1.3 and 1.4.

49 Section 105. Section 2001 of the Uniform Mechanical Code,
50 1991 Edition, is amended as follows:

1 **DEFINITIONS**

2 **Sec. 2001.** For the purpose of this chapter the following definitions shall apply:

3 **COMMERCIAL FOOD HEAT-PROCESSING EQUIPMENT** is equipment used in
4 a food establishment for heat-processing food or utensils and
5 which produces grease vapors, steam, fumes, smoke or odors which
are required to be removed through a local exhaust ventilation
system.

6 **COMPENSATING HOOD** is a hood that has an outside air supply with
7 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.

8 **GREASE EXTRACTOR** is a device designed to remove a large percentage
9 of grease and other contaminants from the air before it enters the duct
system. A listed grease extractor is one complying with the standard
identified in Appendix C, Reference Standards.

10 **GREASE FILTER** is a device used to capture by entrapment,
11 impingement, adhesion or similar means, grease and similar contaminants
before they enter a duct system.

12 **HOOD** is an air-intake device connected to a mechanical exhaust
13 system for collecting and removing grease, vapors, fumes, smoke,
14 steam, heat or odors from commercial food heat-processing equipment.

15 **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.

16 **Type II Hood** is a general kitchen hood for collecting and
17 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 6kw (20,500 BTU) capacity. Subject to the
approval of the building official, other roasting ovens that do not
generate significant smoke or grease may be covered with a Type II
hood.

20 Section 106. Subsection 2002(d) of the Uniform Mechanical
21 Code, 1991 Edition, is amended as follows:

22 **KITCHEN VENTILATION SYSTEMS**

23 **(d) Duct Enclosure.** A grease duct serving a Type I hood which
24 penetrates a fire rated or nonrated ceiling, wall or floor shall
be enclosed in a duct enclosure from the point of penetration. A
25 duct serving a Type II hood which penetrates a fire-rated ceiling,
floor or wall shall be enclosed in a duct enclosure from the
point of penetration to the outside air. A duct may only penetrate
26 exterior walls at locations where unprotected openings are permitted
by Table No. 5-A of the Building Code. Duct enclosures shall be
27 constructed as the Building Code requires shaft enclosures to be
constructed. Duct enclosures shall be of at least one-hour fire-resistive
28 construction in all buildings and shall be of two-hour fire-resistive
construction in Types I and II

1 fire-resistive buildings. The duct enclosure shall be sealed
2 around the duct at the point of penetration and vented to the
3 exterior through weather-protected openings. The enclosure shall
4 be separated from the duct by at least 3 and not more than 12
5 inches and shall serve a single grease exhaust duct system.

6 Section 107. Subsection 2002(i) of the Uniform Mechanical
7 Code, 1991 Edition, is amended as follows:

8 (i) **Exhaust Outlets.** Exhaust outlets for grease ducts serving
9 commercial food heat-processing equipment shall extend through
10 the roof unless otherwise approved by the building official.
11 Such extension shall be at least 2 feet above the roof surface,
12 at least 10 feet from ~~((parts of the same or contiguous
13 buildings,))~~ any adjacent building, adjacent property line other
14 than a property line abutting a public street or alley right-of-
15 way or air intake opening into any building, and shall be located
16 at least 10 feet above the adjoining grade level.

17 **EXCEPTIONS:** 1. Exhaust outlets for grease ducts serving
18 commercial food heat-processing equipment may terminate not
19 less than 5 feet from an adjacent building, adjacent prop-
20 erty line or air intake opening into a building if the air
21 from the exhaust outlet is discharged away from such
22 locations.

23 2. Upon approval of the building official, the exhaust
24 from any hood serving commercial food heat-processing equip-
25 ment may terminate in a properly engineered air recovery
26 system not exceeding two cooking appliances (80 lb. grease
27 capacity total), for recirculation to the room in which the
28 hood is located.

Section 108. Subsection 2003(a) of the Uniform Mechanical
Code, 1991 Edition, is amended as follows:

HOOD

19 **Sec. 2003. (a) Where Required.** Hoods shall be installed at or
20 above all commercial-type deep fat fryers, broilers, fry grills,
21 steam-jacketed kettles, hot-top ranges, ovens, barbecues,
22 rotisseries, dishwashing machines above 140°F maximum water
23 temperature and similar equipment which produce comparable
24 amounts of steam, smoke, grease or heat in a food-processing
25 establishment. For the purpose of this section a food-processing
26 establishment shall include any building or portion thereof used
27 for the processing of food but shall not include a dwelling
28 unit.

24 **EXCEPTION:** Residential type equipment installed in
25 offices, churches, nursing homes, congregate residences,
26 boarding homes and similar occupancies with a capacity of
27 not more than 50 persons and with kitchens and dining rooms
28 designed to serve not more than 150 meals per day.

Section 109. Subsection 2003(g) of the Uniform Mechanical
Code, 1991 Edition, is amended as follows:

(g) Capacity of Hoods. 1. Type I canopy-type, ((commercial cooking)) hoods shall exhaust through the hood a minimum quantity of air determined by application of the following formula((s)):

WHERE:

A = the horizontal surface of the hood, in square feet.

P = that part of the perimeter of the hood that is open, in feet.

D = distance, in feet, between the lower lip of the hood and the cooking surface.

Q = quantity of air, in cubic feet per minute.

NUMBER OF EXPOSED SIDES

FORMULA

4 (island or central hood)

$Q = 150A$

3 or less

$Q = 100A$

Alternate formula

$Q = 50PD$

2. For Type II hoods the minimum quantity of air flow shall be 50 percent of that required for a Type I hood.

EXCEPTION: Listed grease extractors are to be installed in accordance with the terms of their listing and manufacturer's installation instructions.

((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. When all appliances are electric, the airflow required may be reduced to 80 percent of the formula value. Type II hood airflow requirements shall be in accordance with the requirements for low-temperature appliance hoods. Undefined cooking equipment other than charcoal and solid-fuel charbroilers may be installed under a common hood. The minimum airflow for charcoal-, solid-fuel and grease-burning charbroilers and undefined equipment shall be:

1.3. Type I hoods for use over charcoal and other solid-fuel charbroilers shall be provided with separate exhaust systems. Undefined cooking equipment other than charcoal and solid-fuel charbroilers may be installed under a common hood. The minimum airflow for charcoal-, solid-fuel and grease-burning charbroilers and undefined equipment shall be:

Number of Exposed Sides

Formula

4 (island or central hood)

$Q = 300A$

3 or less

$Q = 200A$

Alternate formula

$Q = 100PD$

2. Type I hoods when the cooking equipment includes high-temperature appliances such as deep fat fryers:

Number of Exposed Sides

Formula

4 (island or central hood)

$Q = 150A$

3 or less

$Q = 100A$

Alternate formula

$Q = 100PD$

1 3. ~~Type I hoods when the cooking equipment includes medium-~~
2 ~~temperature appliances such as rotisseries, grills and ranges.~~

Number of Exposed Sides	Formula
4 (island or central hood)	$Q = 100A$
3 or less	$Q = 75A$
Alternate formula	$Q = 50PD$

5 4. ~~Type I hoods when the cooking equipment includes low-~~
6 ~~temperature appliances such as medium-to-low-temperature ranges,~~
7 ~~roasters, roasting ovens, pastry ovens and equipment approved for~~
8 ~~use under a Type II hood, such as pizza ovens.~~

Number of Exposed Sides	Formula
4 (island or central hood)	$Q = 75A$
3 or less	$Q = 50A$
Alternate formula	$Q = 50PD$

10 Section 110. Subsection 2003(i) of the Uniform Mechanical
11 Code, 1991 Edition, is amended as follows:

12 (i) Makeup Air. A separate makeup air system shall be provided
13 for the kitchen which supplies not less than 90 percent of the
14 air to be exhausted. ((~~Each room provided with an exhaust system~~
15 ~~shall have air supplied to the room equal to the amount of air~~
16 ~~to be exhausted.~~)) Makeup diffusers shall be located to prevent a
17 short-circuiting of air furnished to the exhaust system. The
18 makeup air system shall be capable of heating the air supplied to
19 the space to a minimum of 65°F., if the amount of makeup air
20 exceeds 2500 cfm per space. Exterior windows and doors shall
21 not be used for the purpose of providing makeup air. The exhaust
22 and makeup air systems shall be connected by an electrical cross-
23 interlocking switch. Compensating hoods shall meet the airflow
24 requirements specified in Sections 2003(g) ((~~2 through 4~~)).
25 Compensating hoods shall extract at least 20 percent of their
26 required exhaust airflow from the kitchen area.

27 Section 111. Subsection 2004(a) of the Uniform Mechanical
28 Code, 1991 Edition, is amended as follows:

MOTORS, FANS, SAFETY DEVICES

29 **Sec. 2004. (a) General.** Motors and fans shall be of sufficient
30 capacity to provide the required air movement as specified in
31 this chapter. Exhaust fans shall continue to run in event of
32 fire, except for carbon dioxide fire extinguishing systems.
33 Electrical equipment shall be approved for the class of use as
34 provided in the Electrical Code. Motors and fans shall be
35 accessible for servicing or maintenance. Motors shall not be
36 installed within ducts or under hoods.

37 Section 112. Section 2101 of the Uniform Mechanical Code,

1991 Edition, is amended as follows:

PURPOSE

Sec. 2101. The purpose of this chapter is to establish and provide minimum standards for the protection of public welfare, health, safety and property by regulating and controlling the quality, location and installation of steam and hot-water boilers and pressure vessels.

Section 113. Section 2102 of the Uniform Mechanical Code, 1991 Edition is amended as follows:

SCOPE

Sec. 2102. The requirements of this chapter shall apply to the construction, installation, operation, repair and alteration of all boilers and pressure vessels.

EXCEPTIONS: 1. ((Listed and approved potable water heaters with a nominal capacity of 120 gallons or less having a heat input of 200,000 Btu/h or less used for hot-water supply at pressure of 160 pounds per square inch or less and at temperatures not exceeding 210°F. as regulated by the Plumbing Code.)) In other than Group A, E and I occupancies, listed potable hot water heaters and pool heaters, provided none of the following limitations shall be exceeded:

A. A heat input of 200,000 Btu/h, or

B. A water temperature of 210°F., or

C. A nominal water-containing capacity of 120 gallons, or

D. A pressure of 160 pounds per square inch.

((2. Pressure vessels used for unheated water supply, including those containing air which serves only as a cushion and is compressed by the introduction of water and tanks connected to sprinkler systems.))

3. Portable unfired pressure vessels subject to regular inspection by State of Washington inspectors and I.C.C. containers.

4. Containers for liquefied petroleum gases((bulk oxygen and medical gas)) which are regulated by the Fire Code.

5. Unfired pressure vessels in Groups B, H, R and M Occupancies having a volume of 5 cubic feet or less and operated at pressures not exceeding 250 psi.

((6. Pressure vessels used in refrigeration systems which are regulated by Chapter 15 of this code.))

7. Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables, and other similar humidity control systems.

8. Any boiler or pressure vessel subject to regular inspection by federal inspectors or licensed by federal authorities.

1
2 Section 114. Section 2104 of the Uniform Mechanical Code,
3 1991 Edition, is amended as follows:

4 **DEFINITIONS**

5 **Sec. 2104.** Certain words and terms used in this chapter,
6 unless clearly inconsistent with their context, shall mean as
7 follows:

8 **AUTOMATIC BOILER** When applied to any class of boiler defined
9 below, such boiler shall be equipped with certain controls and
10 limit devices as specified in Section 2111 and Table 21-C.

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

14 **BOILER, NON CODE** is a boiler not constructed in accordance with
15 the requirements of Section 2106 (a).

16 **BURNER, AUTOMATIC BOILER.** A burner for an automatic boiler is a
17 device to convey fuel into the combustion chamber in proximity to
18 its combustion air supply so as to permit a stable controlled heat
19 release compatible with the burner design and which is equipped
20 with an ignition system to reliably ignite the entire heat release
21 surface of the burner assembly.

22 **CONTINUOUS PILOT** is a pilot that burns without turndown through-
23 out the entire period that the boiler is in service whether or not
24 the main burner is firing.

25 **HOT-WATER-HEATING SUPPLY BOILER** is a boiler having a volume
26 exceeding 120 gallons, or a heat input exceeding 200,000 Btu/h or
27 an operating temperature exceeding 210°F. that provides hot
28 water to be used externally to itself.

29 **INTERLOCK** is a device which senses a limit or off-limit condi-
30 tion or improper sequence of events and shuts down the offending
31 or related piece of equipment or prevents proceeding in an
32 improper sequence in order to prevent a hazardous condition
33 developing.

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

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

39 **LOW-PRESSURE HOT-WATER-HEATING BOILER** is a boiler in which water
40 is heated for the purpose of supplying heat at pressures not
41 exceeding 160 psi and temperatures not exceeding 250°F.

42 **MINIATURE BOILER** is a power boiler having an internal shell
43 diameter of 16 inches or less, and a gross volume of 5 cubic feet
44 or less; and a heating surface of 20 square feet or less (not
45 applicable to electric boilers) and not exceeding 100 psi.

46 **PACKAGE BOILER** May be any class of boiler defined herein and

1 shall be a boiler equipped and ((shipped)) listed as a boiler
2 burner unit complete with fuel-burning equipment, automatic con-
trols and accessories, and mechanical draft equipment, if used.

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

5 **POOL HEATER** is a heater which is used to heat a swimming pool,
6 has a volume no greater than 120 gallons, and a heat input no
greater than 200,000 Btu/h, and an operating temperature no
7 greater than 210°F. See HOT-WATER SUPPLY BOILER for heaters
having greater volume, heat input or temperature.

8 **POWER BOILER** is a boiler in which steam is generated at pres-
sures exceeding 15 psi.

9 **POWER HOT-WATER BOILER (HIGH-TEMPERATURE WATER BOILER)** is a
10 boiler used for heating water or liquid to a pressure exceeding
160 psi or to a temperature exceeding 250°F.

11 **PRESSURE VESSEL (Unfired)** is a closed container, having a nomi-
12 nal internal diameter exceeding 6 inches and a volume exceeding
1½ cubic feet, for liquids, gases or vapors subjected to pres-
sures exceeding 15 psi or steam under any pressure.

13 **PRESSURE VESSEL, NON CODE**, is a pressure vessel not constructed
14 in accordance with the requirements of Section 2106 (a).

15 **PURGE**. Acceptable method of scavenging the combustion chamber,
boiler passes and breeching to remove all combustible gases.

16 **RECYCLING BOILER** is any class of boiler in which the heat source
cycles* automatically in response to a control system.

17 *NOTE: The term cycle shall include (as applicable) pre-
18 ignition purge, ignition, operation, shut off and post-firing
purge.

19 **STEAM HEATING BOILER** is a boiler operated at pressures not
20 exceeding 15 psi for steam.

21 Section 115. Section 2105 of the Uniform Mechanical Code,
22 1991 Edition, is amended as follows:

23 **PERMIT REQUIRED**

24 **Sec. 2105.** Except for work exempted by Subsection 301(b) of
this code, a permit shall be obtained from the building official
25 prior to installation, ((alteration, repair)) or replacement of
boilers and pressure vessels. Alteration of control systems on
26 automatic boilers, replacement of a fuel burner, changing fuels
or adding a different fuel to a combination burner previously
27 operated on a single fuel and the conversion of solid-fuel-fired
boilers as permitted by Section 2113 shall also require a permit.
See Chapter 3 for requirements for obtaining permits.

28 Section 116. Section 2106 of the Uniform Mechanical Code,

1991 Edition, is amended as follows:

DETAILED REQUIREMENTS

Sec. 2106. (a) Safety Requirements. The construction of boilers and pressure vessels and the installation thereof shall conform to minimum requirements for safety from structural and mechanical failure and excessive pressures. (~~established by the building official in accordance with nationally recognized standards.~~) Compliance with the applicable section of the American Society of Mechanical Engineerings (A.S.M.E.) Boiler and Pressure Vessel Code, the American National Standards Institute (A.N.S.I.) B31.1.0 Power Piping Code and the National Board (of Boiler and Pressure Vessel) Inspectors Code (ANSI-NB-23), together with addenda thereto is required. The building official shall review and consider for adoption the current editions of these codes. Adoption shall be pursuant to Section 207 of this code. Non-code boilers or unfired pressure vessels shall not be reinstalled.

(b) Registration. All boilers, except those constructed of cast iron, and pressure vessels shall be registered with the National Board of Boiler and Pressure Vessel Inspectors.

((b))(c) Controls. Required electrical, mechanical, safety and operating controls shall carry approval of an approved testing agency. Electrical controls shall be of such design and construction as to be suitable for installation in the environment in which they are located.

New burners installed on boilers that are capable of burning two or more fuels shall be equipped with a fuel selector switch designed and constructed to prevent switching from one fuel to a different fuel without a physical stop in the center/off position.

((c))(d) Gages. All steam boilers shall be provided with a pressure gage and a water level glass. All water boilers shall be provided with a pressure gage and a temperature indicator.

((d))(e) Stack Dampers. Stack dampers on boilers fired with oil or solid fuel shall not close off more than 80 percent of the stack area when closed, except on automatic boilers with prepurge, automatic draft control and interlock. Operative dampers shall not be placed within any stack, flue or vent of a gas-fired boiler, except on an automatic boiler with prepurge, automatic draft control and interlock.

EXCEPTION: Baffles, draft restrictors or regulators and dampers which are supplied by the manufacturer as part of a boiler design and which are welded into position or otherwise permanently affixed when adjusted at installation.

((e))(f) Welding. Welding on pressure vessels shall be done by approved welders in conformity with nationally recognized standards. All such welding shall be subject to the approval of the building official.

(g) Repairs. Where a repair is necessary, an inspector shall be called for consultation and advice as to the best method of making the repair. After the repair is made it shall be subject to the approval of the inspector. Repairs to all boilers, unfired pressure vessels, and their appurtenances shall conform to the rules contained in the National Board (of Boiler and Pressure

Vessel) Inspectors Code (ANSI-NB-23) wherever they apply. In all cases the material and workmanship shall comply with the rules contained in the appropriate sections of the A.S.M.E. Boiler and Pressure Vessel Code.

Section 117. Section 2107 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

EXPANSION AND BLOW-OFF TANKS

Sec. 2107. (a) General. All hot-water-heating systems shall be provided with an air expansion tank securely fastened to the structure. Supports shall be adequate to carry twice the weight of the tank filled with water without placing any strain on connecting piping.

All hot-water heating systems incorporating hot-water tanks or fluid relief columns shall be so installed as to prevent freezing under normal operating conditions.

(b) Systems with Open Expansion Tank. Systems, equipped with an open expansion tank to satisfy thermal water expansion, shall be provided with an indoor overflow from the upper portion of the expansion tank in addition to an open vent. The indoor overflow shall be carried within the building to a suitable plumbing fixture or to the basement.

(c) Closed-type Systems. Systems of the closed type shall have an airtight tank or other suitable air cushion that will be consistent with the volume and capacity of the system, and shall be suitably designed for a hydrostatic test pressure of two and one half times the allowable working pressure of the system. Expansion tanks for systems designed to operate ((at or)) above 30 psig shall be constructed in accordance with nationally recognized standards approved by the building official. Provisions shall be made for draining the tank without emptying the system, except for pressurized tanks.

(d) Minimum Capacity of Closed-type Tank. The minimum capacity of the closed type expansion tank may be determined from Tables No. 21-A, No. 21-B or from the following formula:

$$V_t = \frac{(0.00041t - 0.0466)V_s}{\frac{P_a}{P_f} - \frac{P_a}{P_o}}$$

WHERE:

- V_t = minimum volume of expansion tank, gallons.
 V_s = volume of system, not including expansion tank, gallons.
 t = average operating temperature, degrees°F.
 P_a = atmospheric pressure, feet H₂O absolute.
 P_f = fill pressure, feet H₂O absolute.
 P_o = maximum operating pressure, feet H₂O absolute.

(e) Blow-off Tanks, New Construction. Blow-off tanks, when used, shall be designed in accordance with the National Board of Boilers and Pressure Vessels Blow-off Equipment Standards, 1973

1 Edition. For power boilers, blow-off tanks shall be used to
2 receive effluent from the bottom blow-off and low water cutoff
3 drains unless an alternate means of safe discharge can be pro-
4 vided. Any alternate method shall be approved by the building
5 official prior to installation.

6
7 Section 118. Section 2108 of the Uniform Mechanical Code,
8 1991 Edition, is amended as follows:

9 **SAFETY OR RELIEF VALVE DISCHARGE**

10 **Sec. 2108.** The discharge from relief valves shall be piped to
11 within 18 inches of the floor or to an open receptacle, and when
12 the operating temperature is in excess of 212°F., shall be
13 equipped with a splash shield or centrifugal separator.

14 Safety valve discharge from boilers and pressure vessels
15 containing steam shall be directed upward to a minimum of 6 feet
16 above the boiler room floor or horizontally to an inaccessible
17 area of the boiler room. When the discharge from safety valves
18 would result in a hazardous discharge of steam inside the boiler
19 room, such discharge shall be extended outside the boiler room to
20 a safe location.

21 No valve of any description shall be placed between the safety
22 or relief valve and the boiler, nor on the discharge pipe between
23 the safety valve and the atmosphere.

24 Safety valve and discharge piping drains shall conform to the
25 applicable paragraphs of the ASME Boiler and Pressure Vessel
26 Code.

27
28 Section 119. Section 2111 of the Uniform Mechanical Code,
1991 Edition, is amended as follows:

LOW-WATER CUTOFF

Sec. 2111. Every ((hot=))water ((heating)) boiler, other than
manually fired, shall be equipped with a manual reset type low-
water cutoff except that a coil-type boiler or a water-tube
boiler which requires forced circulation to prevent overheating
of the coils or tubes shall have a flow-sensing device installed
in the outlet piping in lieu of the low-water cutoff. The
required manual reset type low-water cutoff or flow switch, as
applicable, shall be mounted so as to prevent damage to the
boiler and to permit testing of the ((fuel-supply)) low-water
cutoff without draining the heating system, ((except that such
boilers used in Group R Occupancies of less than six units and
Group M Occupancies need not be equipped with the low-water
cutoff or flow switch)).

Every steam boiler, other than manually fired, shall be equipped
with 2 low-water cutoffs. The lower of the two cutoffs shall be
equipped with a manual reset device.

In installations where two or more low-water cutoffs are
installed, the cutoffs shall be separately piped where feasible.

All steam, vapor or hot water boilers shall be equipped with an
automatic water feeding device. For steam boilers this device
shall sense the liquid level in the boiler.

1 **EXCEPTION:** Boilers which have a constant attendant who has
2 no other duties while the boiler is in operation.

3 Section 120. Section 2112 of the Uniform Mechanical Code,
4 1991 Edition, is amended as follows:

5 **COMBUSTION REGULATORS: SAFETY VALVES**

6 **Sec. 2112.** The following requirements shall be retroactive:

7 1. Every ~~((hot-))~~water ~~((heating))~~ boiler, other than manually
8 fired, shall be equipped with two temperature ~~((combustion))~~ reg-
9 ulators in series. Every steam ~~((heating))~~ boiler, other than
10 manually fired, shall be equipped with ~~((a))~~ two pressure
11 ~~((combustion))~~ regulators and a low-water cutoff. (See Section
12 2111.) Each temperature or pressure regulator shall have an
13 independent sensing element. Shutoff valves of any type shall
14 not be installed between a boiler and any pressure regulator.

15 **EXCEPTION:** Newly installed water/liquid boilers shall be
16 equipped with two temperature limit controls, one of which
17 shall be provided with a manual reset on the control with the
18 highest setting. Newly installed steam/vapor boilers shall
19 be equipped with two pressure limit controls, one of which
20 shall be provided with a manual reset on the control with
21 the high-est setting. These devices shall be independently
22 connected and electrically wired in series.

23 2. Boilers and pressure vessels shall be provided with the
24 required number, size and capacity of safety or relief valves to
25 ensure positive relief of over pressure in accordance with nation-
26 ally recognized standards, as applicable. Valves so employed
27 shall be constructed, sealed and installed in accordance with
28 nationally recognized standards, as applicable.

29 3. Every mechanically fired boiler which requires manual
30 ignition of the burner shall have a manual reset device to prevent
31 automatic recycling in the event of any shut down.

32 Section 121. Section 2113 of the Uniform Mechanical Code,
33 1991 Edition, is amended as follows:

34 **AUTOMATIC BOILERS**

35 **Sec. 2113.** Automatic boilers shall be equipped with controls and
36 limit devices as set forth in Table No. 21-C. Automatic boilers
37 shall also be equipped with the following gages, as applicable:
38 oil temperature, oil suction pressure, high and low gas pressure,
39 stack temperature and windbox pressure.

40 A copy of the approved wiring diagram for an automatic boiler
41 installation shall be permanently and prominently displayed, under
42 protective covering, in the boiler room. Such diagram shall
43 include the coding of the actual wiring by color or by number to
44 permit a ready check of the system.

45 Except as otherwise specified, gas-fired boilers exceeding
46 400,000 Btu/h input shall conform to nationally recognized stan-

1 dards approved by the building official.

2 All automatic gas- and oil-fired boilers of over 12,500,000 Btu
3 shall also comply with the installation requirements of N.F.P.A.
4 Standard No. 85 or No. 85B, 1985 edition, for the prevention of
5 furnace explosions in fuel oil and natural gas-fired boiler
6 furnaces.

7 EXCEPTION: Firetube boilers shall require only four air
8 changes for prepurge of the combustion chamber passes and
9 breeching.

10 The building official may approve solid-fuel-fired boilers that
11 can meet the safety requirements for automatic gas-or oil-fired
12 boilers.

13 Section 122. Section 2114 of the Uniform Mechanical Code,
14 1991 Edition, is amended as follows:

15 **CLEARANCE FOR ACCESS**

16 **Sec. 2114.** When boilers are installed or replaced, clearance
17 shall be provided to allow access for inspection, maintenance and
18 repair. Passageways around all sides of boilers shall have an
19 unobstructed width of not less than 18 inches. Clearance for
20 repair and cleaning may be provided through a door or access panel
21 into another area, provided the opening is of sufficient size.

22 **EXCEPTION:** Subject to the approval of the building
23 official, boilers may be installed with a side clearance of
24 less than 18 inches, provided that the lesser clearance does
25 not inhibit inspection, maintenance or repair.

26 Power boilers having a steam generating capacity in excess of
27 5000 pounds per hour or having a heating surface in excess of 1000
28 square feet or input in excess of 5,000,000 Btu/h shall have a
minimum clearance of 7 feet from the top of the boiler to the
ceiling.

Steam heating boilers and hot-water-heating boilers which exceed
one of the following limits: 5,000,000 Btu/h input; 5000-pound-
steam-per-hour capacity or 1000-square-foot heating surface; and
power boilers which do not exceed one of the following limits:
5,000,000 Btu/h input; 5000-pound-steam-per-hour capacity or
1000-square-foot heating surface; and all boilers with manholes
on top of the boiler, except those described in the second and
fourth paragraphs shall have a minimum clearance of 3 feet from
the top of the boiler to the ceiling.

Package boilers, steam heating boilers and hot-water heating
boilers with no manhole on top of shell and not exceeding one of
the above limits shall have a minimum clearance of 2 feet from the
ceiling.

Adequate clearance access shall be provided for pressure vessels
25 equipped with manhole openings. All other inspection openings
26 shall be at least 18 inches from any obstruction.

27 Section 123. Section 2122 of the Uniform Mechanical Code,
28 1991 Edition, is amended as follows:

OPERATING ADJUSTMENTS AND INSTRUCTIONS

Sec. 2122. ~~((Hot-water))~~ ~~((b))~~ Boiler installations upon completion shall have controls set, adjusted and tested by the installing contractor. A complete control diagram of a permanent legible type, together with complete boiler operating instructions, shall be furnished by the installer for each installation.

EXCEPTIONS: 1. Copper coil water tube hot water supply boilers when equipped with a temperature limit control for which no field test procedure is approved by the manufacturer, are not required to have this limit control tested, provided further that if a hot water storage tank is connected to the boiler that a separate operating limit control capable of adjustment shall be installed on the tank and wired into the boiler limit circuit.

2. Hot water supply boilers equipped with a temperature limit control of the disk-type design are not required to have this limit control tested.

Section 124. Section 2125 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

MAINTENANCE INSPECTION

Sec. 2125. (a) Inspection Required. The building official shall inspect all boilers and pressure vessels operated under permit at such intervals as he deems necessary but in no event less frequently than noted below:

1. Power boilers and miniature boilers shall be inspected externally annually. Where construction and operating conditions permit, they shall, in addition, be subject to inspection internally annually. All required boiler controls and safety devices shall be tested during the external inspection to determine that they are operating properly.

2. Steam heating boilers, ~~((and))~~ hot-water-heating boilers and hot water supply boilers shall be inspected externally annually. Where construction and operating conditions permit, they shall, in addition, be subject to inspection internally annually. All required boiler controls and safety devices (which are required by Section 2122 to be tested at installation) shall be tested during the external inspection to determine that they are operating properly.

~~((3- Automatic steam heating boilers shall be inspected externally biennially. Where construction and operating conditions permit, they shall, in addition, be subject to inspection internally biennially.~~

4))3. Unfired pressure vessels shall be inspected externally biennially. When subject to corrosion and construction permits, they shall, in addition, be subject to inspection internally biennially.

4. Potable water heaters located in any Group A, E or I Occupancy shall be inspected externally biennially.

(b) Inspection by Insuring Companies. Inspection of boilers and pressure vessels covered by insurance may be made by employees of

1 the insuring company holding commissions from the National Board
2 of Boiler and Pressure Vessel Inspectors, subject to approval of
3 the building official. Approved insuring company inspectors
4 shall make reports on prescribed forms on inspections authorized
5 by the building official. The reports shall be filed in
6 the building official's office. Company inspectors shall notify
7 the building official of suspension of insurance because of dan-
8 gerous conditions, new insurance in effect, and discontinuance of
9 insurance coverage.

10 (c) Preparation for Internal Inspection. 1. The owner or user
11 shall prepare a boiler for internal inspection by either the
12 building official or insuring company in the following manner:

13 A. Water shall be drawn off and the boiler thoroughly washed.

14 B. Manhole and handhole plates and wash-out plugs and water
15 column connections shall be removed, the furnace and
16 combustion chambers thoroughly cooled and cleaned.

17 C. All grates of internally fired boilers shall be removed.

18 D. At each annual inspection brickwork shall be removed as
19 required by the inspector in order to determine the condition
20 of the boiler headers, furnace, supports or other parts.

21 E. Any leakage of steam or hot water into the boiler shall be
22 cut off by disconnecting the pipe or valve at the most
23 convenient point.

24 F. The low water cutout shall be disassembled to such a degree
25 as the inspector shall require.

26 G. If a boiler or unfired pressure vessel has not been properly
27 prepared for an internal inspection, the inspector may
28 decline to make the inspection or test and the certificate
of inspection shall be withheld until the owner or user
complies with the requirements.

2 2. The owner or user shall prepare an unfired pressure vessel
3 for inspection to the extent deemed necessary by the inspector.

4 Section 125. Section 2126 of the Uniform Mechanical Code,
5 1991 Edition, is amended as follows:

6 **OPERATION AND MAINTENANCE OF BOILERS AND PRESSURE VESSELS.**

7 **Sec. 2126. (a) General.** Boilers and pressure vessels shall be
8 operated and maintained in conformity with requirements for ade-
9 quate protection of the public established by the building offi-
10 cial in accordance with nationally recognized standards.

11 The building official shall notify the owner or authorized
12 representative of defects or deficiencies which shall be promptly
13 and properly corrected. If such corrections are not made, or if
14 the operation of the boiler or pressure vessel is deemed unsafe
15 by the building official, the permit to operate the boiler or
16 pressure vessel may be revoked. If the operation of a boiler or
17 pressure vessel is deemed by the building official to constitute
18 an immediate danger, the pressure on such boiler or pressure ves-
19 sel may be relieved at the owner's cost and the boiler or pressure
20 vessel shall not thereafter be operated without approval of the
21 building official.

1 (b) Owner to Notify Building Official in Case of Accident. In
2 case of serious accident, such as explosion or an event which
3 renders a boiler or pressure vessel unsafe to return to operation,
4 notice shall be given immediately by telephone, telegraph, or
5 messenger to the building official and neither the boiler nor
6 unfired pressure vessel nor any parts thereof shall be removed or
7 disturbed before an inspection has been made by an authorized
8 inspector unless for the purpose of saving life. The inspector
9 making the investigation and inspection shall report to the
10 building official as soon as possible.

11 Section 126. Section 2127 of the Uniform Mechanical Code,
12 1991 Edition, is amended as follows:

13 STEAM AND WATER PIPING

14 Sec. 2127. Steam and water piping systems which are part of a
15 heating or cooling system, shall comply with the following
16 requirements:

17 1. Those portions of piping systems in which the pressure
18 exceeds 160 psig or the temperature exceeds 250°F., shall comply
19 with nationally recognized standards approved by the building
20 official and the requirements of Item No. 2.

21 2. Those portions of piping systems in which the pressure does
22 not exceed 160 psig and the temperature does not exceed 250°F.,
23 shall comply with the following requirements:

24 A. **Materials and construction.** (1) **Pipe.** Pipe shall be
25 brass, copper, cast iron, ((galvanized or)) black wrought iron,
26 ((galvanized or)) black steel, or other approved materials.

27 (2) **Tubing.** Tubing shall be copper water tube.

28 (3) **Valves.** Valves up through 2 inches in size shall be brass,
malleable iron, or steel bodies. Each gate valve shall be a full-
way type with working parts of noncorrosive metal.

(i) **Pressure Reducing Valves.** (i). Where pressure reducing
29 valves are used one or more relief or safety valves shall be
30 provided on the low pressure side of the reducing valve in case
31 the piping or equipment on the low pressure side does not meet
32 the requirements for full initial pressure. The relief or
33 safety valves shall be located adjoining to or as close as
34 possible to the reducing valve. Proper protection shall be
35 provided to prevent injury or damage caused by the escaping
36 steam from the discharge of relief or safety valves if vented
37 to the atmosphere. The combined discharge capacity of the
38 relief valves shall be such that the pressure rating of the
39 lower pressure piping or equipment shall not be exceeded in
40 case the reducing valve sticks open.

(ii) The use of hand-controlled by-passes around reducing
41 valves is permissible. The by-pass if used around a reducing
42 valve shall not be greater in capacity than the reducing
43 valve unless the piping or equipment is adequately protected
44 by relief valves or meets the requirements of the high
45 pressure system. It is mandatory that a pressure gage as
46 well as a relief valve be installed on the low pressure side
47 of a reducing valve.

(4) **Fittings.** (i) Plain screwed fittings shall be brass, bronze,

1 cast iron, ((~~or galvanized or~~)) black malleable iron, or black
2 steel.

3 (ii) Fittings for copper tubing shall be wrought copper,
4 wrought bronze or cast brass.

5 (iii) Welding fittings shall be black steel.

6 (iv) Fittings for asbestos-cement shall be cast iron.

7 (5) **Pipe joint compound.** Pipe joint compound shall be
8 noncorrosive and insoluble in the material being carried in the
9 pipe.

10 (6) **Protective coatings.** Protective coatings shall be
11 watertight, durable, heat resistant, electrically nonconductive
12 and tightly adherent to the pipe.

13 (7) **Fluxes.** Fluxes for solder, sweat, and brazed joints shall
14 be a noncorrosive type and suitable for the use intended.

15 (8) **Insulation.** Coverings or insulation used on hot-water or
16 steam pipes shall be of materials suitable for the operating tem-
17 perature of the system. The insulation, jackets and lap-seal
18 adhesives shall be tested as a composite product and shall have a
19 flame spread of not more than 25 and a smoke-developed rating of
20 not more than 50 when tested in accordance with U.B.C. Standard
21 No. 42-1.

22 (9) **Flashing material.** Flashing shall be lead, copper, galva-
23 nized iron or other approved materials.

24 (10) **Gaskets.** Flange gaskets shall be metal or asbestos or
25 other approved materials.

26 (11) **Hangers and anchors.** Hangers and anchors shall be suitable
27 for the use intended.

28 (12) **Sleeves.** Sleeves shall be of steel, cast iron or wrought
29 iron pipe, or tile.

30 (13) **Standards.** All piping, tubing, valves, joints, fittings,
31 devices and materials shall be free of defects and comply with
32 nationally recognized standards approved by the building official.

33 (14) **Marking.** Materials and devices shall be suitably
34 identified. In addition to the incised marking required in the
35 standards, all harddrawn copper tubing shall be marked by means
36 of a continuous and indelible colored stripe, at least 1/4 inch
37 in width as follows:

38 Type L -- Blue
39 Type K -- Green
40 Type M -- Red

41 (15) **Other materials.** Other materials and construction may be
42 installed as provided in this chapter or in their approval, pro-
43 vided that they are first acceptable to the building official and
44 are equivalent, for the use intended, to those specified in this
45 chapter.

46 B. **Fabrication of joints.** Joints shall be made by use of fit-
47 tings except as otherwise permitted in this chapter.

1 (1) **Screwed joints.** Threads on iron pipe size (I.P.S. pipe)
2 shall be standard taper pipe threads. All burrs shall be removed.
3 Pipe ends shall be reamed or filed out to full size of bore and
4 all chips shall be removed.

5 (2) **Solder joints.** Surfaces to be joined by soldering shall be
6 cleaned bright by manual or mechanical means. The joints shall be
7 properly fluxed. Tubing shall be reamed out to the full size of
8 bore.

9 (3) **Welded joints.** Welding shall be performed in accordance
10 with nationally recognized standards approved by the building
11 official.

12 (4) **Flanged joints.** Flanged joints shall be tightened evenly
13 and provided with suitable nuts, bolts and gaskets.

14 (5) **Mechanical joints.** Mechanical joints shall comply with
15 nationally recognized standards.

16 C. **Connections.** (1) **Brass and copper piping.** Joints in brass
17 and copper piping shall be threaded, brazed, welded, flanged or
18 mechanical type.

19 (2) **Cast-iron piping.** Joints in cast-iron pipe shall be
20 threaded, flanged or mechanical type.

21 (3) **Galvanized wrought-iron and galvanized steel piping.**
22 Joints in galvanized wrought-iron and galvanized steel piping
23 shall be threaded, flanged or mechanical type.

24 (4) **Black wrought-iron piping.** Joints in black wrought-iron
25 piping shall be threaded, brazed, welded, flanged or mechanical
26 type except that joints built into or embedded in concrete or
27 masonry shall be welded.

28 (5) **Black steel piping.** Joints in black steel piping shall be
threaded, brazed, welded, flanged or mechanical type.

(6) **Asbestos-cement piping.** Joints in asbestos-cement piping
shall be mechanical type and suitable for the service temperature
intended.

(7) **Copper water tubing.** Joints in copper tubing shall be
soldered, sweated, or brazed; except that joints under a building
and in or under any concrete slab resting on the ground, shall be
silver brazed, or equal, and fittings shall be of wrought copper.
All solder and sweat joints may be made with 95 percent tin-5 per-
cent antimony solder; however, if the steam pressure does not
exceed 15 psig nor the water pressure exceed 30 psig, then 50
percent tin-50 percent lead solder may be used. Lead-based sol-
ders shall not be used in piping conveying potable water.

(8) **Piping to tubing.** Joints connecting piping to tubing
shall be made with adapter fittings connected as required in Item
Nos. (1) through (7).

D. **Changes in direction.** Changes in direction shall be made by
the appropriate use of fittings, except that changes in direction
in copper tubing may be made with bends having a radius not less
than six diameters of the tubing, provided that such bends are
made by the use of forming equipment which does not deform or
reduce appreciably the cross-sectional area of the tubing.

1 **E. Changes in pipe sizes.** Where different sizes of pipe or
2 pipe and fittings are to be connected, the proper size increasers
3 or reducer fittings shall be used between the two sizes. When
4 the branch is at least two sizes smaller than the main, weldolets
or threadolets may be used in lieu of welding tees. Bushings
shall not be used. Eccentric reducing fittings shall be used
wherever necessary to provide free drainage of lines.

5 **F. Hangers and supports.** All piping and equipment shall be
6 adequately supported to the satisfaction of the building
7 official. Hot-water and steam piping shall be supported,
8 anchored, provided with swing joints, expansion loops or joints,
9 or other means to avoid excessive strain on piping, equipment, or
the building structure to the satisfaction of the building
official.

10 (1) **Vertical piping-attachment.** Vertical piping and tubing
11 shall be secured at sufficiently close intervals to keep the pipe
in alignment and carry the weight of the pipe and contents.

12 (2) **Horizontal piping.** (i) **Supports.** Horizontal piping and
13 tubing shall be supported at sufficiently close intervals to keep
14 it in alignment and prevent excessive sagging.

15 (ii) **In ground.** Piping and tubing in the ground shall be laid
16 on a firm bed for its entire length, except where support is
17 otherwise provided which is adequate in the judgment of the
18 building official. Asbestos-cement piping shall be provided with
adequate blocking.

19 **G. Installation.** (1) **Same materials required.** All piping mate-
20 rials used, except valves and similar devices, shall be of a like
21 material except as otherwise acceptable to the building official.

22 (2) **Wall thickness.** (i) Piping shall be at least standard
23 weight brass or copper, Class 150 cast iron, standard weight
24 wrought iron, ASTM Schedule 40 steel or suitable asbestos-
25 cement of adequate pressure rating.

26 (ii) **Tubing shall be at least:** Type K-for condensate return
27 lines; Type L-for steam condenser cooling water lines, underground
28 water lines, and aboveground water lines; Type M-for aboveground
water lines not embedded in concrete or masonry.

29 (3) **Piping embedded in structure.** Piping shall not be built
30 into or embedded in concrete or masonry; except, where used for
31 radiant panel heating or cooling, black steel pipe, wrought-iron
32 piping or Type L copper tubing may be so embedded.

33 (4) **Cutting structure.** Structural members shall not be seri-
34 ously weakened or impaired by cutting or notching.

35 (5) **Providing for expansion, contraction and settling.** Piping
36 shall be installed so that piping, connections and equipment shall
37 not be subjected to excessive strains or stresses and provisions
38 shall be made for expansion, contraction, shrinkage, and struc-
tural settlement.

39 (6) **Circulation.** Piping shall provide adequate circulation.
40 Piping shall be graded so that all gases can move in the direction
41 of the water flow to a vented section of the system. When sec-
42 tions of a piping system cannot be installed with the required
grade, such sections shall be provided with automatic or manual

1 air vents whose discharge is piped to an approved location.
2 Steam traps shall be provided where required.

3 (7) **Underground piping.** (i) **Cinders and other corrosive mate-**
4 **rial fills.** All piping passing through or under cinders or other
5 corrosive fill materials shall be suitably protected from
6 corrosion.

7 **EXCEPTION:** Where a soil analysis by an acceptable test-
8 ing laboratory shows the soil to be free of materials
9 which may corrode the pipe to be installed, the require-
10 ments for protective coatings may be waived.

11 (ii) **Beneath buildings.** Piping installed within a building
12 and in, or under, a concrete floor slab resting on the ground
13 shall be installed as follows:

14 **Ferrous piping.** Ferrous piping shall be galvanized and covered
15 with an approved protective coating.

16 **Copper tubing.** Copper tubing shall be installed without joints
17 where possible.

18 **Asbestos-cement.** Asbestos-cement pipe shall not be installed
19 beneath any building.

20 (iii) **Outside of buildings-black wrought iron and black steel.**
21 Black wrought-iron and black steel piping shall be protected
22 against corrosion by an approved pipe wrapping.

23 **Asbestos-cement.** Asbestos-cement piping shall be installed in
24 accordance with the manufacturer's recommendations, but shall not
25 be installed within 2 feet of any building.

26 (iv) **Under walls or foundations.** Piping passing under walls or
27 foundations shall be protected from breakage.

28 (v) **Openings into buildings.** Voids around piping passing
through concrete or masonry floors or walls shall be appropriately
sealed at the opening into the building; sleeves shall be provided
at such openings.

(8) **Aboveground piping.** (i) **Sleeves.** Sleeves shall be
installed where piping passes through masonry or concrete, or
through any fire separation.

(ii) **Insulation.** The temperature of surfaces within normal
reach of building occupants shall not exceed 140°F. unless they
are protected by suitable insulation. Where sleeves are
installed any insulation shall continue full-sized through them.

(iii) **Lining.** Combustible portions of unventilated spaces
which contain piping or devices whose outside temperature,
including insulation, exceeds 140°F., shall be lined with No. 24
gage steel, or 1/4 inch-thick insulating millboard.

(iv) **Clearance.** There shall be at least 1-inch clearance from
structure around steam pipes.

(v) **Exposed piping.** Exposed piping subject to excessive corro-
sion, erosion, or mechanical damage shall be suitably protected.

(vi) **Asbestos-cement piping.** Asbestos-cement piping shall not
be installed within any building.

1 (vii) **Roof and wall openings.** Joints at the roof around pipes
2 or appurtenances shall be made watertight by the use of approved
3 flashings or flashing material. Exterior wall openings shall be
4 made watertight.

5 (viii) **Drainage.** Means shall be provided to drain all piping.

6 (ix) **Freezing.** Where required, piping outside of a building or
7 in an exterior wall shall be protected from freezing.

8 (9) **Trenches and tunnels. (i) Protection of structure.**
9 Trenches deeper than the footings of a building or structure and
10 paralleling the same shall be at least 45 degrees therefrom,
11 unless otherwise permitted by the building official.

12 (ii) **Mechanical equipment.** Use of mechanical excavating equip-
13 ment is prohibited within 2 feet of existing piping or
14 appurtenances.

15 (iii) **Tunneling and driving.** Tunnels shall, before
16 backfilling, have a clear height of 2 feet above the pipe and
17 shall be limited in length to one half the depth of the trench,
18 with a maximum length of 8 feet. When pipes are driven, the
19 drive pipe shall be at least one size larger than the pipe to be
20 laid.

21 (iv) **Backfilling.** Excavation shall be completely backfilled
22 as soon after inspection as practicable. Adequate precaution
23 shall be taken to ensure proper compaction of backfill around
24 piping without damage to such piping. Trenches shall be
25 backfilled in thin layers to 12 inches above the top of the pip-
26 ing with clean earth which shall not contain stones, boulders,
27 cinder-fill or other materials which would damage or break the
28 piping or cause corrosive action. Mechanical devices such as
bulldozers, graders, etc., may then be used to complete backfill
to grade. Fill shall be properly compacted. Suitable precau-
tions shall be taken to ensure permanent stability for pipe laid
in filled or made ground.

H. **Pressure testing. (1) Responsibility.** The equipment, mate-
rial and labor necessary for inspection or test shall be fur-
nished by the person to whom the permit is issued or by whom
inspection is requested.

(2) **Media.** The piping shall be tested with water.

(3) **Pressure test.** Piping shall be tested with a hydrostatic
pressure of not less than 100 psig, but at least 50 psig greater
than operating pressure. This pressure shall be maintained for at
least 30 minutes. Required tests shall be conducted by the owner
or contractor in the presence of an authorized inspector. The
piping being tested shall remain exposed to the inspector and
shall not leak during the test.

(4) **Moved structures.** Piping systems of a building and parts
thereof, that are moved from one foundation to another shall be
completely tested as prescribed elsewhere in this section for new
work, except that walls or floors need not be removed during such
test when equivalent means of inspection acceptable to the build-
ing official are provided.

(5) **Test waived.** No test or inspection shall be required where
a system, or part thereof, is set up for exhibition purposes and
has no connection with a water system.

1 (6) **Exceptions.** In cases where it would be impractical to pro-
2 vide the aforementioned tests, or for minor installations and
3 repairs, the building official at his discretion may make such
4 inspection as he deems advisable in order to assure himself that
5 the work has been performed in accordance with the intent of this
6 chapter.

7 **I. Installation of Pipes Conveying Gases, Vapors or Liquids in**
8 **any Hoistway, Machine Room or Machinery Space.**

9 Pipes conveying gases, vapors or liquids which are not used in
10 connection with the operation of the elevator shall not be
11 installed in any hoistway, machine room or machinery space.

12 **1. Pipes for sprinklers only may be installed in these**
13 **spaces subject to the following:**

14 **A. All risers and returns shall be located outside these**
15 **spaces.**

16 **B. Branch lines in hoistways shall supply sprinklers at not**
17 **more than one floor level.**

18 **C. Shutoff valves shall be provided in accessible**
19 **locations outside these spaces.**

20 **2. Piping for pit and sump pumps may be installed.**

21 **3. Those portions of the hot-water piping systems in which the**
22 **continuous pressure-temperature relationship does not exceed the**
23 **following may be constructed of polybutylene pipe or tubing of**
24 **SDR-11 conforming to specification ASTM D 3309.**

25 **TEMPERATURE(°F.)**

26 **PRESSURE(PSI)**

73	200
180	100
200	80

27 Polybutylene also may be used for applications requiring up to
28 one year total exposure at conditions of 210°F., 150 psi, typical
conditions for temperature and pressure-relief valve discharge
lines in heating systems.

A. Materials and construction. (1) PB pipe and tubing. Pipe
shall be IPS or copper tube size polybutylene, both SDR-11 con-
forming to ASTM D 3309.

(2) Fittings. Fittings shall be of polybutylene or metal.

(3) Insulation. Coverings and insulation used on hot-water
pipes shall be of materials suitable for the operating tempera-
ture of the system. The insulation, jackets and lap-seal adhe-
sives shall be tested as a composite product and shall have a
flame spread of not more than 25 and a smoke-developed rating of
not more than 50 when tested in accordance with U.B.C. Standard
No. 42-1.

4. Gaskets. Flanged PB systems may be installed without
gaskets.

5. Hangers, sleeves and anchors. Hangers, sleeves and anchors
shall be suitable for the use intended as recommended by the

1 manufacturer's installation instructions.

2 **6. Standards.** All piping, tubing, valves, joints, fittings,
3 devices and materials shall be free of defects and comply with
4 nationally recognized standards approved by the building official.

5 **7. Marking.** Materials and devices shall be suitably identified.

6 **B. Fabrication of joints.** Joints shall be made by one or more
7 of the following methods:

8 (1) **Socket fusion.** Polybutylene socket fittings may be heat
9 fused to the pipe.

10 (2) **Crimp/Insert fittings.** Insert fittings of metal with crimp
11 rings of aluminum or copper may be used.

12 (3) **Compression fittings.** Metallic or polybutylene fittings
13 utilizing compression seals are acceptable.

14 (4) **Transition fittings.** Connections to other piping materials
15 shall be made by approved types of special transition fittings.

16 **C. Changes in direction.** Changes in direction shall be made by
17 the appropriate use of fittings or with pipe bends having a radius
18 of not less than 10 diameters of the pipe. No forming equipment
19 or heating is required.

20 **D. Hangers and supports.** Piping and equipment shall be
21 adequately supported to the satisfaction of the building official.
22 Hot-water piping shall be supported, anchored and provided with
23 swing joints, expansion loops or joints, or utilize the pipe's
24 flexibility to avoid excessive strain on piping, equipment or the
25 building structure to the satisfaction of the building official.

26 **E. Installation details.** (1) Piping embedded in structure.
27 Piping shall not be built into or embedded in concrete or masonry,
28 except where used for radiant panel heating or cooling. See
Chapter 23 of this appendix.

(2) **Cutting structure.** Structural member shall not be
seriously weakened or impaired by cutting or notching.

(3) **Under walls or foundations.** All piping passing under load-
bearing foundations shall be protected by sleeving.

(4) **Openings into buildings.** Voids around piping passing
through concrete or masonry floors or walls shall be appropriately
sealed at the opening into the building; sleeves shall be provided
at such openings.

(5) **Above ground piping.** (i) **Sleeves.** Sleeves shall be
installed where piping passes through masonry or concrete, or
through any fire separation.

(ii) **Insulation.** The temperature of surfaces within normal
reach of building occupants shall not exceed 140°F. unless they
are protected by suitable insulation. Where sleeves are
installed, any insulation shall continue full sized through them.

(6) **Belowground piping.** (i) **Protection of structure.** All
trenches deeper than the footings of any building or structure and
paralleling the same shall be at least 45 degrees therefrom,
unless otherwise permitted by the building official.

1 (ii) **Mechanical equipment.** Use of mechanical excavating
2 equipment is prohibited within 2 feet of existing piping or
appurtenances.

3 (iii) **Boring and pulling.** Boring pipe shall be at least one
4 size larger than the pipe to be laid. Pulling force shall not
exceed the tensile yield strength of the pipe.

5 (iv) **Backfilling.** All excavations shall be completely
6 backfilled as soon after inspection as practicable. Adequate
7 precaution shall be taken to ensure proper compaction of the
8 backfill around piping without damage to such piping. Trenches
9 shall be backfilled in thin layers to 12 inches above the top of
the piping with clean earth which shall not contain stones,
boulders, cinderfill or other materials which would damage or
break the piping. Mechanical devices such as bulldozers,
graders, etc., may then be used to complete backfill to grade.
Fill shall be properly compacted. Suitable precautions shall be
taken to ensure permanent stability for pipe laid in filled or
made ground.

10 (v) **Pipe or tube under concrete.** Pipe or tubing installed
11 beneath footings or slab shall be in continuous lengths or with
fused joints.

12 **F. Pressure testing.** (1) **Responsibility.** The equipment,
13 material and labor necessary for inspection or test shall be
furnished by the person to whom the permit is issued or by whom
14 inspection is requested.

15 (2) **Media.** The piping shall be tested with water.

16 (3) **Pressure test.** Piping shall be tested with a hydrostatic
17 pressure of not less than 100 psig or 1.5 times the system design
operating pressure. The pressures shall be maintained for 30
18 minutes at which time the indicated pressure may have decreased
due to the initial expansion of the pipe. After 30 minutes,
adjust the system to the required pressure and visually inspect
19 for leaks. Required tests shall be conducted by the owner or
contractor in the presence of an authorized inspector. The pip-
ing being tested shall remain exposed to the inspector and shall
not leak during the test.

20
21 Section 127. Chapter 21 of the Uniform Mechanical Code, 1991
Edition, is amended by adding a new section 2128 as follows:

22 **MONITORING SYSTEMS FOR AUTOMATIC BOILERS.**

23 **Sec. 2128.** Sections 2128 through 2135 regulate the
24 installation, maintenance and use of monitoring systems for
automatic boilers.

25 For purposes of Sections 2128 through 2135, words and phrases
shall mean as follows:

26 **ALARM SERVICE:** The service required following the transmission
27 of an alarm signal.

28 **ALARM SIGNAL:** A signal indicating an emergency requiring
immediate action.

1 **CENTRAL-STATION SYSTEM:** A system, or group of systems, the
2 operations of which are signaled to, recorded in, maintained and
3 supervised from an approved central station in which there are
4 competent and experienced observers and operators in attendance at
5 all times whose duty it shall be upon receipt of a signal to take
6 such action as required. Such systems shall be independently
owned, controlled and operated by a person, firm or corporation
whose principal business is the furnishing and maintaining of
supervised protective signaling service and who has no interest in
the protected properties or such system shall be owned and
operated by a governmental agency having not less than five
separate locations.

7 **FUEL SHUT DOWN SYSTEM:** A system to shut off the fuel supply to
8 the burner which is operated by the same alarm signal as that
relayed to the monitoring system. The fuel shut down system shall
contain a device for manually resetting the fuel shut down system
prior to resuming burner operation.

9 **MAINTENANCE:** Repair service, including periodically recurrent
10 inspections and tests, required to keep the protective signalling
11 system and its component parts in an operative condition at all
times together with replacement of the system or of its compo-
nents, when for any reason they become undependable or
inoperative.

12 **MONITORING STATION:** The central station of a central station
13 system or the central supervisory station of a proprietary system.

14 **MONITORING SYSTEM:** An approved protective signaling used for
15 surveillance of controls and limit devices required on certain
automatic boilers.

16 **PROPRIETARY SYSTEM:** A system with supervision by competent and
17 experienced personnel in a central supervising station at the
property protected. The system is to include equipment and other
facilities required to permit the operators to test and operate
the system and, upon receipt of a signal, to take such action as
is required.

18 **PROTECTIVE SIGNALING SYSTEMS:** Electrically operated circuits,
19 instruments and devices, together with the necessary electrical
20 energy designed to transmit alarms and trouble signals, necessary
for monitoring boilers.

21 **TROUBLE SIGNAL:** A signal indicating trouble of any nature, such
22 as a circuit break or ground, occurring in the devices or wiring
associated with a protective signaling system.

23 Section 128. Chapter 21 of the Uniform Mechanical Code, 1991
24 Edition, is amended by adding a new section 2129 as follows:

25 **MONITORING SYSTEM FUNCTIONS**

26 **Sec. 2129.** An approved monitoring system shall sense low water
27 level and flame failure on all boilers, steam pressure at the
upper limit setting on steam boilers or water temperature at the
upper limit setting on hot water boilers. Upon sensing any of
28 the above conditions, a manually reset relay device shall shut
off the fuel supply to the boiler and shall relay an alarm signal
to the monitoring system. The monitoring system shall sense
existing limit controls and flame failure devices.

1 Section 129. Chapter 21 of the Uniform Mechanical Code, 1991
2 Edition, is amended by adding a new section 2130 as follows:

3 **APPROVAL OF MONITORING SYSTEMS**

4 **Sec. 2130.** An annually renewable permit issued by the building
5 official shall be required for a monitoring system. Before such
6 permit may be issued, the provisions of this Section shall be met.

7 (a) **Application.** Application for the first monitoring permit
8 shall be made in writing to the building official on forms pro-
9 vided, therefor. The annual fee for such permit shall be as
10 established in the Permit Fee Ordinance.

11 Complete information regarding the system including specifica-
12 tions, wiring diagrams and floor plans shall be submitted to the
13 building official. The permit for operation of automatic boilers
14 under supervision by a monitoring system shall be required in
15 addition to the operating permit required under Section 2124.

16 (b) **Equipment.** All devices, combinations of devices and
17 equipment constructed and installed in conformity with the
18 provisions of Sections 2130 through 2135 shall be approved only
19 for the purposes for which they are intended. All devices shall
20 carry approval of Underwriters' Laboratories, Inc., or other
21 comparable agency.

22 (c) **Acceptance Tests.** Upon completion of a system, a
23 satisfactory test of the entire installation shall be made in the
24 presence of the building official.

25 (d) **Maintenance.** All systems shall be under the supervision of
26 qualified persons. These persons shall cause proper tests and
27 inspection to be made at prescribed intervals and shall have
28 general charge of all alterations and additions to the system
under their supervision or a satisfactory agreement on the main-
tenance, operation and efficiency of the system shall be pro-
vided.

29 (e) **First Operating Permit.** When a monitoring system has been
30 approved, the building official shall issue a first operating
31 permit without additional charge. The first operating permit
shall expire at the end of the calendar year during which the
system was first inspected.

32 (f) **Annually Renewable Monitoring System Operating Permit.**
33 When the first Monitoring System Operating Permit expires, the
34 owner of a boiler plant served by a monitoring system shall
35 obtain an annually renewable permit therefor issued by the
36 building official.

37 A monitoring system permit shall not be renewed until the system
38 and appurtenances thereto have been inspected and approved by the
building official.

39 It shall be the responsibility of the applicant to demonstrate
40 in the presence of the building official by testing of the appa-
41 ratus, or such other means as may be appropriate, the operation
42 and reliability of the subject monitoring system. The building
43 official may require additional tests as he/she deems necessary
for the safe operation and proper maintenance of the monitoring
system and the boiler plant(s) served by such system.

1 Section 130. Chapter 21 of the Uniform Mechanical Code, 1991
2 Edition, is amended by adding a new section 2131 as follows:

3 **DESIGN AND INSTALLATION OF MONITORING SYSTEMS**

4 **Sec. 2131.** The design and installation of all electrical wiring,
5 equipment and devices of a monitoring system, service requirements
6 therefor and electrical supervision thereof, shall be in
7 conformity with the Seattle Electrical Code, applicable
provisions of NFPA Standards No. 71, Central Station Protective
Signaling Systems, and No. 72D, Proprietary Protective Signaling
Systems, as published by the National Fire Protection
Association.

8 Central station systems and facilities which have been approved
9 by the Seattle Fire Department are acceptable as a central alarm
monitoring system.

10 Section 131. Chapter 21 of the Uniform Mechanical Code, 1991
11 Edition, is amended by adding a new section 2132 as follows:

12 **MONITORING STATION BUILDING**

13 **Sec. 2132. (a) General.** The monitoring station building and its
fire protection shall be satisfactory to the building official.

14 **(b) Access.** Access to operating rooms of monitoring stations
15 shall be restricted to authorized persons. A central station
operating room shall be locked at all times.

16 **(c) Emergency Lighting.** Emergency lighting facilities shall be
17 provided in the operating room and in other areas of the
18 monitoring station as determined necessary by the building offi-
cial. The emergency lighting system shall illuminate the area
automatically upon failure of the normal lighting system power
supply.

19 Section 132. Chapter 21 of the Uniform Mechanical Code, 1991
20 Edition, is amended by adding a new section 2133 as follows:

21 **MONITORING STATION FACILITIES**

22 **Sec. 2133. (a) Signal Recording.** The monitoring station shall
23 be equipped with the necessary instruments of an approved pattern
24 for automatically receiving and recording all signals. The time
of receipt of signals shall also be recorded manually or, prefer-
ably, by an automatic device.

25 **(b) Durability.** The devices and circuits shall be designed and
26 installed so as to meet successfully the most severe conditions
liable to be met in practice and no change or alteration shall be
made in same without approval of the building official.

27 **(c) Circuit Arrangement.** Circuits between the protected premises
28 and the monitoring station, and within the protected premises,
where essential to the actuation or operation of signaling devices
shall be so arranged that the occurrence of a signal break or
single ground fault shall not prevent the transmission of an alarm
signal.

1 **EXCEPTION:** Circuits wholly within the monitoring station or
2 the carrier transmission portion of circuits.

3 (d) **Circuit Breaks.** The occurrence of a single break or a single
4 ground fault on any circuit shall not of itself cause a false
5 signal which may be interpreted as an alarm signal. Where such
6 single fault prevents the normal functioning of any circuit its
7 occurrence shall be indicated automatically at the monitoring
8 station by a trouble signal compelling attention and readily
9 distinguishable from signals other than those indicative of an
10 abnormal condition of supervised parts of a boiler monitoring
11 system.

12 (e) **Circuit Adjustments.** Circuit adjusting means for emergency
13 operation may either be automatic or be provided through manual
14 operation upon receipt of a trouble signal.

15 (f) **Signal Location Indication.** The circuits and devices shall
16 be arranged to receive and record a signal readily identifiable as
17 to location of origin.

18 (g) **Carrier Transmission.** The carrier transmission portion of
19 circuits between the protected premises and the monitoring station
20 shall meet the following requirements:

21 1. Carrier channels shall be designed to transmit a constant
22 tone of one frequency, which tone shall shift to a second
23 frequency for transmission of signals.

24 2. Two carrier channels shall be provided for each circuit with
25 all signals transmitted simultaneously over both channels; or one
26 carrier channel shall be provided plus means for immediate
27 transfer of the circuit to a standby carrier channel, a maximum
28 of eight circuits being associated with each standby channel.

 3. The two channels (or one channel with standby arrangement)
for each circuit shall be routed between the carrier transmitter
and the carrier receiver as follows:

 A. Over separate routes between terminating equipment.

 B. Over separate cables on the same route.

 C. Over separate pairs of wires in the same cable.

 D. Over one pair of wires provided service is limited to one
plant.

 4. Failure of a carrier channel, including any standby channels
provided, shall be indicated instantly and automatically in the
monitoring station.

 NOTE: The term "carrier transmission" as used herein does
not preclude the use of microwave links in the carrier
circuit.

 Section 133. Chapter 21 of the Uniform Mechanical Code, 1991
Edition, is amended by adding a new section 2134 as follows:

OPERATIONS AND TESTS

Sec. 2134. (a) Personnel. The monitoring station shall have sufficient personnel (a minimum of two persons) constantly on duty to assure immediate attention to all signals received. In the monitoring station of a proprietary system, the building official may permit a minimum of one person to be on constant duty, provided there are approved means, such as a watchman's service, to maintain a check at intervals of not less than two hours to assure that the operator is on duty. The minimum age of all operators shall be eighteen years. Operation and supervision shall be the primary functions of the operators and no other interest or activity shall take precedence over the protective service.

(b) Manual Test Frequency. Manual tests of all circuits extending from the monitoring station and of monitoring station devices shall be made at intervals of approximately 12 hours.

(c) Tests. Facilities shall be provided at the monitoring station on all circuits extending from the monitoring station and on all local current sources at the monitoring station for making the following tests:

1. Current strength on each circuit; this current to be adjusted to normal before making other tests.
2. Voltage across terminals of each circuit at the inside terminals of protective devices.
3. Voltage between ground and each side of each circuit.

(d) Actuating and Transmitting Device Tests. A complete and satisfactory test shall be made monthly of all actuating and transmitting devices.

Section 134. Chapter 21 of the Uniform Mechanical Code, 1991 Edition, is amended by adding a new section 2135 as follows:

SIGNALS AND REPORTS

Sec. 2135. (a) Report Availability. Reports of all signals received shall be made available upon request to the building official.

(b) Disposition of Signals. 1. Upon receipt of trouble signals or other signals pertaining solely to matters of equipment maintenance of the signaling systems, the operating company shall immediately investigate and, if possible, assure that the trouble is remedied at once.

In all cases where service of the signaling system is interrupted and is corrected within 12 hours, the property owner shall be notified immediately. This notification shall be confirmed by written notice with a copy sent to the building official.

2. Upon receipt of an alarm signal, the monitoring station shall notify the on-site operating engineer, if any, or the boiler supervisor by telephone or by the quickest method available.

Upon receipt of an alarm signal not caused by routine inspection and maintenance, the designated boiler supervisor shall notify the building official.

1 3. Definite instructions for the handling of alarms shall be
2 posted for the guidance of operators of the monitoring system.

3 4. The operating company shall have a person available within
4 two-hours travel who is competent to inspect, maintain and repair
5 the monitoring system.

6 Section 135. Table 21-C of the Uniform Mechanical Code,
7 1991 Edition, is amended as follows:
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TABLE NO. 21 - C -- CONTROLS AND LIMIT DEVICES FOR AUTOMATIC BOILERS

BOILER GROUP	FUEL	FUEL INPUT RANGE ¹ (inclusive)	TYPE OF PILOT ²	SAFETY CONTROL TIMING (Nominal Maximum time in Seconds)				ASSURED FUEL SUPPLY CONTROL ⁴	ASSURED AIR SUPPLY CONTROL ⁵
				TRIAL FOR PILOT	TRIAL FOR MAIN BURNER FLAME		MAIN BURNER FLAME FAILURE ³		
					DIRECT ELECTRIC IGNITION	FLAME PILOT			
A	Gas	0-400,000 Btu/h	Any type	90	Not Required	90	90	Not Required	Required
B	Gas	400,001 - 2,500,000 Btu/h	((Interrupted or intermittent)) Any type	15	15	15	2 - 4	Not Required	Required
C	Gas	2,500,001 - ((5,000,000)) 12,500,000 Btu/h	Interrupted or intermittent	15	15	15	2 - 4	Required	Required
D	Gas	Over ((5,000,000)) 12,500,000 Btu/h	Interrupted	15	15	15	2 - 4	Required	Required
E	Oil	0-400,000 Btu/h	Any type	Not Required	90	90	90	Not Required	Required
F	Oil	400,001 - ((1,000,000)) 3,000,000 Btu/h	Interrupted	Not Required	30	30	2 - 4	Required	Required
G	Oil	((1,000,001-3,000,000)) 3,000,001-12,500,000 Btu/h	Interrupted	Not Required	15	15	2 - 4	Required	Required
H	Oil	Over ((3,000,000)) 12,500,000 Btu/h	Interrupted	15	15	60	2 - 4	Required	Required
K	Electric	All	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required

BOILER GROUP	FUEL	FUEL INPUT RANGE ¹ (inclusive)	LOW FIRE START UP CONTROL ⁶	PRE-PURGING CONTROL ⁷	HOT WATER TEMPERATURE AND LOW WATER LIMIT CONTROLS ⁸	STEAM PRESSURE AND LOW WATER LIMIT CONTROLS ⁹	APPROVED FUEL SHUTOFF ¹⁰	CONTROL AND LIMIT DEVICE SYSTEM DESIGN ¹¹
A	Gas	0-400,000 Btu/h	Not Required	Not Required	Required	Required	Not Required	Required
B	Gas	400,001 - 2,500,000 Btu/h	Not Required	Not Required	Required	Required	Not Required	Required
C	Gas	2,500,001 - ((5,000,000)) 12,500,000 Btu/h	Required	Required	Required	Required	Required	Required
D	Gas	Over ((5,000,000)) 12,500,000 Btu/h	Required	Required	Required	Required	Required	Required
E	Oil	0-400,000 Btu/h	Not Required	Not Required	Required	Required	Not Required	Required
F	Oil	400,001 - ((1,000,000)) 3,000,000 Btu/h	Not Required	Not Required	Required	Required	Not Required	Required
G	Oil	((1,000,001-3,000,000)) 3,000,001-12,500,000 Btu/h	Not Required	Not Required	Required	Required	Not Required	Required
H	Oil	Over ((3,000,000)) 12,500,000 Btu/h	Required	Required	Required	Required	Required	Required
K	Electric	All	Not Required	Not Required	Required	Required	Not Required	Required

FOOTNOTES FOR TABLE NO. 21-C

¹Fuel input shall be determined by one of the following:

- (a) The maximum burner input as shown on the burner nameplate or as otherwise identified by the manufacturer.
- (b) The nominal boiler rating, as determined by the building official, plus 25 percent.
- (c) A permanently affixed meter to indicate fuel consumption, timed to determine the rate of fuel input.

²Automatic boilers shall have one flame failure device on each burner which shall prove the presence of a suitable ignition source at the point where it will reliably ignite the main burner, except that boiler groups A, B, E and F ((and G)) which are equipped with direct electric ignition shall monitor the main burner, and all boiler groups using interrupted pilots shall monitor only the main burner after the prescribed ((limited)) trial and ignition periods. ((Boiler group A equipped with continuous pilot shall accomplish 100 percent shutoff within 90 seconds upon pilot flame failure. The use of intermittent pilots in boiler group C is limited to approved burner units.)) Continuous pilots used in boiler groups A and B shall accomplish 100 percent shutoff upon pilot flame failure. Intermittent pilots may be used in group C for atmospheric burners only, provided the input per combustion chamber does not exceed 5,000,000 Btu/h and modulating or high-low firing is not employed.

((3In boiler groups B, C and D a 90-second main burner flame failure limit may apply if continuous pilots are provided on manufacturer assembled boiler-burner units which have been approved by an approved testing agency as complying with nationally recognized standards approved by the building official. Boiler groups F and G equipped to re-energize their ignition system within 0.8 second after main burner flame failure will be permitted 30 seconds for group F or 15 seconds for group G to re-establish its main burner flame.))

³Continuous pilots provided on manufacturer assembled boiler-burner units must be approved by a testing agency complying with nationally recognized standards approved by the building official.

⁴Boiler groups C and D shall have controls interlocked to accomplish a nonrecycling fuel shutoff upon high or low gas pressure, and boiler groups F, G and H using steam or air for fuel atomization shall have controls interlocked to accomplish a nonrecycling fuel shutoff upon low atomizing steam or air pressure. Boiler groups F, G and H equipped with a preheated oil system shall have controls interlocked to provide fuel shutoff upon low oil temperature.

⁵Automatic boilers shall have controls interlocked to shut off the fuel supply in the event of draft failure if forced or induced draft fans are used or, in the event of low combustion air flow, if a gas power burner is used. In boiler groups C, D, G and H failure to prove the air flow required shall result in a safety shutdown. Where a single motor directly driving both the fan and the oil pump is used, a separate control is not required.

1 6Boiler groups, C, D, G and H when firing in excess of 400,000 Btu
2 per combustion chamber shall be provided with low fire start of
its main burner system to permit smooth light-off. This will
normally be a rate of approximately one third of its maximum
firing rate.

3 7Boiler groups B, C, D, G and H shall not permit pilot or main
4 burner trial for ignition operation before a purging operation of
sufficient duration to permit a minimum of four complete air
5 changes through the furnace, including combustion chamber and the
boiler passes. Where this is not readily determinable, five com-
6 plete air changes of the furnace, including combustion chamber up
to the first pass, will be considered equivalent. An atmospheric
7 gas burner with no mechanical means of creating air movement or
an oil burner which obtains two thirds or more of the air
8 required for combustion without mechanical means of creating air
movement shall not require purge by means of four air changes so
9 long as its secondary air openings are not provided with means
of closing. If such burners have means of closing secondary air
10 openings, a time delay must be provided which puts these clo-
sures in a normally open position for four minutes before an
attempt for ignition. An installation with a trapped combustion
11 chamber shall in every case be provided with a mechanical means
of creating air movement for purging.

12 Purge air flow in boiler groups C, D, G and H shall be proved.
13 Proof of purge air flow may be accomplished by providing:

- 14 (1) Air pressure and "open damper" interlocks for all
15 dampers in the flow path, or
16 (2) Air flow interlock.

17 8Every automatic hot-water heating supply boiler, low-pressure
18 hot-water heating boiler, and power hot-water boiler shall be
equipped with two high-temperature limit controls with a manual
19 reset on on the control with the higher setting interlocked to
shut off the main fuel supply, except that manual reset on the
20 high-temperature limit control shall not be required on any
automatic package boiler not exceeding 400,000 Btu/h input and
which has been approved by an approved testing agency. Every
21 automatic hot water heating, power boiler and package hot-water
supply boiler shall be equipped with one low-water level limit
22 control with a manual reset interlocked to shut off the fuel
supply so installed as to prevent damage to the boiler and to
23 permit testing of the control without draining the heating
system. ((except on boilers used in Group R Occupancies of less
24 than six units and in Group M Occupancies and further, except
that the low-water level limit control is not required on
package hot-water supply boilers approved by a nationally
25 recognized testing agency.)) However, a low-water flow limit
control installed in the circulating water line may be used
26 instead of the low-water level limit control for the same pur-
pose on coil-type boilers.

27 9Every automatic low-pressure steam-heating boiler, ((small power
28 boiler)) and power steam boiler shall be equipped with two high-
steam pressure limit controls interlocked to shut off the fuel
supply to the main burner with manual reset on the control with
the higher setting and two low-water-level limit controls, one of
which shall be provided with a manual reset device and shall be
independent of the feed water controller. Coil-type flash steam
boilers may use two high-temperature limit controls, one of which

shall be manually reset in the hot-water coil section of the boiler instead of the low-water level limit control.

((¹⁰Boiler groups C, D and H shall use an approved automatic reset safety shutoff valve for the main burner fuel shutoff which shall be interlocked to the programming control devices required. On oil burners where the safety shutoff valve will be subjected to pressures in excess of 10 psi when the burner is not firing, a second safety shutoff valve shall be provided in series with the first. Boiler groups C and D using gas in excess of 1-pound-per-square-inch pressure or having a trapped combustion chamber or employing horizontal fire tubes shall be equipped with two approved safety shutoff valves, one of which shall be an automatic reset type, one of which may be used as an operating control, and both of which shall be interlocked to the limit-control devices required. Boiler groups C and D using gas in excess of 1-pound-per-square-inch pressure shall be provided with a permanent and ready means for making periodic tightness checks of the main fuel safety shutoff valves.))

¹⁰Automatic boilers firing gas or using gas pilots shall be equipped with an approved safety shutoff valve(s) in the main gas burner supply line and/or pilot gas burner supply line. The safety shutoff valve(s) shall be interlocked to the programming control devices required. Boilers in group C having an input per combustion chamber which does not exceed 5,000,000 Btu/h shall have two safety shutoff valves in series or one safety shutoff valve of the type incorporating a valve seal overtravel interlock. Boilers in group C having an input per combustion chamber exceeding 5,000,000 Btu/h and boilers in group D shall have two safety shutoff valves in series, of which the downstream valve shall be of the type incorporating a valve seal overtravel interlock. Boilers in groups C and D using gas in excess of one half pound per square inch pressure shall be provided with a permanent and ready means for making periodic tightness checks of the main fuel safety shutoff valves. Boilers in group D shall have a normally open electrically operated valve in a vent line between the two safety shutoff valves. This vent shall be sized in accordance with an approved vent sizing table but shall not be less than 3/4 inch pipe size. On oil burners where the safety shutoff valve will be subjected to pressures in excess of 10 psi a second safety shutoff valve shall be provided in series with the first. In boiler group H where a second safety shutoff valve is required the upstream valve shall be of the 3-way by-pass or recirculating type.

¹¹Control and limit device systems shall be grounded with operating voltage not to exceed 150 volts, except that upon approval by the building official, existing control equipment to be reused in an altered boiler control system may use 220-volt single phase with one side grounded, provided such voltage is used for all controls. Control and limit devices shall interrupt the ungrounded side of the circuit. A readily accessible means of manually disconnecting the control circuit shall be provided with controls so arranged that when they are de-energized the burner shall be inoperative.

Section 136. Section 2201 of the Uniform Mechanical Code, 1991 Edition, is amended as follows:

GENERAL

1 **Sec. 2201.** The regulations of this chapter shall govern the
2 installation of fuel-gas piping in or in connection with a build-
ing or structure or within the property lines of premises, other
than service pipe.

3 The Director of Public Health shall be responsible for the
4 administration and enforcement of this chapter and for this
5 purpose shall have all of the powers of the building official.
6 Whenever the words "building official" are used in this chapter,
7 such words shall mean "Director of Public Health."

8 Section 137. Section 2203 of the Uniform Mechanical Code,
9 1991 Edition, is amended as follows:

10 **PERMIT**

11 **Sec. 2203.** A permit shall be obtained prior to installation,
12 removal, alteration or repair of fuel-gas piping systems as
13 required by the provisions of Chapter 3 of this code.

14 Fees shall be as required by the Permit Fee Ordinance and shall
15 be collected by the Director of Public Health.

16 All gas piping systems for which a permit is required shall be
17 inspected by the Director of Public Health as specified in Section
18 2206.

19 Section 138. Subsection 2213(k) of the Uniform Mechanical
20 Code, 1991 Edition, is amended as follows:

21 **Installation of Gas Piping**

22 (k) **Barbecue or Fireplace Outlets.** Gas outlets in a barbecue or
23 fireplace shall be controlled by an approved operating valve
24 located in the same room and outside the fireplace but not more
25 than 4 feet from the outlets. If piping on the discharge side of
26 the control valve is standard weight brass or galvanized steel,
27 the piping may be embedded in or surrounded by not less than 2
28 inches of concrete or masonry.

29 Where it is impractical to locate the operating valve outside
30 the hearth it may be installed just inside the hearth within 2
31 inches of the outside edge of the hearth on either side of the
32 fire box.

33 Section 139. The Uniform Mechanical Code, 1991 Edition, is
34 amended by adding a new chapter 25 as follows:

35 **Chapter 25**

36 **WATER HEATERS**

37 **GENERAL**

38 **Sec. 2501.** The regulations of this chapter shall govern the
construction, location and installation of all water heaters
heating potable water (hot water tanks with a nominal water
containing capacity of 120 gallons or less having a heat input of

1 200,000 Btu's per hour or less used for hot water supply at
2 pressure of 160 pounds per square inch or less and at operating
3 temperatures of 210°F. or less). All design, construction and
4 workmanship shall be in conformity with accepted engineering
practices. The Director of Public Health shall be responsible for
the administration of this chapter and for this purpose he shall
have all the powers of the building official.

5 **DEFINITIONS**

6 **Sec. 2502.** The interpretation of words and phrases used in this
chapter shall be in accordance with Sections 401 through 425 of
this code.

7 **PERMITS**

8 **Sec. 2503.** It shall be unlawful for any person to install or
9 cause to be installed any water heater without first obtaining a
permit from the Director of Public Health to do so.

10 **EXCEPTION:** No permit shall be required for the replacement
of existing water heaters. Where a conversion of energy
11 source is involved an appropriate permit for the new energy
source (gas piping, oil piping or electrical) shall be
obtained in accordance with the applicable code section.

12 **INSPECTIONS**

13 **Sec. 2504. (a) Inspection of Chimneys or Vents.** Inspection of
14 chimneys or vents shall be made after all chimneys, vents or parts
thereof authorized by the permit have been installed and before
any such vent or part thereof has been covered or concealed.

15 **(b) Water Heater Inspection.** Inspection of water heaters shall
16 be made after all work authorized by the permit has been
installed. The Director of Public Health shall make such inspec-
17 tion as he/she deems necessary to assure that the work has been
installed in accordance with the intent of this code. No equip-
18 ment or part thereof shall be covered or concealed until the same
has been inspected and approved by the Director of Public
Health.

19 **WATER HEATER APPROVAL REQUIREMENTS**

20 **Sec. 2505. (a) General.** Water heaters shall conform to approved
21 recognized applicable standards or to other standards acceptable
to the Director of Public Health. Each such water heater shall
22 bear the label of an approved testing agency, certifying and
attesting that such equipment has been tested and inspected and
meets the requirements of applicable standards.

23 **(b) Temperature Safety-Protection Controls.** Storage-type water-
24 heaters, in addition to the primary temperature controls, shall be
provided with an over-temperature safety-protection device con-
25 structed, listed and installed in accordance with nationally
recognized applicable standards for such devices.

26 **ENCLOSURES AND COMBUSTION AIR**

27 **Sec. 2506.** Fuel burning water heaters shall be assured a
sufficient supply of air for fuel combustion and ventilation in
28 accordance with Chapter 6.

CLEARANCES

Sec. 2507. Listed water heaters shall be installed in accordance with their listing and the manufacturer's instructions. In no case shall the clearance be such as to interfere with combustion air, draft hood clearance and relief, and accessibility for servicing.

PROHIBITED LOCATIONS

Sec. 2508. No water heater which depends on combustion of fuel for heat shall be installed in any room used for or designed to be used for sleeping purposes or in any bathroom, clothes closet, closet or other confined space opening into any bath or bedroom. See also Section 802.

PROTECTION FROM DAMAGE

Sec. 2509. Water heaters generating a glow, spark or flame capable of igniting flammable vapors may be installed in a Group M Occupancy provided the pilots and burners, or heating elements and switches, are at least 18 inches above the floor level.

Where such water heaters installed within a private garage are enclosed in a separate, approved compartment having access only from outside the garage, such water heaters may be installed at floor level provided the required combustion air is also taken from the exterior of the garage. Fuel burning water heaters having sealed combustion chambers need not be elevated.

All water heaters installed in areas where they may be subjected to mechanical damage shall be suitably guarded against such damage by installation behind adequate barriers by elevation or by location out of the normal path of a vehicle using any such garage.

ACCESS AND WORKING SPACE

Sec. 2510. Every water heater installation shall be accessible for inspection, repair or replacement. The appliance space shall be provided with an opening or removable panel of sufficient size to remove the water heater. In no case shall such opening or removable panel be less than 24 inches in dimension. Every water heater located in an attic shall be equipped with a water-tight drain pan connected to a drain line leading to a safe disposal area.

VENTING OF WATER HEATERS

Sec. 2511. Every water heater designed to be vented shall be connected to a venting system and such system shall comply with the provisions of Chapter 9.

WATER PRESSURE, PRESSURE REGULATORS AND PRESSURE RELIEF VALVES

Sec. 2512. (a) Relief Valve Required. Any water system provided with a pressure regulating device or check valve at its source or any water system containing water heating equipment shall be provided with an approved, listed, adequately sized pressure relief valve.

(b) Maximum Pressure. Each pressure relief valve shall be an approved automatic type with drain and each such relief valve shall be set at a pressure of not more than 150 psi.

1 (c) **Relief Valve Drains.** Relief valves located inside a build-
2 ing shall be provided with a full size drain, not smaller than the
3 relief valve outlet, of galvanized steel, hard drawn copper piping
4 and fittings, CPVC or PB with fittings which will not reduce the
5 internal bore of the pipe or tubing (straight lengths as opposed
6 to coils) and shall extend from the valve to the outside of the
7 building with the end of the pipe not more than two (2) feet
8 (.6m) nor less than six (6) inches (152.4 mm) above the ground
9 and pointing downward. Such drains may terminate at other
10 approved locations. No part of such drain pipe shall be trapped
11 and the terminal end of the drain pipe shall not be threaded.

6 (d) **Water Heater Pressure Valves.** Any water heating device
7 connected to a separate storage tank and having valves between
8 said heater and tank shall be provided with an approved water
9 pressure relief valve.

9 (e) **Combination Valves.** Nothing contained herein shall prevent
10 the use of an approved combination temperature and pressure relief
11 valve. Each such approved combination temperature and pressure
12 relief valve shall be installed on the water heating device in an
13 approved location based on its listing requirements and the
14 manufacturer's instructions. Each such combination temperature
15 and pressure relief valve shall be provided with a drain as
16 required in Subsection (c) of this section.

13 **PIPING INSULATION**

14 **Sec. 2513.** All hot water piping installed to serve buildings and
15 within buildings shall be thermally insulated in accordance with
16 the Seattle Energy Code.

16 **ENERGY EFFICIENCY STANDARDS**

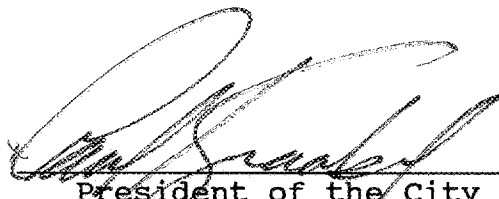
17 **Sec. 2514.** All hot water heaters shall meet the energy effi-
18 ciency standards contained in the Seattle Energy Code.

18 **Section 140.** The Director of the Department of Construction
19 and Land Use shall for a period of 60 days following the effec-
20 tive date of this ordinance, accept applications for permit
21 which comply with Ordinances 113702 and 113703 in lieu of this
22 ordinance.

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25
26
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910802
I:mec-ord.cpt/2-mec.1 thru 2-mec.146

1 Section 141. This ordinance shall take effect and be in force
2 thirty days from and after its passage and approval, if approved
3 by the Mayor, otherwise it shall take effect at the time it shall
4 have become a law under the provisions of the City Charter.

5 Passed by the City Council the 16th day of December,
6 1991, and signed by me in open session in authentication of its
7 passage this 16th day of December, 1991.

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9
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11 

12 President of the City Council

13 Approved by me this 20th day of December, 1991

14
15 
16 MAYOR

17
18 Filed by me this 23rd day of December, 1991

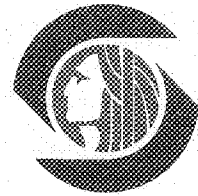
19
20 ATTEST: 
21 City Comptroller and City Clerk

22
23 BY: 
24 Deputy Clerk

25
26
27 TR:jl/em
28 910802

I:MEC-ORD.CPT/2-mec.1 - 2.mec.147

Seattle Department of Construction and Land Use



Dennis J. McLerran, Director
Norman B. Rice, Mayor

1991 SEATTLE AMENDMENTS TO THE 1991 UNIFORM MECHANICAL CODE

AUGUST, 1991

ANALYSIS OF REVISIONS

This is a chapter by chapter analysis of the revisions proposed for the adoption of the 1991 Seattle Mechanical Code. The code includes changes from the 1985 Seattle Mechanical Code as a result of changes in the 1988 and 1991 editions of the Uniform Mechanical Code. There are also changes proposed to the Seattle amendments. Changes are also incorporated from the Washington State Ventilation and Indoor Air Quality Code, the Seattle Energy Code and the Seattle Building Code. Each change is noted as to its source.

- 88 UMC -Are changes to UMC provisions from the 85 UMC and contained in the 88 UMC.
- 91 UMC -Are changes to UMC provisions from the 88 UMC and contained in the 91 UMC.
- WSVC -Are changes incorporated into the proposed Seattle Mechanical Code to adopt provisions required by the Washington State Ventilation and Indoor Air Quality Code as adopted by the Washington State Building Code Council.
- SMC -Are changes proposed to the Seattle Mechanical Code which are either new amendments or revisions to existing amendments.
- SEC -Are changes incorporated into the proposed Seattle Mechanical Code to adopt provisions required by the Seattle Energy Code.
- SBC -Are changes incorporated into the proposed Seattle Mechanical Code to adopt provisions required by the Seattle Building Code.

I:MECH-2.CPT/arltr

Seattle
Department of Construction and Land Use



Dennis J. McLerran, Director
Norman B. Rice, Mayor

1991 SEATTLE AMENDMENTS TO THE 1991 UNIFORM MECHANICAL CODE

SIGNIFICANT CHANGES

Chapter 4 Definitions -- Several changes concerning chapters 1-3, 6 and 10.1.

Chapter 5 Equipment -- Revision of language regarding headroom clearance in garages and equipment in hoistways, elevator machine rooms or machinery spaces.

Chapter 6 Combustion Air -- Many changes from four sources: 1988 UMC, 1991 UMC, WSVC, staff and Building Code Advisory Board Mechanical Code Committee (MCC).

Chapters 7/12 Heating/Cooling Systems -- 1991 UMC changes and deletion of Seattle requirement that equipment meet ASHRAE Standard 62.

Chapter 9 Appliance Venting -- Many changes per staff and 1988/1991 UMC.

Chapter 10 Ducts -- Changes concerning corridors used to convey air; gypsum products; combustibles within ducts or plenums; and equipment in stair enclosures, elevator shafts or dumbwaiter shafts.

Chapter 10.1 Ventilation and Indoor Air Quality -- New chapter from Washington State Ventilation and Indoor Air Quality Code (residential requirements) and from 1991 Seattle Energy Code (commercial requirements).

Chapter 11 Ventilation and Product Conveying Systems -- Changes concerning gypsum products; combustibles within ducts or plenums; and equipment in hoistways, elevator mechanical rooms or elevator machinery spaces.

Chapter 15 Mechanical Refrigerating Equipment -- Changes regarding refrigeration machinery rooms.

Chapter 20 Commercial Hoods and Kitchen Ventilation -- Fire-extinguishing equipment section greatly expanded per 1988 UMC.

Appendix B-Chapter 21 Steam and Hot-water Boilers -- Changes from 1991 UMC, MCC, staff.

smcmem

Analysis of Revisions - Chapter 1-3 - Administrative, Organization and Enforcement, Permits and Inspections

Chapters 1-3 are entirely Seattle amendments. Some changes were made to the mechanical code to make it more consistent with Seattle amendments to the building code.

Sec. 301 PERMITS

Sec. 301(b,c) Exempted Work - SMC. Change two sections, one for mechanical and one for refrigeration.

Reason: Editorial.

Sec. 301(d) Special Flood Hazard - SMC. New Section.

Reason: New Seattle Floodplain Development Ordinance required by FEMA, and added in 1989 by amendatory ordinance.

Analysis of Revisions - Chapter 4 - Definitions and Abbreviations

Sec. 403

(New) - ACCESSIBLE - 91 UMC.
ACCESSIBLE, READILY - 91 UMC.

Reason: To provide a definition for "accessible" as is used in Chapter 5, 7, 9, 10, 11, 12, and 13. The change also moves definition of "readily accessible" from Section 420 to Section 403.

The relocation of terms is beneficial because it brings together related definitions which will facilitate use and understanding of the code. The definitions are consistent with those used in the Uniform Plumbing Code.

(New) - ADDITION. - Also APPROVED. - SBC.

Reason: To be consistent with Seattle Building Code.

(New) - AIR, TRANSFER. Also AIR, VENTILATION and AMCA and ASHRAE - WSVC.

Reason: To be consistent with Washington State Ventilation Code.

(New) - AUTOMATIC - SEC

Reason: To be consistent with Seattle Energy Code.

(Change) - EXHAUST AIR, MAKEUP AIR, OUTSIDE AIR, RETURN AIR, SUPPLY AIR. 88 UMC.

Reason: New definitions for exhaust air, makeup air, outside air, return air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air", which had a definition unique to the Uniform Mechanical Code.

Sec. 404

(New) - BACK-DRAFT DAMPER. Also BAROMETRIC DAMPER. WSVC.

Reason: To be consistent with Washington Ventilation Code.

(Change) - BUILDING OFFICIAL. SBC.

Reason: To be consistent with SBC.

Sec. 405

(New) - CFM. WSVC.

Reason: To be consistent with Washington State Ventilation Code.

**Analysis of Revisions - Chapter 4 - Definitions and Abbreviations
(Cont.)**

Sec. 405 (Change) - Chimney, Residential Appliance-type.- 91 UMC

Reason: Residential-type chimneys referenced in Table No. 9-A, Chimney Selection Chart, are available in two varieties, an HT and a non-HT. The HT chimney has been tested to a maximum flue gas temperature of 2100°F while the non-HT chimney has only been tested to a flue gas temperature of 1700°F. Research conducted at the National Bureau of Standards (NBS) and at the Consumer Product Commission (CPSC) indicates that chimneys tested to 1700°F are not adequate for use with closed-combustion wood-burning appliances. This is because chimneys attached to wood-burning appliances are likely to be involved in chimney fires.

The NBS work documented the temperatures obtained on the chimney liner during chimney fires. Excluding the most severe chimney fire data, the average of the maximum flue liner temperature obtained at NBS with three chimneys was 1650°F. Comparing this temperature with the liner temperature obtained during CPSC laboratory tests using the 1700°F. UL fire test illustrates the problem. When the flue gas temperature was 1700°F. in the gas generator as specified in UL 103, the liner temperature was only 1208°F. Thus, since the chimney fire can produce 1650°F. and the 1700°F. test produces only 1208°F. on the liner, the integrity of a regular residential-type and building heating appliance chimney tested to 1700°F. has not been evaluated at temperatures foreseeable during its use with a wood-burning appliance. Testing the chimney to the HT specifications of 2100°F. in the flue gas generator solves this problem.

Underwriters Laboratory has revised its Standard UL 103, Chimneys Factory-Built, to allow a manufacturer to have a chimney listed to either the HT or the non-HT specifications. The National Fire Protection Association has revised its code, NFPA 211, Chimneys, Fireplaces, Vents and Solid Fuelburning Appliances, in the 1988 edition to require the use of HT chimneys for closed-combustion wood-burning appliances. The ICBO Evaluation Service, Inc., acceptance criteria for solid-fuel-burning heating appliances has also adopted a requirement for HT chimneys for use with closed-combustion appliances. Participation in this program, however, is voluntary. The severity of the problem dictates a need for mandatory, uniform policy. Addition of these specifications of the ICBO code would provide this type of protection.

**Analysis of Revisions - Chapter 4 - Definitions and Abbreviations
(Cont.)**

(New) - CLOSED COMBUSTION SOLID-FUEL BURNING APPLIANCE.
91 UMC.

Reason: See reason for the definition of Chimney,
Residential Appliance-type.

Sec. 406

(New) - DEHUMIDISTAT. WSVC.

Reason: To be consistent with Washington State
Ventilation Code.

(New) - DISTRICT HEATING PLANT. 88 UMC.

Reason: This definition was added as a companion change
to Sec. 607(a) (91 UMC), where the term is used.

Sec. 407

(Change) - DUCT SYSTEMS. 91 UMC. Delete Low-pressure
Systems, Medium-pressure Systems, High pressure Systems
and last sentence.

Reason: To remove the terminology "low", "medium", and
"high" static pressures as identified regimes in duct
design for conformity with the current SMACNA practice
in U.M.C. Standard No. 10-2. The current practice is to
identify duct systems by static design pressure alone.

(Change) - DWELLING UNIT. SBC.

Reason: To be consistent with Seattle Building Code.

Sec. 408

(Change) - FIREPLACE. WSVC.

Reason: To be consistent with Washington State
Ventilation Code.

Sec. 410

(New) - HABITABLE SPACE. Also HEAT RECOVERY VENTILATION
SYSTEM and HVAC AND HVI. WSVC.

Reason: To be consistent with Washington State
Ventilation Code.

(Change) - HEATING SYSTEM. 88 UMC.

Reason: New definitions for exhaust air, makeup air,
return air and supply air were substituted to reconcile
terminology employed in the Uniform Mechanical Code with
that used by the heating, ventilating and air condition-
ing industries, contractors and engineers and particu-
larly to discontinue use of the term "circulating air",
which had a definition unique to the Uniform Mechanical
Code.

**Analysis of Revisions - Chapter 4 - Definitions and Abbreviations
(Cont.)**

Sec. 414 (New) - LINE CONTACT INSTALLATION. 88 UMC.

Reason: This definition has been added as clarification for the term formerly used in Section 504. A change in that section deleted the terminology, but it is still used in furnace listings compiled by the American Gas Association.

(New) - LOW-PRESSURE-HOT-WATER-HEATING BOILER. 91 UMC.

Reason: Moved from Appendix B Chapter 21. Editorial.

(New) - LOW-PRESSURE STEAM HEATING BOILER. 91 UMC.

Reason: Moved from Appendix B Chapter 21. Editorial.

Sec. 415 (New) - MACHINERY ROOM. Also REFRIGERATION MACHINERY ROOM. SMC.

Reason: To guide code users to Sec. 1507, 1508, 1509 requirements for a refrigeration machinery room. The word "refrigeration" was added before "machinery room" in Sec. 603(c), 1507, 1508, 1509, 1601 in the 1988 UMC for clarity.

(New) - MANUAL. WSVC.

Reason: To be consistent with Washington State Ventilation Code.

Sec. 418 (Change) - PLENUM. 91 UMC.

Reason: Part of the revisions to Section 1002(a).

(Change) - PLENUM. Also PORTABLE COOLING UNIT. 88 UMC.

Reason: New definitions for exhaust air, outside air, return air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air" which had a definition unique to the Uniform Mechanical Code.

**Analysis of Revisions - Chapter 4 - Definitions and Abbreviations
(Cont.)**

Sec. 418 (Change) - PORTABLE HEATING APPLIANCE. 88 UMC.

Reason: The definition was revised in 1985 and has been further revised to limit application of the term to heating appliances having either a self-contained fuel supply or a factory-installed-power supply cord. Appliances receiving fuel through connectors, piping, tubing, etc., will be classified as installed as used in Section 807(c).

(New) - POWER BOILER PLANT. 88 UMC.

Reason: This definition was transferred from Appendix B.

Sec. 420 (New) R VALUE - WSVC.

Reason: To be consistent with Washington State Ventilation Code.

Sec. 421 (New) - SHAFT. 91 UMC.

Reason: Part of the shaft construction and penetration revisions throughout the building code. The definition is the same as that included in the Uniform Building Code.

(New) - SHAFT ENCLOSURE. 91 UMC.

Reason: Part of the shaft construction and penetration revisions throughout the building code. The definition is the same as that included in the Uniform Building Code.

(New) - SMOKE DETECTOR. 88 UMC.

Reason: This definition has been added because U.B.C. Standard No. 43-6 was deleted. The definition is the same as that included in the Uniform Building Code.

(New) - SOLID FUEL BURNING APPLIANCE. ALSO SOURCE SPECIFIC VENTILATION SYSTEM AND SYSTEM. WSVC.

Reason: To be consistent with Washington State Ventilation Code.

(New) - SUBSTANTIALLY AIRTIGHT DUCTS. SMC.

Reason: Term is used in Sec. 1002(d). Definition is needed.

Analysis of Revisions - Chapter 4 - Definitions and Abbreviations
(cont.)

Sec. 422 (New) - TERMINAL ELEMENT. Also THERMAL RESISTANCE.
WSVC.

Reason: To be consistent with Washington State

Sec. 423 (New) - UNCONDITIONED SPACE. WSVC.

Reason: To be consistent with Washington State
Ventilation Code.

(New) - UNUSUALLY TIGHT CONSTRUCTION. 88 UMC.

Reason: The added definition for "Unusually Tight
Construction" is applicable specifically in Sections
601(a) and 607(b)1.

Sec. 424 (Change) - VENTILATING CEILING. SMC

Reason: The words "containing many small apertures"
were deleted because they do not describe a ventilating
ceiling.

(New) - VENTILATION. Also VENTILATION, MECHANICAL and
VENTILATION, NATURAL. WSVC.

Reason: To be consistent with Washington State
Ventilation Code.

(New) VENTILATION EFFECTIVENESS. SEC.

Reason: To be consistent with Seattle Energy Code.

Sec. 425 (Change) - WATER HEATER. SMC. Add "potable".

Reason: To be consistent with UPC and ASME Standard.

(New) WHOLE HOUSE VENTILATION SYSTEM. Also WOOD STOVE.
WSVC.

Reason: To be consistent with Washington State
Ventilation Code.

Sec. 426 (New) ZONE. WSVC.

Reason: To be consistent with Washington State
Ventilation Code.

**Analysis of Revisions - Chapter 5 - Heating, Ventilating and Cooling
Equipment - General**

Sec. 503 TYPE OF FUEL AND FUEL CONNECTION

Sec. 503(a) GENERAL - 91 UMC Add 12 words before exceptions.

Reason: The intent of the proposed change is to clarify that the gas shutoff valve is in the same room or space as the appliance. The increase in specificity removes consideration of measurements through walls, partitions or floors. The proposed change does not alter the intent of the code provision because location of the valve in the same room or space with the appliance has been the way the provision has been applied.

Sec. 503(c) Gas-burning Appliances EXCEPTION 1 - 91 UMC. Add three words. Exception 4 - Delete 24 words.

Reasons: To coordinate with the Uniform Plumbing Code.

Sec. 505 ACCESS - SMC. Add sentence.

Reason: Refers to Sec. 710 to call attention to access for equipment installed on roofs.

Sec. 507 LABELING - 88 UMC

The words "approved agency" were changed to "organization" in Sec. 507(a)(b)(c).

Reason: Editorial.

Sec. 507(a) Fuel-burning Appliances - 91 UMC. Add Item #7.

Reason: To require that listed clearances to combustible surfaces be identified on the nameplate for fuel-burning appliances as currently required for electric heating appliances.

Sec. 508 LOCATION

Sec. 508(a) GENERAL - SMC. Add paragraph.

Reason: Refers to Sections 1004(f), 1104, 1105 which have been reworded to incorporate DR 28-87 and for consistency with the SBC.

**Analysis of Revisions - Chapter 5 - Heating, Ventilating and Cooling
(Cont.)**

Sec. 508(b) Special Hazards - SMC. Reword.

Reason: Clarity.

Sec. 509 ELECTRICAL CONNECTIONS - SMC. Add 4 words to second sentence.

Reason: Clarity.

Sec. 510 CONDENSATE WASTES - 88 UMC

Reference to new subsection (c) was added to Sec. 510(a). Text was revised.

Reason: Provisions for disposing of condensate from fuel-burning condensing appliances have been added.

**TABLE NO. 5-A STANDARD INSTALLATION CLEARANCES IN INCHES FOR UNLISTED
HEAT-PRODUCING APPLIANCES - 91 UMC. Deletions.**

Reason: The expressions regarding venting are all inappropriate in the table and should be removed for consistency with Section 807(c). All references to venting are removed in the revised version.

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Analysis of Revisions - Chapter 6 - Combustion Air

Sec. 601 General

Sec. 601(a) Air Supply - WSVC. Add last sentence to first paragraph.

Reason: To be consistent with Washington Ventilation Energy Code.

Sec. 601(a) Air Supply - 88 UMC. SMC. Add second paragraph.

Reason: Requires that combustion air for new equipment be obtained from outdoors.

Sec. 602 COMBUSTION AIR OPENINGS

Sec. 602(a) Location - 91 UMC. Reword.

Reason: Current Uniform Mechanical Code wording implies that the upper and lower combustion air openings only need to be one-half in size of the actual total area required. Table No. 6-A substantiates that this is not the case. The proposed wording does eliminate a potential or actual source of misinterpretation.

Sec. 602(b) Dampers Prohibited - 88 UMC. Add last sentence.

Reason: In addition to revision in the language to promote better understanding of the existing requirements, an alternate method of supplying combustion air in cold-climate areas have been added. The alternate involves the use of power-actuated moveable louvers interlocked with the appliance fuel-supply valve and requires prior approval of the system. The alternate is intended for use in cold climate areas where continuously open louvers are not acceptable.

WSVC. Add Exception.

Reason: Refers to new Chapter 10.1 to be consistent with Washington State Ventilation Code.

Sec. 602(c) Louvers, Grilles and Screens - 88 UMC. Add two sentences.

Reason: The addition to this subparagraph is recognition of the use of louvers and grilles in combustion air openings and that they exert a blocking effect on openings. This change brings the ICBO combustion air requirements closer to those used in the Uniform Plumbing Code and the National Fuel Gas Code.

Analysis of Revisions - Chapter 6 - Combustion Air (cont.)

Sec. 603 SOURCE OF COMBUSTION AIR

Sec. 603(a)2 Air From Outside - 88 UMC. Add 16 words.

Reason: The revision to Item 2 is a precautionary measure to assure that attic-ventilating openings remain open when combustion air is taken from an attic.

Sec. 603(a)2C Air From Outside - 91 UMC. Add two words.

Reason: Increased depths of attic insulation are being specified as a result of the energy conservation ethic. The revision indicates that if attic insulation will be deeper than the ceiling joists, the combustion air sleeve must extend above the surface of the insulation.

Sec. 603(b)1 Under-floor Supply - SMC. Add two words.

Reason: To distinguish air required for equipment combustion from air required for under-floor areas.

Sec. 603(d) Interior Spaces - 88 UMC. Revise.

Reason: This section now contains the requirements that were previously part of Section 601(a)1 and 3.

Sec. 604(b) Dampers - WSVC. Add sentence.

Reason: Refers to new Chapter 10.1 to be consistent with Washington State Ventilation Code.

Sec. 605 GRAVITY-TYPE WARM-AIR FURNACES - 88 UMC. Change circulating air to cold air.

Reason: The changes result from the new terminology for exhaust air, makeup air, outside air, return air and supply air. New definitions were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air" which had a definition unique to the Uniform Mechanical Code.

Analysis of Revisions - Chapter 6 - Combustion Air (cont.)

Sec. 607 **AREA OF COMBUSTION AIR OPENINGS - 91 UMC. Revise.**

Reason: This section was amended to provide a more easily understood tabulation of combustion air opening sizes in Table No. 6-A to replace the text of Section 607. Also, the revision recognizes that screens, grilles or louvers on combustion air openings do reduce the effective area.

TABLE NO. 6-A SIZE OF COMBUSTION AIR OPENINGS OR DUCTS - 91 UMC. New table.

Reason: To provide an alternate in tabular form to the rather involved text of Section 607.

Analysis of Revisions - Chapter 7 - Warm-Air Heating Systems

Sec. 704(1) **PROHIBITED INSTALLATIONS EXCEPTION - 88 UMC.** Add sentence referring to Chapter 6.

Reason: The exception to Item 1 was revised to permit the installation of replacement furnaces in closets having lesser depth than prescribed, provided the installation does not interfere with the flow of combustion air and with listed clearances to combustible construction.

Sec. 706 **RETURN AND OUTSIDE AIR - 88 UMC.** Change title and reword entire section.

Reason: New definitions for exhaust air, makeup air, outside air, return air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air" which had a definition unique to the Uniform Mechanical Code.

Sec. 706(f) **Prohibited Sources - 91 UMC.** Change.
1, 2, 6

Reason: Section 706(f) and 1206(b) play the same role for heating systems (Chapter 7) and cooling systems (Chapter 12). The two sections should be identical. If a source of air is not good for a heating system, it is not any better for a cooling system and vice-versa. The proposal, rather than making the two sections identical, places all the provisions in Section 706(f) and reduces Section 1206(b) to a reference. This shortens the code and eases future updates. The suggested changes to Items 1, 2 and 7 are clarifications of the general provisions of those items and will be helpful in enforcement of these provisions.

Sec. 706(g) **Screen - 91 UMC.** Change.

Section 1206(d) and 706(g) serve the same function and have the same standard, but are organized very differently. The format of Section 1206(d) is better code language. Section 706(g) should be changed to be identical with 1206(d). Also suggested is a small revision to the exception. As worded in the 1988 edition, it appears that only screens with 1-inch openings can be used versus other sizes such as 1/2 inch or 3/4 inch.

Sec. 706(i) **Exhaust Outlets - SMC.** Change "openable" to "operable".

Reason: To be consistent with 1107(j) and 1206(h).

Analysis of Revisions - Chapter 7 - Warm Air Heating Systems (cont.)

Sec. 707 **AIR SUPPLY - 88 UMC.** Change title and reword entire section.

Reason: New definitions for exhaust air, makeup air, outside air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air" which had a definition unique to the Uniform Mechanical Code.

Sec. 708 **ATTIC FURNACE - 88 UMC.** Reword first and third paragraphs and third paragraph EXCEPTION

Reason: The first paragraph was revised to eliminate the special listing requirements for furnaces installed in attics. See analysis to Sections 414 and 504. Permission to install upright furnaces in attics and furred spaces was added, provided that the required clearances are observed.

The section has been revised by adding an exception to the requirement for a 30-by 30-inch attic access opening for the purpose of recognizing construction employing roof trusses spaced 24 inches on center.

Sec. 710 **FURNACES INSTALLED ON ROOFS OR EXTERIOR WALLS OF BUILDINGS**

Sec. 710(f) **Catwalk - 88 UMC.** Reword.

Reason: The requirement for catwalks on roofs was revised for consistency with the roof slope criterion employed in Subsection (e).

Sec. 710(h) **Access - 91 UMC.** Reword EXCEPTIONS. Add Exception 3.

Reason: 1. The current code requires that furnaces located on the roof be readily accessible. Section 420 defines "readily accessible" as "... 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.

It seems more appropriate to add an exception to the access requirements clarifying when you do not need permanent ladders.

Analysis of Revisions - Chapter 7- Warm Air Heating Systems (cont.)

2. The exceptions are relocated to clarify that they are exceptions to the readily accessible requirement rather than exceptions to the ladder construction requirements.
3. The wording of the proposed code revision is amended to reference permanent ladders.

Analysis of Revisions

Chapter 8 - Vented Decorative Appliances, Floor Furnaces, Vented Wall Furnaces, Unit Heaters and Room Heaters

Sec. 806 UNIT HEATERS

Sec 806(f) Unit Heaters Installed in Group B Occupancies - 88 UMC. Change "recirculating air" to "return air".

Reason: New definition for exhaust air, makeup air, outside air, return air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air" which had a definition unique to the Uniform Mechanical Code.

Sec. 807 ROOM HEATERS

Sec. 807(c) Unvented - 88 UMC. Add last sentence.

Reason: Revisions have been made to except unvented portable portable oil-fired heating appliances used for supplemental heating in Group B and Group M Occupancies which are regulated under Uniform Fire Code Section 61.106.

Sec. 807(d) Overhead Radiant Heaters - 88 UMC. Add new subsection title and delete "ventilation" in #2.

Reason: The revision redesignates the material pertaining to overhead radiant heaters as a separate Subsection (d) so that the applicability is clear. The word "ventilation" occurring in two places in Item 2, has been deleted to clarify the intended manner of installation of unvented overhead heaters.

Analysis of Revisions - Chapter 9 - Venting of Appliances

Sec. 903 INSTALLATION AND CONSTRUCTION REQUIREMENTS

Sec. 903(a) General - 91 UMC. Add second sentence to refer to Sec. 913.

Reason: While the Uniform Mechanical Code does not have the construction standards for masonry chimneys, it does have specific standards located in Section 913 which might be overlooked. By taking out all reference as in the original proposal, the reader is left wondering where to find the construction standards. Section 913(a) provides them. Even the committee in their reason for approval felt it was necessary to say where these provisions were. Why not provide the reader of the code with the same help?

Sec. 903(b) Dampers - 88 UMC. Add "vent" and "devices" to second paragraph.

Reason: The revision was to free thermostatically actuated vent dampers from the requirement because they require heat from the burner to open.

Sec. 904 LOCATION AND SUPPORT OF VENTING SYSTEMS OTHER THAN MASONRY CHIMNEYS - 91 UMC. Delete "exhaust duct".

Reason: The words "exhaust duct" were deleted from Sec. 904, where inappropriate, and added to Sec. 1104, 1105, and 1903(a). The intent is not to allow any type of exhaust duct to extend into or through any air duct or plenum. This requirement more suitably belongs in the corresponding sections.

Sec. 906 VENT TERMINATION

Type B or BW - 91 UMC. Reword.

Reason: The provision was amended to provide guidance on vent terminations, which is consistent with the standard under which they are tested and listed, namely, UL441.

Sec. 906(d) Type B or BW - 88 UMC. Change graph to table.

Reason: The editorial revision of Figure No. 1 is to display the requirements in tabular rather than graphic form for greater specificity.

Analysis of Revisions - Chapter 9 - Venting of Appliances (cont.)

- Sec. 906(f) Vent Terminals - 88 UMC.** Change "forced air inlets" to "outside- or makeup-air inlet".

Reason: New definitions for exhaust air, makeup air, return air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air" which had a definition unique to the Uniform Mechanical Code.

- Sec. 906(g) Outdoor Appliances with Integral Vents - 91 UMC.** Change second sentence.

To clarify that the required separation for vent terminals applies only to openable windows. A fixed window is not an opening into the building.

88 UMC. Add two sentences to end of paragraph.

Reason: The section was revised to delineate the limitations applicable to appliances having integral vents.

- Sec. 907(3) Vents for all Wall Furnaces Requiring a Type BW Gas Vent - 91 UMC.** Add sentence.

Reason: When a BW vent is installed in a wall that has building paper on either or both sides, the plasterers have a tendency to push the paper against the vent and thereby reduce the required clearance to combustibles. The plaster on perforated and metal lath will also touch against the vent and cause cracking in the plaster.

- Sec. 907(5) Vents for Wall Furnaces Requiring a Type BW Gas Vent - 91 UMC.** Add EXCEPTION.

Reason: The metal sleeve or attic shield is installed to keep debris from falling into the open stud bay when the ceiling plate is cut out. If a fire stop is used at this location, the stud bay will already be closed off and the metal sleeve is not necessary.

- Sec. 908 SIZE OF GRAVITY VENTING SYSTEM - 88 UMC.** Change title and reword section.

Reason: The section was revised to recognize that the minimum area of a listed power venting system may be smaller than the 7 square inches specified as a minimum for gravity venting systems.

Analysis of Revisions - Chapter 9 - Venting of Appliances (cont.)

Sec 910(2) EXISTING VENTING SYSTEMS - 88 UMC. Add 14 words to end of sentence.

Reason: Revision is for clarity and specificity.

Sec. 912 TYPES OF CHIMNEYS - (a) Factory-built Chimneys - 91 UMC. Delete exception.

Reason: To eliminate a conflict with the terms of listing for factory-built chimneys as set forth in UL Standard 103.

Sec. 915 CONNECTORS

Sec. 915(a) General - 88 UMC. Add new sentence at paragraph third from last.

The section was revised to indicate at least one approved means for joining a single-wall vent connector to a listed double-wall gas vent.

Sec. 916 MECHANICAL DRAFT SYSTEMS

Sec. 916(b) Positive Pressure Systems - 88 UMC. Add "static".

Reason: Clarity.

Sec. 916(d) (e) Interlock Controls and Exit Terminals - 88 UMC. Change "mechanical draft system(s)" to "forced-draft or induced-draft system(s)".

Reason: The revision relates to the change made in Section 916(b) to assure that the so-called new generation of appliance designs is safe with types of venting systems specified in the code.

Sec. 916(e) Exit Terminals - SMC. Change "7" feet to "10" feet.

Reason: To be consistent with Seattle Land Use Code and other sections in the mechanical code.

Analysis of Revisions - Chapter 9 - Venting of Appliances (cont.)

Table 9-A **CHIMNEY SELECTION CHART** Types of Appliances to be used
with Each Type Chimney - 88 UMC.

Column II (C) - change "50 Psig" to "1000 F flue gas temperature".

Column IV (16) - change "50-lb-per sq.-in. gage pressure except pressing machine boilers" to "1000 F flue gas temperature".

Reason: The revisions update the Uniform Mechanical Code for consistency with other nationally recognized standards. The determinant of chimney selection is more appropriately flue gas temperatures rather than steam pressures.

Analysis of Revisions - Chapter 10 - Ducts

Sec. 1002 - MATERIAL

Sec. 1002(a) General - 88 UMC. Revise terminology.

Reason: New definitions for exhaust air, makeup air, return air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air," which had a definition unique to the Uniform Mechanical Code.

Second Paragraph - 88 UMC. Revise second paragraph.

Reason: A new second paragraph which incorporates prohibition on use of one-hour corridors as air-handling plenums was removed from Sections 706(b) and 1206(b). and moved to Sec. 1002.

Second Paragraph - SMC. Add three exceptions.

Reason: The intent of the code requirement is that a corridor cannot be used as a supply plenum. Sometimes this code section is interpreted as not allowing corridors to be ventilated. Corridors need to be ventilated for odor control in an efficient, cost-effective manner. Hallway doors to rooms are usually undercut, which allows air from the hall to enter the rooms under the hallway doors. UMC language prohibits the use of corridors to convey air to the rooms. The concern from ICBO staff is that smoke would enter rooms under doors. The three proposed exceptions address smoke control.

Fourth Paragraph - SMC. Reword last sentence.

Reason: UMC language is vague and difficult to enforce. The proposed language allows the design professional to determine when gypsum products can be used in ducts and plenums. The design professional determines if there will be adverse effects from temperature or moisture.

Fifth, Sixth, Seventh Paragraphs - SMC. Delete new 1991 UMC language which does not allow exhaust ducts to extend into or through ducts or plenums. Add references to Sections 904 and 1104 instead.

Reason: In some circumstances environmental air ducts should be allowed to extend into or through ducts or plenums. The concern is not fire but air contamination. The proposed exception addresses air contamination.

Analysis of Revisions - Chapter 10 - Ducts (cont.)

Eighth Paragraph - 91 UMC. New subtitle.

Reason: Editorial

Eighth Paragraph - 88 UMC. New reference to U.B.C. Standard No. 42-1.

Reason: Revise to cite U.B.C. Standard No. 42-1 as the approved method for testing for surface-burning characteristics.

Exceptions - SMC. New Exception 7.

Reason: New exception allows plastic piping, such as that used for condensate piping and HVAC equipment, in ventilating ceilings.

Sec. 1004 INSTALLATION OF DUCTS

Sec. 1004(a) Metal Ducts - SMC. Move paragraph from Sec. 1004(c).

Reason: Paragraph should not be under (c), which describes metal duct protection, because the paragraph describes fire-proofing protection. The paragraph belongs in (a), which describes general installation requirements for metal ducts.

Sec. 1004(b) Factory-made Air Ducts - 91 UMC. Add "with at least 4 inches of separation from earth."

Reason: To require the same clearance from the ground that is required for metal ducts.

Sec. 1004(d) Support of Ducts - 88 UMC. Reword and refer to new Table 10-F.

Reason: The section has been revised by adding a new Subsection (d) and Table No. 10-F specifying how factory-made air ducts may be supported when the manufacturer's installation instructions fail to specify requirements.

Sec. 1004(f) Installation of Ducts in Hoistways, Elevator Machine Rooms and Elevator Machinery Spaces - SMC. Reword.

Reason: Incorporate DR 28-87 and consistency with the SBC.

FIRE DAMPERS

Sec. 1006(e) Connection - 91 UMC. New subsection.

Reason: The additional requirement for attachment of ducts indicates the expected performance of the connection.

Analysis Of Revisions - Chapter 10 - Ducts (cont.)

Sec. 1009 AUTOMATIC SHUTOFFS

Sec. 1009(a)(c) When Required and Smoke Detection - 91 UMC.
Revise.

Reason: The revision is an editorial reformatting of existing provisions. The main thrust of this is to (a) determine when shutoffs are required and (b) where the smoke detectors are to be located. Smoke detectors in the supply duct will detect filter fires as well as smoke being drawn into the building from outside. The fire records contain numerous instances where buildings have had to be evacuated because smoke from a nearby fire made the building untenable. Clean up of this smoke can be very expensive.

Sec. 1009(b) When Required - SMC. Move from within text of (a) to new paragraph (b).

Reason: Editorial.

Sec. 1009(c) Smoke Detection - SMC. New second paragraph.

Reason: Automatic shutoffs are required to shut down air moving equipment when smoke is detected in return or supply air ducts. Smoke detectors shall be installed in the main return-air duct.

Systems that do not have return-air ducts have no choice but to install smoke detectors in each room served by the return-air duct. This is expensive and is difficult to install. The new Seattle language provides an alternate for systems without return-air ducts, by allowing smoke detectors to be installed at the exhaust or relief.

Table 10-B Construction Details for Round and Flat-Oval Ducts Low, Medium and High Pressure - 91 UMC. Revise first column.

Reason: Clarification.

Table 10-F Alternate Supports for Factory-Made Ducts - 88 UMC. New table.

Reason: Specifies how factory made air ducts may be supported when there are no manufacturer's installation instructions.

91 UMC. Revise the third entry to "1½".

Reason: To provide supports which do not tend to deform flexible factory-made air duct, and to extend the support interval.

**Analysis of Revisions - Chapter 11 - Ventilation Systems and
Product-Conveying Systems**

Sec. 1101 **SCOPE - WSVC.** Change reference from "Seattle Energy Code" to "Seattle Mechanical Code, Chapter 10.1".

Reason: Ventilation and indoor air quality issues are in SMC.

Sec. 1102 **DEFINITIONS Flammable Vapor or Fumes - 88 UMC.** New definition.

Reason: Term used in text and needs definition.

Sec. 1104 **ENVIRONMENTAL AIR DUCT SYSTEMS**

First Paragraph - SMC. Add "or motorized" before dampers, third sentence.

Reason: Provides another option for designer.

First Paragraph - 88 UMC. Add sentence.

Reason: The section has been revised by adding a sentence clarifying that HVAC ducts which may be used for smoke removal in an emergency need not be designed as product-conveying ducts.

Third Paragraph - SMC. Delete Uniform Code language. Add Seattle language.

Reason: UMC language is vague and difficult to enforce. The proposed language allows the design professional to determine when gypsum products can be used in ducts and plenums. The design professional determines if there will be adverse effects from temperature or moisture.

Fourth Paragraph - 91 UMC. Add sentence.

Reason: The words "exhaust duct" were deleted from Sec. 904, where inappropriate, and added to Sec. 1104, 1105, and 1903(a). The intent is not to allow any type of exhaust duct to extend into or through any air duct or plenum. This requirement more suitably belongs in the corresponding sections.

Fourth Paragraph - SMC. Add three exceptions.

Reason: In some circumstances environmental air ducts should be allowed to extend into or through ducts or plenums. The concern is not fire but air contamination. The proposed exception addresses air contamination.

**Analysis of Revisions - Chapter 11 - Ventilation Systems and
Product-Conveying Systems (cont.)**

Sixth Paragraph - SMC. Add new paragraph.

Reason: Requirement was deleted from chapter 10 and moved to Chapter 11 where it is more appropriate.

Seventh Paragraph - SMC. Add paragraph.

Reason: Incorporates DR28-87. To be consistent with the SBC.

Sec. 1105(a) DESIGN OF PRODUCT-CONVEYING VENTILATION SYSTEMS
First Paragraph -General - 91 UMC. Add sentence.

Reason: The words "exhaust duct" were deleted from Sec. 904, where inappropriate, and added to Sec. 1104, 1105, and 1903(a). The intent is not to allow any type of exhaust duct to extend into or through any air duct or plenum. This requirement more suitably belongs in the corresponding sections.

First Paragraph - General - 88 UMC. Add EXCEPTION.

Reason: The purpose of the revision is to insert an exception allowing ducts carrying a low concentration of flammable fumes or flammable dusts to pass through other spaces in a building, even when the mixture transported does not qualify as non-flammable.

Fourth Paragraph - General - SMC. Add new paragraph.

Reason: Incorporates DR28-97. To be consistent with the SBC.

Sec. 1105(c) DESIGN OF PRODUCT-CONVEYING VENTILATION SYSTEMS
Makeup Air - SMC. Reword Seattle language.

Reason: Clarity. New references to other sections are more specific than previous Seattle wording.

Sec. 1107 PRODUCT CONVEYING DUCTS

Sec. 1107(b) Materials - 91 UMC. Add paragraph to EXCEPTION 2.

Reason: The second exception was amended to provide guidance to building officials on the characteristics of nonmetallic factory-made ducts suitable for use in conveying corrosives.

**Analysis of Revisions - Chapter 11 - Ventilation Systems and
Product-Conveying Systems (cont.)**

Sec. 1107(c) Construction - 88 UMC. Change exception #1.

Reason: The previous wording of the exception would indicate that a Class 1 duct could be constructed of gypsum products, which directly conflicts with Section 1107(b) which states that product-conveying ducts shall be of metal. The revised wording refers to tables specifically governing metal duct construction

Sec. 1107(j)3 Exhaust Outlets - SMC. Change "5 feet" to "3 feet."

Reason: To be consistent with 1991 UMC and 1991 UBC Code Changes.

Analysis of Revisions - Chapter 12 - Cooling

Sec. 1205 **CONDENSATE CONTROL - SMC.** Add "structural".

Reason: Clarity.

Sec. 1206 **RETURN AIR AND OUTSIDE AIR - 88 UMC.** Change title and reword entire section from "circulating air".

Reason: New definitions for exhaust air, makeup air, return air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air" which had a definition unique to the Uniform Mechanical Code.

Sec. 1206(b) **Prohibited Sources - 91 UMC.** Change section.

Reason: Sections 706(f) and 1206(b) play the same role for heating systems (Chapter 7) and cooling systems (Chapter 12). The two sections should be identical. If a source of air is not good for a heating system, it is not any better for a cooling system and vice-versa. The proposal, rather than making the two sections identical, places all the provisions in Section 706(f) and reduces Section 1206(b) to a reference. This shortens the code and eases future updates.

Sec. 1206(d) **Screen - 91 UMC.** Change.

Reason: Section 1206(d) and 706(g) serve the same function and have the same standard, but are organized very differently. The format of Section 1206(d) is better code language. Section 706(g) should be changed to be identical with Section 1206(d). Also suggested is a small revision to the exception. As worded in the 1988 edition, it appears that only screens with 1-inch openings can be used versus other sizes such as 1/2 inch or 3/4 inch.

Sec. 1206(e) **Exhaust Outlets - SMC.** Change "5 feet to 3 feet" and "openable window" to "operable opening".

Reason: To be consistent with 1991 UMC and 1991 UBC code.

Analysis of Revisions - Chapter 12 - Cooling (cont.)

Sec. 1206(f) Separation - SMC. Delete.

Reason: Combustion air is not needed for cooling equipment.

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910429

Analysis of Revisions - Chapter 13 - Evaporative Cooling Systems

Sec. 1301 **General - 88 UMC.** Change "circulating air" to "outside air".

Reason: New definitions for exhaust air, makeup air, outside air, return air and supply air were substituted to reconcile terminology employed in the Uniform Mechanical Code with that used by the heating, ventilating and air conditioning industries, contractors and engineers and particularly to discontinue use of the term "circulating air," which had a definition unique to the Uniform Mechanical Code.

**Analysis of Revisions - Chapter 14 - REFRIGERATION - Absorption
Refrigerating Equipment**

Sec. 1404(4) Location - 88 UMC. Change.

Reason: Deletion of the prohibition on locating absorption refrigeration equipment under a stairway is an editorial correction for consistency with changes made during the previous (1982-1985) cycle to Section 704. See also analysis to Section 802. With the deletion of Item 4 as it appeared in the 1985 edition, the existing Item 5 was redesignated Item 4 and the revised wording from Section 704 is used here also.

**Analysis of Revisions - Chapter 15 - Mechanical Refrigerating
Equipment**

SMC. Editorial changes were made to seven sections that use Seattle language - the meaning did not change - these changes are marked "SMC" in the right margin.

88 UMC. The word "refrigeration" was added before "machinery room" throughout the chapter

Reason: Clarity.

**Sec. 1508 - Emergency Refrigeration Machinery Room Ventilation - SMC.
Revise.**

Reason: Section 1508 was reworded to require ventilation for refrigeration machinery rooms and allow emergency and required (24-hour) ventilation systems to be combined (they may use the same fan). Allows ventilation systems to be switched off when the refrigeration machinery room is not occupied.

**Sec. 1509 - Equipment in a Refrigeration Machinery Room - SMC.
Revise.**

Reason: Former Exception No. 9 should not be an item in the electrical equipment paragraph and is moved to second paragraph.

**Sec. 1512 - Refrigerant Containers and Receivers - SMC. Delete
Seattle language at first paragraph.**

Reason: Criteria for Specific Standards should not be in code text.

**Sec. 1515 - Pressure-Relief Valves - Compressors - 88 UMC. New last
paragraph.**

Reason: The section was revised to provide a termination for the compressor pressure-relief valve, which is consistent with the termination location specified in Section 1517 for pressure vessels.

SMC. Add "operable" before "window". Also Sec. 1517(d).

Reason: To be consistent with 1988 UMC and 1991 UMC.

**Sec. 1516 Pressure Relief Devices - Pressure Vessels - SMC.
Delete last sentence, fourth paragraph.**

Reason: Covered in Sec. 1517.

Analysis of Revisions - Chapter 16 - Storage of Refrigerants

NO CHANGES

Analysis of Revisions - Chapter 17 - Cooling Towers

NO CHANGES

Analysis of Revisions - Chapter 18 - MISCELLANEOUS - Incinerators

NO CHANGES

Analysis of Revisions - Chapter 19 - Miscellaneous Heat-producing Appliances

Sec 1903 - CLOTHES DRYER - 88 UMC. Revise
(a, b, c, d)

Reason: The basic change is that a 4-inch-diameter moisture-exhaust duct discharging outside the building is required when a compartment or space is designated for a domestic clothes dryer. The moisture-exhaust duct length and number of fittings are restricted based on ANSI Standard Z21.5.1 used to evaluate clothes dryers. By reference to Uniform Mechanical Code Section 1104, the moisture-exhaust duct must be of metal with a smooth interior surface. Guidance for installation of commercial clothes dryers has been added.

Sec. 1903(a) Moisture Exhaust Ducts - 91 UMC. Add sentence.

Reason: The words "exhaust duct" were deleted from Sec. 904, where inappropriate, and added to Sec. 1104, 1105, and 1903(a). The intent is not to allow any type of exhaust duct to extend into or through any air duct or plenum. This requirement more suitably belongs in the corresponding sections.

SMC. Delete requirement for removable lint strainer.

Reason: All dryers are now equipped with such strainers.

Sec. 1904 Direct Gas-fired Makeup Air Heaters and Industrial Air Heaters - 91 UMC. Revise
(a,b,d)

Reason: The revisions recognize a newly introduced gas-fired industrial air heater manufactured to a new listing standard, ANSI Z83.18. The industrial heater can obtain its return air from both the building and outdoors.

Sec. 1905(e)2 SMALL CERAMIC KILNS - Installations Inside Buildings - Hoods - 91 UMC. Add EXCEPTION.

Reason: Extensive testing by the Edward Orion Jr. Ceramic Foundation indicates that a far more effective method of removing fumes and vapors from electric kilns would be to place the interior of the kiln under a vacuum and collect the fumes at the bottom of the kiln. Then taking these fumes and mixing them with a larger amount of room air, through the plenum chamber, to cool these gases before exiting these directly to the outdoors, thus eliminating any entry of these fumes into the room environment.

Analysis of Revisions - Chapter 19 - Miscellaneous Heat-producing Appliances (cont.)

Several years of design and test work have led to the manufacture of such a system that not only conveys odors and fumes to the out-of-doors but adds to the quality of the fired ware, and is safer to operate as no contact with the hot kiln lid is now necessary. There are currently six kiln manufacturers who are either manufacturing or using this control for electric kiln ventilation.

When venting with a hood or overhead system you must prop the lid of the kiln open for the first part (1000°F.) of your firing to allow for sufficient oxygen inside the kiln. If a kiln is not properly vented, the available oxygen will soon be used up during the process of firing. Thus, proper burn out of the organic material will be prevented, leaving behind carbon in the ware, which will produce unacceptable results. By propping the lid open during the firing, you are allowing all the fumes and vapor to escape from the kiln and pollute the surrounding air. Hoods cannot effectively capture all of these fumes that now have entered into the atmosphere of the room.

It should be noted that makeup air requirements for a gravity ventilation system are difficult to determine since the height of the vertical duct and the difference in temperature between the air within the duct and the air outside determines the flow. The discharge volume is always known for any mechanical system.

This method is becoming very popular with schools and institutions across the country for three reasons. First, it directly addresses the rising concerns of health and proper kiln ventilations, and secondly, it actually improves the results of the fired ware. Third, this system was submitted to Underwriters Laboratories for testing and evaluation and is not UL listed.

In summary, by implementing this concept of kiln ventilation the chamber is operating under negative pressure, taking in oxygen (makeup air) through the top holes in the kiln lid, thus allowing for proper oxidation of the organic material being fired. These fumes are then drawn down and out through the bottom of the kiln and mixed with a larger amount of room air to cool the gases before exiting out the duct to the outdoors, thus preventing these fumes and vapors from ever reaching into the atmosphere of the room.

**Analysis of Revisions - Chapter 19 - Miscellaneous Heat-producing
Appliances (cont.)**

Analysis: This is an improved version of code change M1905(e)-89-1, which was considered in 1989. It specifically applied to electric kilns and as the proponents' reason indicates, improves the quality of the fired ware. Use of a mechanically ventilated kiln probably results in a somewhat safer installation from the viewpoint of personnel who may be exposed to the fumes from the firing of more rapid dilution.

Analysis of Revisions Chapter 20 - Commercial Hoods and Kitchen Ventilation

88 UMC. Change "Type I ducts" to "grease ducts" and "Type II ducts" to "nongrease ducts" throughout the chapter.

Reason: These changes were made to emphasize the applicability of each requirement. Section 2002 (a) 2 deals with exhaust ducts which do not handle grease-laden vapors; for example, those serving a Type II kitchen hood. The changes were almost editorial but contribute to ease of understanding and more uniform enforcement.

Sec. 2001 **DEFINITIONS. SMC.** Delete "GREASE COLLECTOR"

Reason: Same as "Grease Extractor".

Sec. 2001 **DEFINITIONS. SMC.** Expand definition of HOOD Type II.

Reason: The small amount of grease generated in a 6 KW roasting oven is equal to a pizza oven allowed by the UMC to use a Type II hood.

Sec. 2002 **KITCHEN VENTILATION SYSTEMS**

Sec. 2002(a)3 **Corrosion Protection - 88 UMC.** Change "and" to "or".

Reason: The section was revised to indicate that either condition requires corrosion protection.

Sec. 2002(b) **Prevention of Grease Accumulation - 88 UMC.** Add one sentence to end of first paragraph and add "approved" to item #3.

Reason: The section was revised to recognize the use of vertically discharging fans for handling grease-laden vapors.

Sec. 2002(i) **Exhaust Outlets - SMC.** Change "40 inches" to "2 feet".

Reason: To be consistent with the Uniform Mechanical Code.

**Analysis of Revisions Chapter 20 - Commercial Hoods and Kitchen
Ventilation (cont.)**

Sec. 2002(i) Exhaust Outlets - Exception 2. SMC - Add eight words.

Reason: Limits total amount of grease being recirculated in the space.

Sec. 2003 HOOD

Sec. 2003(a) Where Required - SMC. Add "above 140° F maximum water temperature at middle of first sentence.

Reason: Heat and steam generated from low temperature dish washing equipment is not a hazard and does not need a hood.

SMC. Add "Residential type equipment installed in offices, churches, nursing homes," at beginning of EXCEPTION.

Reason: Residential type equipment is smaller than and is used less often than commercial equipment, is less of a fire hazard and does not need a hood.

Sec. 2003(d) Clearances for Type I Hood - SMC. Change "6 inches" to "3 inches" in first paragraph.

Reason: Other agencies no longer require 6 inches.

Sec. 2003(g)1 Capacity of Hoods - 88 UMC. Add "solid-fuel"

Reason: Item 1 of this section was revised to require a separate hood and duct system only over charcoal or solid-fuel fired charbroilers. Other charbroiler designs employing gas or electric heat sources do not require a separate hood or duct system, but do require the highest ventilation volume specified.

Sec. 2003(i) Makeup Air - SMC. Add "to the space" to third sentence.

Reason: Emphasizes that makeup air to the space must be capable of being heated. Makeup air to the hood does not need to be heated.

88 UMC. Add the words "and doors".

Reason: The wording was revised to specify that doors shall not be used to admit makeup air to kitchens.

**Analysis of Revisions Chapter 20 - Commercial Hoods and Kitchen
Ventilation (cont.)**

Sec. 2003(j) Exhaust Outlet - 88 UMC. New EXCEPTION added.

Sec. 2004 MOTORS, FANS, SAFETY DEVICES

Sec. 2004(a) General - SMC. Add new second sentence.

Reason: Fans must continue to run so that fire suppression chemicals can be drawn into the exhaust system to extinguish the fire and evacuate smoke from the kitchen.

Sec. 2004(b) Fire-extinguishing Equipment for Protection of Kitchen Grease Hoods and Ducts - 88 UMC. Reword and enlarge.

Reason: The change represents a comprehensive and detailed exposition of fire-extinguishing equipment required for kitchen grease hoods and ducts. It was developed in cooperation with the Uniform Fire Code Committee in order to consolidate in one place all requirements for new construction: it will be maintained by the Uniform Fire Code Committee in the future.

The section as published in the 1986 Supplement was revised by deleting the reference to portable extinguishers in Item 5 because the requirement was not readily enforceable by building departments. A requirement was placed in the Uniform Fire Code to replace the one deleted by this change.

The section was further revised to substitute the words "wet chemical" for "liquid agent other than water" in three places, that is (b)3D, and (b)4D and (b)4E because wet chemical is the correct current usage.

Analysis of Revisions - Appendix A - Uniform Mechanical Code Standards

Appendix A-10-2 - 88 UMC. - Amended.

Reason: The standard was amended for conformity with SMAC-NA's 1985 HVAC Duct Construction Standard. The text of the standard containing performance requirements was not revised, but revised tables were inserted based on both experimental observations and calculations based on the strength of materials. By updating the standard, inconsistencies with the source documents now being used by the industry are avoided.

Analysis of Revisions - Appendix B Chapter 21 - Steam and Hot-water Boilers - Steam and Hot-water Piping (Hydronics)

Sec. B2102 **SCOPE - SMC. Reword Exception No. 1.**

Reason: Conformity with State law and clarity.

Sec. B2104 **DEFINITIONS - 91 UMC. Revise five definitions:
AUTOMATIC BOILER, HOT-WATER HEATING BOILER,
MINIATURE BOILER, POWER BOILER, STEAM HEATING
BOILER.**

Reasons:

AUTOMATIC BOILER - Existing reference to
Table No. 21-B is incorrect.

HOT-WATER-HEATING BOILER; STEAM HEATING BOILER-
Jurisdictional requirements are based upon terminology established by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. Reference: ASME Section IV, Article 1.

MINIATURE BOILER - Jurisdictional requirements are based upon terminology and limits established by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. Reference: ASME Section 1, Part PMB.

POWER BOILER - As outlined in the Purpose Section 2101, this chapter provides standards for regulating and controlling steam and hot-water boilers. By including the definition of "Power Boiler", the requirements of ASME Section I regarding organic fluid vaporizers are excluded from this chapter.

STEAM HEATING BOILER - See reason for HOT
WATER-HEATING BOILER above.

SMC. Add new definition for POOL HEATER.

Reason: Term is used in revision of Sec. 2102

Exception No. 1. Needs definition.

Sec. B2105 **PERMIT REQUIRED - 91 UMC. Revise.**

Reason: For consistency with the accepted format employed in U.M.C. Section 301 and U.A.C. Section 301.

Analysis of Revisions - Appendix B Chapter 21 - Steam and Hot-water Boilers - Steam and Hot-water Piping (Hydronics) (cont.)

Sec. B2106 DETAILED REQUIREMENTS

Sec. B2106(a) Safety Requirements - 88 UMC. Reword.

Reason: This section was revised to clarify that the construction of boilers and pressure vessels is regulated by Appendix Chapter 21.

Sec. B2106(a) Stack Dampers - SMC. Add four words after welded.

Reason: Many manufacturers "permanently affix" baffles by methods other than welding (riveting, bolts and nuts, etc.). These are acceptable methods.

EXPANSION TANKS

Sec. B2107(c) Closed Type Systems - 91 UMC. Change "50 psig" to "30 psig".

Reason: The proposed change is in accordance with the nationally recognized standard, ASME Boiler and Pressure Vessel Code Section IV.

Sec. B2111 LOW WATER CUTOFF - 91 UMC. Reword.

Reason: Provisions for accepting a flow switch in lieu of a low-water cutoff as described in Table No. 21-C, Note 8, and ASME Boiler and Pressure Vessel Code Section IV, were not adequately described. Also, jurisdictional requirements exempt Group R Occupancies not to exceed four units.

Sec. B2112(1) COMBUSTION REGULATORS: SAFETY VALVES - SMC. Add EXCEPTION.

Reason: Conformity with State law.

Sec. B2112(2) COMBUSTION REGULATORS: SAFETY VALVES - 91 UMC. Revise.

Reason: Nationally recognized standards (i.e., ASME Boiler and Pressure Code Sections I, IV, VIII, Division 1) specifically describe detailed requirements.

Analysis of Revisions - Appendix B Chapter 21 - Steam and Hot-water Boilers - Steam and Hot-water Piping (Hydronics) (cont.)

Sec. B2112(3) **COMBUSTION REGULATORS: SAFETY VALVES - SMC. Add EXCEPTION.**

Reason: Conformity with State law.

Sec. 2114 **CLEARANCE FOR ACCESS - 88 UMC. Reword.**

Reason: The change clarifies the need for clearances around all sides of a boiler for inspection, repair, maintenance and cleaning.

Sec. B2119 **DRAINAGE - 88 UMC. Reword.**

Reason: The revision provides a practical means of draining water from a boiler.

Table B21-C **88 UMC. Revise.**
Footnote 10

Reason: The revision replaces the words "not operating" with "not firing" to clarify the intended meaning.

Analysis of Revisions - Appendix B - Chapter 22 - Fuel Gas Piping

Sec. B2202 **DEFINITIONS - 88 UMC.** Delete second paragraph.

Liquefied Petroleum Gas Facilities - 88 UMC. Move to definition section.

Reason: The section was revised to relocate the definition of "liquefied petroleum gas facilities" in the definitions paragraph in an appropriate location so that it can be found easily.

The following sections have additions or new wording to conform with Chapter 12 and Appendix E of the 1988 Uniform Plumbing Code.

Sec. B2203 **PERMITS - 88 UMC.** Reword.

Sec. B2206(b) **Accessibility for Inspection - 88 UMC.** New section.

Sec. B2206(c)2 **Inspections. Final piping inspection - 88 UMC.** Add "CO₂ or nitrogen" to first and fourth sentence, second paragraph.

Sec. B2213 **INSTALLATION OF GAS PIPING**

Sec. B2213(e) **Corrosion Isolation - 88 UMC.** New section.

Sec. B2213(m) **Tracer for Nonmetallic Buried Piping - 88 UMC.** Change "one" to "each".

Analysis of Revisions - Appendix B - Chapter 23- Hydronic Panel Heating Systems

NO CHANGES

**Analysis of Revisions - Appendix B - Chapter 24 - Process Piping
88 UMC. New Chapter.**

NOT ADOPTED

Analysis of Revisions - Appendix B - Chapter 25 - Water Heaters

GENERAL

Sec. B2501 SMC. Change "200°F" to "210°F".

Reason: To be consistent with 1988 Uniform Plumbing Code Sec. 1302(j) definition of water heater.

Analysis of Revisions - Appendix C - Chapter 9 - Reference Standards - 88 UMC. Revise dates.

Reason: Revised dates for three UL reference standards were submitted prior to availability of the 1985 edition of the Uniform Mechanical Code; these dates appear in the first printing. Staff also updated a number of other references as a part of a comprehensive review of standards prior to printing in 1985 code.

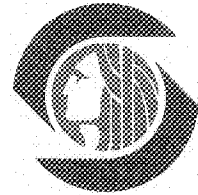
91 UMC. Revise dates for two ANSI Standards: Z83.18-1987 and Z83.4-1985.

Reason: Editorial.

Analysis of Revisions - Appendix D - Unit Conversion Tables

NO CHANGES

Seattle
Department of Construction and Land Use



Dennis J. McLerran, Director
Norman S. Rice, Mayor

M E M O R A N D U M

TO: Paul Kraabel, President
City Council

Via: Andrew Lofton, Director
Office of Management and Budget

ATTN: Desiree Leigh

FROM: Dennis J. McLerran *D.J.M.*
Director

Contact Staff: Kermit Robinson
Code Research Coordinator

DATE: August 9, 1991

RE: Proposed 1991 Seattle Building and Mechanical Codes

Attached for your consideration are the proposed 1991 editions of the Seattle Building Code and the Seattle Mechanical Code. These proposals are the result of extensive development by Department staff, an interdepartmental review and a thorough review by the Building Code Advisory Board. These two codes are the third and fourth of the construction codes submitted to Council this year. The Energy and Electrical codes were reviewed by the Utilities Committee.

BACKGROUND

Washington State Law requires that each local jurisdiction adopt and enforce the Uniform Building Code (UBC) and the Uniform Mechanical Code (UMC) (RCW 19.27). These model codes are promulgated by the International Conference of Building Officials (ICBO) and are reissued every three years. The most recent editions were published in May of this year. With this adoption, Seattle will be brought up to date with the uniform codes.

Within certain limitations, state law allows local jurisdictions to amend the model codes. Seattle historically amends both codes. Many of these amendments date from before 1976 when there was no state law and Seattle had its own codes. Many of our amendments are unique to the City and reflect the strength and knowledge of our development community, the difficulty of applying a model code to an already built city, and the desire by the Department to give all users of the codes equal access to commonly approved alternative methods of construction which the

Department has found acceptable. These alternatives often serve to reduce housing costs.

There are two limitations on local amendments. The first is that the code adopted by Seattle must not reduce the standards of the codes as adopted by the State. These proposed codes, as a total document, meet this limitation. The second limitation is that any amendments which affect the construction of buildings containing 1 to 4 dwelling units must be reviewed and approved by the State Building Code Council. These proposed ordinances contain a few such amendments. The State Council's procedure requires that the City Council approve such amendments prior to submittal to the State for review. In anticipation of the City Council's action, we are preparing that submittal. If the State Council does not approve, or requires revision of any of these amendments, we will return to the City Council with an amendatory ordinance.

Over the past six 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 approximately 30 previous Seattle amendments are now contained in the uniform codes, or in the State adoption of those codes. However, many local amendments still remain.

KEY CHANGES AND IMPROVEMENTS

Considering changes made at each level (national, state and Seattle), there are over 400 changes proposed for the Seattle Building Code and over 125 changes proposed for the Seattle Mechanical Code. A section by section detailed analysis and summary of these revisions has been prepared for each of the codes. These analyses are attached. There are some important changes we want especially to mention:

1. Earthquake Resistant Construction Standards

The new Building Code contains improved construction standards to better equip buildings to withstand an earthquake. These standards were developed primarily by the Structural Engineers Association of California based on the experience of several earthquakes in the 1970's and 1980's, and have been incorporated into the Uniform Building Code. With Seattle's earthquake history and the growing scientific evidence that the Puget Sound area may be subject to much stronger earthquakes than experienced this century, these improved standards are important to adopt.

2. Advisory Board

Under this code, the former Building Code Advisory Board and the Electrical Code Advisory Board will be merged into a single board to be called the Construction Codes Advisory Board. The new Board will be composed of 13 members representing key professions in the development industry, including a labor representative. In addition, the number of general public positions would increase from 2 to 3. The new Board, like the existing Boards, will be appointed by the Mayor, with confirmation by the Council. The consolidation will allow better coordination of the public review of the 5 key construction codes administered by the Department (Building, Mechanical, Energy, Electrical and Grading). It also eliminates the Electrical Board which has historically met for only a few months every three years and then been inactive. This will result in savings in staff and cost for this Department, as well as for the Mayor and Council.

3. Mixed Use Buildings

The 1991 Building Code contains a provision which will facilitate the construction of mixed use buildings. Seattle's Land Use Policies in areas such as the Denny Regrade and the Neighborhood Commercial zones encourage buildings with businesses on the ground floor and apartments above. The previous editions of the UBC either forced such buildings to remain fairly small, or forced them into more expensive construction of concrete and steel. A cost effective construction method for these mixed use buildings is a commercial-use ground floor of concrete with upper stories in wood frame; however the UBC did not allow retail or office uses on the ground floor. A Seattle-sponsored change to this provision in the UBC, reflected in this proposed code, allows this cost effective construction technique to be used for these mixed occupancy buildings.

4. Small Apartment Buildings

In the fall of 1990, the Fire Department and Department of Construction and Land Use recommended an ordinance to City Council which increased the sprinkler requirements for new multifamily construction. Since the late 1970's our building codes have contained exceptions allowing certain small apartment buildings to have only one stairway (exit) if other fire protection provisions were increased. One of the increases was a partial sprinkler system. With the 1990 sprinkler requirement, we had to revise this valuable exception in our codes in order to maintain equivalent protection. The current proposal retains the single exit

exception, in a format we think will still be useful on small infill lots within the city. The new provision will also further the City's goals of facilitating affordable housing within small apartment buildings.

5. Hazardous Occupancies

With the adoption of this code, the City will have the latest state of the art regulation for the construction of new buildings in which hazardous materials will be used, manufactured, stored and disposed. These requirements are contained in Chapter 9 of the UBC. The Fire Code, adopted last year, contains a set of companion regulations which addresses storage requirements for both new and existing businesses.

6. Mechanical Code Provisions

Most of the improvements to the Mechanical Code can be described as evolutionary changes in the regulation of heating, ventilating, air-conditioning, cooking and refrigeration systems. The changes generally reflect code clarifications, improved technologies, increases in safety and/or reductions of cost of construction. An example is a change made to the refrigeration chapter which improved the ventilation in rooms with refrigeration equipment, making them safer in the case of a leak of a toxic refrigerant. Another example is the inclusion of provisions which will simplify the supply of air to corridors, without any reduction in the safety of corridors for exiting.

PUBLIC REVIEW

The primary avenue of public review of these codes is the Building Code Advisory Board. The Board is composed of 11 representatives from the development community and the general public. For the review of these codes, the Board established a Committee to review the Mechanical Code, but reviewed the Building Code as a committee of the whole. Lists of the members serving on the Board and its Mechanical Committee are attached.

The Mechanical Committee had 11 meetings during which they spent over 20 hours reviewing and providing comments and revisions to the department proposals. Similarly, the full Board met 14 times, for over 50 hours, to review the proposed Building Code.

Based on these reviews, changes have been incorporated into the draft codes. The Board recommends their adoption by the City Council.

We have made announcements regarding the development of the codes and have made available copies of the draft codes to the general

public. We have received no comments from the public other than inquiries as to when the codes will be adopted.

COST IMPACTS OF ADOPTION

The cost of adopting these codes include the purchase and distribution to staff of the uniform codes, printing of the City's amendments to the codes, training of staff, providing seminars to the public, updating forms and brochures, and revising client assistance memos (CAM's) and director's rules as needed. In the process of review of these codes, the staff and Advisory Board identified additional areas where new CAM's or Rules would help ease public understanding of new regulations, and the Department's enforcement of them.

In addition, the new ventilation requirements incorporated into the mechanical code, required by the State, will raise the cost of enforcement of these regulations. The annual cost of this new regulation is anticipated to be about \$38,000, primarily for increased inspection time to determine compliance.

The one time, or start-up costs for adopting the new Building and Mechanical Codes are \$175,940 and \$56,049 respectively. Since we are mandated by the State to update these codes every three years, these costs have been anticipated in the regular budget process.

Detailed Implementation Cost Analyses for each of the codes is attached for your information.

ENVIRONMENTAL (SEPA) REVIEW

Adoption of the Building and Mechanical Codes are categorically exempt from environmental review per Section 25.05.800U of the Seattle Municipal Code.

TRANSITION

Both ordinances include a section allowing a 60-day grace period after the new codes go into effect. The design and development process is one of long lead times. The changes in building codes can have a significant impact on a design. It is reasonable to allow applicants a limited period during which projects applications can be submitted subject to the existing building code rather than the new codes. A similar transition period was allowed when the last editions were adopted in 1987.

BUILDING CODE ADVISORY BOARD ROSTER
October 1990

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ESTIMATES OF COST IMPACTS OF

1991 SEATTLE AMENDMENTS TO THE 1991 UNIFORM BUILDING CODE

August 1991

The cost estimates which follow can be subdivided into two categories: one-time or first year costs, and ongoing costs. One-time or first year costs include publishing the new code, training for staff, revising director's rules, public information and forms and additional plan review and inspection time attributed to the learning curve expected when all codes change. Ongoing costs are those over and above the current code which are expected to continue.

There are projected one-time or first year costs in items 1-12 and 14-16. Ongoing costs are in item 8d. Staff time is converted to cost at the rate of \$110/hour. The overall estimate is \$175,940 in one-time or first year costs and an increase in ongoing costs of \$5,500. A detailed breakdown follows the table.

Estimated Cost Impacts of 1991 Seattle Amendments to the 1991 Uniform Building Code

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
1. <u>Training</u>		
a. Prepare materials	51	\$ 5,610
b. Give training	34	3,740
c. Receive training	274	30,140
2. <u>Copying</u>		
a. Cost for ordinance	--	1,420
3. <u>Publishing</u>		
a. Cost for code pages	--	1,350
b. Costs for purchasing uniform codes		7,060
4. <u>Map Changes</u>		
None required	--	--
5. <u>Revise Director's Rules</u>		
a. New or revised rule(s)	275	30,250
b. Rescind rule(s)	20	2,200
c. Process rule(s)	70	7,700
d. Copy costs		760
6. <u>Public Information</u>		
a. New bulletin preparation	40	4,400
b. Revised bulletin preparation	205	22,550
c. Copy costs	--	1,560
d. More information for public (phones)	--	
7. <u>Procedural Changes</u>		
None required	--	--

Cost Report
August 1991

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
8. <u>Plan Review Time</u>		
a. Vesting Impact	---	---
b. New type of decision	---	---
c. Additional review	---	---
d. More complex rules	50/year	5,500/year
e. Learning curve	520	\$57,200
9. <u>Automation</u>		
No changes	---	---
10. <u>New Forms</u>		
a. Develop forms	---	---
b. Copy forms	---	---
11. <u>Enforcement</u>		
No changes	---	---
12. <u>Code Committee</u>		
No increase in time (beyond learning curve)	---	---
13. <u>Inspection Impacts</u>		
a. New special inspections	---	---
b. More items to inspect	---	---
c. New type of inspection	---	---
14. <u>Records Management/Microfilm</u>		
No changes	---	---
15. <u>New Types of Permits</u>		
None	---	---
16. <u>Space and Equipment Costs</u>		
No changes	---	---
17. <u>Total for Amendment</u>		
a. One-time or first year costs ²	--	175,940
b. Ongoing costs/year ³	--	5,500

¹ Costs are based on \$110/hour of staff time.

² One-time or first year costs include all costs except ongoing costs.

³ Ongoing costs are from item 8d.

Notes on Line Item Cost Impacts Estimate for 1991 Seattle
Amendments to the 1991 Uniform Building Code

1. <u>Training</u>	<u>Hours</u>	<u>Costs</u>
a. Prepare materials		
Staff training: Kermit Robinson, Tom Kinsman, Jon Siu, others	51	\$ 5,610
b. Give training		
Staff training: Kermit Robinson, Tom Kinsman, Jon Siu, others	34	3,740
c. Receive training		
Staff training (*most during regular staff meetings)		
Energy/mechanical section (4 staff x 4 hours)	16	1,760
Building plans examiners (26 x 10 hours-6 outside of staff meeting)	156	17,160
Intake staff (15 x 1 hour)*		
Building inspectors (15 x 6 hr.-4 outside of staff meetings)	60	6,600
Mechanical inspectors (Joint meeting with E-M section) (3 x 4 hrs.)	12	1,320
Boiler inspectors (5 x 0.5 hrs.)*		
Code development and coordination (12 x 0.5 hrs)*		
Quality Control Staff (5 x 10 hours-6 outside of staff meetings)	30	3,300
2. <u>Copying</u>		
Cost for ordinance		
355 ordinance pages x \$0.04/page = \$14.20/copy x 100	--	1,420
3. <u>Publishing</u>		
Cost for code pages		
450 draft code pages x \$0.03 = \$13.50/copy x 100	--	\$1,350
Purchase Codes and Standards		
UBC 4,785		
Standards 1,322		
Analyses 193		
Tabs 760		
		7,060
4. <u>Map Changes</u>		
None required		

Cost Report
August 1991

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
5. <u>Revise Director's Rules</u>		
a. New or revised rules		
Revised:		
51-80 - Guidelines for Moving Houses within the City	20	\$2,200
1-81 - Criteria for Establishing 6'8" Ceiling Height in Dwelling Units	20	2,200
20-89 - Code Alternate for Day Care Facilities	20	2,200
23-87 - General Duties and Responsibilities for Registered Special Inspectors	10	1,100
28-87 - Limitation on Heating, Cooling and Ventilation Equipment in Elevator Machine Rooms/Hoistways	10	1,100
40-86 - Awnings and Canopies	20	2,200
17-87 - Adoption of Addenda to the Elevator Safety Code	5	550
New:		
?? - BCAB/ECAB Transition Rule	10	1,100
?? - Historic Buildings	20	2,200
?? - Woodworking Shops Larger than 3,000 sq. ft.	30	3,300
?? - Exits from Yards and Courts	40	4,400
?? - Dead-end Corridors in B-2 Offices	40	4,400
?? - Testing of Fire Alarms	30	3,300
b. Rescind Rules	20	2,200
28-86 - Use of Vinyl Siding		
38-88 - Opening Protection Requirements for Group R-1 When Located Downtown		
23-88 - Key Switch Requirements		
36-88 - Fill Slopes in Excess of 2 to 1: Engineered Design		
c. Process Rules		
14 rules x 5 hours/rule	70	7,700
d. Copying Costs		
76 pages x \$0.04/page x 250 copies		760

Cost Report
August 1991

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
6. <u>Public Information</u>		
a. New Client Assistance Memo Preparation Chapter 9 - Summary of requirements	40	4,400
b. Revised Client Assistance Memo Preparation		
IB 47 - Artist Studio Dwellings	40	4,400
CAM 303 - Building Permit Requirements for Single Family and Duplex	5	550
CAM 303A - Common S/F and Duplex Code Items	5	550
IB 304 - Building Permit Requirements for Prefab Steel Buildings	5	550
IB 305 Manufactured Buildings	30	3,300
IB 306 Permit Requirements for Safety Improvements in Highrise Buildings	20	2,200
IB 309 Blanket Permits	40	4,400
IB 313 Highrise Pre-design Conference Requirements	10	1,100
IB 315 Shotcrete for Structural Applications	5	550
CAM 316 Subject to Field Inspection Permits	10	1,100
CAM 317 Where to Locate Smoke Detectors	15	1,650
CAM 318 Building Code Pre-Design Conferences	10	1,100
CAM 319 Getting a Grasp on Handrails	10	1,100
c. Copy costs 78 pages x \$0.04/page x 500 copies	--	1,560
d. More information for public (phones) No changes		
7. <u>Procedural Changes</u> None required		
8. <u>Plan Review Time</u>		
a. Vesting impact None		
b. New type of decision None		
c. Additional review See Learning curve for first year costs	520	57,200
d. More complex rules Chapter 9 - Hazardous Occupancies	50/year	5,500

Cost Report
August 1991

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
9. <u>Automation</u> No changes		
10. <u>New Forms</u> No changes		
11. <u>Enforcement</u> No changes		
12. <u>Code Committee</u> No increase in time beyond learning curve		
13. <u>Inspection Impacts</u> a. New special inspections None b. More items to input None c. New type of inspection None		
14. <u>Records Management/Microfilm</u> No changes		
15. <u>New Types of Permits</u> None		
16. <u>Space and Equipment Costs</u> No changes		

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ESTIMATES OF COST IMPACTS OF

1991 SEATTLE AMENDMENTS TO THE 1991 UNIFORM MECHANICAL CODE

August 1991

The cost estimates which follow can be subdivided into two categories: one-time or first year costs, and ongoing costs. One-time or first year costs include publishing the new code, training for staff, revising director's rules, public information and forms and additional plan review and inspection time attributed to the learning curve expected when all codes change. Ongoing costs are those over and above the current code which are expected to continue.

There are projected one-time or first year costs in items 1-12 and 14-16. Ongoing costs are in item 13c. Staff time is converted to cost at the rate of \$110/hour. The overall estimate is for \$56,049 in one-time or first year costs and an increase in ongoing costs of \$38,170. A detailed breakdown follows the table.

Estimated Cost Impacts of 1991 Seattle Amendments to the 1991 Uniform Mechanical Code

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
1. <u>Training</u>		
a. Prepare materials	16	\$ 1,760
b. Give training	11	1,210
c. Receive training	24	2,640
2. <u>Copying</u>		
a. Cost for ordinance	--	212
3. <u>Publishing</u>		
a. Cost for code amendment pages	--	744
b. Cost to purchase uniform codes	--	2,628
4. <u>Map Changes</u>		
None required	--	--
5. <u>Revise Director's Rules</u>		
a. New or revised rule(s)	140	15,400
b. Rescind rule(s)	2	220
c. Process rule(s)	45	4,950
6. <u>Public Information</u>		
a. New or revised bulletin preparation	26.5	2,915
b. Copy costs	--	920
c. More information for public (phones)	--	--
7. <u>Procedural Changes</u>		
None required	--	--

Cost Report
August 1991

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
8. <u>Plan Review Time</u>		
a. Vesting Impact	--	--
b. New type of decision	--	--
c. Additional review	--	--
d. More complex rules	--	--
e. Learning curve	183	\$20,130
9. <u>Automation</u>		
No changes	--	--
10. <u>New Forms</u>		
a. Develop forms	20	2,200
b. Copy forms	--	120
11. <u>Enforcement</u>		
No changes	--	--
12. <u>Code Committee</u>		
No increase in time	--	--
13. <u>Inspection Impacts</u>		
a. New special inspections	--	--
b. More items to inspect	--	--
c. New type of inspection	347	38,170
14. <u>Records Management/Microfilm</u>		
No changes	--	--
15. <u>New Types of Permits</u>		
None	--	--
16. <u>Space and Equipment Costs</u>		
No changes	--	--
17. <u>Total for Amendment</u>		
a. One-time or first year costs ²	--	\$56,049
b. Ongoing costs/year ³	--	\$38,170

¹ Costs are based on \$110/hour of staff time.

² One-time or first year costs include all costs except ongoing costs.

³ Ongoing costs are from item 13c.

Notes on Line Item Cost Impacts Estimate for 1991 Seattle
Amendments to the 1991 Uniform Mechanical Code

1. <u>Training</u>	<u>Hours</u>	<u>Costs</u>
a. Prepare materials		
Staff training: Terry Ross	16	\$ 1,760
b. Give training		
Staff training: Terry Ross	11	1,210
c. Receive training		
Staff training (*most during regular staff meetings)		
Energy/mechanical section (4 staff x 8 hours)*		
Building plans examiners (26 x 0.5 hours)*		
Intake staff (15 x 0.5 hours)*		
Building inspectors (15 x 1 hr.)*		
Mechanical inspectors (Joint meeting with E-M section) (3 x 8 hrs.)	24	2,640
Boiler inspectors (5 x 0.5 hrs.)*		
Code development and coordination (12 x 0.5 hrs)*		
2. <u>Copying</u>		
Cost for ordinance		
152 ordinance pages x \$0.04/page = \$6.08/copy x 35	--	212
Distribution (in same order as for training above)		
(4) Liem, Chiu, Go, Parast		
(6) Curry, Kinsman, Kimball, Pfeiffer, Siu, Wong		
(3) Blazina, Justad, Ramos		
(2) Cordaro, Weller		
(3) Keys, Strobels, Watier		
(5) Edelman, Folta, Gentry, McClinton, Rainieri		
(2) Robinson, Ross		
(7) Garcia, Gilbert, Hairston, Herzfeld, Lampe, McLerran, Sugimura		
(3) Law, Mayor, OMB		
3. <u>Publishing</u>		
a. Cost for code amendment pages		
200 draft code pages x \$0.04 = \$8.00/copy		
x 93	--	744
(88) Staff		
(5) City Light, Fire, Health, Licensing, Water		
b. Cost to purchase uniform codes (UMC)	--	2,628
Uniform Mechanical Code 93 x \$27.45 = \$2,552		
Index Tabs 10 x \$7.60 = \$76		
4. <u>Map Changes</u>		
None required		

Cost Report
August 1991

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
5. <u>Revise Director's Rules</u>		
a. New or revised rules		
Revised:		
6-87 Kitchen Hoods	20	\$2,200
5-89 Laboratory Guidelines	20	2,200
13-89 Boiler	20	2,200
17-89 Boiler	20	2,200
35-88 Furnace	20	2,200
New:		
?-91 SMACNA Test	20	2,200
?-91 Kitchen Hood Grease	20	2,200
b. Rescind/rules		
28-90 Boiler	1	110
39-86 Boiler	1	110
c. Process rules		
9 Rules x 5 hours/rule	45	4,950
6. <u>Public Information</u>		
a. New or revised bulletin preparation		
Revised: Wood Stove (40 pp)	5	550
New: Land Use Requirements Relating to SMC (6 pp)	20	2,200
Visual specialist time: 6 pages x.25 hours/page	1.5	165
b. Copy costs		
46 pages x \$0.04/page x 500 copies	--	920
c. More information for public (phones)		
No changes		
7. <u>Procedural Changes</u>		
None required		
8. <u>Plan Review Time</u>		
a. Vesting impact		
None		
b. New type of decision		
None		
c. Additional review		
See Learning curve for first year costs		
d. More complex rules		
None		
e. Learning curve (first year costs)		
First year time for review will add 15 minutes per residential plans to check for new ventilation requirements. This part of the code amendments was effective 7-1-91.		
733 plans x .25 hr	183	20,130

Cost Report
August 1991

<u>Task</u>	<u>Hours</u>	<u>Costs</u>
9. <u>Automation</u> No changes		
10. <u>New Forms</u> a. Develop forms Revised: Kitchen Hood Worksheet (6 pp)	20	\$2,220
b. Copy forms 6 pages x \$0.04/page x 500 copies		120
11. <u>Enforcement</u> No changes		
12. <u>Code Committee</u> No increase in time.		
13. <u>Inspection Impacts</u> a. New special inspections None b. More items to input See new type of inspection c. New type of inspection New ventilation requirements will add 6 minutes of inspection time per residential unit. Net impact: 3478 units x .10 hr	347	38,170
14. <u>Records Management/Microfilm</u> No changes		
15. <u>New Types of Permits</u> None		
16. <u>Space and Equipment Costs</u> No changes		

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City of Seattle

Executive Department-Office of Management and Budget

Andrew J. Lofton, Director
Norman B. Rice, Mayor



September 4, 1991

The Honorable Mark Sidran
City Attorney
City of Seattle

Dear Mr. Sidran:

The Mayor is proposing to the City Council that the enclosed legislation be adopted.

REQUESTING
DEPARTMENT

Construction and Land Use

SUBJECT:

AN ORDINANCE relating to the Seattle Mechanical Code, repealing ordinances, 113702 and 113703, revising Section 22.400.010 of the Seattle Municipal Code, adopting Chapters 4 through 20 of the 1991 Uniform Mechanical Code, adopting the Uniform Mechanical Code Standards contained in Appendix A of the 1991 Uniform Medical Code, adopting Chapters 21, 22, and 23 contained in Appendix B of the 1991 Uniform Medical Code and Standards.

Pursuant to the City Council's S.O.P. 100-014, the Executive Department is forwarding this request for legislation to your office for review and drafting. It is my understanding that Margaret Klockers of your office has already reviewed a draft prepared by the department.

After reviewing this request and any necessary redrafting of the enclosed legislation, return the legislation to OMB by noon on September 9. Any specific questions regarding the legislation can be directed to Desiree Leigh at 684-8087.

Sincerely,

Norman B. Rice
Mayor

by

Andrew J. Lofton
ANDREW J. LOFTON
Budget Director

AL/dl/rsr

Enclosure

cc: Director, DCLU

STATE OF WASHINGTON - KING COUNTY

12473
City of Seattle

—ss.

No.

Affidavit of Publication

The undersigned, on oath states that he is an authorized representative of The Daily Journal of Commerce, a daily newspaper, which newspaper is a legal newspaper of general circulation and it is now and has been for more than six months prior to the date of publication hereinafter referred to, published in the English language continuously as a daily newspaper in Seattle, King County, Washington, and it is now and during all of said time was printed in an office maintained at the aforesaid place of publication of this newspaper. The Daily Journal of Commerce was on the 12th day of June, 1941, approved as a legal newspaper by the Superior Court of King County.

The notice in the exact form annexed, was published in regular issues of The Daily Journal of Commerce, which was regularly distributed to its subscribers during the below stated period. The annexed notice, a

ORD: 116011

was published on

01/08/92

The amount of the fee charged for the foregoing publication is the sum of \$ _____, which amount has been paid in full.

C. Trent

Subscribed and sworn to before me on

01/08/92

Jennifer A. Nicholson

Notary Public for the State of Washington,
residing in Seattle

SPONSORSHIP

THE ATTACHED DOCUMENT IS SPONSORED FOR FILING WITH THE CITY COUNCIL BY
THE MEMBER(S) OF THE CITY COUNCIL WHOSE SIGNATURE(S) ARE SHOWN BELOW:

Sam Smith - kw

FOR CITY COUNCIL PRESIDENT USE ONLY

COMMITTEE(S) REFERRED TO:

PRESIDENT'S SIGNATURE

City of Seattle Ordinances

City of Seattle

ORDINANCE 119911

AN ORDINANCE relating to the Seattle Mechanical Code, repealing Section 22.400.010 (Ordinances 113702 and 113703), and adding a new Section 22.400.010 to adopt Chapters 4 through 20 of the 1991 Uniform Mechanical Code, the Uniform Mechanical Code Standards and Uniform Building Code Standards contained in Appendix A of the 1991 Uniform Mechanical Code, Chapters 21, 22 and 23 contained in Appendix B of the 1991 Uniform Mechanical Code; amending the adopted Uniform Mechanical Code and Standards by: adding new Chapters 1, 2 and 3 related to administration, permitting and enforcement; amending Chapter 4, Definitions; amending certain provisions of Chapter 5 regulating mechanical equipment; amending certain provisions of Chapter 6 regulating the provision of combustion air to appliances; amending certain provisions of Chapters 7 and 8 regulating heating systems; amending Chapters 9, 10 and 11 regulating the venting of mechanical equipment; amending certain provisions of Chapters 12 and 13 regulating cooling and refrigeration equipment systems; amending certain provisions of Chapter 14 regulating incinerators; amending certain provisions of Chapter 15 regulating miscellaneous heat producing appliances; amending certain provisions of Chapter 16 regulating commercial kitchen equipment systems; amending certain provisions of Chapter 17 regulating boilers; amending certain provisions of Chapter 22 regulating the installation of fuel-gas piping; repealing Table No. 10-D regulating the insulation of ducts; and adding a new Chapter 10.1, establishing minimum ventilation standards as required by State law, and Chapter 25, establishing minimum standards for water heaters as required and allowed by the State Building Code Act, Chapter 19.27 of the Revised Code of Washington.

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. Section 22.400.010 of the Seattle Municipal Code adopting the 1985 Uniform Mechanical Code (Ordinance 113702 as amended by Ordinance 113703) is hereby repealed, and a new Section 22.400.010 is added to the Seattle Municipal Code to read as follows:

22.400.010 Adoption of Uniform Mechanical Code

The Uniform Mechanical Code, 1991 Edition, published by the International Conference of Building Officials, and International Association of Plumbing and Mechanical Officials, one copy of which is filed with the City Comptroller in C.F. 22.400.010, except for Chapters 1 through 3, the Uniform Fire Code Standard contained in Appendix A, Appendix C and Appendix D is hereby adopted and by this reference made a part of this subtitle. The Uniform Mechanical Code, 1991 Edition Chapters 4-20, and the Uniform Mechanical Code Standards and Uniform Building Code Standards contained in Appendix A, and Chapters 21, 22, 23 of Appendix B together with the amendments and additions thereto adopted shall constitute the Seattle Mechanical Code.

Section 2. The Uniform Mechanical Code, 1991 Edition, (Seattle Municipal Code Section 22.400.010), is amended by adding new Chapters 1, 2, and 3 as follows:

ADMINISTRATIVE

Chapter 1

TITLE, SCOPE AND GENERAL

TITLE

Sec. 101. This subtitle shall be known as the "Seattle Mechanical Code," may be so cited, and is referred to herein as "this mechanical code" or "this code."

PURPOSE

Sec. 102. The purpose of this mechanical 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.

The purpose of this mechanical code is not to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by the terms of this mechanical code.

SCOPE OF THIS MECHANICAL CODE

Sec. 103. (a) Applicability. The provisions of this mechanical

The building official may approve any such alternate, provided he/she finds that the proposed design is satisfactory and complies with the provisions of this mechanical code and that the material, method or work offered is, for the purpose intended, at least the equivalent to that prescribed in this mechanical code in suitability, strength, effectiveness, fire resistance, durability, safety and sanitation.

The building official may require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding the use of alternate materials or methods of construction. The details of any action granting approval of an alternate shall be recorded and entered in the files of the building official.

MODIFICATIONS

Sec. 104. Whenever there are practical difficulties involved in carrying out the provisions of this code, the building official may grant modifications for individual cases, provided the building official shall first find that a special individual reason makes the strict letter of this code impractical and that the modification is in conformity with the intent and purpose of this code. The details of any action granting modifications shall be recorded and entered in the files of the building official.

TESTS

Sec. 107. Whenever there is insufficient evidence of compliance with any of the provisions of this mechanical code or evidence that any material or construction does not conform to the requirements of this mechanical code, the building official may require tests as proof of compliance to be made at no expense to the City.

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

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

Chapter 2

ORGANIZATION AND ENFORCEMENT

DEPARTMENT OF CONSTRUCTION AND LAND USE - JURISDICTION

Sec. 201. The "Department of Construction and Land Use" shall be the code enforcement agency in the City of Seattle for this mechanical code. The Department shall be under the administration and operational control of the Director of the Department of Construction and Land Use who shall be the building official.

POWERS AND DUTIES OF BUILDING OFFICIAL

Sec. 202. (a) General. The building official is authorized and directed to enforce this mechanical code, except that enforcement of Chapters 22 and 23 shall be the primary responsibility of the Director of Public Health and enforcement authority as provided in this mechanical code to the building official shall also be vested in the Director of Public Health or the Fire Chief. Compliance with the requirements of this mechanical code shall be the obligation of the owner of the building, structure or premises, the duly authorized agent of the owner, or other person responsible for the condition or work, and not of the City or any of its officers or employees.

(b) Deputies. The building official may appoint such officers and inspectors and other employees as shall be authorized from time to time. The building official may deputize such inspectors or employees as may be necessary to carry out the functions of the Department of Construction and Land Use.

(c) Right of Entry. With the consent of the owner or occupier of a building or premises, or pursuant to a lawfully issued warrant, the building official may enter a building or premises at any reasonable time, to perform the duties imposed by this mechanical code.

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

(e) Authority to Disconnect Utilities in Emergencies. The building official shall have the authority to disconnect fuel-gas utility service, or energy supplies to a building, structure, premises or equipment regulated by this mechanical 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 utilities.