

An ordinance amending Article 5, Chapter IX of the Los Angeles Municipal Code.

THE PEOPLE OF THE CITY OF LOS ANGELES  
DO ORDAIN AS FOLLOWS

**Section 1.** Article 5 of Chapter IX of the Los Angeles Municipal Code is amended in its entirety to read as follows:

**ARTICLE 5**

**MECHANICAL CODE**

**DIVISION 1**

**ADMINISTRATION**

**PART I**

**GENERAL**

**SEC. 95.101. TITLE.** This article is a portion of the Los Angeles Municipal Code and shall be known as the Los Angeles Mechanical Code. Whenever the word "Code" is used in this article, it shall mean the Los Angeles Mechanical Code unless it is apparent from the context that another code is intended and applicable.

Section number references are to the Los Angeles Municipal Code unless otherwise indicated.

**SEC. 95.102. PURPOSE.** The purpose of this Code is to safeguard life, health, property and public welfare by regulating the design, construction, installation, alteration, repair, quality of materials, location, operation and maintenance of heating, ventilating, air-conditioning and refrigeration equipment and other miscellaneous heat-producing appliances installed in the City. The provisions of this Code are not intended to apply to equipment installed on railroad cars, motor vehicles, aircraft or on shipboard that are not used as permanent occupancies for longer than six months.

For other requirements concerning the installation of ventilating equipment, see Article 7, Chapter V of the Los Angeles Municipal Code (Fire Code); Article 3, Chapter IX of the Los Angeles Municipal Code (Electrical Code); Article 1,

Chapter IX of the Los Angeles Municipal Code (Building Code); and the Los Angeles County Public Health Code.

The provision of Chapters 2 through 9 and Chapters 11 and 16; the standards of Appendix A, Chapter 12 of Appendix B, Appendices C and D of the Uniform Mechanical Code, prepared by the International Conference of Building Officials and the International Association of Plumbing and Mechanical Officials; and Uniform Fire Code Standard No. 9-2 are hereby adopted by reference as part of the Los Angeles Municipal Code with amendments in the form of exceptions, modifications, deletions, supplements and additions as are specifically provided for in Divisions 1 and 17 which have been added to Article 5, Chapter IX of the Los Angeles Municipal Code. Chapter references are to chapters of the Uniform Mechanical Code. The abbreviation "U.M.C." shall mean and refer to the Uniform Mechanical Code.

Except as specified in this division, all heating, air-conditioning, ventilation, refrigeration and miscellaneous heat-producing appliance installations and materials shall be in conformity with the Uniform Mechanical Code as adopted by reference.

**SEC. 95.103. SCOPE.**

**SEC. 95.103.1 General.** The provisions of this Code shall apply to any heating, ventilating, air-conditioning and refrigeration equipment and other miscellaneous heat-producing appliances installed in the City.

**SEC. 95.103.2 Applicability.** No person shall erect, install, alter, repair, relocate, replace, add to, use or maintain within the City any heating, ventilating, air-conditioning and refrigeration equipment or other miscellaneous heat-producing appliances except as provided by this Code.

**SEC. 95.104. APPLICATION TO EXISTING MECHANICAL SYSTEMS.**

**SEC. 95.104.1. EXISTING MECHANICAL.** The provision of this Code shall not apply to the use, maintenance or repair of heating, ventilating, air-conditioning and refrigeration equipment and other miscellaneous heat-producing appliances lawfully installed prior to the effective date of this Code and which is used and maintained in accordance with its original design and location and is not a hazard to life, health or property.

**SEC. 95.104.2. BUILDING RELOCATION.** Apartment houses and dwellings moved into or within the City and all other buildings moved within the City, may retain the existing heating, ventilating, air-conditioning and refrigeration equipment and other miscellaneous heat-producing appliances, provided the building does not become or continue to be a substandard residential building or a residential building subject to repair. However, existing mechanical equipment, including vents, which is not in good and safe condition and not working properly shall be corrected.

Existing heating, ventilating, air-conditioning and refrigeration equipment and other miscellaneous heat-producing appliances in any building, other than an apartment house or dwelling, moved from outside the City to inside the City shall comply with all the requirements of this Code.

New heating, ventilating, air-conditioning and refrigeration equipment and miscellaneous heat-producing appliances which are installed in any building relocated into or within the City shall conform to the provisions of this Code.

**SEC. 95.105. ALTERNATE MATERIALS AND METHODS OF CONSTRUCTION.** New or alternate materials and methods of construction may be approved by the Department in accordance with the provisions of Article 8, Chapter IX of the Los Angeles Municipal Code.

**SEC. 95.106. MODIFICATIONS.** Appeals or requests for slight modifications in individual cases from the requirements of this Code shall be made in accordance with the procedure established in Sections 98.0403.1 and 98.0403.2 of the Los Angeles Municipal Code.

**SEC. 95.107. TESTS.** Whenever there is insufficient evidence of compliance with the provisions of this Code, or evidence that a material or method does not conform to the requirements of this Code, or in order to substantiate claims for alternate materials or methods, the building official may require tests as evidence of compliance to be made at no expense to the jurisdiction.

Test methods shall be as specified in this Code or by other recognized test standards. In the absence of recognized and accepted test methods, the building official shall specify the testing procedures.

All tests shall be performed by an approved agency. Reports of tests shall be retained by the building official for the period required for retention of public records.

## PART II

### ORGANIZATION AND ENFORCEMENT

#### SEC. 95.108. POWERS AND DUTIES OF THE DEPARTMENT.

**SEC. 95.108.1. GENERAL.** The powers of the Department and the Board are enumerated in Section 98.0403.1 of the Los Angeles Municipal Code.

#### SEC. 95.108.2. INTERPRETATION.

1. If two or more pertinent limitations are not identical, those limitation shall prevail which provide the greater safety to persons, property or public welfare.

2. The Superintendent of Building or a duly authorized representative is empowered to make all interpretations concerning the provisions of this Code.

**SEC. 95.108.3. RIGHT OF ENTRY.** Right of entry shall be governed by Section 98.0105 of the Los Angeles Municipal Code.

**SEC. 95.108.4. POWER TO STOP WORK.** Whenever any construction regulated by this Code is being or has been done contrary to the requirements of this Code, the Department may order all work stopped on that portion of the installation on which the violation has occurred and order the removal of the equipment on which the violation has occurred. Every such order shall be in writing, stating the nature of the violation and fixing a time limit for compliance. No person shall do any work on any portion of the equipment regulated by this Code after a stop order has been issued except in conformance with directions of the Department.

**SEC. 95.108.5. AUTHORITY TO CONDEMN EQUIPMENT.** Whenever the Department learns or ascertains that any equipment, as defined in this Code, has become hazardous to life, health or property, it shall order, in writing, that such equipment be restored to a condition of safety or be dismantled or removed from its present location. The written notice shall fix a time limit for compliance with the order. No person shall use or maintain the defective equipment after receiving such notice.

**SEC. 95.108.6. NONRESPONSIBILITY OF CITY.** Neither the City of Los Angeles nor any Department, nor any board, commission, officer or employee thereof shall be held liable or responsible for any damage or injury caused by or resulting from the issuance of any permit, the making of any inspection or the granting of any approval under the provisions of this Code.

**SEC. 95.109. UNSAFE EQUIPMENT.** Equipment regulated by this Code, which is unsafe or which constitutes a fire or health hazard or is otherwise dangerous to human life is, for the purpose of this section, unsafe. Use of equipment regulated by this Code constituting a hazard to safety, health or public welfare by reason of inadequate maintenance, dilapidation, obsolescence, fire hazard, disaster, damage or abandonment is, for the purpose of this section, an unsafe use. Unsafe equipment is hereby declared to be a public nuisance and shall be replaced or abated by repair, rehabilitation, demolition or removal as set forth by law, including the provisions of Division 89 of the Los Angeles Building Code.

**SEC. 95.110. APPEALS.** In order to hear and decide appeals of orders, decisions or determinations made by the building official relative to the application and interpretations of this Code, the appeal process shall be made in accordance with the procedure established in Sections 98.0403.1 and 98.0403.2 of the Los Angeles Municipal Code.

**SEC. 95.111. PROHIBITED ACTS.** No person shall sell, offer for sale, display for sale, advertise for sale, loan, rent, or lease, dispose of by way of gift, premium or otherwise, any equipment regulated by this Code unless such equipment is listed by an approved testing agency or is of a type and construction approved by the Department.

### **PART III**

#### **PERMITS AND INSPECTIONS**

**SEC. 95.112. PERMITS.**

**SEC. 95.112.1. GENERAL.** No person shall install or alter, repair, relocate, replace or add to any installed heating, ventilating, air-conditioning, or refrigeration equipment or other miscellaneous heat-producing appliances unless a permit therefor has been obtained from the Department, except as provided in this Code.

**EXCEPTION:**

1. A separate permit shall not be required for installation of any heating, ventilating, air-conditioning, or refrigeration equipment or other miscellaneous heat-producing appliances for which a combined building/mechanical permit has been obtained pursuant to Section 91.107.2 of the Los Angeles Municipal Code.

2. No person shall be subject to fine, imprisonment or payment of an investigation fee for starting and doing any such work without a permit being first obtained, if a permit is obtained therefor on or before 12:00 noon on the third day the office of the Department is open for public business after such work was started. (See Section 98.0402 of the Los Angeles Municipal Code).

3. No permit shall be required for:

- A. Any portable ventilating equipment.
- B. Any portable comfort-cooling unit.
- C. Any steam, hot or chilled water piping within any comfort-heating or cooling system regulated by this Code.
- D. Any portable evaporative cooler.
- E. Any unit refrigerating system.
- F. Any cooking range, broiler unit or domestic-type clothes dryer.
- G. Any replacement or repairing of a compressor, provided the compressor replaced or repaired is of the same horsepower rating and is installed in the same location.
- H. Any replacement or repair of controls, motors and components which are not part of, or used for, any emergency smoke-control system required by the Building Code or the Fire Code.
- I. Any replacement or repair of any component part of listed factory-assembled

comfort-heating or comfort-cooling equipment which does not alter its original approval and complies with all other applicable requirements of this Code.

J. Any repair of equipment not specified herein, if the total value of the repair is less than \$300.00 for labor and material. For the purpose of this requirement, no permit shall be required where the work is performed on more than one piece of equipment or duct system that is located in the same building, provided the total value of material and labor for any separate and individual repair does not exceed \$300.00.

K. The replacement of defective forced-air units with one of equivalent size, Btu (L/W) rating and vent capacity when the vent does not require replacement or relocation in a detached single-family dwelling and the replacement is performed by a contractor with a valid Certificate of Registration pursuant to Section 91.1705. A Certificate of Compliance pursuant to Section 91.108.12 must be filed with the City in lieu of a permit.

L. The replacement of defective air-conditioning units when they are replaced with one of equivalent size and Btu (L/W) rating by a contractor with a valid Certificate of Registration pursuant to Section 91.1705. A Certificate of Compliance pursuant to Section 91.108.12 must be filed with the City in lieu of a permit.

The foregoing exemptions for permit requirements shall not apply where the equipment is regulated by the California Energy Commission, or the equipment is used to provide the required heating capacity for any residential occupancy, or the equipment is used as part of an emergency smoke-control system.

The foregoing exemptions from permit requirements shall not be deemed to allow any equipment regulated by this Code to be installed in a manner contrary to other provisions of this Code.

**SEC. 95.112.2. PERMIT REQUIRED.** A permit shall be obtained for all heating, ventilating, air-conditioning or refrigeration equipment or other miscellaneous heat-producing appliances moved with, or installed in, a relocated building in the City.

**SEC. 95.112.3. SEPARATE PERMIT.** A separate permit shall be obtained for the equipment installed in each separate building or structure and for the work required by each building permit.

**SEC. 95.112.4. INCIDENTAL GAS.** Any qualified installer as specified in Section 95.113.4 of this Code may install incidental gas piping to connect any heating appliance or absorption unit to the existing gas piping system, provided:

1. The incidental piping installation complies with the requirements as set forth in the Los Angeles Plumbing Code; and
2. There is an existing gas supply meter on the premises serving the gas piping system.

**SEC. 95.113. APPLICATION FOR PERMIT.**

1. To obtain a permit, the applicant shall file an application on forms furnished by the Department. The application shall contain all information necessary to the lawful enforcement of the provisions of this Code.
2. The application shall be accompanied by approved plans and specifications when required by this Code.
3. When the Department determines that the information on the application is in conformance with this Code, the Department shall issue a permit upon receipt of the total fees.

**SEC. 95.113.2. PLANS AND SPECIFICATIONS.**

1. Except for minor installations satisfactory to the Department, plans and specifications for the complete installation of comfort-heating systems, comfort-cooling systems, absorption systems, ventilation systems and hoods shall be filed with the Department and approved before the issuance of any permit for the following:



A. Any Group A; E; H; I; or S Division 3 Occupancies as defined in Division 3, Article 1, Chapter IX of the Los Angeles Municipal Code (Building Code).

B. Installations where the aggregate Btu/h (L/W) input capacity is 350,000 Btu/h (1609.5 L/W) and over, for comfort heating, or an aggregate of 25 horsepower (87.9 k/W) and over for comfort-cooling, or an aggregate of 350,000 Btu/h (1609.5 L/W) input capacity and over for absorption units.

C. Smoke-control systems that are required by the Los Angeles Municipal Code.

D. Any comfort-cooling compressor or refrigeration compressor for any system which contains any Group B refrigerant.

When required by the Department for the enforcement of any provision of this Code, plans and specifications for a refrigeration installation using other refrigerants and serving a refrigerator shall be filed with the Department and approved before the issuance of any permit.

E. Any commercial cooking hood and ventilation system.

2. Plans and specifications for installation of heating, ventilating and air-conditioning equipment shall be filed with the Department, when required by the state energy standards. They shall be approved before the issuance of any permit required by this Code.

3. One set of plans and specifications may be filed for checking, provided that not less than two sets of corrected plans and specifications are filed before approval is given by the Department. After approval, one set shall be returned to the applicant and the other set shall be retained by the Department for field checking.

4. When the plans and specifications do not comply with provisions of this Code, the necessary changes or revisions shall be made thereto.

5. Every plan shall be a print or other type of plan approved by the Department. The information contained on the plans shall be clearly legible and specifically indicated. No plan shall be of a scale smaller than 1/8 inch per foot (1 cm/m).

6. Specifications, when submitted, shall be legible and definitively stated, and be included either on the plans or on separate sheets.

7. The approval of any plans or specifications shall not be construed to sanction any violation of this Code.

8. No person shall materially deviate from approved plans or specifications or fail, neglect or refuse to comply therewith unless permission to do so has first been obtained from the Department.

9. One set of plans and specifications may be filed for checking provided that not less than two sets of corrected plans and specifications are filed before approval is given by the Department. One set shall be approved and returned to the applicant and shall be kept at the site of the construction or work, and shall be available to the authorized representative of the Department. One approved set shall be retained by the Department for at least three months after completion of the final inspection.

10. Plans and specifications for work in new high-rise buildings, new covered mall buildings, new buildings with multifloor open atriums, buildings with emergency smoke-control systems and new Group I Occupancies shall be prepared by and bear the signature and registration number of a professional engineer in an appropriate discipline who is duly registered by the State of California Board of Registration for Professional Engineers and Land Surveyors.

**EXCEPTION:**

Plans may be designed and submitted by a California state-licensed contractor with the proper classification within 90 days of issuance of the building permit.

**SEC. 95.113.3. INFORMATION ON PLANS AND SPECIFICATIONS.**

1. The plans or specification shall show all of the following:

A. Layout for each floor with dimensions of all working spaces and a legend of all symbols used;

B. The location, size and material of all piping;

C. The location, size and materials of all air ducts, air inlets and air outlets;

D. The location of all fans, warm-air furnaces, boilers, absorption units, refrigerant compressors, condensers and the weight of all pieces of such equipment weighing 200 pounds (90.7 kg) or more;

E. The rated capacity or horsepower of all boilers, warm-air furnaces, heat exchangers, blower fans, refrigerant compressors and absorption units;

F. The location, size and material of all combustion products, vents and chimneys;

G. The location and area of all ventilation and combustion-air openings and ducts;

H. The location of all air dampers, fire dampers, smoke-control dampers and combustion-products-type smoke detectors;

I. The information necessary to show compliance of the mechanical equipment with the state energy standards;

J. The occupancy of each area served by any heating, air-conditioning or ventilation system;

K. The location of all required fire-resistive separations which are penetrated by ducts or openings of any heating, air-conditioning or ventilation system;

L. Complete drawings of commercial hoods and ventilation systems, including the cooking appliances served by the hoods, and verify:

1. The interface of the fire-extinguishing system and fuel shutoff devices,

2. Compliance with Health Department requirements,

3. Compliance with South Coast Air Quality Management District requirements.

2. All plans and specifications required by this section shall be drawn with indelible pencil or drawn or printed in ink, or made by reproduction process which produces a permanent print. The first sheet of each set of plans and specifications shall show the address of the proposed work and the name and address of the owner or lessee of the premises.

The plans and specifications shall be of sufficient clarity to show that the proposed installation will conform to the provisions of this Code and of all applicable laws, ordinances, rules, regulations and orders.

**SEC. 95.113.4. QUALIFIED INSTALLER.** It is unlawful for any person who is not a qualified installer to install, alter, reconstruct or repair any equipment regulated by this Code unless the person is under the direct supervision of a qualified installer.

A qualified installer is:

1. One who holds a valid contractor's license in the proper classification issued by the State of California; or

2. One who holds a valid Certificate of Qualification and is acting as a maintenance supervisor pursuant to the provisions of this Code; or

3. One who is the owner of a single-family dwelling which is, or is intended to be, occupied by the owner, and the buildings accessory thereto provided:

A. The dwelling is a detached building containing no other dwelling unit or other occupancy; and

B. There are no buildings other than the dwelling and buildings accessory thereto located on the premises; and

C. The owner files a statement with the Department certifying to all of the foregoing facts.

4. One who is employed by, and who has been designated by, a governmental agency which is required to comply with the provisions of this Code, and who is qualified as determined by the Department to supervise or control any work regulated by this Code.

5. Any person performing minor maintenance operations to, or adjustments of, the gas-control equipment or burners of any heating system, or heating appliance when such person is in the employ of a public utility company engaged in the business of supplying and distributing gas in the City of Los Angeles under a valid franchise granted by the City.

6. One that holds a Certificate of Qualification for air balancing in accordance with Section 95.118 of the Los Angeles Municipal Code.

**EXCEPTION:**

One who holds a valid contractor's license in the proper classification issued by the State of California and personally performs the work.

**SEC. 95.114. PERMIT ISSUANCE.**

**SEC. 95.114.1. ISSUANCE.** The issuance of a permit is not an approval or an authorization of the work specified therein. A permit is merely an application for inspection, the issuance of which entitles the permittee to inspection of the work described therein.

**SEC. 95.114.2. EFFECT OF ISSUANCE.** Neither the issuance of a permit nor the approval by the Department of any plans or specifications shall constitute an approval of any work or material that is in violation of any provision of this Code or of any other applicable law.

**SEC. 95.114.3. EXPIRATION OF PERMITS.** Permits shall expire as provided for in Section 98.0602 of the Los Angeles Municipal Code.

**SEC. 95.114.4. REVOCATION OF PERMITS.** Permits may be revoked as provided for in Section 98.0601 of the Los Angeles Municipal Code.

**SEC. 95.115. PERMIT FEES.**

**SEC. 95.115.1. PERMIT FEES.** Before any permit required by this Code is issued, the applicant therefor shall pay to the Department the following fees:

**PERMIT FEE SCHEDULE FOR HEATING, VENTILATING,  
AIR-CONDITIONING AND REFRIGERATION EQUIPMENT AND  
MISCELLANEOUS HEAT-PRODUCING APPLIANCES**

<b>Permit</b>	<b>Fee</b>
1.	
a. For issuing permit . . . . .	\$17.00
b. For issuing a supplementary permit (the fee for which shall be the difference between the fee paid for the original permit and the fee which would have been required had the original permit included the entire installation, repair, relocation or alteration plus . . . . .	14.00
2. For the installation or relocation of each fuel-burning heating appliance regulated by this Code . . . . .	13.50
3. For each air inlet and air outlet served by any heating, air-conditioning or ventilation system . . . . .	3.50
or for each 1,000 square feet (92.9 m <sup>2</sup> ) or fraction thereof of conditioned area for any heating or air-conditioning system using perforated building material in lieu of conventional air inlets and outlets . . . . .	27.00
4.	
a. For the installation of each appliance vent system, factory-built chimney and each absorption unit vent system regulated by this Code . . . . .	8.50

b. For the installation of each unlisted single-wall metal chimney (smokestack) . . . . . 40.00

**Note:** This fee shall not apply to a vent system which is an integral part of an appliance or an absorption unit, which is listed for outdoor installation.

5. For the repair of, alteration of or addition to each refrigeration system, fuel-burning heating appliance, comfort-cooling unit, absorption unit, or each comfort-heating, cooling, absorption, ventilation or evaporative cooling system, including the installation of controls regulated by this Code . . . . . 17.00

6. a. For each ventilation system which is serving a commercial cooking hood . . . . . 23.00

b. For each environmental air and commercial-type clothes dryer ventilation system regulated by Chapter 5 . . . 8.50

c. For each product-conveying duct system regulated by Division 6 and 17 . . . . . 41.00

7. For the installation of each hood (See definition Section 95.210 and 95.507.) . . . . . 23.00

8. a. For the installation of each comfort-cooling compressor of 25-horsepower (87.9 k/W) rating or less and each absorption unit having an input capacity of 500,000 Btu/h (2299.3 L/W) or less . . . . . 17.00

b. For the installation of each refrigeration compressor of 25-horsepower rating (87.9 k/W) or less, other than a compressor for a unit refrigeration system . . . . . 27.00

9. a. For the installation of each comfort-cooling compressor over 25-horsepower (87.9 k/W) rating and under 50-horsepower (175.8 k/W) rating, and each absorption unit having an input capacity over 500,000 Btu/h (2299.3 L/W) and under 1,000,000 Btu/h (4598.6 L/W) . . . . . 41.00

b. For the installation of each refrigeration compressor over 25-horsepower (87.9 k/W) rating and under 50-horsepower (175.8 k/W) rating . . . . . 54.00

- 10.
  - a. For the installation of each comfort-cooling compressor of 50-horsepower (175.8 k/W) rating and over, and each absorption unit having an input capacity of 1,000,000 Btu/h (4598.6 L/W) and over . . . . . 81.00
  - b. For the installation of each refrigeration compressor of 50-horsepower (175.8 k/W) rating and over . . . . . 110.00
- 11. For the installation of each air-handling unit used for the distribution of conditioned air supply . . . . . 17.00
 

**Note:** This fee shall not apply to an air-handling unit which is a portion of a factory-assembled appliance, comfort-cooling unit, evaporative cooler or absorption unit for which a permit is required elsewhere in this Code.
- 12. For the installation of each evaporative cooler which is not classified as a portable evaporative cooler . . . . . 17.00
- 13. When it shall be necessary to make an extra inspection trip due to the applicant having given an incorrect address or wrong location for any permit when obtaining a permit required by this Code, a fee shall be paid by the applicant for correcting the address or location given in such permit. . . . . 25.00
- 14. For the installation of incidental gas piping for each existing individual metered system up to and including five outlets (see Section 95.112.4) . . . . . 18.00
 

For each outlet over five . . . . . 5.00

**Note:** For the purpose of this fee, incidental gas piping shall mean any addition made to an existing low-pressure gas piping system to accommodate gas-burning equipment regulated by this Code. This fee shall not apply if such piping is less than six feet (1.8 m) in length and connects to an existing gas outlet.
- 15. For the installation of each fire damper . . . . . 8.50
- 16. For the installation of each smoke-control damper which is a portion of a smoke-control system that is required by the Los Angeles Municipal Code . . . . . 8.50
- 17. For each smoke detector which is required by the Los Angeles Mechanical Code . . . . . 7.00



- 18. For witnessing the performance test of any emergency mechanical smoke-control system, stair shaft pressurization system, smoke detector or smoke damper which is a portion of that system. For each hour or fraction thereof . . . 75.00
- 19. For witnessing the performance test of any heating or cooling equipment for automatic shutoff. For each hour or fraction thereof . . . . . 75.00
- 20. For witnessing the performance test of any ventilating system serving commercial food heat-processing equipment. For each hour or fraction thereof . . . . . 75.00
- 21. For the minimum inspection . . . . . 65.00
- 22. For each additional inspection . . . . . 65.00
- 23. Minimum inspection fee. Los Angeles Municipal Code Section 98.0412.1 and 98.0412.1.1:
  - a. For the installation of a single fixture described in this section . . . . . 40.00
  - b. Where the cumulative fees described in this section total less than the minimum fee required by the Los Angeles Mechanical Code . . . . . 65.00
- 24. For transfer of a permit . . . . . 35.00

**Note:** Items 18, 19 and 20. For the purpose of witness fee requirements, more than one system of the same category can be inspected in the same building spaces if completed within the same hour. For each additional category or additional hour or fraction thereof a fee of \$60.00 is required. These fees are not to be included in determining plan check fee.

**SEC. 95.115.2. PLAN CHECK FEES.** Before formally accepting a set of plans and specifications for checking, the Department shall collect a plan check fee.

A complete schedule of the permit fees due shall be included with each set of plans submitted to the Department.

The plan check fees required by the provisions of this section are in addition to the inspection fees required by Sections 95.115.5 and 115.8 of this Code.

A fee as specified in item 10 of Section 95.115.2.5 shall be collected by the Department prior to approval for each set of plans submitted beyond the two required by this Code containing more than 10 sheets including calculations and documentation.

Plan check fee shall be as follows:

1. Apartments and condominiums not over three stories:

Type of Installation	Standard Design	Additional Fee for Checking Analysis of Annual Energy Budget
Equipment as listed in Section 95.115.1 to be installed in apartments and condominiums not over three stories in height	40% of permit fee, \$65.00 minimum; plus a surcharge of 10% of permit fee, \$50.00 minimum, for checking compliance with State Energy Standards	60% of permit fee, \$100.00 minimum, \$500.00 maximum

2. Commercial cooking ventilation systems, serving type I hoods, each . . . . . \$150.00

3. Commercial cooking ventilation systems, serving type II hoods each . . . . . \$100.00

4. Type I, Type II or fume hoods, each . . . . . \$50.00

5. Product conveying ventilation systems, not including garage ventilation or smoke control systems, each . . . . . \$150.00

6. Engineering calculations of smoke control systems, each . . . . . \$750.00

7. Engineering calculations of stair shaft pressurization systems, each . . . . . \$150.00

8. Engineered and/or proprietary duct joints, each HVAC system, minimum . . . . . \$100.00

9. Other projects:

Type of Installation	Standard Design	Additional Fee for Checking Analysis of Annual Energy Budget
Installation of equipment as listed in Section 95.115.1, except in apartments and condominiums less than three stories in height or systems listed above in subsections 95.0304, (2), (3), (4), (5), (6), (7), and (8).	70% of permit fee \$65.00 minimum; plus a surcharge of 10% of permit fee, \$50.00 minimum, for checking compliance with State Energy Standards  NOTE: For conditioned areas where the number of air inlets and air outlets is unknown, \$9.00 for each 1000 sq. ft. or fraction thereof.	60% of permit fee, \$100.00 minimum, \$2,800.00 maximum

10. The Department may collect a plan check fee as specified in Section 98.0415 (e) of the Los Angeles Municipal Code for the following plan check services:

- A. Specially engineered systems;
- B. Engineered systems not listed in Section 95.115.1;
- C. Review of expired plans provided that the original approved plans are submitted along with the new plans, and the new plans have no changes other than those required to comply with the current Code;
- D. Review of plans revised for reasons other than to comply with plan check corrections;
- E. Review of "As Built" plans provided that the original approved plans are submitted along with the new plans;
- F. Any time not included in the original plan check fee.

This fee shall be in addition to other fees specified in this Code.

**SEC. 95.115.3. EXPIRATION OF PLAN CHECK.** Plan check approval shall expire as provided for in Section 98.0603 of the Los Angeles Municipal Code.

**SEC. 95.115.4. MINIMUM INSPECTION FEE.**

1. A minimum fee as specified in Section 98.0412 of the Los Angeles Municipal Code shall be paid to the Department for each mechanical installation for which a permit is required by this Code.

2. When the cumulative fees and the issuing fee set forth in this Code are less than the minimum fee, the minimum fee shall be paid, which shall include the issuing fee.

3. The fee for single fixture shall apply to the installation of only one mechanical fixture/equipment and shall include the issuing fee. Where the fee for a single fixture exceeds the minimum fee for single fixtures, this fee shall not apply.

**SEC. 95.115.5. FEES FOR MISCELLANEOUS PERMITS.**

1. When permission has been obtained from the Department, a permit may be issued for that portion of equipment to be concealed if the permit cannot be issued until required plans have been approved. The miscellaneous permit shall not be an authorization for the installation of any other equipment.

The permittee shall submit plans along with this permit application which shall clearly designate the equipment to be concealed and the building area involved. If the work done on the miscellaneous permit is not in accordance with the final approved plans, the permittee shall be responsible for making all necessary corrections for compliance with the Code.

A fee as specified in Section 98.0412 of the Los Angeles Municipal Code shall be paid for the inspection of this installation and shall be limited to one inspection trip and one reinspection trip. This fee is in addition to the permit-issuing fee specified in Section 95.115.1.

2. A miscellaneous permit fee as specified in Section 98.0412 of the Los Angeles Municipal Code shall be paid for inspection of the installation of equipment

regulated by this Code which requires an inspection for determination of Code compliance and where such installation inspection is not provided for in the permit fee schedule specified in Section 95.115.1. This fee is in addition to the permit issuing fee specified in Section 95.115.1.

**SEC. 95.115.6. INVESTIGATION FEE.** Except as provided in Section 95.112.1, whenever any work for which a permit is required under the provisions of this Code has been commenced without the authorization of a permit, a special investigation shall be made before a permit may be issued for the work. In addition to the permit fee, an investigation fee shall be collected as provided for in Section 98.0402 of the Los Angeles Municipal Code.

**SEC. 95.115.7. TRANSFER OF PERMITS AND PLAN CHECKS.** No permit shall be transferable from the original permittee to any other person, unless the original permittee authorizes the transfer in writing. Upon authorization, the new permittee shall file with the Department a new permit and pay to the Department a fee as specified in Section 98.0415 of the Los Angeles Municipal Code for issuing the new permit. This fee includes the issuing permit fee specified in the fee schedule set forth in Section 95.115.1.

**Note:** No plan check shall be transferable from one contractor to another contractor. Where the original plans were submitted by a properly state-licensed engineer, the plans are valid for use by any installing contractor.

**SEC. 95.115.8. FEES FOR ADDITIONAL INSPECTIONS.**

1. Each permit shall be entitled to three inspection trips when the job is of a type requiring an inspection before covering or concealing the work. On jobs which may be completely inspected on one inspection trip, two inspection trips will be allowed.

**EXCEPTION:**

The number of inspection trips will not be limited on progress jobs, provided, however, that only one inspection will be permitted for checking a correction. For the purpose of this section, progress jobs are those in which circumstances beyond the control of the applicant make it impossible for the installation to be completed at any specific time.

2. If more inspection trips than are specified in Subsection 1 of this section are required due to the fault or error on the part of the applicant or the applicant's employees, an additional fee as specified in Section 98.0412 of the Los Angeles Municipal Code shall be paid by the applicant for each additional inspection trip.

3. The Department may recheck installations at intervals of 30 days or more, where violations continue to exist, until either the violations are cleared or a total of three rechecks are made. The fees specified in Subsection 2 of this section shall apply for each recheck inspection.

4. The fees charged under this section are in addition to any other fees shown and the payment of the fees required by this section shall not exempt any person from compliance with other provisions of this Code nor from any penalty prescribed by law.

5. Whenever special enforcement procedures are required to obtain compliance with properly executed Department notices or orders, a fee, as specified in Section 98.0407 of the Los Angeles Municipal Code, shall be assessed in addition to the added trip fee specified in Subsection 2 of this section.

**SEC. 95.115.9. INSPECTION FEES FOR OFF-HOURS INSPECTIONS.** The Department may, at its discretion, make emergency inspections at other than normal working hours upon the request of a permittee, provided that additional fees are paid as specified in Section 98.0406 of the Los Angeles Municipal Code.

**SEC. 95.115.10. FEES FOR OFF-SITE INSPECTIONS.** Upon written request, the Department may, at its discretion, make inspections at locations other than the site upon which a building will be located, provided that location is within 60 miles (96.56 km) of the Los Angeles City Hall.

A fee, in addition to fees charged elsewhere in this Code, at the rate specified in Section 98.0412 of the Los Angeles Municipal Code per hour shall be charged for such inspections, time to include travel to and from the place of inspection, with the minimum fee as specified in Section 98.0412 of the Los Angeles Municipal Code.

**SEC. 95.116. INSPECTIONS.**

**SEC. 95.116.1. INSPECTION.**

1. All equipment for which a permit is required by this Code shall be inspected by an authorized inspector of the Department.

**EXCEPTION:**

Contractors holding a Certificate of Registration complying with Section 91.108.12 of the Los Angeles Municipal Code for detached single-family dwellings.

2. No portion of any equipment intended to be enclosed by any permanent portion of the building shall be enclosed until inspected and approved.

3. When the installation of any equipment is complete, a second or final inspection shall be made.

4. The first and second inspections may be made at the same time if no portion of the equipment is concealed by any permanent portion of any building.

5. **Approved fabricators.** The inspections provided for in this section shall not be required for construction or installation work done on the premises of a Type II fabricator to whom an approval has been issued pursuant to the provisions of Division C of Article 6 of Chapter IX of the Los Angeles Municipal Code.

**SEC. 95.116.2. REQUEST FOR INSPECTION.**

1. The Department shall require that every request for inspection be filed at least one day before the inspection is desired. This request may be in writing or by telephone at the option of the Department.

2. It shall be the duty of the person requesting inspection of any equipment regulated by this Code to provide access to and means for proper inspection for the equipment.

3. The removal of any material necessary to permit an inspection shall be required by the Department by written order. The City shall not be liable for any expense entailed in the removal or replacement of any material required to permit the inspection.

**SEC. 95.117. CONNECTION APPROVAL.**

**SEC. 95.117.1. CONNECTION APPROVAL.** No equipment regulated by this Code shall be connected to the fuel or power supply until it complies with all applicable requirements of this Code and a final inspection tag of approval has been issued by the Department.

**EXCEPTION:**

The requirements of this subsection shall not be considered to prohibit the operation of any equipment installed to replace defective equipment serving an occupied portion of a building, in the event a request for inspection of that equipment has been filed with the Department not more than 48 hours after the replacement work is completed and before any portion of the equipment is concealed by any permanent portion of the building.

**SEC. 95.117.2. FINAL INSPECTION.** A final inspection tag of approval may, upon notice, be revoked by the Department if the Department finds that the equipment fails in any respect to comply with the requirements of this Code or that the installation is unsafe, dangerous or a hazard to life or property.

**SEC. 95.118. REGISTRATION.**

**SEC. 95.118.1. MAINTENANCE SUPERVISOR.** No person shall act in the capacity of a maintenance supervisor or air balancer for smoke-control systems, unless the person has paid the filing fee and successfully passed an examination as specified in Section 95.118.3 of this Code.

**EXCEPTION:**

One who holds a valid contractor's license in the proper classification issued by the State of California and personally performs the work.

**SEC. 95.118.2. APPLICATIONS.**

1. Every applicant for Certificate of Qualification as a maintenance supervisor or air balancer shall make an application in writing to the Department on forms furnished for that purpose.

2. Every application for a Certificate of Qualification as a maintenance supervisor or air balancer



shall be accompanied by a filing fee as specified in Section 98.0414 of the Los Angeles Municipal Code.

3. Every applicant for a Certificate of Qualification as a maintenance supervisor or air balancer shall be examined as required by the provisions of Section 95.118.3 of this Code.

**Note:** For the purpose of this Code, an air balancer holding a Certificate of Qualification may qualify to perform work to comply with the State Energy requirements (Title 24, Parts 1 and 6).

**SEC. 95.118.3. EXAMINATIONS.**

1. Every applicant for a Certificate of Qualification as a comfort-heating and cooling maintenance supervisor or a refrigeration maintenance supervisor or air balancer shall be given an examination to evaluate that applicant's knowledge and experience. The extent and scope of the examination shall, in the judgement of the Superintendent of Building, be sufficient to indicate that a person who successfully passes the examination has the necessary ability to repair, maintain, alter and service refrigeration equipment, heating appliances, heating systems, gas piping, gas-control devices, vents for gas appliances, and air balancing in compliance with this Code. The examination shall include a written test and an oral interview.

2. The Superintendent of Building is hereby granted the power and authority to make and establish such rules and regulations as he or she may consider necessary for the proper conduct of the examination. The results of each examination shall be subject to review and approval by the Superintendent.

**SEC. 95.118.4. FAILURE TO PASS EXAMINATION.** No part of any filing fee shall be returned to any applicant who fails to pass the examination for which the fees were paid. If any applicant shall fail to receive the percentage required at the first examination, the applicant shall be entitled to take a second examination without payment of a second fee, but shall be required to wait at least two weeks before taking the second examination. In case any applicant fails to pass the second examination, the applicant shall be required to wait at least six months before he or she may file another application for examination, at which time the applicant shall pay another filing fee.

**SEC. 95.118.5. ISSUANCE OF CERTIFICATE.**

1. Every applicant for a Maintenance Certificate of Registration shall make application to the Department on forms furnished for that purpose. The application shall provide the following information:

- A. Business name and address of applicant.
- B. The signature of the responsible managing officer.
- C. The name of the maintenance supervisor.

2. Before a Maintenance Certificate of Registration is issued to any person, that person shall pay a registration fee as specified in Section 98.0414 of the Los Angeles Municipal Code.

3. Each Maintenance Certificate of Registration issued shall expire one year following the date of issuance, but may be renewed from year to year upon payment of an annual renewal fee as specified in Section 98.0414 of the Los Angeles Municipal Code, which must be paid not later than 30 days after the date of expiration.

4. The Department shall issue a Certificate of Qualification as a maintenance supervisor or air balancer to any person who has successfully passed the examination prescribed in Section 95.118.3.

5. Every Certificate of Qualification as maintenance supervisor or air balancer shall expire one year following the date of issuance, but may be renewed from year to year by the payment of an annual fee as specified in Section 98.0414 of the Los Angeles Municipal Code within 30 days after the date of expiration.

6. A maintenance supervisor shall be limited to perform only the labor for maintenance, repair, addition to or alteration of existing equipment on premises owned by or under control of the holder of a valid Maintenance Certificate of Registration.

**SEC. 95.118.6. REVOCATION, SUSPENSION AND VOIDING OF CERTIFICATES.**

1. Any Certificate of Registration or Certificate of Qualification required by this Code may be suspended or revoked in accordance with the provisions of Article 8 of this Chapter.

2. Any person whose certificate is revoked hereunder shall not, for a period of 30 days thereafter, be eligible for a new certificate and shall receive a new certificate only after passing the required examination and paying the required fee.

3. The revocation of any Certificate of Registration or Certificate of Qualification shall not exempt the holder from any other penalty provided in this Code.

4. A Certificate of Registration shall become void 30 days after a maintenance supervisor is no longer in the employ of a holder of a Certificate of Registration.

5. A Certificate of Qualification shall become void when the maintenance supervisor is no longer in the employ of the holder of a Certificate of Registration.

**SEC. 95.118.7. EXHIBITION OF MAINTENANCE CERTIFICATE.**

Every person holding a Certificate of Qualification as a maintenance supervisor or air balancer shall exhibit that certificate to authorized personnel of the Department upon demand.

**SEC. 95.118.8. TRANSFER OF CERTIFICATES.** No Certificate of Registration or Qualification shall be transferable.

**SEC. 95.118.9. EXPIRED CERTIFICATES.**

1. Expired certificates may be renewed at any time within 12 months following the date of expiration provided that, after the first month, the renewal fee shall be increased by 10 percent for each month after the first.

2. After a certificate has been expired for one year, it may not be renewed. A new application and payment of the filing fees set forth in Sections 95.118.2 and 118.5 of this Code will be required.

## DIVISION 2

### DEFINITIONS AND ABBREVIATIONS

**SEC. 95.201. GENERAL.** Section 201 of the U.M.C. is incorporated by reference.

**SEC. 95.202. ACCEPTED MEANINGS.** Section 202 of the U.M.C. incorporated by reference.

**SEC. 95.203. DEFINITIONS "A".**

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

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

**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.

**ADMINISTRATIVE AUTHORITY** is the Superintendent of Building or an authorized agent.

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

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

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

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

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

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

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

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

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

**APPLIANCE** is a device which utilizes fuel or other forms of energy to produce light, heat, power, refrigeration or air conditioning. This definition shall also include a vented decorative appliance, commercial clothes dryer and factory-built fireplace.

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

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

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

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

**SEC. 95.204. DEFINITIONS "B".**

**BLOWER-TYPE WARM-AIR FURNACE** is a warm air furnace equipped with a fan which provides the primary means for circulation of air through the furnace.

**BOARD** is the Board of Building and Safety Commissioners of the City of Los Angeles, California.

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

**BOILER ROOM** is any room containing a steam or hot-water boiler.

**BREECHING** is a metal connector for medium- and high-heat appliances.

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

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

**BUILDING CODE** is the City of Los Angeles Building Code, current edition, set forth in Article 1, Chapter IX, of the City of Los Angeles Municipal Code.

**BUILDING OFFICIAL** is the Superintendent of Building or an authorized agent.

**SEC. 95.205. DEFINITIONS "C".**

**CAS NUMBER** is the Chemical Abstract System registry number.

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

**CERTIFICATE OF QUALIFICATION** is a Certificate of Qualification as a maintenance supervisor or air balancer as issued by the Department.

**CERTIFICATE OF REGISTRATION** is a Maintenance Certificate of Registration as issued by the Department.

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

**Factory-Built Chimney** is a listed chimney.

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

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

**CHIMNEY CLASSIFICATIONS:**

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

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

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

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

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

**CITY** is the City of Los Angeles, California.

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

**CLOSET** See "confined space".

**CLOTHES DRYER** is a mechanical device which is factory assembled and used for the drying of clothes by the circulation of heated air.

**Commercial Type** is a dryer primarily used in a place of business where it may be operated by the public or a hired attendant and may or may not be coin operated.

**Domestic Type** is a dryer primarily used in a residential-type building and is smaller physically and in its functional output as compared to a commercial-type clothes dryer.

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

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

**COMPRESSOR, COMFORT-COOLING**, is a compressor which is a portion of a comfort-cooling system or a comfort-cooling unit.



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

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

**COMPRESSOR, REFRIGERATION**, is a compressor serving a refrigerator.

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

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

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

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

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

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

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

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

**SEC. 95.206. DEFINITIONS "D".**

**DAMPERS** shall be defined as follows:

**Ceiling Damper** is an automatic-closing assembly complying with U.L. Standard 555C.

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

**Leakage Rated Damper** See "smoke damper."

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

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

**DEPARTMENT** is the Department of Building and Safety of the City of Los Angeles, California, or its authorized representative.

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

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

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

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

1. Assure the ready escape of the flue gases in the event of no draft, backdraft or stoppage beyond the draft hood.

2. Prevent a backdraft from entering the appliance.

3. Neutralize the effect of stack action of the chimney or gas vent upon the operation of the appliance.

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

1. A vent, a vent connector or a chimney connector.

2. A tube or conduit wherein the pressure of the air exceeds 1 pound per square inch (6.9 Pa).

3. The air passages of listed self-contained systems.

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

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

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

**DWELLING UNIT** is a building or portion thereof which contains living facilities, including provisions for sleeping, eating, cooking and sanitation, as required by this Code, for not more than one family.

#### **SEC. 95.207. DEFINITIONS "E".**

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

**ELECTRICAL CODE** is the City of Los Angeles Electrical Code, current edition, set forth in Article 3, Chapter IX of the City of Los Angeles Municipal Code.

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

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

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

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

#### **SEC. 95.208. DEFINITIONS "F".**

**FIRE CODE** is the City of Los Angeles Fire Code, set forth in Article 7, Chapter V, of the City of Los Angeles Municipal Code.

**FIREPLACE** is a hearth and fire chamber or similar prepared place in which a fire may be made and which is built in conjunction with a chimney.

**FIREPLACE, Factory-built** is a listed assembly of a fire chamber, its chimney and related factory-made parts designed for unit assembly without requiring field construction. Factory-built fireplaces are not dependent on mortar-filled joints for continued safe use.

**FIREPLACE, Masonry** is a hearth and fire chamber of solid masonry units such as bricks, stones, masonry units, or reinforced concrete provided with a suitable chimney.

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

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

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

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

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

**Enclosed Furnace** is a specific heating or heating and ventilating furnace incorporating an integral total enclosure and using only outside air for combustion.

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

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

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

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

**SEC. 95.209. DEFINITIONS "G".** Section 209 of the U.M.C. is incorporated by reference.:

**SEC. 95.210. DEFINITIONS "H".**

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

**HEATING DEGREE DAY** is a unit, based on temperature difference and time, used in estimating fuel consumption and specifying nominal annual heating load of a building. For

any one day when the mean temperature is less than 65°F. (18°C.), there exist as many degree days as there are Fahrenheit degrees difference in temperature between mean temperature for the day and 65°F. (18°C.).

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

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

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

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

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

**HORSEPOWER** is the horsepower of the power unit driving the refrigerant compressor. If the compressor is electrically driven, the horsepower rating shall be determined as set forth in Article 430 of the National Electrical Code incorporated by reference in the Electrical Code.

**SEC. 95.211. DEFINITIONS "I".** Section 211 of the U.M.C. is incorporated by reference.

**SEC. 95.212. DEFINITIONS "J".** Section 212 of the U.M.C. is incorporated by reference.

**SEC. 95.213. DEFINITIONS "K".** Section 213 of the U.M.C. is incorporated by reference.

**SEC. 95.214. DEFINITIONS "L".** Section 214 of the U.M.C. is incorporated by reference.

**SEC. 95.215. DEFINITIONS "M".**

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

**MAINTENANCE CERTIFICATE OF REGISTRATION** is a Certificate of Registration issued to the owner or occupant of specified premises for the sole purpose of repairing, maintaining, altering or adding to existing heating, ventilating, air-conditioning or refrigeration equipment on the premises.

**MAINTENANCE SUPERVISOR** is a comfort-heating and cooling maintenance supervisor or a refrigeration maintenance supervisor.

**Comfort-Heating and Cooling Maintenance Supervisor** is a person registered with the Department by the holder of a Maintenance Certificate of Registration to repair, maintain, alter or add to existing heating, ventilating and air-conditioning equipment only on the premises designated on the Maintenance Certificate Registration.

**Refrigeration Maintenance Supervisor** is a person registered with the Department by the holder of a Maintenance Certificate of Registration to repair, maintain, alter or add to existing refrigeration equipment only on the premises designated on the Maintenance Certificate of Registration.

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

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

**SEC. 95.216. DEFINITIONS "N".** Section 216 of the U.M.C. is incorporated by reference.

**SEC. 95.217. DEFINITIONS "O".** Section 217 of the U.M.C. is incorporated by reference.

**SEC. 95.218. DEFINITIONS "P".** Section 218 of the U.M.C. is incorporated by reference.

**SEC. 95.219. DEFINITIONS "Q".** Section 219 of the U.M.C. is incorporated by reference.

**SEC. 95.220. DEFINITIONS "R".** Section 220 of the U.M.C. is incorporated by reference.

**SEC. 95.221. DEFINITIONS "S".**

**SEAM, WELDED,** See "joint, welded."

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

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

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

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

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

**STATE ENERGY STANDARDS** are the rules and regulations establishing energy, insulation and conservation standards for buildings, adopted by the California Energy Commission as specified in the City of Los Angeles Building Code as set forth in the Los Angeles Municipal Code.

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



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

**SUPERINTENDENT OF BUILDING** is the general manager of the Department of Building and Safety.

**SEC. 95.222. DEFINITIONS "T"**. Section 222 of the U.M.C. is incorporated by reference.

**SEC. 95.223. DEFINITIONS "U"**.

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

**U.M.C.** is the 1994 Edition of the Uniform Mechanical Code published by the International Conference of Building Officials and the International Association of Plumbing and Mechanical Officials.

**U.M.C. STANDARDS** are the Uniform Mechanical Code Standards included in Appendix A of the 1994 Edition of the Uniform Mechanical Code.

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

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

**UNIT REFRIGERATION SYSTEM** is a refrigerating unit not to exceed three-horsepower rating and which has been factory assembled and tested prior to its installation. This unit shall not be connected to any ductwork. The unit shall be a complete one-unit package without remote parts.

**UNUSUALLY TIGHT CONSTRUCTION** is construction where:

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

2. Weatherstripping on openable windows and doors; and

3. Caulking or sealants are applied to areas such as joints around window and door frames, between sole plates and floors, between wall-ceiling joints, between wall panels and at penetrations for plumbing, electrical and gas lines and at other openings.

**SEC. 95.224. DEFINITIONS "V".**

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

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

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

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

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

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

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

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

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

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

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

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

**VENTILATION SYSTEM** is all of that equipment intended or installed for the purpose of supplying air to, or removing air from, any room or space by mechanical means, other than equipment which is a portion of an environmental heating, cooling, absorption or evaporative cooling system. This definition shall include commercial and domestic-type clothes dryers.

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

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

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

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

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

**SEC. 95.225. DEFINITIONS "W".**

**WALL HEATER** See definition of "vented wall furnace."

**WARM-AIR FURNACE** is an environmental heating appliance designed or arranged to discharge heated air through any duct or ducts. This definition shall not include a unit heater or a direct gas-fired makeup air heater.

**WATER HEATER or HOT-WATER-HEATING BOILER** is an appliance designed primarily to supply hot water and is equipped with automatic controls limiting water temperature to a maximum of 210°F. (99°C.).

**SEC. 95.226. DEFINITIONS "X".** Section 226 of the U.M.C. is incorporated by reference.

**SEC. 95.227. DEFINITIONS "Y".** Section 227 of the U.M.C. is incorporated by reference.

**SEC. 95.228. DEFINITIONS "Z".** Section 228 of the U.M.C. is incorporated by reference.

### DIVISION 3

## GENERAL REQUIREMENTS FOR HEATING, VENTILATING AND COOLING

### PART I

#### EQUIPMENT, GENERAL

**SEC. 95.301. SCOPE.** Section 301 of the U.M.C. is incorporated by reference.

**SEC. 95.302. APPROVAL OF EQUIPMENT.** Section 302 of the U.M.C. is incorporated by reference.

**SEC. 95.303. TYPE OF FUEL AND FUEL CONNECTIONS.**

**SEC. 95.303.1. GENERAL.** Each appliance shall be designed for use with the type of fuel to which it will be connected. Appliances shall not be converted from the fuel specified on the rating plate for use with a different fuel without securing reapproval from the building official and as recommended by the manufacturer of either the original equipment or the conversion equipment. The serving gas supplier may convert appliances in accordance with procedures approved by the building official without securing reapproval of the appliance if properly relabeled.

**SEC. 95.303.2. GAS SHUTOFF VALVES REQUIRED.** An accessible approved shutoff valve shall be installed in the fuel-gas piping outside of each appliance and ahead of the union connection thereto in addition to any valve provided on the appliance. Such valve shall be within 3 feet (914 mm) of the appliance it serves, and in the same room or space where the appliance is located.

**EXCEPTION:**

1. Shutoff valves may be accessibly located inside or under an appliance when the appliance can be removed without removal of the shutoff valve.

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

**SEC. 95.303.3. GAS-BURNING APPLIANCES.** Rigid appliance connections shall have a diameter of not less than that of the inlet connection provided on the appliance by the manufacturer. Appliances designed to burn gas shall be rigidly connected to the gas-supply outlet in an approved manner and with approved materials.

**EXCEPTION:**

A gas appliance may be connected with an approved, listed metal appliance connector under the following conditions:

1. Listed metal appliance connectors shall have an overall length not to exceed 3 feet (914 mm), except range and domestic clothes dryer connectors, which may not exceed 6 feet (1830 mm).

2. Connectors shall not be concealed within or extended through a wall, floor, partition or through the appliance housing.

3. A listed appliance connector valve not less than the nominal size of the connector shall be accessible at the gas piping outlet immediately ahead of the connector.

4. Connectors shall be of adequate size to provide the total demand of the connected appliance based on Table 3-D-1 or 3-D-2, as applicable.

5. Aluminum alloy connectors may be used only in interior locations where they shall not be in contact with masonry, plaster or insulation or are not subject to repeated corrosive wettings.

6. The connection of an indoor appliance with any type of gas hose is prohibited, except when used for laboratory or shop equipment or equipment that requires mobility during operation. These connections shall have the shutoff or stopcock installed at the connection to the building piping. When gas hose is used, it shall be of the minimum practical length, but not to exceed 6 feet (1830 mm), except for hand torches and special mobile equipment, and shall not extend from one room to another nor pass through walls, partitions, ceilings or floors. Gas hose shall not be concealed from view or used in a concealed location. Only listed gas hose shall be used in accordance with its listing. Gas hose shall not be used where it is likely to be subject to temperatures exceeding 125°F. (52°C.), nor shall it be used as a substitute for a standard appliance connector.

7. Outdoor portable appliances may be connected with an approved outdoor hose connector not to exceed 15 feet (4572 mm) in length, provided it connects outdoors to approved gas piping, including an approved valve at the inlet of the hose connector.

8. Appliances may be connected to fuel-gas piping with an approved listed quick-disconnect device.

**SEC. 95.303.4. PIPE SIZE.** Additional fuel connectors may be made to existing fuel-supply lines, provided pipe sizes are approved by the building official.

**SEC. 95.304. INSTALLATION.** Section 304 of the U.M.C. is incorporated by reference.

**SEC. 95.305. ACCESS FOR MAINTENANCE SERVICE AND REPAIR.** Section 305 of the U.M.C. is incorporated by reference.

**SEC. 95.306. CONTROLS.** Section 306 of the U.M.C. is incorporated by reference.

**SEC. 95.307. LABELING FOR IDENTIFICATION.** Section 307 of the U.M.C. is incorporated by reference.

**SEC. 95.308. LOCATION IN GARAGES AND WAREHOUSES.** Section 308 of the U.M.C. is incorporated by reference.

**SEC. 95.309. ELECTRICAL CONNECTIONS.**

**SEC. 95.309.1. GENERAL.** Equipment regulated by this Code requiring electrical connections of more than 50 volts shall have a positive means of disconnect adjacent to, in sight of and be separate from the equipment served. A 120-volt receptacle shall be located within 25 feet (7620 mm) of the equipment for service and maintenance purposes. The receptacle need not be located on the same level as the equipment. Low-voltage wiring of 50 volts or less within a structure shall be installed in a manner to prevent physical damage. Such wiring, exposed to weather, shall be installed in conduit approved for exterior use.

**SEC. 95.309.2. ELECTRICAL EQUIPMENT.** Electrical equipment used as part of, or in connection with, the installation of a kiln shall comply with the requirements set forth in the Electrical Code.

**SEC. 95.309.3. INSTALLATION HEIGHT.** The center of the grip of the operating handle of switches intended to be used by the occupant of the room or area to control cooling, heating and ventilation equipment shall be not less than 3 feet nor more than 4 feet above the floor or working platform.

**EXCEPTION:**

1. This section shall not apply to existing buildings when the Department determines that compliance with these standards would create an unreasonable hardship and equivalent facilitation is provided.

2. This section shall not apply to the repair of, rehabilitation of, or addition to privately-funded apartment houses, condominiums or time-share units.

3. This section shall not apply to dwellings or buildings containing less than four condominium dwelling units.

**SEC. 95.310. CONDENSATE WASTES.** Section 310 of the U.M.C. is incorporated by reference.

**SEC. 95.311. PERSONNEL PROTECTION.** Section 311 of the U.M.C. is incorporated by reference.

**PART II**

**WARM-AIR HEATING SYSTEMS**

**SEC. 95.312. SCOPE OF PART II.** Section 312 of the U.M.C. is incorporated by reference.

**SEC. 95.313. CROSS-REFERENCES.** Section 313 of the U.M.C. is incorporated by reference.

**SEC. 95.314. FURNACE ACCESS.** Section 314 of the U.M.C. is incorporated by reference.

**SEC. 95.315. PROHIBITED INSTALLATIONS.** Section 315 of the U.M.C. is incorporated by reference.

**SEC. 95.316. HEAT EXCHANGER AND COOLING COILS MOUNTED IN FURNACES.** Section 316 of the U.M.C. is incorporated by reference.

**SEC. 95.317. RETURN AND OUTSIDE AIR.** Section 317 of the U.M.C. is incorporated by reference.

**SEC. 95.318. AIR SUPPLY.** Section 318 of the U.M.C. is incorporated by reference.



**SEC. 95.319. ATTIC FURNACE.**

**SEC. 95.319.1. UPRIGHT FURNACES.** Upright furnaces may be installed in an attic or furred space more than 5 feet (1524 mm) in height, provided the required listings and furnace and duct clearances are observed.

**SEC. 95.319.2. CLEARANCES.** Clearances of a warm-air attic furnace from combustibles shall be as specified in Section 95.304.1.

**SEC. 95.319.3. ACCESS.** An attic or furred space in which a warm-air furnace is installed shall be readily accessible by an opening and passageway as large as the largest piece of the furnace but not smaller than 30 inches by 30 inches (762 mm by 762 mm) continuous from the opening to the furnace and its controls.

Access to attic or furred space shall be by means of a stairway, ramp, pulldown ladder or fixed ladder.

Every such fixed ladder shall:

1. Extend from a building floor level.
2. Have landings less than 18 feet (5486 mm) apart measured from the finished grade. All landing platforms shall be equipped with guardrails 42 inches (1067 mm) in height with vertical rails not more than 21 inches (533 mm) apart. Platforms shall be not less than 24 inches (610 mm) in width and 30 inches (762 mm) in length.
3. Be at least 14 inches (356 mm) in width.
4. Have rungs not more than 14 inches (356 mm) on center.
5. Have minimum 6-inch (152 mm) toe space.
6. Lead directly to the required attic access opening.

A suitable handhold shall be provided in the attic directly above the access ladder.

**EXCEPTION:**

- A. The access opening into the space may be 22 inches by 30 inches (559 mm by 762 mm),

provided the largest piece of equipment can be removed through the opening.

**B.** Access to attics or furred spaces in residential occupancies need not be by means of a stairway, ramp, pulldown ladder or fixed ladder.

**C.** Equipment designed to be installed above a removable ceiling need not be provided with a working platform and ready access, provided the equipment can be serviced, replaced and lowered without removing permanent construction and the height from finish floor to the center line of the equipment shall not exceed 12 feet (3658 mm).

(**Note:** All electrical installation shall be in accordance with the City of Los Angeles Electrical Code).

**SEC. 95.319.4. PASSAGEWAY LENGTH.** The distance from the passageway access to furnace shall not exceed 20 feet (6096 mm) measured along the center line of the passageway. The passageway shall be unobstructed and shall have continuous solid flooring not less than 24 inches (610 mm) wide from the entrance opening to the furnace.

**SEC. 95.319.5. WORKING PLATFORM.** A level working platform not less than 30 inches (762 mm) in depth and width shall be provided in front of the entire firebox side of the warm-air furnace, and if the furnace temperature-limit control, air filter, fuel-control valve, vent collar or air-handling unit is not serviceable from the firebox side of the furnace, a continuous floor not less than 24 inches (610 mm) in width shall be provided from the platform in front of the firebox side of the furnace to and in front of this equipment.

**EXCEPTION:**

A working platform need not be provided when the furnace can be serviced from the required access opening.

**SEC. 95.319.6. ELECTRICAL REQUIREMENTS.** A permanent electric outlet and lighting fixture controlled by a switch located at the required passageway opening shall be provided at or near the furnace.

**SEC. 95.320. UNDER-FLOOR FURNACES.** Section 320 of the U.M.C. is incorporated by reference.

**SEC. 95.321. FURNACES ON EXTERIOR WALLS AND ROOFS.**

**SEC. 95.321.1. GENERAL.** A roof or exterior building wall supporting a furnace shall comply with the requirements for roof and wall structures specified in the Building Code, and the equipment shall be listed or approved for that use.

**SEC. 95.321.2. WEATHER PROTECTION.** Unless listed or designed for outside installation, a furnace on the roof of a building shall be enclosed in a penthouse complying with the requirements of the Building Code for roof structures or shall be completely enclosed in a weatherproof housing. The housing, when constructed of metal, shall be of galvanized steel not less than 0.024 inch (0.61 mm) (No. 24 U. S. Standard gage) or of aluminum not less than 22 B. & S. gage (0.025 inch) (0.64 mm) supported on a substantial metal frame. The housing shall not be larger than necessary to properly cover and provide a minimum 6-inch (152 mm) clearance around the appliance or appliances enclosed therein, including all controls and draft diverters.

**SEC. 95.321.3. VENTILATION.** An enclosure or penthouse shall be provided with openings complying with the requirements of Chapter 7, together with means for proper ventilation of the furnace draft hood relief openings.

**SEC. 95.321.4. CLEARANCE.** Clearance of the furnace from combustible construction shall be as specified in Section 95.304.

**SEC. 95.321.5. PLATFORM.** A furnace located on a roof shall be installed on a substantial level platform. When the roof has a slope greater than 4 units vertical in 12 units horizontal (33% slope), a level working platform at least 30 inches (762 mm) in depth and width shall be provided along the firebox and control sides of the furnace. Sides of a working platform facing the roof edge below shall be protected by a substantial railing 42 inches (1067 mm) in height with vertical rails not more than 21 inches (533 mm) apart, except that parapets at least 24 inches (610 mm) in height may be utilized in lieu of rails or guards.

**SEC. 95.321.6. CATWALK.** On roofs having slopes greater than 4 units vertical in 12 units horizontal (33% slope), a catwalk at least 16 inches (406 mm) in width with substantial cleats spaced not more than 24 inches (610 mm) apart shall be

provided from the roof access to the working platform at the appliance.

**SEC. 95.321.7. ROOF ACCESS SCUTTLE.** Required working platforms, railings and catwalks may be omitted when access to the equipment is through a required roof scuttle and all of the following provisions are met:

1. The required scuttle is located immediately adjacent to the control side of the equipment unit.
2. Controls, filters, burners, fans and motors are accessible for service and repair within 2 feet (610 mm) of the edge of the equipment platform on the scuttle side.
3. The equipment platform is not more than 20 inches (508 mm) above the high side of the scuttle opening.
4. A substantial working platform not less than 30 inches (762 mm) in depth and width shall be provided directly below the scuttle at a point not less than 30 inches (762 mm) or more than 32 inches (813 mm) below the high side of the scuttle opening.
5. Scuttles located on other than the roof incline side of the equipment unit shall have the hatch hinged on the low side of the scuttle. Hatches shall be equipped with means to ensure an opening angle of not less than 90 nor more than 100 degrees from the closed position. Hatches and hardware, when open, shall be capable of withstanding a 300-pound (1334 N) lateral force from the roof incline side.
6. The lid for the scuttle shall be so arranged that it can be opened and closed without excess physical strain.
7. Access to scuttles shall comply with Section 95.319.

**SEC. 95.321.8. ACCESS.** Every furnace installed in or on an exterior wall of a building, which is designed so that the burners or controls must be serviced from outside the building, shall be readily accessible.

Furnaces located on the roof of a building shall be readily accessible.

**EXCEPTION:**

1. Permanent exterior ladders providing roof access need not extend closer than 8 feet (2438 mm) to the finished grade.

2. A portable ladder may be used for access for furnaces on the single-story portion of a Group U or R Occupancy.

3. Permanent ladders for equipment access need not be provided at parapets or walls less than 30 inches (762 mm) in height.

Permanent ladders providing roof access shall:

A. Have side railings which extend at least 30 inches (762 mm) above the roof edge or parapet wall.

B. Have landings less than 18 feet (5486 mm) apart measured from the finished grade. All landing platforms shall be equipped with guardrails 42 inches (1067 mm) in height with vertical rails not more than 21 inches (533 mm) apart. Platforms shall be not less than 24 inches (610 mm) in width and 30 inches (762 mm) in length.

C. Be at least 14 inches (356 mm) in width.

D. Have rungs not more than 14 inches (356 mm) on center.

E. Have a minimum of 6-inch (152 mm) toe space.

**PART III**

**DECORATIVE APPLIANCES, FLOOR FURNACES**

**VENTED WALL FURNACES, UNIT HEATERS AND ROOM HEATERS**

**SEC. 95.322. SCOPE.** Section 322 of the U.M.C. is incorporated by reference.

**SEC. 95.323. GENERAL.**

**SEC. 95.323.1. VENTING REQUIRED.** Vented decorative appliances, floor furnaces, vented wall furnaces, unit heaters and room heaters shall be of a type listed for vented use and shall be connected to a vent complying with Division 8, except as provided in Section 95.327.

**SEC. 95.323.2. COMBUSTION AIR.** Vented decorative appliances, floor furnaces, vented wall furnaces, unit heaters and room heaters shall be provided with combustion air complying with Division 7.

**SEC. 95.323.3. PROHIBITED LOCATIONS.** A vented decorative appliance, floor furnace, vented wall furnace, unit heater or room heater shall not be located in the following places:

1. In a surgical operating room.
2. In a hazardous location.
3. In a Group H, Division 1, 2 or 3 Occupancy.
4. In a room or space where an open flame is prohibited.
5. In Group H, Division 4 Occupancies, devices generating a spark or glow capable of igniting gasoline vapors shall not be installed or used within 18 inches (457 mm) of the floor.
6. In a Group H, Division 5 Occupancy, and Group S, Division 5 Occupancy, unless the appliance is located at least 8 feet (2438 mm) above the floor.
7. A vented decorative appliance shall not be located in any Group I, Division 1, 2 or 3 Occupancy.

**SEC. 95.323.4. AIRCRAFT SERVICING AND STORAGE AREAS.** Overhead heaters installed in aircraft storage or servicing areas of Group S, Division 5 Occupancies shall be at least 10 feet (3048 mm) above the upper surface of wings or engine enclosures of the tallest aircraft which may be housed in the hangar. Overhead heaters shall be at least 8 feet (2438 mm) above the floor of shops, offices and other sections of hangars communicating with aircraft storage or working areas.

**SEC. 95.323.5. LOCATING TO MINIMIZE DAMAGE.** Vented decorative appliances, floor furnaces, vented wall furnaces, unit heaters and room heaters shall be installed so as to minimize the probability of damage from an external source.

**SEC. 95.324. FLOOR FURNACES.** Section 324 of the U.M.C. is incorporated by reference.

**SEC. 95.325. VENTED WALL FURNACES.** Section 325 of the U.M.C. is incorporated by reference.

**SEC. 95.326. UNIT HEATERS.** Section 326 of the U.M.C. is incorporated by reference.

**SEC. 95.327. ROOM HEATERS.** Section 327 of the U.M.C. is incorporated by reference.

#### **DIVISION 4**

##### **VENTILATION AIR SUPPLY**

**SEC. 95.401. SCOPE.** Section 401 of the U.M.C. is incorporated by reference.

**SEC. 95.402. DIRECT GAS-FIRED MAKEUP AIR HEATERS AND INDUSTRIAL AIR HEATERS.** Section 402 of the U.M.C. is incorporated by reference.

**SEC. 95.403. AIR FILTERS.** Section 403 of the U.M.C. is incorporated by reference.

**SEC. 95.404. VENTILATION AIR SUPPLIED BY EVAPORATIVE COOLERS.** Section 404 of the U.M.C. is incorporated by reference.

#### **DIVISION 5**

##### **EXHAUST SYSTEMS**

###### **PART I**

##### **PRODUCT-CONVEYING AND ENVIRONMENTAL AIR SYSTEMS**

**SEC. 95.501. SCOPE OF PART I.** Section 501 of the U.M.C. is incorporated by reference.

**SEC. 95.502. DEFINITIONS.** Section 502 of the U.M.C. is incorporated by reference.

**SEC. 95.503. MOTORS AND FANS.** Section 503 of the U.M.C. is incorporated by reference.

**SEC. 95.504. ENVIRONMENTAL AIR DUCTS.**

**SEC. 95.504.1. MAKEUP AND EXHAUST AIR DUCTS.**

Environmental air ducts not regulated by other provisions of this Code shall comply with this section. Ducts shall be substantially airtight and shall comply with the provisions of Division 6. Exhaust ducts shall terminate outside the building and shall be equipped with backdraft dampers. Environmental air ducts which have an alternate function as a part of an approved smoke-control system do not require design as Class I product-conveying ducts.

**SEC. 95.504.2. DOMESTIC RANGE VENTS.** Ducts used for domestic kitchen range ventilation shall be of metal and shall have smooth interior surfaces.

**EXCEPTION:**

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

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

**SEC. 95.504.3. DOMESTIC DRYER VENT.** Domestic clothes dryer moisture exhaust ducts shall be of metal and shall have smooth interior surfaces.

**EXCEPTION:**

Approved flexible duct connectors not more than 6 feet (1830 mm) in length may be used in connection with



domestic dryer exhausts. Flexible duct connectors shall not be concealed within construction.

**SEC. 95.504.3.1. MOISTURE EXHAUST DUCTS.** Moisture exhaust ducts for domestic clothes dryers shall terminate on the outside of the building and shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination. Ducts for exhausting clothes dryers shall not be connected or installed with sheet metal screws or other fasteners which will obstruct the flow. Clothes-dryer moisture-exhaust ducts shall not be connected to a gas vent connector, gas vent or chimney. Clothes-dryer moisture exhaust ducts shall not extend into or through ducts or plenums.

**SEC. 95.504.3.2. LENGTH LIMITATION.** Unless otherwise permitted or required by the dryer manufacturer's installation instructions and approved by the building official, domestic dryer moisture exhaust ducts shall not exceed a total combined horizontal and vertical length of 14 feet (4267 mm), including two 90-degree elbows. Two feet (610 mm) shall be deducted for each 90-degree elbow in excess of two.

**SEC. 95.504.4. COMMERCIAL DRYER EXHAUST SYSTEMS.** In addition to other requirements specified in this Chapter for ventilation systems, every commercial-type clothes dryer shall comply with the following requirements:

1. All dryers shall be connected to a duct system which is designed and installed in a manner to prevent adverse operation due to back pressures that might be created in the system.
2. Permanent provisions shall be made for air to enter the room in which a dryer is located at a rate not less than at which the room air is exhausted by the dryer.
3. All dryer ducts shall have a clearance of at least 2 inches (51 mm) from combustible material.
4. The installation of commercial clothes dryer exhaust ducts shall comply with the appliance manufacturer's installation instructions.
5. The installation of commercial clothes dryer shall comply with the appliance listing and manufacturer's installation instructions.

**SEC. 95.505. PRODUCT-CONVEYING SYSTEMS.** Section 505 of the U.M.C. is incorporated by reference.

**SEC. 95.506. PRODUCT-CONVEYING DUCT SYSTEMS.** Section 506 of the U.M.C. is incorporated by reference.

## **PART II**

### **COMMERCIAL KITCHENS**

**SEC. 95.507. COMMERCIAL KITCHEN HOODS AND KITCHEN VENTILATION SYSTEMS.**

**SEC. 95.507.1. SCOPE.** Part II of Division 5 is applicable to commercial kitchen hoods and kitchen ventilation systems.

**SEC. 95.507.2. DEFINITIONS.** For the purpose of Part II, the following definitions shall apply:

**COMMERCIAL FOOD HEAT-PROCESSING EQUIPMENT** is equipment used in a food establishment for heat-processing food or utensils and which produces grease vapors, steam, fumes, smoke or odors which are required to be removed through a local exhaust ventilation system.

**COMPENSATING HOOD** is a hood assembly with a integrated supply-air plenum, and shall be listed.

**GREASE FILTER** is a device used to capture by entrapment, impingement, adhesion or similar means, grease and similar contaminants before they enter a duct system.

**HOOD** is an air-intake device connected to a mechanical exhaust system for collecting and removing grease, vapors, fumes, smoke, steam, heat or odors from commercial food heat-processing equipment.

**Type I Hood** is a kitchen hood for collecting and removing grease and smoke.

**Type II Hood** is a general kitchen hood for collecting and removing steam, vapor, heat or odors.

**SEC. 95.507.3. GREASE DUCT MATERIALS.** Grease ducts and plenums serving a Type I hood shall be constructed of at least 0.055-inch-thick (1.40 mm) (No. 16 manufacturer's standard gage) steel or stainless at least 0.044 inch (1.10 mm) in thickness.

**SEC. 95.507.3.1. FAN CASING.** Exhaust fan housings serving a Type I hood shall be constructed of steel.

**EXCEPTION:**

Fans listed as "Power Roof Ventilators for Restaurant Cooking Appliances."

**SEC. 95.507.3.2. JOINTS AND SEAMS OF GREASE DUCTS.** Joints and seams shall be made with a continuous liquid-tight weld or braze made on the external surface of the duct system. A vibration isolation connector may be used with prior approval by the building official to connect ducts to collars of blowers provided it consists of noncombustible packing in a metal sleeve joint of approved design.

**SEC. 95.507.3.3. GREASE DUCT SUPPORTS.** Duct bracing and supports shall be noncombustible, not less than the gage required for grease duct construction and designed to carry gravity and lateral loads within the stress limitations of the Building Code. Bolts, screws, rivets and other mechanical fasteners shall not penetrate duct walls.

**SEC. 95.507.3.4. NONGREASE DUCTS.** Ducts and plenums serving Type II hoods shall be constructed of rigid metallic materials as set forth in Division 6. Duct bracing and supports shall comply with Division 6. Ducts subject to positive pressure shall be adequately sealed.

**SEC. 95.507.3.5. CORROSION PROTECTION.** Ducts exposed to the outside atmosphere or subject to a corrosive environment shall be protected against corrosion. Galvanization of metal parts, protection with noncorrosive paints and waterproof insulation are considered acceptable methods of protection.

**SEC. 95.507.4. PREVENTION OF GREASE ACCUMULATION.** Duct systems serving a Type I hood shall be so constructed and installed that grease cannot become pocketed in any portion thereof, and the system shall slope not less than 1/4 unit vertical in 12 units horizontal (2% slope) toward the hood or toward an approved grease reservoir. Where horizontal ducts exceed 75 feet (22860 mm) in length the slope shall not be less

than 1 unit vertical in 12 units horizontal (8.3% slope). When a centrifugal fan is used it shall be positioned so the discharge outlet is either vertical or bottom horizontal with the air so diverted that there will be no impingement on the roof, other equipment or parts of the structure. A vertical discharge fan shall be manufactured with an approved drain outlet at the bottom of the housing to permit drainage of grease to an approved collection device.

**SEC. 95.507.4.1. GREASE DIVERTER.** Centrifugal fans with bottom horizontal or vertical discharges shall be located outside the building. Centrifugal fans with a bottom horizontal discharge shall have a duct or duct fitting that diverts the discharge from the grease exhaust duct system in an upward direction and shall be connected to the fan outlet with the following:

1. The duct or duct fitting shall be constructed of metal as set forth in Tables 6-A and 6-B or U.M.C. Standard 6-2.
2. The maximum total developed length of the duct or duct fitting measured along the center line shall not exceed three times the vertical dimension of the fan outlet.
3. The duct or duct fitting shall be provided with openings at the lowest point to permit drainage of grease to an approved collection device.

**SEC. 95.507.5. CLEANOUTS AND OTHER OPENINGS.** Grease duct systems shall not have openings therein other than those required for proper operation and maintenance of the system. Any portion of such system having sections inaccessible from the duct entry or discharge shall be provided with adequate and accessible cleanout openings. Doors shall be equipped with a substantial method of latching, sufficient to hold the door tightly closed. Doors shall be so designed that they can be opened without the use of a tool. Cleanout openings shall be:

1. Equipped with tight-fitting doors constructed of steel having a thickness not less than that required for the duct.
2. Access doors shall be provided with approved noncombustible gasket material.

3. Large enough to permit cleaning and inspection.
4. At each change of direction and not to exceed 15 feet (4572 mm) apart.
5. Located in the side or top of a horizontal duct, the lower edge of a side opening shall be not less than 1 ½ inches (38.1 mm) from the bottom of the duct.

**SEC. 95.507.6. DUCT ENCLOSURE.** A grease duct serving a Type I hood which penetrates a ceiling, wall or floor shall be enclosed in a duct enclosure from the point of penetration to the outside air. A duct may only penetrate exterior walls at locations where unprotected openings are permitted by the Building Code. Duct enclosures shall be constructed as the Building Code requires shaft enclosures to be constructed. Duct enclosures shall be of at least one-hour fire-resistive construction in all buildings and shall be of two-hour fire-resistive construction in Types I and II fire-resistive buildings. The duct enclosure shall be sealed around the duct at the point of penetration and vented to the exterior through weather-protected openings. The continuous enclosure shall be used exclusively for the grease duct and be separated from the duct by at least 3 inches (76 mm) and not more than 12 inches (305 mm) and shall serve a single grease exhaust duct system.

**SEC. 95.507.7. FIRE-RESISTIVE ACCESS OPENING.** When cleanouts or access openings are located in ducts within a fire-resistive shaft or enclosure, access openings within the shaft or enclosure shall be protected by approved rated self-closing doors.

**SEC. 95.507.8. AIR VELOCITY.** Grease duct systems serving a Type I hood shall be designed and installed in a manner to provide an air velocity within the duct system of not less than 1,500 feet per minute (7.5 m/s) and not to exceed 2,500 feet per minute (12.7 m/s).

**SEC. 95.507.9. SEPARATION OF GREASE DUCT SYSTEM.** A separate grease duct system shall be provided for each Type I hood, except that a single duct system may serve more than one hood located in the same story of the building, provided that all hoods served by the system shall be located in the same room or adjoining rooms; portions of the interconnecting ducts shall not pass through any construction which would require the opening to be fire protected as specified in the Building Code.

**SEC. 95.507.10. CLEARANCES.** Exposed grease duct systems serving a Type I hood shall have a clearance from unprotected combustible construction of at least 18 inches (457 mm). This clearance may be reduced to not less than 3 inches (76 mm), provided the combustible construction is protected with material required for one-hour fire-resistive construction.

**SEC. 95.507.11. EXHAUST OUTLETS.** Exhaust outlets for ducts serving commercial food heat-processing equipment shall extend through the roof unless otherwise approved by the building official. Such extension shall be at least 2 feet (610 mm) above the roof surface. When the exhaust outlet serves a grease duct system, such extension outlet shall be at least 40 inches (1016 mm) above roof surface, at least 10 feet (3048 mm) from parts of the same or contiguous buildings, adjacent property line or air intake opening into any building, and shall be located at least 10 feet (3048 mm) above the adjoining grade level.

**EXCEPTION:**

1. Exhaust outlets for grease ducts serving commercial food heat-processing equipment may terminate not less than 5 feet (1524 mm) from an adjacent building, adjacent property line or air intake opening into a building if the air from the exhaust outlet is discharged away from those locations.

2. Upon approval of the building official, the exhaust from any hood serving commercial food heat-processing equipment may terminate in a properly engineered air-recovery system for recirculation to the room in which the hood is located.

3. Exhaust systems installed with approved or listed pollution and odor control equipment may terminate to the outside as approved by the building official.

**SEC. 95.507.12. FUEL-BURNING APPLIANCES.** When vented fuel-burning appliances are located in the same room or space as the hood, the vent shall be arranged to prevent the hood system from interfering with normal operation of the appliance vent.

**SEC. 95.507.13. COOKING EQUIPMENT.**

**SEC. 95.507.13.1. APPROVAL.** Approval of equipment shall be based on the listing by the testing agency or test data acceptable to the building official.

**SEC. 95.507.13.2. INSTALLATION.** All listed appliances shall be installed in accordance with the terms of their listing and the manufacturer's installation instructions.

**SEC. 95.508. COMMERCIAL KITCHEN HOODS.**

**SEC. 95.508.1. WHERE HOODS ARE REQUIRED.** Hoods shall be installed at or above all commercial-type deep fat fryers, broilers, fry grills, steam-jacketed kettles, hot-top ranges, ovens, barbecues, rotisseries, dishwashing machines and similar equipment which produce comparable amounts of steam, smoke, grease or heat in a food-processing establishment. For the purpose of this section a food-processing establishment shall include any building or portion thereof used for the processing of food but shall not include a dwelling unit.

**SEC. 95.508.2. MATERIALS AND INSTALLATION.** Types I and II hoods shall be constructed of galvanized steel, stainless steel, copper or other material approved by the building official for the use intended.

**SEC. 95.508.2.1. TYPE I HOODS.** Type I hoods constructed of galvanized steel shall be at least 0.030 inch (0.76 mm) (No. 22 gage) steel.

**SEC. 95.508.2.2. TYPE II HOODS.** Type II hoods shall be constructed of at least 0.024-inch (0.61 mm) (No. 24 gage) steel.

Hoods constructed of copper shall be of copper sheets weighing at least 24 ounces per square foot (7.3 kg/m<sup>2</sup>). Hoods constructed of stainless steel shall have a minimum thickness of 0.030 inch (0.76 mm).

**SEC. 95.508.2.3. SUPPORTS.** Hoods shall be secured in place by noncombustible supports.

**SEC. 95.508.2.4. JOINTS AND SEAMS.** Joints and seams shall be substantially tight. Solder shall not be used except for sealing a joint or seam.

**SEC. 95.508.3. CLEANING AND GREASE GUTTERS.** When installed, a hood shall be designed to provide for thorough cleaning of the entire hood. When grease gutters are provided, they shall drain to a collecting receptacle, fabricated, designed and installed to be accessible for cleaning.

**SEC. 95.508.4. CLEARANCES FOR TYPE I HOODS.** A Type I hood shall be installed with clearance of at least 18 inches (457 mm) from combustible construction. This clearance may be reduced to 3 inches (76 mm), provided the combustible material is protected with materials as specified for one-hour fire-resistive construction on the hood side. Hoods less than 12 inches (305 mm) from the ceiling or wall shall be flashed solidly with materials of the thickness specified in Section 508.2 or materials conforming to one-hour fire-resistive construction.

**SEC. 95.508.4.1. HOODS PENETRATING A CEILING.** Type I hoods or portions thereof penetrating a ceiling, wall or furred space shall comply with all the requirements of Section 95.507.6.

**SEC. 95.508.5. GREASE FILTERS.** Type I hoods shall be equipped with approved grease filters designed for the specific purpose. Grease-collecting equipment shall be accessible for cleaning. The lowest edge of a grease filter located above the cooking surface shall be at least the height set forth in Table 5-D.

**SEC. 95.508.5.1. CRITERIA.** Filters shall be of such size, type and arrangement as will permit the required quantity of air to pass through the units at rates not exceeding those for which the filter or unit was designed or approved. Filter units shall be installed in frames or holders with handles by which they may be readily removed without the use of tools, unless designed and installed to be cleaned in place and the system is equipped for such cleaning in place. They shall be sized and made removable so they may be passed through a dishwashing machine or cleaned in a pot sink and so arranged in place or provided with drip intercepting devices so as to avoid grease or other condensate from dripping into food or on food preparation surfaces.

**SEC. 95.508.5.2. MOUNTING POSITION.** Filters shall be installed at an angle greater than 45 degrees from the horizontal and shall be equipped with a drip tray beneath the lower edge of the filters.

**SEC. 95.508.6. CANOPY SIZE AND LOCATION.** For canopy-type commercial cooking hoods the inside edge thereof shall overhang or extend a horizontal distance of not less than 6 inches (152 mm) beyond the edge of the cooking surface on all open sides, and the vertical distance between the lip of the hood and the cooking surface shall not exceed 4 feet (1219 mm).



**EXCEPTION:**

Listed exhaust hoods are to be installed in accordance with the terms of their listing and manufacturer's installation instructions.

**SEC. 95.508.7. CAPACITY OF HOODS.** Canopy-type commercial cooking hoods shall exhaust through the hood a minimum quantity of air determined by application of the following formulas:

**WHERE:**

- A** = the horizontal surface area of the hood, in square feet (m<sup>2</sup>).
- D** = distance in feet (m) between the lower lip of the hood and the cooking surface.
- P** = that part of the perimeter of the hood that is open, in feet (m).
- Q** = quantity of air, in cubic feet per minute (m<sup>3</sup>/s).

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.

**SEC. 95.508.7.1. SOLID FUEL.** Type I hoods for use over solid-fuel cooking equipment shall be provided with separate exhaust systems. Undefined cooking equipment other than solid-fuel cooking equipment may be installed under a common hood. The minimum airflow for solid-fuel cooking equipment, grease-burning charbroilers, and undefined equipment shall be:

Number of Exposed Sides	Formula	
		For SI:
4 (island or central hood)	$Q=300A$	$Q=0.46A$
3 or less	$Q=200A$	$Q=0.31A$
Alternate formula	$Q=100PD$	$Q=0.16PD$

**SEC. 95.508.7.2. HIGH TEMPERATURE.** Type I hoods when the cooking equipment includes high-temperature appliances such as deep-fat fryers:

Number of Exposed Sides	Formula	
	For SI:	
4 (island or central hood)	$Q=150A$	$Q=0.23A$
3 or less	$Q=100A$	$Q=0.16A$
Alternate formula	$Q=100PD$	$Q=0.16PD$

**SEC. 95.508.7.3. MEDIUM TEMPERATURE.** Type I hoods when the cooking equipment includes medium-temperature appliances such as rotisseries, grills and ranges:

Number of Exposed Sides	Formula	
	For SI:	
4 (island or central hood)	$Q=100A$	$Q=0.16A$
3 or less	$Q=75A$	$Q=0.12A$
Alternate formula	$Q=50PD$	$Q=0.08PD$

**SEC. 95.508.7.4. LOW TEMPERATURE.** Type I hoods where the cooking equipment includes low-temperature appliances such as medium-to-low temperature ranges, roasters, roasting ovens, pastry ovens and equipment approved for use under a Type II hood:

Number of Exposed Sides	Formula	
	For SI:	
4 (island or central hood)	$Q=75A$	$Q=0.12A$
3 or less	$Q=50A$	$Q=0.08A$
Alternate formula	$Q=50PD$	$Q=0.08PD$

**EXCEPTION:**

Listed exhaust hoods are to be installed in accordance with the terms of their listing and the manufacturer's installation instructions.

**SEC. 95.508.8. CAPACITY FOR NONCANOPY HOODS.** In addition to all other requirements for hoods specified in this section, the volume of air exhausting through a noncanopy-type hood to the duct system shall not be less than 300 cubic feet per minute per lineal foot [0.043 m<sup>3</sup>/(s•m)] of cooking equipment. Listed noncanopy grease hoods and filters shall be sized and installed in accordance with the terms of their listing and the manufacturer's installation instructions.

**SEC. 95.508.9. EXHAUST OUTLET.** An exhaust outlet within the hood shall be located so as to optimize the capture of particulate matter. Each outlet shall serve not more than a 12-foot (3658 mm) section of hood.

**EXCEPTION:**

Listed exhaust hoods are to be installed in accordance with the terms of their listing and the manufacturer's installation instructions.

**SEC. 95.508.10. PERFORMANCE TEST.** Upon completion and before final approval of the installation of a ventilation system serving commercial food heat-processing equipment, a performance test shall be required to verify the rate of airflow and proper operation as specified in this Chapter. The permittee shall furnish the necessary test equipment and devices required to perform the tests. Tests shall be conducted by the permittee in the presence of an authorized representative of the Department.

**SEC. 95.509. FANS, MOTORS AND SAFETY DEVICES.**  
Section 509 of the U.M.C. is incorporated by reference.

**DIVISION 6**

**DUCT SYSTEMS**

**SEC. 95.601. SCOPE.** Ducts and plenums which are portions of a heating, cooling, absorption or evaporative cooling system shall comply with the requirements of this Chapter.

**SEC. 95.601.1. MATERIAL.** Supply air, return air and outside air for heating, cooling or evaporative cooling systems shall be conducted through duct systems constructed of metal as set forth in Tables 6-A, 6-B and 6-C; metal ducts complying with U.M.C. Standard 6-2 with prior approval; or factory-made air ducts complying with U.M.C. Standard 6-1. Ducts, plenums and fittings may be constructed of asbestos cement, concrete, clay or ceramics when installed in the ground or in a concrete slab,

provided the joints are tightly sealed.

**SEC. 95.601.1.1. USE OF CORRIDOR AS A PLENUM.**

Corridors shall not be used to convey air to or from rooms if the corridor is required to be of fire-resistive construction by Section 91.1005 of the Building Code.

**SEC. 95.601.1.2. USE OF CONCEALED SPACE AS PLENUM.**

Concealed building spaces or independent construction within buildings may be used as return-air ducts or plenums.

**SEC. 95.601.1.3. PRODUCTS EXPOSED IN PLENUMS.**

See Chapter 8 for limitations on combustion products venting systems extending into or through ducts or plenums.

See Division 5 for limitations on environmental air systems exhaust ducts extending into or through ducts or plenums.

**SEC. 95.601.2. CONTAMINATION PREVENTION.**

Exhaust ducts under positive pressure and venting systems shall not extend into or pass through ducts or plenums. For appliance vents and chimneys, see Division 8.

**SEC. 95.601.3. 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 8-1.

**EXCEPTION:**

1. Return-air and outside-air ducts, plenums or concealed spaces which serve a dwelling unit may be of combustible construction.

2. Air filters meeting the requirements of Section 95.403.

3. Water evaporation media in an evaporative cooler.

4. Charcoal filters, provided fire sprinklers are on the downstream side of the filters at locations acceptable to the Department, and the air-handling units that circulate air through the filters are arranged so that they will automatically shut off when a fire sprinkler operates.

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

5.1. Exhibit a flame travel of 5 feet (1524 mm) or less, and

5.2. Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with U.M.C. Standard 6-3.

5.3. Wiring meeting these requirements shall be listed and labeled as plenum cable as required by the Electrical Code.

**SEC. 95.601.4. FACTORY-MADE AIR DUCTS.** Factory-made air ducts shall be approved for the use intended or shall conform to the requirements of U.M.C. Standard 6-1. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with U.M.C. Standard 6-1 and its class designation. These ducts shall be listed and shall be installed in accordance with the terms of their listing, and the requirements of U.M.C. Standard 6-5.

**SEC. 95.601.5. JOINTS AND SEAMS OF DUCTS.** Joints of duct systems shall be made substantially airtight by means of tapes, mastics, gasketing or other means.

Tapes or sealants used for sealing joints and seams for any duct system shall be of approved material and conform to conditions of approval.

**SEC. 95.601.5.1. ROUND DUCTS.** Crimp joints for round ducts shall have a contact lap of at least 1 ½ inches (38 mm) and shall be mechanically fastened by means of at least three sheet-metal screws equally spaced around the joint, or an equivalent fastening method.

**SEC. 95.601.5.2. RESIDENTIAL RECTANGULAR DUCTS.** Joints and seams for 0.016-inch (0.41 mm) (No. 28 gage) and 0.013-inch (0.33 mm) (No. 30 gage) residential rectangular ducts shall be as specified in Table 6-A for 0.019-inch (0.48 mm) (No. 26 gage) material.

**SEC. 95.601.5.3. RECTANGULAR DUCTS.** Joints and seams for rectangular duct systems shall be as specified in Table 6-A.

**SEC. 95.601.5.4. OVAL DUCTS.** Joints and seams for flat oval ducts and round ducts in other than single dwelling units shall be as specified in Table 6-B.

**SEC. 95.601.5.5. LISTED DUCTS.** Joints and seams and all reinforcements for factory-made air ducts and plenums shall meet with the conditions of prior approval in accordance with the installation instructions that shall accompany the product.

**SEC. 95.601.6. METAL.** Every duct, plenum or fitting of metal shall comply with Table 6-A or 6-B.

**EXCEPTION:**

1. Ducts, plenums and fittings for systems serving single dwelling units may comply with Table 6-C.

2. Duct systems complying with U.M.C. Standard 6-1.

**SEC. 95.601.7. TINNED STEEL.** Existing tinned steel ducts may be used when cooling coils are added to a heating system, provided the first 10 feet (3048 mm) of the duct or plenum measured from the cooling coil discharge are constructed of metal of the gage thickness set forth in Table 6-A, 6-B or 6-C of this Chapter or are of approved material and construction. Tinned ducts completely enclosed in inaccessible, concealed areas need not be replaced. All accessible ducts shall be insulated to comply with Table 6-D of this Chapter. For the purpose of this subsection, ducts shall be considered accessible if the access space is 30 inches (762 mm) or greater in height.

**SEC. 95.601.8. VIBRATION ISOLATORS.** Vibration isolators installed between mechanical equipment and metal ducts (or casings) shall be made of an approved material and shall not exceed 10 inches (254 mm) in length.

**SEC. 95.602. QUALITY OF MATERIAL.** Section 602 of the U.M.C. is incorporated by reference.

**SEC. 95.603. INSTALLATION OF DUCTS.**

**SEC. 95.603.1. METAL DUCTS.** Ducts shall be securely fastened in place at each change of direction and as set forth in Table 6-E. Vertical rectangular ducts and vertical round ducts shall be supported as set forth in Table 6-E, Part 1. 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 (102 mm) separation from earth. Metal ducts when installed in or under concrete slab shall be encased in at least 2 inches (51 mm) of concrete.

**SEC. 95.603.1.1. FIRE-RESISTIVE COATINGS.** Ducts shall be located so as to maintain the minimum required thickness of fire-resistive materials applied to structural members to provide the required fire-resistive rating.

**SEC. 95.603.1.2. RECTANGULAR DUCT SUPPORTS.** Supports for rectangular ducts as set forth in Table 6-E when suspended from above shall be installed on two opposite sides of each duct and shall be riveted, bolted or metal screwed to each side of the duct at not more than 12-inch (305 mm) intervals or alternate intervals approved by the building official.

**SEC. 95.603.1.3. HORIZONTAL ROUND DUCT SUPPORTS.** Horizontal round ducts 40 inches (1016 mm) or less in diameter when suspended from above shall be supported at intervals not more than as set forth in Table 6-E with one hanger installed to comply with the requirements listed below:

1. Ducts shall be equipped with tight-fitting circular bands extending around the entire perimeter of the duct at each specified support interval.
2. Circular bands shall be not less than 1 inch (25 mm) wide nor less than equivalent to the gage of the duct material it supports.

**EXCEPTION:**

Ducts 10 inches (254 mm) and less in diameter may be supported by No. 18 gage (10 mm) galvanized steel wire.

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

4. Ducts shall be braced and guyed to prevent lateral or horizontal swing.

**SEC. 95.603.2. FACTORY-MADE AIR DUCTS.** Approved Class 0 or Class 1 factory-made air ducts may be installed in any occupancy covered by this Code. 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.

**SEC. 95.603.2.1. USED AS RISERS.** Factory-made air ducts shall not be used for vertical risers in air-duct systems serving more than two stories. These ducts shall not penetrate construction where fire dampers are required.

**SEC. 95.603.2.2. PROTECTION.** Factory-made air ducts shall be installed with at least 4 inches (102 mm) of separation from earth, except when installed as a liner inside of concrete, tile or metal pipe; they shall be protected from physical damage.

**SEC. 95.603.2.3. CLASS 2 AIR DUCTS.** Class 2 air ducts shall be installed with at least 3 feet (914 mm) of separation from a heat exchanger.

**SEC. 95.603.2.4. TEMPERATURE.** The temperature of the air to be conveyed in any of these classes of ducts shall be less than 251°F (122°C).

**SEC. 95.603.3. PROTECTION OF DUCTS.** Ducts installed in locations where they are exposed to mechanical damage by vehicles or from other causes shall be protected by approved barriers.

**SEC. 95.603.4. SUPPORT OF DUCTS.** Installers shall furnish the manufacturer's field fabrication and installation instructions to the building official.

Approved factory-made air ducts shall be supported as set forth in Table 6-F.

**SEC. 95.604. INSULATION OF DUCTS.** Section 604 of the U.M.C. is incorporated by reference.

**SEC. 95.605. DAMPERS IN DUCT SYSTEMS.** Section 605 of the U.M.C. is incorporated by reference.

**SEC. 95.606. VENTILATING CEILINGS.** Section 606 of the U.M.C. is incorporated by reference.



**SEC. 95.607. UNDER-FLOOR SPACE USED AS PLENUMS.**

Section 607 of the U.M.C. is incorporated by reference.

**SEC. 95.608. SHUTOFF FOR SMOKE CONTROL.**

**SEC. 95.608.1. AIR-MOVING SYSTEMS.** Air-moving systems supplying air in excess of 2,000 cubic feet per minute (940 L/s) to enclosed spaces within buildings shall be equipped with automatic shutoff. Automatic shutoff shall be accomplished by interrupting the power source of the air-moving equipment upon detection of smoke in the main supply-air, return-air duct and exhaust-air ducts or openings served by that equipment. Smoke detectors shall be labeled by an approved agency for air-duct installation and shall be installed in accordance with the manufacturer's installation instructions. These devices shall be compatible with the operating velocities, pressures, temperatures and humidities of the system. Where fire detection or alarm systems are provided for the building, the smoke detectors required by this section shall be supervised by these systems.

**EXCEPTION:**

1. When the space supplied by the air-moving equipment is served by a total area coverage smoke-detection system complying with U.F.C. Standard 10-4, interconnection to that system may be used to accomplish the required shutoff.

2. Automatic shutoff is not required when all occupied rooms served by the air-handling equipment have direct exit to the exterior and the travel distance does not exceed 100 feet (30.4 m).

3. Automatic shutoff is not required for Group R, Division 3 and Group U Occupancies.

4. Automatic shutoff is not required for approved smoke-control systems or where analysis demonstrates shutoff would create a greater hazard, such as may be encountered in air-moving equipment supplying specialized portions of Group H Occupancies. Such equipment shall be required to have smoke detection with remote indication and manual shutoff capability at an approved location.

5. All air-moving systems within buildings requiring smoke-control systems, shall be provided with automatic shutoffs in accordance with this section, other than the required smoke removal equipment.

6. Group R, Division 1 Occupancies requiring smoke control, an approved smoke detector may be used in each return-air moving system carrying not more than 5000 cubic feet per minute (2360 L/s) and serving not more than 10 air inlet openings.

**SEC. 95.608.2. PERFORMANCE TEST.** Upon completion and before final approval of the air-moving system, a performance test shall be made to verify that the air-moving equipment automatically shuts down. The permittee shall furnish all the necessary equipment and devices required to perform these tests. Tests shall be conducted by the permittee in the presence of an authorized representative of the Department.

**SEC. 95.609. PRODUCT-CONVEYING DUCT SYSTEMS.**

**SEC. 95.609.1. MATERIALS.** Materials used in product-conveying duct systems shall be suitable for the intended use and shall be of metal.

**EXCEPTION:**

1. Asbestos-cement, concrete, clay or ceramic materials may be used when it is shown that these materials will be equivalent to metal ducts installed in accordance with this Division.

2. Ducts serving a Class 5 system may be constructed of approved nonmetallic material when the corrosive characteristics of the material being conveyed make a metal system unsuitable and when the mixture being conveyed is nonflammable.

Approved nonmetallic material shall be either a listed product having a flame-spread index of 25 or less and a smoke-developed rating of 50 or less on both inside and outside surfaces without evidence of continued progressive combustion, or shall have a flame-spread index of 25 or less and shall be installed with an automatic fire-sprinkler protection system inside the duct.

3. Ducts used in central vacuum-cleaning systems within a dwelling unit may be of PVC pipe. Penetrations of fire walls, floor-ceiling or roof-ceiling assemblies shall comply with Sections 91.709 and 91.710 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.

**SEC. 95.609.1.1. ALUMINUM.** 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. (204°C.).

Aluminum construction may be used in Class 1 duct systems only. The thickness of aluminum ducts shall be at least two B. & S. gages thicker than the gages required for steel ducts set forth in Tables 5-B and 5-C.

**SEC. 95.609.1.2. LININGS.** Metal ducts used in Class 5 systems that are not resistant to the corrosiveness of the product shall be protected with appropriate corrosion-resistant material.

**SEC. 95.609.2. 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 5-B or 5-C.

**EXCEPTION:**

1. Class 1 product-conveying ducts that operate at less than 4 inches water column (995 kPa) negative pressure and convey noncorrosive, nonflammable and nonexplosive materials at temperatures not exceeding 250°F. (121°C.) may be constructed in accordance with Tables 6-A, 6-B, 6-E or, with prior approval, U.M.C. Standard 6-2.

2. Ducts used in central vacuuming systems within a dwelling unit may be constructed of PVC pipe. Penetrations of fire-resistive walls, floor-ceiling or roof-ceiling assemblies shall comply with Sections 91.709 and 91.710 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.

**SEC. 95.609.2.1. RECTANGULAR SECTIONS.** The use of rectangular ducts conveying particulates shall be subject to approval of the building official. The design of rectangular ducts shall consider the adhesiveness and buildup of products being conveyed within the duct.

**SEC. 95.609.3. FITTINGS.** Fittings in Class 2, 3 and 4 product-conveying systems shall be at least two gages thicker than the thickness required for straight runs. Flexible metallic duct may be used for connecting ductwork to vibrating equipment. Duct systems subject to wide temperature fluctuations shall be provided with expansion joints.

Branches shall connect to main ducts at the large end of transitions at an angle exceeding 45 degrees.

**SEC. 95.609.4. CLEANOUTS.** Except for ducts used to convey noncorrosive vapors with no particulate, accessible cleanouts shall be provided at 10-foot (3048 mm) intervals and at changes in direction. Access openings shall also be provided for access to sprinklers and other equipment within the duct which requires servicing.

**SEC. 95.609.5. EXPLOSION VENTING.** Ducts conveying explosive dusts shall have explosion vents, openings protected by antiflashback swing valves or rupture diaphragms. Openings to relieve explosive 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 (689 kPa).

**SEC. 95.609.6. SUPPORTS.** Spacing of supports for ducts shall not exceed 12 feet (3658 mm) for 8-inch (203 mm) ducts nor 20 feet (6096 mm) for larger ducts unless justified by the design. The design of supports shall assume that 50 percent of the duct is full of the particulate being conveyed.

**SEC. 95.609.7. FIRE PROTECTION.** Sprinklers or other fire-protection devices shall be installed within ducts having a cross-sectional dimension exceeding 10 inches (254 mm) when the duct conveys flammable vapors or fumes. Sprinklers shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical runs, sprinklers shall be installed at the top and at alternate floor levels.

**SEC. 95.609.8. CLEARANCES.** Ducts conveying flammable or explosive vapors, fumes or dusts shall have a clearance from combustibles of not less than 18 inches (457 mm). This clearance may be reduced when the combustible construction is protected in accordance with Table 3-B.

**SEC. 95.609.8.1. ELEVATED TEMPERATURES.** Ducts conveying products at temperatures exceeding 125°F. (52°C.) shall have a clearance to combustible materials not less than the following: 125°F. to 250°F. (52°C. to 121°C.) --1 inch (25 mm); 251°F. to 600°F. (122°C. to 315°C.) --8 inches (203 mm). For temperatures exceeding 600°F. (315°C.), the clearance shall not be less than required for chimneys in Table 8-D.

**SEC. 95.609.9. PROTECTION FROM PHYSICAL DAMAGE.** Ducts installed in locations where they are subject to physical damage shall be protected by suitable guards.

**SEC. 95.609.10. EXHAUST OUTLETS.** Outlets for exhausts that exceed 600°F. (315°C.) shall be in accordance with Table 8-D.

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

1. Ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property line; 10 feet (3048) from openings into the building; 6 feet (1829 mm) from exterior walls or roofs; 30 feet (9144 mm) from combustible walls or openings into the building which are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.

2. Other product-conveying outlets: 10 feet (3048 mm) from property line; 3 feet (914 mm) from exterior wall or roof; 10 feet (3048 mm) from openings into the building; 10 feet (3048 mm) above adjoining grade.

3. Environmental air duct exhaust: 3 feet (914 mm) from property line; 3 feet (914 mm) from openings into the building.

**EXCEPTION:**

Commercial-type clothes dryers shall terminate at least 2 feet (610 mm) above the roof surface; 10 feet (3048 mm) from an adjacent building, adjacent property line or air intake

opening into any building, and shall be located at least 10 feet (3048 mm) above the adjoining grade and shall be arranged to prevent entrance of rain into the duct system.

4. Exhaust outlets for required smoke-control systems shall terminate outside of the building and at least 10 feet (3048 mm) away from any air intake opening into any building.

## DIVISION 7

### COMBUSTION AIR

**SEC. 95.701. GENERAL.** Section 701 of the U.M.C. is incorporated by reference.

**SEC. 95.702. COMBUSTION-AIR OPENINGS.** Section 702 of the U.M.C. is incorporated by reference.

**SEC. 95.703. SOURCES OF COMBUSTION-AIR.** Section 703 of the U.M.C. is incorporated by reference.

**SEC. 95.704. COMBUSTION-AIR DUCTS.**

**SEC. 95.704.1. GENERAL.** Combustion air ducts shall:

1. Be of galvanized steel complying with Division 6 or equivalent corrosion-resistant material approved for this use.

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

3. Terminate in a space at least 3 inches (76 mm) in depth open to the front or firebox side of the appliance. This space shall extend from the floor to the ceiling of the appliance enclosure.

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

5. Serve a single appliance enclosure.

6. Serve only upper or lower combustion-air openings; the separation between ducts serving upper and lower combustion-air openings shall be maintained to the source of combustion air.

**SEC. 95.704.2. DAMPERS.** Combustion-air ducts shall not be installed so as to pass through construction where fire dampers are required. Volume dampers shall not be installed in combustion-air ducts.

**SEC. 95.704.3. SCREEN.** Neither end of ducts which terminate in an attic shall be screened.

**SEC. 95.705. COMBUSTION-AIR FOR GRAVITY WARM-AIR FURNACES.** Section 705 of the U.M.C. is incorporated by reference.

**SEC. 95.706. CONDITIONS CREATED BY MECHANICAL EXHAUSTING.** Section 706 of the U.M.C. is incorporated by reference.

**SEC. 95.707. AREA OF COMBUSTION-AIR OPENINGS.** Section 707 of the U.M.C. is incorporated by reference.

## DIVISION 8

### CHIMNEYS AND VENTS

**SEC. 95.801. VENTING SYSTEM - GENERAL.** Section 801 of the U.M.C. is incorporated by reference.

#### **SEC. 95.802. TYPES OF VENTING SYSTEMS REQUIRED.**

**SEC. 95.802.1. GENERAL.** The type of venting system required to serve various classification of appliances shall be as set forth in Tables 8-B and 8-C.

**SEC. 95.802.2. LIMITATIONS.** Type B vents shall not be used for venting the following:

1. Appliance which may be converted readily to the use of solid or liquid fuels;
2. Combination gas-oil-burning appliances;
3. Appliance listed for use with chimney only.

**SEC. 95.802.3. VENT CONNECTOR.** Connectors used for gas appliances having draft hoods and for listed conversion-burner-equipped appliances having draft hoods may be constructed of materials having resistance to corrosion and heat not less than that specified in Section 95.816, a listed vent connector, or they may be of Type B or Type L vent material.

**SEC. 95.802.4. SOLID FUEL.** Solid-fuel burning appliances shall not be connected to a venting system which serves gas- or oil-burning appliances.

**SEC. 95.802.5. PLASTIC VENTING SYSTEMS FOR USE WITH LISTED CONDENSING APPLIANCES.** Condensing appliances which cool flue gases nearly to the dewpoint within the appliance resulting in low vent gas temperatures may use plastic venting materials and vent configurations unsuitable for non-condensing appliances. Listed condensing appliances shall be considered properly vented when installed in accordance with the terms of listing and the manufacturer's installation instructions.

**SEC. 95.803. INSTALLATION AND CONSTRUCTION REQUIREMENTS.** Section 803 of the U.M.C. is incorporated by reference.

**SEC. 95.804. LOCATION AND SUPPORT OF VENTING SYSTEMS, INCLUDING MASONRY VENTING SYSTEMS.** Section 804 of the U.M.C. is incorporated by reference.

**SEC. 95.805. GRAVITY VENTING SYSTEMS - LENGTH, PITCH AND CLEARANCES.** Section 805 of the U.M.C. is incorporated by reference.

**SEC. 95.806. VENT TERMINATION.** Section 806 of the U.M.C. is incorporated by reference.

**SEC. 95.807. VENTED WALL FURNACE (TYPE BW) SYSTEMS.** Section 807 of the U.M.C. is incorporated by reference.

**SEC. 95.808. SIZE OF GRAVITY VENTING SYSTEMS.** Section 808 of the U.M.C. is incorporated by reference.

**SEC. 95.809. COMMON VENTING SYSTEM.** Section 809 of the U.M.C. is incorporated by reference.

**SEC. 95.810. EXISTING VENTING SYSTEMS.** Section 810 of the U.M.C. is incorporated by reference.

**SEC. 95.811. DRAFT HOODS.** Section 811 of the U.M.C. is incorporated by reference.

**SEC 95.812. TYPES OF CHIMNEYS.** Section 812 of the U.M.C. is incorporated by reference.



**SEC. 95.813. EXISTING MASONRY CHIMNEYS FOR GAS VENTING.** Section 813 of the U.M.C. is incorporated by reference.

**SEC. 95.814. UNLISTED SMOKESTACKS.** Section 814 of the U.M.C. is incorporated by reference.

**SEC. 95.815. CONNECTORS.** Section 815 of the U.M.C. is incorporated by reference.

**SEC. 95.816. VENT CONNECTORS.** Section 816 of the U.M.C. is incorporated by reference.

**SEC. 95.817. MECHANICAL DRAFT SYSTEMS.** Section 817 of the U.M.C. is incorporated by reference.

**SEC. 95.818. VENTING THROUGH VENTILATING HOODS AND EXHAUST SYSTEMS.** Section 818 of the U.M.C. is incorporated by reference.

## DIVISION 9

### SPECIAL FUEL-BURNING EQUIPMENT

#### PART I

##### FACTORY-BUILT AND MASONRY FIREPLACES

**SEC. 95.901. GAS LOGS IN FIREPLACES.** Section 901 of the U.M.C. is incorporated by reference.

#### PART III

##### MISCELLANEOUS HEAT-PRODUCING APPLIANCES

**SEC. 95.906 - DOMESTIC RANGE AND COOK TOP UNIT INSTALLATION.**

**SEC. 95.906.1. VERTICAL CLEARANCE ABOVE COOKING TOP.** Domestic freestanding or built-in ranges shall have a vertical clearance above the cooking top of not less than 30 inches (762 mm) to unprotected combustible material. When the underside of that combustible material is protected with insulating millboard at least 1/4 inch (6 mm) thick covered with 0.021-inch-thick (0.41 mm) (No. 28 U.S. gage) or a metal ventilating hood, the distance shall not be less than 24 inches (610 mm). For ducts serving domestic range hoods, see Section 95.504.

**SEC. 95.906.2. HORIZONTAL CLEARANCE OF BUILT-IN TOP COOKING UNITS.** The minimum horizontal distance from the center of the burner heads of a top (or surface) cooking unit to adjacent vertical combustible surfaces extending immediately above the counter top shall be at least the distance specified by the permanent marking on the unit.

**SEC. 95.906.3. INSTALLATION OF LISTED MICROWAVE OVEN OVER A LISTED COOKING TOP.** The installation of a listed cooking top shall conform to the conditions of listing. Clearances of listed appliances from combustible materials shall be as specified on the label. The maximum heat source from the cooking top shall be specified on the label of the appliance in Btu or kilowatts.

**SEC. 95.906.4. COMMERCIAL COOKING APPLIANCES.** When installed in a Group R Occupancy, commercial cooking appliances shall be installed in accordance with their listing and manufacturer's installation instructions.

**SEC. 95.907. DOMESTIC OPEN-TOP BROILER UNITS AND HOODS.** Section 907 of the U.M.C. is incorporated by reference.

**SEC. 95.908. CLOTHES DRYERS.** Section 908 of the U.M.C. is incorporated by reference.

**SEC. 95.909. DIRECT GAS-FIRED MAKEUP AIR HEATERS AND INDUSTRIAL AIR HEATERS.** Section 909 of the U.M.C. is incorporated by reference.

**SEC. 95.910. SMALL CERAMIC KILNS.** Section 910 of the U.M.C. is incorporated by reference.

## **DIVISION 11**

### **REFRIGERATION**

#### **PART I**

##### **MECHANICAL REFRIGERATION SYSTEMS**

**SEC. 95.1101. SCOPE.** Section 1101 of the U.M.C. is incorporated by reference.

**SEC. 95.1102. REFRIGERANTS.** Section 1102 of the U.M.C. is incorporated by reference.

**SEC. 95.1103. CLASSIFICATION OF REFRIGERATION SYSTEMS.** Section 1103 of the U.M.C. is incorporated by reference.

**SEC. 95.1104. REQUIREMENTS FOR REFRIGERANT AND REFRIGERATION SYSTEM USE.** Section 1104 of the U.M.C. is incorporated by reference.

**SEC. 95.1105. GENERAL REQUIREMENTS.** Section 1105 of the U.M.C. is incorporated by reference.

**SEC. 95.1106. REFRIGERATION MACHINERY ROOMS.** Section 1106 of the U.M.C. is incorporated by reference.

**SEC. 95.1107. REFRIGERATION MACHINERY ROOM VENTILATION.** Section 1107 of the U.M.C. is incorporated by reference.

**SEC. 95.1108. REFRIGERATION MACHINERY ROOM EQUIPMENT AND CONTROLS.** Section 1108 of the U.M.C. is incorporated by reference.

**SEC. 95.1109. REFRIGERANT PIPING, CONTAINERS AND VALVES.** Section 1109 of the U.M.C. is incorporated by reference.

**SEC. 95.1110. ERECTION OF REFRIGERANT PIPING.** Section 1110 of the U.M.C. is incorporated by reference.

**SEC. 95.1111. REFRIGERANT CONTROL VALVES.** Section 1111 of the U.M.C. is incorporated by reference.

**SEC. 95.1112. PRESSURE-LIMITING DEVICES.** Section 1112 of the U.M.C. is incorporated by reference.

**SEC. 95.1113. PRESSURE-RELIEF DEVICES.** Section 1113 of the U.M.C. is incorporated by reference.

**SEC. 95.1114. PRESSURE-RELIEF DEVICE SETTINGS.** Section 1114 of the U.M.C. is incorporated by reference.

**SEC. 95.1115. MARKING OF PRESSURE-RELIEF DEVICES.** Section 1115 of the U.M.C. is incorporated by reference.

**SEC. 95.1116. OVER-PRESSURE PROTECTION.** Section 1116 of the U.M.C. is incorporated by reference.

**SEC. 95.1117. DISCHARGE PIPING.** Section 1117 of the U.M.C. is incorporated by reference.

**SEC. 95.1118. SPECIAL DISCHARGE REQUIREMENTS.**

Section 1118 of the U.M.C. is incorporated by reference.

**SEC. 95.1119. AMMONIA DISCHARGE.** Section 1119 of the

U.M.C. is incorporated by reference.

**SEC. 95.1120. DETECTION AND ALARM SYSTEMS.**

Section 1120 of the U.M.C. is incorporated by reference.

**SEC. 95.1121. EQUIPMENT IDENTIFICATION.** Section 1121

of the U.M.C. is incorporated by reference.

**SEC. 95.1122. TESTING OF REFRIGERATION EQUIPMENT.**

Section 1122 of the U.M.C. is incorporated by reference.

**SEC. 95.1123. MAINTENANCE AND OPERATION.** Section 1123

of the U.M.C. is incorporated by reference.

**SEC. 95.1124. STORAGE OF REFRIGERANTS AND REFRIGERANT**

**OILS.** Section 1124 of the U.M.C. is incorporated by reference.

**PART II**

**COOLING TOWERS**

**SEC. 95.1125. COOLING TOWERS, EVAPORATIVE CONDENSERS**

**AND FLUID COOLERS.** Section 1125 of the U.M.C. is incorporated by reference.

**DIVISION 17**

**EMERGENCY SMOKE CONTROL**

**SEC. 95.1701. SMOKE CONTROL.**

**SEC. 95.1701.1. SCOPE AND PURPOSE.** The provisions of

this section apply to mechanical or passive smoke-control systems as required by the Building Code for new buildings and change of occupancy, effective January 1, 1996.

The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke-control systems which are intended to provide a tenable environment for the evacuation or relocation of occupants. These provisions are not intended for the preservation of contents or for assistance in fire-suppression or overhaul activities. Smoke-control systems need not comply with the requirements of

Section 95.609 of this Code unless their normal use would otherwise require compliance. Nothing within these requirements is intended to apply when smoke control is not otherwise required by the Building Code. Smoke-control systems are not a substitute for sprinkler protection.

**SEC. 95.1701.2. DESIGN METHODS.**

**SEC. 95.1701.2.1. GENERAL.** Buildings or portions thereof required by the Building Code to have a smoke-control system shall have such systems designed in accordance with the requirements of this section.

**EXCEPTION:**

Smoke and heat venting required by Section 91.906 of the Building Code.

**SEC. 95.1701.2.2. RATIONALITY.**

**SEC. 95.1701.2.2.1. GENERAL.** Systems or methods of construction to be used in smoke control shall be based on a rational analysis in accordance with well-established principles of engineering. The analysis shall include, but not be limited by, Sections 95.1701.2.2.2 through 1701.2.2.6 below.

**SEC. 95.1701.2.2.2. STACK EFFECT.** The system shall be designed such that the maximum probable normal or reverse stack effects will not adversely interfere with the system's capabilities. In determining the maximum probable stack effects, altitude, elevation, weather history and interior temperatures shall be used.

**SEC. 95.1701.2.2.3. TEMPERATURE EFFECT OF FIRE.** Buoyancy and expansion caused by the design fire (Section 95.1701.6) shall be analyzed. The system shall be designed such that these effects do not adversely interfere with the system's capabilities.

**SEC. 95.1701.2.2.4. WIND EFFECT.** The design shall consider the adverse effects of wind. Such consideration shall be consistent with the requirements of Division 16, Part II-Wind Design, of the Building Code.

**SEC. 95.1701.2.2.5. HVAC SYSTEMS.** The design shall consider the effects of the heating, ventilating and air-conditioning (HVAC) systems on both smoke and fire transport. The analysis shall include all permutations of systems status.

The design shall consider the effects of the fire on the heating, ventilating, and air-conditioning systems.

**SEC. 95.1701.2.2.6. CLIMATE.** The design shall consider the effects of low temperatures on systems, property and occupants. Air inlets and exhausts shall be located so as to prevent snow or ice blockage.

**SEC. 95.1701.2.3. SMOKE BARRIER CONSTRUCTION.** A smoke barrier may or may not have a fire-resistive rating. Smoke barriers shall be constructed and sealed to limit leakage areas exclusive of protected openings. Maximum allowable leakage area shall be the aggregate area calculated using the following leakage area ratios:

1. Walls:  
 $A/A_W = 0.00100$
2. Exit enclosures:  
 $A/A_W = 0.00035$
3. All other shafts:  
 $A/A_W = 0.00150$
4. Floors and roofs:  
 $A/A_F = 0.00050$

**WHERE :**

- A = total leakage area, square feet (m<sup>2</sup>).
- A<sub>F</sub> = unit floor or roof area of barrier, square feet (m<sup>2</sup>).
- A<sub>W</sub> = unit wall area of barrier, square feet (m<sup>2</sup>).

Total leakage area of the barrier is then the product of the smoke barrier gross area times the allowable leakage area ratio. Compliance shall be determined by achieving the minimum air pressure difference across the barrier with the system in the smoke-control mode for mechanical smoke-control systems. Passive smoke-control systems may be tested using other approved means such as door fan testing.

**SEC. 95.1701.2.4. OPENING PROTECTION.** Openings in smoke barriers shall be protected by automatic-closing devices actuated by the required controls for the mechanical smoke-control system.

**EXCEPTION:**

1. Passive smoke-control systems may have automatic-closing devices actuated by spot-type smoke detectors listed for releasing service.

2. The airflow method may be used to protect fixed openings between smoke zones.

Duct and other heating, ventilating and air-conditioning openings shall be equipped with a minimum Class II, 250°F. (121°C.) smoke damper as defined and tested in accordance with approved recognized standards. See Division 35, Part III of the Building Code.

**SEC. 95.1701.2.5. DURATION OF OPERATION.** All portions of active or passive smoke-control systems shall be capable of continued operation after detection of the fire event for not less than 20 minutes.

**SEC. 95.1701.3. PRESSURIZATION METHOD.**

**SEC. 95.1701.3.1. GENERAL.** The primary means of controlling smoke shall be pressure differences across smoke barriers. Maintenance of a tenable environment is not required in the smoke-control zone of fire origin.

**SEC. 95.1701.3.2. MINIMUM PRESSURE DIFFERENCE.** The minimum pressure difference across a smoke barrier shall be 0.05 inch water gage (12.4 Pa) in fully sprinklered buildings.

**EXCEPTION:**

Smoke-control systems serving other than fully sprinklered buildings may be approved by the building official provided the system is designed to achieve pressure differences at least two times the maximum calculated pressure difference produced by the design fire.

**SEC. 95.1701.3.3. MAXIMUM PRESSURE DIFFERENCE.** The maximum air pressure difference across a smoke barrier shall be determined by required door-opening forces. The actual force required to open exit doors when the system is in the smoke-control mode shall be in accordance with Section 91.1004 of the Building Code. The calculated force to set a side-hinged, swinging door in motion shall be determined by:

$$F = F_{dc} + K(WA\Delta P)/2(W - d) \quad (5-1)$$

**WHERE:**

- $A$  = door area, square feet (m<sup>2</sup>).
- $d$  = distance from door handle to latch edge of door, feet (m).
- $F$  = total door opening force, pounds (N).
- $F_{dc}$  = force required to overcome closing device, pounds (N).
- $K$  = 5.2 (9.6).
- $W$  = door width, feet (m).
- $\Delta P$  = design pressure difference, inches, (mm) water gage.

Opening forces for other doors shall be determined by standard engineering methods for the resolution of forces and reactions.

**SEC. 95.1701.4. AIRFLOW METHOD.**

**SEC. 95.1701.4.1. GENERAL.** When approved by the building official, smoke may be prevented from migrating through fixed openings between smoke-control zones by the use of the airflow method. The design airflows shall be in accordance with this section.

**SEC. 95.1701.4.2. VELOCITY.** The minimum average velocity through a fixed opening shall not be less than:

$$v = 217.2 [h (T_f - T_o)/(T_f + 460)]^{1/2} \quad (5-2)$$

For **SI**:

$$v = 119.9 [h (T_f - T_o)/T_f]^{1/2}$$



**WHERE :**

- $h$  = height of opening, feet (m).  
 $T_f$  = temperature of smoke, °F. (K).  
 $T_o$  = temperature of ambient air, °F. (K).  
 $v$  = air velocity, feet per minute (m/s).

Airflow shall be directed to limit smoke migration from the fire zone. The geometry of openings shall be considered to prevent flow reversal from turbulent effects.

**SEC. 95.1701.4.3. PROHIBITED CONDITIONS.** This method shall not be employed where either the quantity of air or the velocity of the airflow will adversely affect other portions of the smoke-control system, unduly intensify the fire, disrupt plume dynamics or interfere with exiting. In no case shall airflows toward the fire exceed 200 feet per minute (60,960 mm per minute). Where Formula (5-2) requires airflows to exceed this limit, the airflow method shall not be used.

**SEC. 95.1701.5. EXHAUST METHOD.**

**SEC. 95.1701.5.1. GENERAL.** When approved by the building official, for large enclosed volume, such as in atria or malls, the exhaust method may be used. The design exhaust volumes shall be in accordance with this section.

**SEC. 95.1701.5.2. EXHAUST RATE.**

**SEC. 95.1701.5.2.1. GENERAL.** The height of the lowest horizontal surface of the accumulating smoke layer shall be maintained at least 10 feet (3048 mm) above any walking surface within the smoke zone. The required exhaust rate for the zone shall be the largest of the calculated plume mass flow rates for the possible plume configurations. Provisions shall be made for natural or mechanical supply of outside air to make up an equal volume of the air exhausted at flow rates not to exceed 200 feet per minute (60,960 mm per minute) toward the fire.

**SEC. 95.1701.5.2.2. AXISYMMETRIC PLUMES.** The plume mass flow rate [ $m_p$ , lbs./sec. (kg/s)] shall be determined by placing the design fire center on the axis of the space being analyzed. The limiting flame height shall be determined by:

$$z_1 = 0.533 Q_c^{2/5} \quad (5-3)$$

For **S I**:  $z_1 = 0.166 Q_c^{2/5}$

**WHERE:**

$Q$  = total heat output.

$Q_c$  = convective heat output, Btu/s (kW). (The value of  $Q_c$  shall not be taken as less than  $0.70 Q$ .)

$z$  = height from top of fuel surface to bottom of smoke layer, feet (m).

$z_1$  = limiting flame height, feet (m). ( $z_1$  must be greater than the fuel equivalent diameter. See Section 95.1701.6.)

for  $z > z_1$

$$m_p = 0.022 Q_c^{1/3} z^{5/3} + 0.0042 Q_c \quad (5-4)$$

For **S I**:  $m_p = 0.071 Q_c^{1/3} z^{5/3} + 0.0018 Q_c$

for  $z = z_1$

$$m_p = 0.011 Q_c \quad (5-5)$$

For **SI**:  $m_p = 0.035 Q_c$

for  $z < z_1$

$$m_p = 0.0208 Q_c^{3/5} z \quad (5-6)$$

For **S I**:  $m_p = 0.032 Q_c^{3/5} z$

To convert  $m_p$  from pounds per second of mass flow to a volumetric rate, the following formula shall be used:

$$V = 60 m_p / \rho \quad (5-7)$$

**WHERE :**

- $V$  = volumetric flow rate, cubic feet per minute  
( $m^3/s$ ).
- $\rho$  = density of air at the temperature of the smoke layer, lbs./ft.<sup>3</sup> ( $T$ :in °F.) [ $kg/m^3$  ( $T$ :in°C.)].

**SEC. 95.1701.5.2.3. BALCONY SPILL PLUMES.** The plume mass flow rate ( $m_p$ ) for spill plumes shall be determined using the geometrically probable width based on architectural elements and projections in the following formula:

$$m_p = 0.124 (Q W^2)^{1/3} (z_b + 0.3H) [1 + 0.063(z_b + 0.6H)/W]^{2/3} \quad (5-8)$$

For S I:  $m_p = 0.41 (Q W^2)^{1/3} (z_b + 0.3H) [1 + 0.063 (z_b + 0.6H)/W]^{2/3}$

**WHERE :**

- $H$  = height above fire to underside of balcony, feet (m).
- $W$  = plume width at point of spill, feet (m).
- $z_b$  = height from balcony, feet (m).

**SEC. 95.1701.5.2.4. WINDOW PLUMES.** The plume mass flow rate ( $m_p$ ) shall be determined from:

$$m_p = 0.077 (A_w H_w^{1/2})^{1/3} (z_w + a)^{5/3} + 0.18 A_w H_w^{1/2} \quad (5-9)$$

For S I:  $m_p = 0.68 (A_w H_w^{1/2})^{1/3} (z_w + a)^{5/3} + 1.5 A_w H_w^{1/2}$

**WHERE :**

- $A_w$  = area of the opening, square feet ( $m^2$ ).
- $H_w$  = height of the opening, feet (m).
- $z_w$  = height from the top of the window or opening to the bottom of the smoke layer, feet (m).

$$a = 2.4 A_w^{2/5} H_w^{1/5} - 2.1 H_w \quad (5-10)$$

**SEC. 95.1701.5.2.5. PLUME CONTACT WITH WALLS.** When the axisymmetric plume contacts the surrounding walls, the mass flow rate may be considered to be constant from the point of contact and beyond provided that contact remains constant. Use of this provision requires calculation of the plume diameter, which shall be calculated by:

$$d = 0.48 [(T_c + 460)/(T_a + 460)]^{1/2} z \quad (5-11)$$

For S I:  $d = 0.48 (T_c/T_a)^{1/2} z$

**WHERE:**

$d$  = plume diameter, feet (m).

$T_a$  = ambient air temperature, °F. (K).

$T_c$  = plume centerline temperature, °F. (K).

$$= (318 Q_c^{2/3} H^{-5/3}) + T_a$$

For S I:  $(23.3 Q_c^{2/3} H^{-5/3} + 273.15) + T_a$

$z$  = height at which  $T_c$  is determined, feet (m).

**SEC. 95.1701.6. DESIGN FIRE.**

**SEC. 95.1701.6.1. GENERAL.** The design fire shall be based on a  $Q$  of not less than 5,000 Btu per second (5275 kW) unless a rational analysis is performed by the designer and approved by the building official.

**SEC. 95.1701.6.2. RATIONAL ANALYSIS.**

**SEC. 95.1701.6.2.1. FACTORS CONSIDERED.** The engineering analysis shall include the characteristics of the fuel, fuel load, effects included by the fire, whether the fire is likely to be steady or unsteady.

**SEC. 95.1701.6.2.2. SEPARATION DISTANCE.** Determination of the design fire shall include consideration of the type of fuel, fuel spacing and configuration. The design fire shall be increased if other combustibles are within the separation distance as determined by:

$$R = [Q/(12\pi q'')]^{1/2} \quad (5-12)$$

**WHERE :**

- $q''$  = incident radiant heat flux required for nonpiloted ignition, Btu/ft<sup>2</sup>•s (W/m<sup>2</sup>).
- $Q$  = heat release from fire, Btu/s (kW).
- $R$  = separation distance from target to center of fuel package, feet (m).

The ratio of the separation distance to the fuel equivalent radius shall not be less than 4. The fuel equivalent radius shall be the radius of a circle of equal area to floor area of the fuel package.

**SEC. 95.1701.6.2.3. HEAT-RELEASE ASSUMPTIONS.** The analysis shall make use of best available data and shall not be based on excessively stringent limitations of combustible material. For offices, the heat release rate shall be 25 Btu/ft<sup>2</sup>•s (284 kW/m<sup>2</sup>) or greater. For mercantile and residential occupancies, the heat release rate shall be 50 Btu/ft<sup>2</sup>•s (567 kW/m<sup>2</sup>) or greater.

**SEC. 95.1701.6.2.4. SPRINKLER EFFECTIVENESS ASSUMPTIONS.** The effect of sprinklers may be assumed to have halted fire growth at time of activation only upon a documented engineering analysis.

**SEC. 95.1701.7. EQUIPMENT.**

**SEC. 95.1701.7.1. GENERAL.** Equipment such as, but not limited to, fans, ducts and balance dampers shall be suitable for their intended use, suitable for the probable temperatures to which they may be exposed and approved by the building official.

**SEC. 95.1701.7.2. EXHAUST FANS.** Components of exhaust fans shall be rated and certified by the manufacturer for the probable temperature rise to which the components may be exposed. This temperature rise shall be computed by:

$$T_s = (Q_c/mc) + (T_a) \quad (5-13)$$

**WHERE :**

- $c$  = specific heat of smoke at smoke-layer temperature, Btu/lb.°F. (kJ/kg-K).
- $m$  = exhaust rate, pounds per second (kg/s).

- $Q_c$  = convective heat output of fire, Btu/sec. (kW).  
 $T_a$  = ambient temperature, °F. (K).  
 $T_s$  = smoke temperature, °F. (K).

**EXCEPTION:**

$T_s$  may be reduced if dilution air is assured and the new  $T_s$  is calculated.

**SEC. 95.1701.7.3. DUCTS.** Duct materials and joints shall be capable of withstanding the probable temperatures and pressures to which they are exposed as determined by Formula (5-13). Ducts shall be constructed and supported in accordance with this Code. Ducts shall be leak tested to 1.5 times the maximum design pressure in accordance with nationally accepted practices. Measured leakage shall not exceed 5 percent of design flow. Results of such testing shall be a part of the documentation procedure. Ducts shall be supported directly from fire-resistive structural elements of the building by substantial, noncombustible supports.

**EXCEPTION:**

Flexible connections, for the purpose of vibration isolations complying with this Code, may be used if constructed of approved fire-resistive materials.

**SEC. 95.1701.7.4. EQUIPMENT, INLETS AND OUTLETS.** Equipment shall be located so as to not expose uninvolved portions of the building to an additional fire hazard. Outside air inlets shall be located so as to minimize the potential for introducing smoke or flame into the building. Exhaust outlets shall be located so as to minimize reintroduction of smoke into the building and to limit exposure of the building or adjacent buildings to an additional fire hazard.

**SEC. 95.1701.7.5. AUTOMATIC DAMPERS.** Automatic dampers installed within the smoke-control system shall be listed and conform to the requirements of approved recognized standards. See Division 35, Part III of the Building Code.

**SEC. 95.1701.7.6. FANS.** In addition to other requirements, belt-driven fans shall have 1.5 times the number of belts required for the design duty with the minimum number of belts being two. Fans shall be selected for stable performance based on normal temperature and, where applicable, elevated

temperature. Calculations and manufacturer's fan curves shall be part of the documentation procedures. Fans shall be supported and restrained by noncombustible devices in accordance with the requirements of Division 16 of the Building Code.

**SEC. 95.1701.8. DETECTION AND CONTROL SYSTEMS.**

**SEC. 95.1701.8.1. GENERAL.** Fire-detection and control systems for mechanical smoke-control systems shall be supervised in accordance with the Fire Code. Supervision shall include positive confirmation of actuation, testing, manual override, and the presence of power downstream of all disconnects.

**SEC. 95.1701.8.2. ACTIVATION.** Smoke-control systems shall be activated as follows:

1. Mechanical smoke-control systems, using the pressurization method, serving buildings having occupied floors more than 75 feet (22 860 mm) above or 75 feet (22 860 mm) below exit grade shall have completely automatic control.

2. Mechanical smoke-control systems using the airflow or exhaust method shall have completely automatic control.

3. Passive smoke-control systems may be actuated by approved spot-type detectors listed for releasing service.

**SEC. 95.1701.8.3. AUTOMATIC CONTROL.** Whenever completely automatic control is required or used, the automatic-control sequences shall be initiated by activation of any required initiating device of an approved fire alarm system.

**SEC. 95.1701.8.4. SMOKE DETECTION.** Smoke detectors shall be listed and shall be installed in accordance with the Fire Code.

**SEC. 95.1701.9. CONTROL AIR TUBING.**

**SEC. 95.1701.9.1. GENERAL.** Control-air tubing shall be of sufficient size to meet the required response times. Tubing shall be flushed clean and dry prior to final connections. Tubing shall be adequately supported and protected from damage. Tubing passing through concrete or masonry shall be sleeved and protected from abrasion and electrolytic action.

**SEC. 95.1701.9.2. MATERIALS.** Control-air tubing shall be hard drawn copper, Type L, ACR (See ASTM B 42-92, B 43-91, B 68-88, B 88-92, B 251-88 and B 280-92). Fittings shall be wrought copper or brass, solder type (See ANSI B16.22-89 or ANSI B16.18-84). Changes in direction may be made with appropriate tool bends. Brass, compression-type fittings may be used at final connection to devices; other joints shall be brazed using a BCuP<sub>5</sub> brazing alloy with solidus above 1,100°F. (593°C.) and liquidus below 1,500°F. (816°C.) Brazing flux shall be used on copper to brass joints only.

**EXCEPTION:**

Nonmetallic tubing may be used within control panels and at the final connection to devices provided all of the following conditions are met:

1. Tubing shall be listed by an approved agency for flame and smoke characteristics.

2. Tubing and connected devices shall be completely enclosed within galvanized or paint grade steel enclosure of not less than 0.030 inch (0.76 mm) (No. 22 galvanized sheet gage) thickness. Entry to the enclosure shall be by copper tubing with a protective grommet of neoprene or teflon or by suitable brass compression to male barbed adapter.

3. Tubing shall be identified by appropriately documented coding.

4. Tubing shall be neatly tied and supported within enclosure. Tubing bridging cabinet and door or moveable device shall be of sufficient length to avoid tension and excessive stress. Tubing shall be protected against abrasion. Tubing serving devices on doors shall be fastened along hinges.

**SEC. 95.1701.9.3. ISOLATION FROM OTHER FUNCTIONS.** All control tubing serving other than smoke-control functions shall be isolated by automatic isolation valves or shall be an independent system.



**SEC. 95.1701.9.4. TESTING.** All control-air tubing shall be tested at three times operating pressure for not less than 30 minutes without any noticeable loss in gage pressure prior to final connection to devices.

**SEC. 95.1701.10. MARKING AND IDENTIFICATION.** The detection and control systems shall be clearly marked at all junctions, accesses and terminations.

**SEC. 95.1701.11. CONTROL DIAGRAMS.** Identical control diagrams showing all devices in the system and identifying their location and function shall be maintained current and kept on file with the building official, the fire department and in the central control station in an approved format and manner.

**SEC. 95.1701.12. FIREFIGHTER'S CONTROL PANEL.**

**SEC. 95.1701.12.1. GENERAL.** A firefighter's control panel shall be provided for manual control or override of automatic control for mechanical smoke-control systems. This panel shall be designed to graphically depict the building arrangement and smoke-control system zones served by the systems. The status of each smoke-control zone shall be indicated by lamps and appropriate legends.

Fans, major ducts and dampers within the building that are portions of the smoke-control systems shall be shown on the firefighter's control panel and shall be shown connected to their respective ducts with a clear indication of the direction of airflow.

Devices, switches, indicators and the like shall bear plain English identifying legends having a size and stroke equivalent to 12 point helvetica bold.

Status indicators shall be provided for all smoke-control equipment by pilot lamp-type indicators as follows:

1. Fans, dampers and other operating equipment in their normal status-YELLOW.
2. Fans, dampers and other operating equipment in their off or closed status-RED.
3. Fans, dampers and other operating equipment in their on or open status-GREEN.

4. Fans, dampers and other operating equipment in a fault status-AMBER/ORANGE.

Provision for testing the pilot lamp on the firefighter's control panel by means of one or more "lamp test" momentary push buttons or other self-restoring means shall be included.

The fault status shall be further identified by pulsing the indicator lamp.

**EXCEPTION:**

Light-emitting diodes may be used in lieu of pilot lamps with prior approval. The firefighter's control panel layout shall be submitted at full scale for approval prior to installation.

**SEC. 95.1701.12.2. SMOKE-CONTROL CAPABILITY.** The firefighter's control panel shall provide control capability over the complete smoke-control system equipment within the building as follows:

1. ON-AUTO-OFF control over each individual piece of operating smoke-control equipment that can also be controlled from other sources within the building. This includes stairway pressurization fans; smoke exhaust fans; supply, return and exhaust fans; elevator shaft fans; and other operating equipment used or intended for smoke-control purposes.

2. OPEN-AUTO-CLOSE control over all individual dampers relating to smoke control and that are also controlled from other sources within the building.

3. ON-OFF or OPEN-CLOSE control over all smoke-control and other critical equipment associated with a fire or smoke emergency and that can only be controlled from the firefighter's control panel.

**EXCEPTION:**

1. For complex systems, with prior approval, the controls and indicators may be combined to control and indicate all elements of a single smoke zone as a unit.

2. For complex systems, with prior approval, the control may be accomplished by computer interface using approved, plain English commands.

**SEC. 95.1701.12.3. CONTROL ACTION AND PRIORITIES.** The firefighter's control panel actions shall be as follows:

1. ON-OFF, OPEN-CLOSE control actions shall have the highest priority of any control point within the building. Once issued from the firefighter's control panel, no automatic or manual control from any other control point within the building shall contradict the control action.

Where automatic means is provided to interrupt normal, nonemergency equipment operation or produce a specific result to safeguard the building or equipment (i.e., duct freezestats, duct smoke detectors, high-temperature cutouts, temperature-actuated linkage and similar devices), such means shall be capable of being overridden by the firefighter's control panel control action and the last control action as indicated by each firefighter's control panel switch position shall prevail.

**EXCEPTION:**

Power disconnects required by the Electrical Code.

2. Only the AUTO position of each three-position firefighter's control panel switch shall allow automatic or manual control action from other control points within the building. The AUTO position shall be the NORMAL, nonemergency, building control position. When a firefighter's control panel is in the AUTO position, the actual status of the device (on, off, open, closed) shall continue to be indicated by the status indicator described above.

**SEC. 95.1701.13. RESPONSE TIME.** Smoke-control system activation shall be initiated immediately after receipt of an appropriate automatic or manual activation command. Smoke-control systems shall activate individual components (such as dampers and fans) in the sequence necessary to prevent physical damage to the fans, dampers, ducts and other equipment. The total response time for individual components to achieve their desired operating mode shall not exceed the following:

- |                                        |                    |
|----------------------------------------|--------------------|
| 1. Control air isolation valves        | Immediately        |
| 2. Smoke damper closing                | 15 seconds         |
| 3. Smoke damper opening                | 15 seconds maximum |
| 4. Fan starting (energizing)           | 15 seconds maximum |
| 5. Fan stopping (de-energizing)        | Immediately        |
| 6. Fan volume modulation               | 30 seconds maximum |
| 7. Pressure control modulation         | 15 seconds maximum |
| 8. Temperature control safety override | Immediately        |
| 9. Positive indication of status       | 15 seconds maximum |

For purposes of smoke control, the firefighter's control panel response time shall be the same for automatic or manual smoke-control action initiated from any other building control point.

**SEC. 95.1701.14. ACCEPTANCE TESTING.**

**SEC. 95.1701.14.1. GENERAL.** Devices, equipment, components and sequences shall be individually tested. These tests, in addition to those required above or by other provisions of this Code, shall consist of determination of function, sequence and, where applicable, capacity of their installed condition.

**SEC. 95.1701.14.2. DETECTION DEVICES.** Smoke or fire detectors which are a part of a smoke-control system shall be tested in accordance with the Fire Code in their installed condition. When applicable, this testing shall include verification of airflow in both minimum and maximum conditions.

**SEC. 95.1701.14.3. DUCTS.** Ducts which are part of a smoke-control system shall be traversed using generally accepted practices to determine actual air quantities.

**SEC. 95.1701.14.4. DAMPERS.** Dampers shall be tested for function in their installed condition.

**SEC. 95.1701.14.5. INLETS AND OUTLETS.** Inlets and outlets shall be read using generally accepted practices to determine air quantities.

**SEC. 95.1701.14.6. FANS.** Fans shall be examined for correct rotation. Measurements of voltage, amperage, revolutions per minute and belt tension shall be made.

**SEC. 95.1701.14.7. SMOKE BARRIERS.** Measurements using inclined manometers shall be made of the pressure differences across smoke barriers. Such measurements shall be conducted for each possible smoke-control condition.

**SEC. 95.1701.14.8. CONTROLS.** Each smoke zone, equipped with an automatic initiation device, shall be put into operation by the actuation of one of the devices. Each additional device within the zone shall be verified to cause the same sequence but the operation of fan motors may be bypassed to prevent damage.

Control sequences shall be verified throughout the system, including verification of override from the firefighter's control panel and simulation of standby power conditions.

**SEC. 95.1701.14.9. REPORTS.** A complete report of testing shall be prepared by the required special inspector or special inspection agency. The report shall include identification of all devices by manufacturer, nameplate data, design values, measured values and identification tag or mark. The report shall be reviewed by the responsible designer, and when satisfied that the design intent has been achieved, the responsible designer shall affix the designer's signature and date to the report with a statement as follows:

I have reviewed this report and by personal knowledge and on-site observation certify that the smoke-control system is in substantial compliance with the design intent, and to the best of my understanding complies with requirements of the code.

A copy of the final report shall be filed with the building official and an identical copy shall be maintained in an approved location at the building.

**SEC. 95.1701.14.10. IDENTIFICATION AND DOCUMENTATION.** Charts, drawings and other documents identifying and locating each component of the smoke-control system, and describing their proper function and maintenance requirements shall be maintained on file at the building with the above-described report.

Devices shall have an approved identifying tag or mark on them consistent with the other required documentation and shall be dated indicating the last time they were successfully tested and by whom.

**SEC. 95.1701.14.11. SYSTEM TESTING.** Prior to the issuance of a Certificate of Occupancy, all of the smoke-control systems shall be tested as required by the Department of Building and Safety and the Fire Department and shall show compliance with the Departments' minimum standards. The tests shall be conducted in the presence of an authorized representative from both Departments. A report of the results shall be submitted to both Departments.

**SEC. 95.1702. STAIRWAY, RAMP AND ESCALATOR ENCLOSURES.**

**SEC. 95.1702.1. PRESSURIZED ENCLOSURE.** In a building having a floor used for human occupancy which is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, the entire required enclosure shall be pressurized in accordance with Section 95.1701 of this Code and this section. Pressurization shall occur automatically upon activation of an approved fire alarm system.

**EXCEPTION:**

When the building is not equipped with a fire alarm system, pressurization shall be upon activation of a spot-type smoke detector listed for releasing service installed within 5 feet (1524 mm) of each vestibule entry.

The upper portion of these enclosures shall be provided with controlled relief vent capable of discharging a minimum of 2,500 cubic feet per minute (1180 L/s) of air at the design pressure difference.

These enclosures shall be provided with a pressurized entrance vestibule.

**SEC. 95.1702.2. VESTIBULES.** When required by Section 95.1701, the minimum pressure differences within the vestibule with the doors closed shall be 0.05 inch water gage (12.44 Pa) positive pressure relative to the fire floor and 0.05 inch water gage (12.44 Pa) negative relative to the exit enclosure. No pressure difference is required relative to a nonfire floor.

**SEC. 95.1703. SMOKE-CONTROL SYSTEMS.**

**SEC. 95.1703.1. GENERAL.** Smoke-control systems, for every lawfully existing building requiring smoke control, built between July 1, 1974 and January 1, 1996 as required by the Los Angeles Building Code and the Los Angeles Fire Code shall conform to the requirements of this section.

**SEC. 95.1703.2. CAPACITY.** The smoke-control system shall be designed and installed in a manner to provide the following by mechanical means:

**1. Enclosed stairshafts.** A uniform air velocity within each enclosed stair shaft of not less than 50 feet per minute (.35 m/s) while maintaining a positive pressure (not exceeding 25 pounds (11.3 Kg) force on an interior door) relative to the adjacent areas and discharging this air to the outside of the building. This mechanical ventilation system shall so be arranged that it will start to function when the fire sprinkler system or the smoke detector system would independently or simultaneously be activated and placed into operation. Such ventilation system shall not be solely dependent on public utilities for its power supply.

**2. All other areas.** At least six changes per hour for all areas within the building (with this air exhausted to the outside of the building) and an adequate makeup air supply that is uniformly distributed.

**EXCEPTION:**

The following areas are exempt:

**A.** H-5 and U-1 Occupancies.

**B.** Floors with gravity ventilation openings located in the exterior walls of the building. These openings shall be openable windows or doors. In lieu of doors or windows, openable panels or tempered glass may be used, provided they are acceptable to the Department prior to installation. These required ventilation openings shall be provided at a rate of 20 square feet (1.86 m<sup>2</sup>) per 50 lineal feet (15.24m) of exterior wall in each story and distributed around the perimeter at not more than 50-foot

(15.24 m) intervals. They shall be clearly identified as required by the Fire Department.

C. Bathrooms, elevator shafts, janitors' rooms, sauna rooms, shower rooms, toilet rooms, stair shafts (unless otherwise required), closets and other room areas less than 50 square feet (4.65 m<sup>2</sup>) in floor area.

D. Other special purpose rooms or areas not specified herein, provided they are acceptable to the Department of Building and Safety and the Fire Department.

Where smoke removal can be accomplished by utilizing the comfort-heating, air-conditioning or general exhaust systems for the building, those systems may be used.

3. **Smoke evacuation systems in covered malls.** All supply and exhaust air ducts for smoke evacuation systems shall be installed as per section 95.1701.7.3 of this Code.

**SEC. 95.1703.3. SMOKE-CONTROL DAMPERS.** When a smoke-control system serves more than one floor, smoke-control dampers shall be installed in the main exhaust-air ducts and the main supply-air ducts serving each floor. These dampers shall be installed in a manner that will prevent smoke from going from one floor to another floor when the dampers are closed. The vertical risers of the main exhaust-air duct shall be installed in metal ducts complying with the requirements in Division 6.

Combination fire-smoke and smoke dampers shall be listed to conform to the recognized standards in Chapter 16, Part III of the Building Code. They shall be accessible for inspection, service and repair. Pneumatic tubing to operate these dampers shall be of noncombustible materials.

**SEC. 95.1703.4. COMBUSTION-PRODUCTS-TYPE SMOKE DETECTORS.** Air-moving systems shall be provided with approved smoke detectors, installed in the main supply-air duct and return-air ducts on each floor being served by the system.

Where the comfort-heating or air-conditioning system fans or blowers are utilized for the smoke-control exhaust system, the detectors shall be so arranged that when products of combustion are detected all return air shall automatically



discharge outside of the building. Where other fans or blowers or gravity ventilation openings in exterior walls are being utilized for the smoke-control exhaust system, the detectors shall be so arranged that when products of combustion are detected the air-moving equipment shall automatically shut off. Smoke detectors shall be listed combustion-products-type smoke detectors and shall be installed in accordance with their listing. Every smoke detector shall be accessible for inspection, service and repair.

**EXCEPTION:**

1. When the space supplied by the air-moving equipment is served by a total area coverage smoke-detection system complying with U.F.C. Standard 10-4, interconnection to such system may be used to accomplish the required shutoff.

2. Individual smoke detectors need not be provided to all air-moving equipment for the system, provided the equipment is interlocked with the approved combustion product-type detectors installed in the main supply-air and return-air duct of the comfort heating or air-conditioning system and the equipment shuts down when the main air-moving system is not in operation.

3. The comfort heating or air-conditioning equipment need not be provided with a smoke detector for automatic shutoff within individual dwelling units or guest rooms of Group R, Division 1 Occupancies provided the fans or blowers are shut off by either water flow or fire alarm actuation on the floor of fire origin.

**SEC. 95.1703.5. REMOTE CONTROL PANEL.** As required by the Los Angeles Fire Code, a control panel for the smoke-control system shall be installed at the fire-control station designated by the Los Angeles Fire Department. The panel shall contain controls for remote operation of the fans, blowers and smoke-control dampers. The panel shall contain means to indicate whether the fans and blowers are energized, the position of all smoke-control dampers and in which floors or ducts the smoke detectors have been activated. Indication shall be by actual operation of a light or other active signal.

**SEC. 95.1703.6. MAINTENANCE.** The smoke-control system shall be maintained in good working order. Smoke-control dampers, fans and blowers shall be operated at least every six months by the owner or the owner's representative. A written record available to the Los Angeles Fire Department shall be kept on the premises of all maintenance and test operation of emergency equipment.

**SEC. 95.1703.7. PERFORMANCE TEST.** Upon completion, and before final approval of the installation of a smoke-control system required by the Los Angeles Municipal Code, a performance test shall be made to verify the rate of airflow and proper operation as specified in this Division. The permittee of the air moving system shall furnish all necessary equipment and devices required to perform these tests. Tests shall be conducted by the permittee in the presence of an authorized representative of the Department.

**SEC. 95.1703.8. PRELIMINARY PERFORMANCE REPORT.** Prior to conducting the required smoke-control performance test, a preliminary performance report shall be submitted to the Department by a person holding a Certificate of Qualification pursuant to Section 95.113.4.6 of the Los Angeles Municipal Code, verifying that the performance criteria of the Department has been met.

(22542)

Sec. 2. The City Clerk shall certify to the passage of this ordinance and cause the same to be published by posting for ten days in three public places in the City of Los Angeles, to wit: one copy on the bulletin board located at the Main Street entrance to the City Hall of the City of Los Angeles; one copy on the bulletin board located at the ground level at the Los Angeles Street entrance to the Los Angeles Police Department in City; and one copy on the bulletin board located at the Temple Street entrance to the Hall of Records in the City.

I hereby certify that the foregoing ordinance was introduced at the meeting of the Council of the City of Los Angeles AUG 09 1996 and was passed at its meeting of AUG 16 1996

Approved \_\_\_\_\_

CITY CLERK

Approved AUG 22 1996

BY *Jan M. Tila*  
Deputy

*[Signature]*  
Mayor SL

Approved as to form and legality

\_\_\_\_\_  
JAMES K. HAHN, City Attorney

By *Claudia Culling*  
CLAUDIA CULLING  
Deputy City Attorney

File No. C.F. No. 96-0565

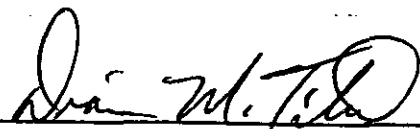
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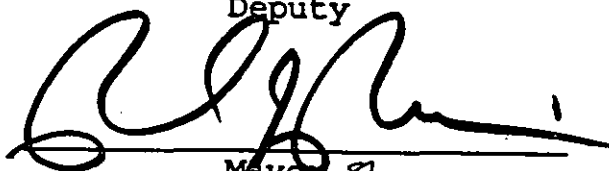
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Approved \_\_\_\_\_

CITY CLERK


Approved AUG 22 1996

BY   
Deputy

  
Mayor 32

Approved as to form and legality

\_\_\_\_\_  
JAMES K. HAHN, City Attorney

By   
CLAUDIA CULLING  
Deputy City Attorney

File No. C.F. No. 96-0565

DECLARATION OF POSTING ORDINANCE

I, MARIA C. RICO, state as follows: I am, and was at all times hereinafter mentioned, a resident of the State of California, over the age of eighteen years, and a Deputy City Clerk of the City of Los Angeles, California.

Ordinance No. 171256, entitled: Amended Article 5, Chapter IX of the LAMC - Mechanical Code, a copy of which is hereto attached, was finally adopted by the Council of the City of Los Angeles on August 16, 1996, & under direction of said Council & said City Clerk, pursuant to Section 31 of the Charter of the City of Los Angeles, on August 28, 1996 I posted a true copy of said ordinance at each of three public places located in the City of Los Angeles, California, as follows: one copy on the bulletin board at the Main Street entrance to City Hall of said City, one copy on the bulletin board on the ground level at the Los Angeles Street entrance to the Los Angeles Police Department in said City, & one copy on the bulletin board at the Temple Street entrance to the Hall of Records of the County of Los Angeles in said City.

The copies of said ordinance posted as aforesaid were kept posted continuously & conspicuously for ten days, or more, beginning 8-28-96 to and including 10-7-96.

I declare under penalty of perjury that the foregoing is true & correct.

Signed this 28th day of August, 1996 at Los Angeles, California.

Maria C. Rico  
Deputy City Clerk

Effective Date: October 7, 1996  
(Rev. 2/95)

C.F. 96-0565