Building Code

For the

City and County of Denver

Based upon the Uniform Codes of the

International Conference of Building Officials
(ICBO)
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ACKNOWLEDGEMENT

The process to review the Uniform Codes, as developed by the International Conference of Building Officials, began with the expressed concern of the construction, development and related industries that the City and County of Denver needed to have a building code similar to the building codes of the other municipalities throughout Colorado and the other western states, which have adopted the Uniform Codes with individual modifications.

As a result, the administration directed the Building Code Revision Committee (BCRC) to establish a Uniform Building Code Review Committee. The UBC Review Committee established a program, with the participation of the BCRC subcommittees, to review the Uniform Building Code, Uniform Mechanical Code, Uniform Plumbing Code, Uniform Building Code Standards and the National Electrical Code. Amendments to those Uniform Codes presented within this document are considered necessary to make the Uniform Codes effective for the construction and development conditions within the City and County of Denver.

We wish to thank the members of the City Council, Public Works Department, City Attorney's Office, Fire Department, Central Services, Commission on the Disabled, Building Inspection Division, the Building Code Revision Committee and the many BCRC subcommittees who represented various segments of the construction and development industry. They have all devoted their time, dedication and professionalism to develop this document.

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Past Active Members:

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Jeffrey Hanson
Denver Board of Realtors

An expression of sincere thanks is extended to all those who have contributed so much for the safety and welfare of the residents of Denver.

Federico Peña
Mayor
ORDINANCE NO. 180
COUNCIL BILL NO. 163
SERIES OF 1990
AS AMENDED 3-20-90
VERSION 2 OF THE
BUILDING CODE AMENDMENTS
SEE ATTACHED AMENDMENTS

A D L

FOR AN ORDINANCE AMENDING AND SUPPLEMENTING THE DENVER
BUILDING CODE.

BE IT ENACTED BY THE COUNCIL OF THE CITY AND COUNTY OF DENVER:

Section 1. That the Denver Building Code enacted by Ordinance
No. 144, Series of 1990, comprised of the Uniform Building Code,
Uniform Plumbing Code, Uniform Mechanical Code, Uniform Building Code
Standards, National Electric Code, and their respective appendices,
be and is hereby amended and supplemented by the adoption of the
supplement attached hereto and incorporated herein by reference.

PASSED BY THE COUNCIL ________________ 1990

CITY WARDEN ___________ - PRESIDENT

APPROVED: ________________ 1990

WILLIAM BLUMENTHAL ___________ - ACTING MAYOR________________ 1990

ATTEST: ________________ 1990

WILLIAM S. WALDRON ___________ - CLERK AND RECORDER,
EX-OFFICIO CLERK OF THE
CITY AND COUNTY OF DENVER

PUBLISHED IN THE DAILY JOURNAL ________________ 1990

PREPARED BY: ________________ 1990
BUILDING DEPT. AND BUILDING CODE COMMITTEE

REVIEWED BY: ________________ 1990
DAVIES WILLS ___________ - CITY ATTORNEY

The effective date of the adopting Ordinance No. 180 Series of

Vertical lines in the margin indicate that chapters, sections, lines,
words, numbers, etc., have been added or revised from the 1988
editions of the related Uniform Codes or the 1990 edition of the National
 Electrical Code.

Deletion arrows > < in the margin indicate that chapters, sections,
lines, words, numbers, etc., have been deleted from the 1988 editions
of the related Uniform Codes or the 1990 edition of the National Electric
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FOR THE

CITY AND COUNTY OF DENVER

1990

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Division 1 - Amendments to 1988 Uniform Building Code and Appendix

Division 2 - Amendments to 1988 Uniform Mechanical Code and Appendix

Division 3 - Amendments to 1988 Uniform Plumbing Code and Appendix

Division 4 - Amendments to 1988 Uniform Building Code Standards

Division 5 - Amendments to 1990 National Electrical Code
DIVISION 1

AMENDMENTS

TO THE

1988 EDITION OF THE

UNIFORM BUILDING CODE

AND

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BY PARTS, CHAPTERS AND SECTIONS

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CHAPTER 1

ADMINISTRATIVE AND BOARD OF APPEALS

SECTION 100. TITLE. The title of this Ordinance shall be, and this Ordinance shall be cited and referred to as, the BUILDING CODE OF THE CITY AND COUNTY OF DENVER.

SECTION 101. PURPOSE. The purpose of this Building Code is to provide minimum standards to safeguard life, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use, occupancy, location and maintenance of all buildings and structures within the City and County of Denver, and certain equipment specifically regulated herein.

SECTION 102. SCOPE. The provisions of this Building Code shall apply to and govern the following:
(a) New Buildings, Structures and Utilities. This Code shall regulate the construction, addition, alteration, repair, demolition, removal, moving, occupancy, use and maintenance of any building, structure or utility hereafter erected within the City, except as set forth in subsection (c) below.
(b) Existing Buildings, Structures or Utilities. This Code shall regulate the alteration, addition, repair, demolition, removal, moving, change of occupancy and maintenance of any existing building, structure or utility heretofore erected within the City.
(c) Buildings, Structures and Utilities not Regulated by this Code. This Code shall not regulate work performed:
1. On work located primarily in the public way unless specifically provided for by this Code.
2. On public utility towers, poles and mechanical equipment used for the production, generation or distribution of the utility product or service through the facilities owned and operated by the utility company to the point of customer service.
(d) Most Restrictive. Where in any specific case the requirements of different sections of this Building Code vary, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific
requirement shall be applicable. Where there is a conflict between the provisions of this Building Code and any other legally adopted city ordinance, the most restrictive shall govern.

(e) Transition Rules. This Building Code and implementation of all its provisions and policies shall become effective as follows:

1. The effective date of the new Building Code shall be as follows:
   a. Divisions 1 through 4 shall be effective six months after the effective date of the adopting ordinance.
   b. Division 5 shall be effective on the effective date of the adopting ordinance.

2. Any projects that will be submitted to the Building Department between the 3rd and 6th month after the effective date of the adopting ordinance shall have the option of using the present Denver Building Code or the new Denver Code, provided that the owner or the owner’s agent submits a letter of commitment to the Building Department stating:
   a. Election to proceed under the new or old building code;
   b. Address of building in question;
   c. Description, number of stories, floor area, occupancy, etc. of the building;
   d. Date of beginning design drawings; and
   e. Date of submitting construction drawings to Building Inspection Division.

3. Major projects on the board during the drafting of this Building Code, that will be submitted to Building Inspection Division after the effective date of this Building Code, shall have the option to use the present Denver Building Code, provided that the owner or the owner’s agent submits a letter of commitment with the same items required in paragraph 2, and provided that the construction of the project will start within 6 months after the Building Code effective date and be completed within 2 years after the Building Code effective date.

4. All letters of commitment must be submitted by the first day of the fourth month.

5. Division 5 - 1990 National Electrical Code with amendments, shall be effective on the date of adoption of the Ordinance and shall be used with either option outlined in item 2 or 3 of this Section.
SECTION 103. ORGANIZATION OF THE BUILDING INSPECTION DIVISION.
(a) General. The Building Inspection Division is (the "Department") established as an agency under the Manager of Public Works. See Chapter 4 for definition.
(b) Director. The Department shall be administered by a Director. The Director is hereby authorized and directed to enforce all the provisions of this Code. Wherever this Building Code makes reference to the "Building Official," it shall mean the Director.
(c) Employees. In accordance with prescribed procedures, the Director shall authorize or appoint engineers, technicians, inspectors or other employees to perform duties and exercise powers delegated to him by this Building Code.
(d) Authorization and Identification. Each employee of the Department shall be provided with an identification card bearing information required by the Director. This card shall be carried by the person identified, and shall be displayed when necessary to identify the person properly to perform official duties.

SECTION 104. GENERAL POWERS AND DUTIES OF THE BUILDING DEPARTMENT.
(a) Powers and Duties. This Department shall administer and enforce this Building Code and all other ordinances which are or may be assigned to the Department for enforcement and administration. The Department is vested with the duties of enforcing and administering this Building Code, and the power necessary for such enforcement.
(b) Interpretations, Rules and Regulations. The Director shall have the full power to render interpretations of this Code and to adopt and enforce Rules and Regulations supplemental to this Code as he may deem necessary in order to clarify the application of Code provisions. Such interpretations and Rules and Regulations shall be in conformity with the intent and purpose of this Code. Rules and Regulations shall be adopted and recorded in accordance with the provisions of the Revised Municipal Code. The Board of Appeals may review any appeal of a Department interpretation subject to Section 121.
(c) Modifications Under Special Circumstances.
1. Modifications for Privately Funded Projects: Upon receipt of a written request to modify the application of the Code for a private project, the Director shall notify:
Sec. 104

a. The owner of the building, structure or utility if the owner is not the applicant;
b. Any other person that the Director determines may be affected.

2. Modifications for City Funded Projects: Upon receipt of a written request from the City, approved by the City Attorney or his designee, to modify the applications of the Code for a particular project, the Director shall notify any person or agency that the Director determines will be affected.

3. After affording an opportunity for comments, the Director may allow, upon approval of the Fire Prevention Division, the modification requested upon a written finding by the Director that:
a. The modification is in conformity with the intent and purpose of the Code; and
b. The modification is necessary as a result of practical difficulties or excess costs which would result from strict compliance with the Code; and
c. The modification does not lessen any requirement relating to strength, safety, sanitation, fire resistance, fire protection or any degree of structural integrity.

4. The written finding and decision shall be delivered to the applicant, the City Attorney and all persons notified under paragraph 1 or 2. The decision, notices, comment and any materials considered shall be maintained as a permanent public record by the Department. Upon the request of the City Attorney, a notice of the approval containing the legal description of the property shall be filed in the property records of the Clerk and Recorder advising of the modification granted and that the records concerning the modification may be reviewed at the Director's office.

(d) Authority to Inspect. The Department shall have the authority to inspect or cause to be inspected all buildings, structures or utilities for compliance with this Building Code.

(e) Investigations and Surveys. Incidental to any of these duties and powers, but without limitation of the same, the Department may conduct investigations or surveys to determine compliance or noncompliance with the provisions of this Building Code; and further may investigate or cause to be investigated all accidents pertaining to buildings, structures or utilities.
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(f) Right of Entry. Whenever it is necessary to make inspections, investigations or surveys to enforce any of the provisions of this Code, or whenever an authorized representative of the Department has reasonable cause to believe that there exists in any building or upon any premises any condition or Code violation which makes such building or premises unsafe, dangerous or hazardous, the Department may enter such building or premises at all reasonable times to inspect the same or to perform any duty imposed upon the Department by this Code. If such building or premises are occupied, the Department shall first present proper credentials and request entry. If such building or premises are unoccupied, he shall first make a reasonable effort to locate the owner or other persons having charge or control of the premises and request entry. If such entry is refused, the Building Official shall have recourse to every remedy provided by law to secure entry.

(g) Orders.

1. Whenever work is or has been performed contrary to the provisions of this Building Code, or whenever conditions exist which are in violation of this Building Code, or any of the several codes or ordinances enforced or administered by this Department, the Department may:
   a. Order any work stopped until authorized by the Department to proceed. The owner, once notified of the order, shall not allow any further work upon the subject property until authorized by the Department.
   b. Order the work being performed or that has been performed to be completed or corrected so that the resulting work is in accordance with the requirements of this Building Code or other codes or ordinances enforced or administered by the Department.
   c. Order the use or occupancy of a building, structure or equipment discontinued and the structure, or portion thereof, vacated by notice served on any person causing such use to be continued. Such person shall discontinue the use within the time prescribed by the Building Official.

2. Any such order shall be by written notice served on the owner of the property upon which work was or is being performed or where the condition exists, or any person engaged in the work, causing the work to be performed or having a permit to perform the work.

3. It shall be unlawful to disobey any written lawful order issued by the Department.
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4. A copy of any order issued by the Department shall, when the original order has not been served on the owner, be served upon the owner of the property affected by the order.

5. The Board of Appeal may review any appeal of a Department order subject to Section 121.

SECTION 105. SERVICE. Service of any order may be by personal service, as specified in the Colorado Rules of Civil Procedure, or by registered or certified mail, return receipt requested, and service shall be deemed complete upon delivery.

SECTION 106. APPLICATION TO EXISTING BUILDINGS.
(a) Additions, Alterations or Repairs. Additions, alterations or repairs may be made to any building or structure without requiring the existing building or structure to comply with all the requirements of this Code, provided that the addition, alteration or repair conforms to that required for a new building or structure, except as otherwise provided for in this Code.

(b) When Additions, Alterations or Repairs are Not Allowed. Additions, alterations or repairs shall not be made to an existing building or structure which will cause the existing building or structure to be in violation of any of the provisions of this Code, nor shall such additions or alterations cause an existing building or structure to become unsafe.
1. An unsafe condition shall have been created if an addition or alteration will cause the existing building or structure to become structurally unsafe or overloaded; will not provide adequate egress in compliance with the provisions of this Code; will obstruct required existing exits; will create a fire hazard; will reduce required fire resistance or will otherwise create conditions dangerous to human life.
2. An unsafe condition shall have been created if any building so altered, or any building plus new additions, exceeds the height, number of stories, or area permitted for new buildings.
(c) Materials. Alterations or repairs to an existing building or structure which are nonstructural and do not adversely affect any structural member or any part of the building or structure having required fire resistance may be made with the same materials as of the existing building or structure.
EXCEPTION: The installation or replacement of glass shall be as required for new installations.

(d) Existing Occupancy.
   1. Buildings in existence at the time of the adoption of this Building Code may have their existing use or occupancy continued, if such use or occupancy was legal at the time of the adoption of this Building Code, provided that such continued use is not dangerous to life.
   2. Any change in the use or occupancy of any existing building or structure shall comply with the provisions of Chapters 3 and 5 of this Building Code.

(e) Maintenance. All buildings, structures or utilities, both existing and new, and all parts thereof, shall be maintained in a safe and sanitary condition. All devices, utilities or safeguards which are required by this Building Code, or which were required under any previous Code or Ordinance, shall be maintained in good working condition. The owner or legally responsible person shall maintain such buildings, structures or utilities. To determine compliance with this subsection, the Department may cause any building, structure or utility to be reinspected.

(f) Moved and Temporary Buildings or Structures. Buildings or structures moved into the City shall comply with the provisions of this Code for new buildings or structures. Temporary structures such as reviewing stands, tents and other miscellaneous structures, sheds, canopies or fences used in conjunction with special events or construction work may be erected by special permit from the Department for a limited period of time as specified in Chapter 3. Temporary buildings or structures need not comply with the type of construction or fire-resistive requirements except where specifically required by this Code. Tents shall be permitted as specified in Chapter 17. Temporary buildings or structures shall be completely removed upon the expiration of the time limit stated on the permit.

(g) Historic Buildings. See Chapter 31 of this Code.

SECTION 107. UNSAFE BUILDINGS OR STRUCTURES. An unsafe building or structure is one which constitutes a fire hazard or a hazard to life, health, property or public welfare by reason of use, construction, damage, vandalism, quality of materials, inadequate maintenance, dilapidation or abandonment, including but not limited to any building or structure in which any one or more of the following conditions exists:
Sec. 107

(a) Those buildings or structures in which a wall or other vertical structural member lists, leans or buckles to such an extent that a plumb line passing through the center of gravity falls outside of the middle third of the base.

(b) Those buildings or structures that show damage or deterioration to:
   1. Any structural or load bearing member to the extent that the member does not have sufficient strength to resist all applicable loads specified in Chapter 23.
   2. Nonbearing exterior walls or enclosures to such an extent that they will not resist the wind pressure or lateral forces specified in Chapter 23.
   3. Any exposed exterior member to the extent that the member provides inadequate protection from the elements to the occupants of the building or structure.

(c) Those buildings or structures in which the loads upon the walls, floors, roofs or any other necessary structural member exceed the maximum design limits specified in Chapter 23.

(d) Those buildings or structures having floors or areas with inadequate egress.

(e) Those building or structures having parts attached in such a manner that they may fall and cause injury to the public or property.

(f) Uncompleted buildings or structures when the permit has been cancelled.

(g) Open pits, open wells and open excavations of all types when such are determined to be hazardous by the Department.

(h) Trenches or ditches not properly shored or cribbed. See Chapter 29.

(i) Vacant buildings which are not secure and to which entry may be made through opened or unlocked doors, windows, or other openings.

(j) Those buildings or structures which are uninhabitable, including but not limited to buildings or structures, with any one of the following conditions:
   1. Where building envelope damage or deterioration has caused the interior of the structure to be open to the elements.
   2. Where vandalism or deterioration has caused the plumbing system, electrical system or heating system to be no longer functional.
   3. Where vandalism or deterioration has caused the internal floor structure or stairways to be incapable of supporting the weight of normal occupancy.
Sec. 107

(k) Any dilapidated building of whatever kind which is unused by the owner, or uninhabited because of deterioration or decay, which condition constitutes a fire hazard or subjects adjoining property to danger of damage by deterioration of structural building elements, storm effect, soil erosion or rodent infestation, or which becomes a place frequented by trespassers and transients seeking a temporary hideout or shelter.

SECTION 108. UNSAFE UTILITY. An unsafe utility is one which constitutes a fire hazard or a hazard to life, health, property or public welfare by reason of use, construction, installation, obsolescence, damage, deterioration, quality of materials, abandonment or inadequate maintenance. However, without limitation of the foregoing, any utility in which any one or more of the following conditions exists shall constitute an unsafe utility:

(a) Gas-Fired, Oil-Fired, Solid Fuel-Fired Devices. Gas-fired, oil-fired or solid fuel-fired appliances, devices or apparatus which have any of the following defects:

1. Broken or cracked heat exchangers.
2. Defective or deteriorated vents, venting or flues which permit leakage of flue products.
3. Defective or improperly installed fuel supply piping.
4. Insufficient air supply for the combustion of fuel.
5. Inadequate ventilation of the heating equipment room.
6. Defective, improperly installed or maladjusted controls and appurtenances.
7. Defective or improperly installed heating equipment.
8. Equipment locations which constitute a fire or explosion hazard.
9. When a negative air pressure condition exists in a heating equipment room or area.
10. Excessive corrosion of combustion chambers where the original thickness of the metal is reduced 50% or more.
11. Warped or distorted combustion chambers or furnace boiler firing doors which permit leakage of combustion products.
12. A listed appliance or appurtenance that is altered or modified.
13. Excessive scaling, corrosion, cracks in seams, tube or shell of boilers.
14. Defective valves, gauges or cocks of boilers.
15. Grooving or pitting of boilers.
16. Boilers with improperly installed or maladjusted controls and appurtenances.
17. Any unlisted appliance or appurtenance installed without approval of the Department.
18. Appliances not provided with required safety controls.

(b) *Elevators and Similar Conveyances.* Elevators, escalators, dumbwaiters, moving walks or similar conveyances or apparatus which have any of the following defects:
   1. Hoisting, counterweight or governor ropes or cables with frayed or broken strands.
   2. Operation in a hoistway used to store material other than elevator equipment. This shall also apply to elevator machine room, machinery spaces and pits where materials other than elevator equipment are maintained or stored.
   3. Operation in a hoistway that is in danger as a result of dust or other highly combustible material on the mechanism or in the hoistway, penthouse or pit.
   4. Brake mechanism not functioning properly or safely.
   5. Those not safety tested in accordance with the requirements of this Building Code, or where required safety devices have been disconnected or discontinued.
   6. Those safety or operational devices provided in the elevator cab which are not functioning properly or safely.
   7. Where hoistway entrance protection does not meet the requirements of this Building Code.

(c) *Electrical Systems.* Electrical systems, appliances, devices or apparatus which have any of the following defects:
   1. Bare wiring.
   2. Poor electrical connections.
   3. Overloaded circuits, feeders or services.
   4. Equipment not properly grounded.
   5. Disconnecting means not provided at the appliance.
   6. Over-fused circuits.
   7. Misuse of cord wiring.
   8. Wiring not properly supported.
   9. Non-approved wiring exposed to extreme heat, moisture, gases or other harmful vapors or liquids.

(d) *Refrigeration Systems.* Refrigeration systems which have any of the following defects:
   1. Inadequate ventilation.
   2. Inadequate venting of pressure relief valves.
   3. Unauthorized fuel-fired equipment located in the same room designated for the refrigeration equipment.
Sec. 108

4. Improperly installed cooling towers by reason of location, type, fan, water condition, controls, roof or floor overload.
5. Faulty controls.

(e) Plumbing Systems. Plumbing systems or devices which have any of the following defects:
1. When the supply water does not meet the standards of potability as required by the Colorado State Department of Public Health and the City Department of Health and Hospitals.
2. Those water systems subjected to the hazards of backflow or back-siphonage which might create a pollution to the potable water supply, i.e., hose bibbs shall have anti-siphon devices.
3. Where inadequate piping does not supply sufficient water to the various appliances.
4. Clogged sewers or drains
5. Where a trap seal is not provided or is inadequate.
6. Inadequate venting.
7. Leaking water, sewage or sewer gas within a building or structure.
8. Trenches or ditches not properly shored or cribbed.

SECTION 109. NOTICE AND ABATEMENT OF UNSAFE BUILDINGS, STRUCTURES OR UTILITIES.

(a) General. If, after inspection by the Department, the building, structure or utility is determined to be unsafe, it shall be abated by repair, replacement, removal or demolition upon notice by the Department.

(b) Unsafe Building or Structure. In the case of an unsafe building or structure, the Department may order such building or structure, or any buildings or structures placed in jeopardy by the unsafe building or structure, vacated immediately. The unsafe buildings or structures shall be posted in accordance with the provisions of Section 109(g).

(c) Unsafe Utility.
1. In the case of an unsafe utility, the Department shall affix an approved warning tag on the unit declared to be unsafe. The Department shall order the unsafe utility disconnected or its use discontinued until the nuisance created thereby is abated. In addition, the Department may order any building, structure or utility which is placed in jeopardy by the unsafe utility to be vacated and/or disconnected, and these shall not be reoccupied or reconnected until declared safe by the Department.
2. It shall be unlawful for anyone to mark any unsafe utility, as herein defined, with any type markings or tags declaring them to be unsafe, except as authorized by the Department.

(d) Demolition or Securing by the City. If the owner and/or occupant of an unsafe building, structure or utility fails to perform the repairs, rehabilitation, securing or removal required by an order within the time specified in the order or any extension of time to comply with said order, the City may, as set forth in subsection (h), cause the demolition or securing of the unsafe building or structure.

(e) Emergency Demolition or Securing. In the event an emergency should occur wherein the continued use or existence of a building, structure or utility may constitute an immediate hazard to life, health, property or public welfare, the Department may order and/or cause the building, structure or utility to be demolished, removed, disconnected or secured at once by any means available to the Department. When feasible, the Department shall attempt to give notice, by any means, to the owner of the building, structure or utility prior to taking any action. Cost and expense of demolition and/or removal or securing, if borne by the City, shall be recovered as provided for in Section 109(h).

(f) Emergency Barricades. If any building, structure or utility is declared a hazard to life or safety of persons using a public way, the public way shall be provided with barricades to prevent public use. The barricades shall be erected on order from the Department. Recovery of cost and expense, if borne by the City, shall be made as provided for in Section 109(h).

(g) Posting of Signs. When necessary to protect life, property, health and public welfare, the Department may post signs which shall prohibit entry into an unsafe building or structure. However, with permission of the Department, it shall be lawful to enter the unsafe building or structure for the purpose of effecting any required repairs, rehabilitation or demolition; or by members of the Fire Department. The signs shall be provided and attached to the building or structure by the Department and shall read, in addition to other information, "DANGER KEEP OUT". See Section 112 for Prohibitions and Violations.

(h) Procedure for Demolition or Securing by City. Upon the failure of the owner or legally responsible person of a building or structure to make any building or structure safe after the issuance of an order, the Department:
Sec. 109

1. May obtain competitive bids for the securing or demolition of the building or structure.

2. May, upon receipt of bids, issue a notice of intent to raze or secure the building or structure which shall include the estimated cost of demolition or securing plus a fee not to exceed 25% of the cost of demolition or securing with a minimum of $100 to cover administrative and other costs. Such notice shall be served personally or by registered or certified mail, return receipt requested, upon the owners of all recorded interests in the property at least 10 days prior to the demolition or securing.

3. If service cannot be obtained upon any or all parties with record interests as provided in subsection 2 above, may post the notice upon the property for 10 days and mail notices to the last known address of each party having a record interest.

4. Ten days after completion of service under subsection 2 or 3 above, may proceed with demolition or securing.

5. Upon completion of the demolition or securing, shall mail a notice of the final cost of demolition or securing and of the intent to file a lien against the property to owners of a recorded interest in the property.

(i) City's Lien. In the event the owner fails to pay the costs as set forth in the notice sent under subsection 109(h)5 within 15 days of such notice, the amount shall constitute a lien against the real property upon which the building or structure was or is situated. The Department shall thereafter pay the cost and expense of demolition, removal, securing and/or barricading, from any appropriation made available for that purpose, and shall certify a statement thereof to the Manager of Revenue, who shall assess and charge the same against the property involved and collect the same due, together with interest at the rate established by law for delinquent real property taxes.

1. The lien created thereby shall be superior and prior to other liens, regardless of date, except liens for general and specific taxes.

2. For purposes of this Building Code, cost and expense shall include the demolition, removal, securing, barricading and administrative costs incurred therewith.

SECTION 110. USED MATERIALS. Used materials may be used in the construction of any building, structure or utility only with prior approval of the Department.
SECTION 111. ALTERNATE MATERIALS AND METHODS OF CONSTRUCTION AND EQUIPMENT.

(a) General. The provisions of this Building Code shall not prevent the use of alternate methods, materials or equipment that meet the standards of strength, safety, sanitation and fire resistance required to be met in any building, structure or utility to which this Building Code applies, provided that the alternate has been approved by the Department.

(b) Application and Fee. An application for approval of an alternate material, method or equipment shall be filed with the Department upon a Departmental form. Information shall be that required by the Department and this Building Code. The application shall be accompanied by a fee of $200.00, payable to the Manager of Revenue, City and County of Denver, and shall be paid in the office of the Department.

(c) Review and Renewal. Each approved material, method or equipment shall be subject to a review and renewal of the approval every three years. The fee for each review and renewal shall be $75.00.

(d) Department Decision. The Department shall notify the applicant in writing of its decision about the application for any such alternate methods, materials or equipment. No application shall be approved unless the Department finds that the proposed design is satisfactory and that the alternate is, for the purpose intended, at least the equivalent of that prescribed in this Building Code.

(e) Requirements and Tests.
   1. When a construction material, assembly, fixture, device, utility or other article different from that provided for in this Building Code is proposed for use, the plans, specifications, details, test data, samples and literature shall be furnished to the Department for review.
   2. In order that claims for alternate materials, methods or equipment may be substantiated, the Department may require tests to be made at the expense of the applicant by an approved laboratory or agency. Test methods shall be as set forth by the Standards which are part of this Building Code, or by a test method established for a particular product by a nationally recognized agency. If there are no appropriate test methods or Standards set forth in this Building Code, the manufacturer or fabricator may present testing methods and their results for evaluation.
Sec. 111

(f) Approved Testing Laboratories. At the discretion of the Department, new methods and materials may be acceptable if tested by a recognized testing laboratory or agency. The testing laboratory or agency must be one approved by the Department and it shall provide listing, labeling and follow-up inspection services. A copy of the agency approval report or the test report shall be submitted to the Department for approval.

(g) Right to Appeal. The Board of Appeals may review a Department decision upon appeal, subject to Section 121.

SECTION 112. PROHIBITIONS, VIOLATIONS, PENALTIES AND REMEDIES.

(a) Prohibitions. It shall be unlawful for anyone to do or cause to be done any act or allow a condition to exist that violates or is contrary to the provisions of this Building Code, any other code, ordinance or rule and regulation promulgated thereunder which is enforced and administered by the Department, and without limitation to the foregoing:

1. Alternate Methods, Materials or Equipment. It shall be unlawful for anyone to use any method, material or equipment as an alternate to the methods, materials or equipment permitted by this Building Code without first obtaining approval in the manner herein provided.

2. Licensing, Certificate and Registration. It shall be unlawful for any person to perform any work on any building or utility without first obtaining a license, certificate or registration in accordance with the requirements of Chapter 2 of this Building Code, except that the owner of a building, where authorized under Chapter 3 of this Code, who obtains a permit for the work being performed, need not be licensed, certified or registered.

3. Licensing, Certificate and Registration Holder Responsibility. It shall be unlawful for any license, certificate or registration holder to violate any of the responsibilities enumerated in Chapter 2 of this Building Code.

4. Permits. It shall be unlawful for any person to perform or cause to perform any work on any building, structure or utility without first obtaining a permit for such work from the Department in accordance with Chapter 3 of this Building Code.

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5. **Certificate of Occupancy.** It shall be unlawful for anyone to occupy a new building or structure or change the occupancy of any building or structure without first having obtained a Certificate of Occupancy from the Department as required by the provisions of this Building Code. A Certificate of Occupancy will not be required for remodeling or additions, unless there is a change of occupancy. See Chapters 3 and 5.

6. **Unsafe Building, Structure or Utility.** It shall be unlawful for any person to maintain or permit to be maintained any building, structure or utility which is unsafe as defined in this Building Code. It shall also be unlawful to remove or deface any City red tag attached to a utility. These provisions shall apply to buildings, structures or utilities which are new, existing, under construction, altered or demolished.

7. **Enter, Occupy or Inhabit an Unsafe Building or Structure.** It shall be unlawful to enter, occupy or inhabit any unsafe building or structure posted in accordance with the provisions of Section 109(g).

8. **Removal of Danger Sign(s).** It shall be unlawful to remove or deface a sign required by Section 109 (g), without specific approval from the Department.

9. **False Information.** It shall be unlawful to furnish the Department any false information in any application for a license, certificate or permit required by this Building Code or during the course of an investigation conducted by the Department to enforce this Building Code.

10. **Vacant and Inadequately Maintained or Boarded up Buildings or Structures.** It shall be unlawful for any person to maintain or permit to be maintained for a period longer than six months any building or structure in any residential zoned district which is vacant and inadequately maintained or which is boarded up, and which does not show evidence of current construction or remodeling activity.

11. **Vacant and Inadequately Maintained Buildings or Structures Located within 1,000 feet of a Residential Zoned District.** It shall be unlawful for any person to maintain or permit to be maintained for a period longer than six months any building or structure which is vacant and inadequately maintained, and which does not show evidence of current construction or remodeling activity, and which is:
Sec. 112

a. Within 1,000 feet of a residential zoned district and is located in an I-0 zone district.
b. Within 1,000 feet of a residential zoned district and is located in a business zone district.

EXCEPTION: B-5, B-7 and B-8 zone districts.

12. Operate or Maintain Unsafe Utility. It shall be unlawful for any person to operate or maintain an unsafe utility or reconnect the power or fuel supply to any utility declared by the Department as being unsafe, and to which a City red tag has been attached as provided for in Section 109(c)1 of this Code. The owner and occupant of any building or structure containing an unsafe utility to which a City red tag has been attached, who has notice that the utility has been declared unsafe and so tagged by the Department, shall not permit said utility to be operated and shall take whatever steps are necessary to insure that the utility is not operated.

EXCEPTION: A properly Licensed Contractor with a permit may remove a City red tag for purposes of repair of the equipment. However, in the case of elevators, it shall be unlawful to allow any person to occupy the elevator except a licensed contractor and his employees during said repairs. Permission shall be obtained from the Department prior to removal of the City red tag.

13. Removal of City Warning or City Danger Tag. It shall be unlawful for any person to remove a City red tag attached to any utility as provided for in Section 109(c)1 of this Building Code.

14. Conspiracy. It shall be illegal for any person to act with another for the purpose of evading requirements of this Building Code.

(b) Violation. Wherever, by the provisions of this Building Code, any act is prohibited, or wherever any regulation, dimension or limitation is imposed on the erection, alteration, maintenance or occupancy of any building, structure or utility, each failure to comply with provisions of this Building Code shall constitute a violation. Each day on which a violation exists shall constitute a separate offense and a separate violation.

(c) Penalties. Whenever, in any Section of this Building Code, or any Section of a Rule or Regulation promulgated hereunder, the performance of any act is required, prohibited or declared to be unlawful, and no definite fine or penalty is provided for a violation thereof, any person, convicted of a violation of any
Sec. 112

Section shall, for each offense, be fined a sum of not more than $999.00, and/or imprisoned not to exceed 180 days, or both so fined and imprisoned. The suspension or revocation of any license, certificate, permit or other privileges conferred by the City shall not be regarded as a penalty for the purpose of this Building Code.

(d) Remedies. In the event any building, structure or utility is erected, constructed, reconstructed, altered, repaired, converted, demolished, moved, maintained or used in violation of this Building Code, the City or any proper person may institute an appropriate action or proceedings to prevent the unlawful erection, construction, reconstruction, alteration, repair, conversion, maintenance or occupancy, and to restrain, correct or abate such violation, or to prevent the occupancy of said building, structure or land. The imposition of any penalty hereunder shall not preclude the City or any proper person from instituting any appropriate action or proceeding to require compliance with the provisions of this Building Code, and with administrative orders and determination made hereunder.

SECTIONS 113 THROUGH 119 HAVE BEEN PURPOSELY OMITTED.

SECTION 120. BOARD OF APPEALS.

(a) Creation. There is hereby created a Board of Appeals. (the "Board"), which shall consist of 5 members and 3 alternates appointed by the Mayor. The Board shall be comprised of the following persons:

1. One professional engineer registered in the state of Colorado.
2. One architect licensed in the state of Colorado.
3. One person who is the holder of a City Building Contractor Class A, B, or C license.
4. Two citizen members who are not associated with the building industry.

Two alternates shall be a professional engineer registered in Colorado and an architect licensed in Colorado, respectively. A third alternate shall be a citizen not associated with the building industry and shall fill a temporary vacancy for a citizen member. In the absence of any member of the Board, the alternates shall be authorized to fill such temporary vacancy, regardless of the resulting composition of the Board, with the full power and compensation accorded the regular
Sec. 120

member. A permanent vacancy shall be filled in accordance with subsection (d) below. Alternates may appear at all meetings but shall not vote unless they are filling a temporary vacancy.

(b) Secretary. There shall be a Secretary of the Board, furnished by the Department. The Secretary shall be the custodian of the records, shall conduct official correspondence of the Board and generally be responsible for clerical work of the Board. The Secretary shall be present at all meetings and shall present all relevant information regarding appeals to the Board, including the application and other information submitted by the Applicant prior to the hearing. The Secretary shall notify all interested parties regarding matters to come before the Board prior to the meeting of the Board.

(c) Fire Department Representative. The Chief of the Fire Prevention Bureau, or his authorized representative, shall be an ex officio member to the Board without voting power. Terms of office and remuneration shall not be applicable to this member.

(d) Terms. As of the effective dated of this Ordinance, the Mayor shall appoint the initial Board members in accordance with subsection (a) above. The initial terms of these members shall be as follows: Citizen 1 - 1 year; Citizen 2 - 2 years; Architect - 2 years; Contractor - 3 years; Engineer - 3 years; Engineer Alternate - 2 years; Architect Alternate - 3 years; Citizen Alternate - 2 years. Following these initial terms, subsequent terms of all Board members and alternates shall be for 3 calendar years. No member of the Board shall serve more than 3 consecutive full terms or a total of more than 9 consecutive calendar years. Any vacancy which occurs in the Board shall be filled by the Mayor for the unexpired term of that Board member. Board members may be removed only for cause upon written charges.

(e) Procedures - Meetings - Quorum.

1. Regular Meetings. Regular meetings shall be held once each month, or as often as may be required by the Department. At the first regular meeting of each calendar year, the Board shall elect a Chairman and a Vice Chairman. The Chairman of the Board shall require that all members of the Board be polled during voting at the meeting. Three members of the Board shall constitute a quorum.
Sec. 120

2. Special Meetings. Special meetings may be held at the call of the Chairman and at such times as the Board shall determine. The Board, the Department or an appellant may request a special meeting. Any special meeting held at the request of an appellant shall be paid for by the appellant in the amount of $150.00. Three members of the Board shall constitute a quorum at special meetings.

3. Business Meetings. Business meetings of the Board may be called by the Chairman of the Board.

4. Public Notice. Public notice shall be given of all meetings and all meetings shall be open to the public except executive sessions or business meetings.

5. Notice. Due notice of all meetings shall be given by the Secretary to all parties in interest including the Department. The Department shall be permitted to intervene, for and on behalf of the City, in all public meetings.

6. Oath/Subpoena. The Chairman may administer oaths, accept affirmations and compel the attendance of witnesses. A failure or refusal to appear in response to a subpoena issued by the Board shall constitute a violation of this Building Code.

7. Department/Interested Party. At any public meeting a representative of the Department and Fire Department and any other interested party may appear in person, by agent or by attorney, offer evidence and testimony and cross-examine witnesses. All evidence and testimony shall be presented publicly. The Board may take judicial notice of facts to the same extent and in the same manner as courts of record and may consider relevant facts within the personal knowledge of any member of the Board that are stated into the record by such member.

8. Recording. All meetings before the Board shall be recorded either by electronic means or by a Certified Court Reporter.

(f) Powers and Duties of the Board.

1. Rules and Procedures. The Board shall adopt rules and procedures governing all proceedings before it consistent with the provisions set forth herein. The Rules and Regulations shall include proper procedures and time periods for applying to the Board, contents of the application, and time allotted for each case.
Sec. 120

2. **Powers.** Subject to the limitations enumerated herein, the Board shall have and may exercise the following powers:
   a. **Administrative Review.** To hear and decide appeals where it is alleged there is error in any order, requirement, decision, or determination made by the Department in the enforcement of the Building Code.
   b. **Variances.** To hear, grant or deny requests for a variance from the terms of the Code or from an order or decision of the Department upon finding that the following conditions exist:
      (1) The applicant properly applied for a variance under Section 121.
      (2) That, owing to exceptional and extraordinary circumstances, there are practical difficulties or unnecessary hardship involved in carrying out the strict letter of the Code.
      (3) That the variance will not weaken the general purposes of the Code.
      (4) That the variance will be in harmony with the spirit and purposes of the Code.
      (5) That the variance will not adversely affect the public health and safety.
      (6) That the variance will not adversely affect the structural integrity of the building.
      (7) That the variance will not adversely affect the fire safety of the building.
   c. **Alternate Methods and Materials.** To hear and decide appeals from the Department’s denial of an application for alternate materials and methods of construction and equipment under Section 111 herein, after the applicant has obtained an approval or certified test results from an approved testing agency. All relevant information and documentation shall be submitted to the Board prior to the hearing. The decision of the Department shall not be overturned unless the Board shall find that the following conditions exist:
      (1) That the applicant properly applied under the terms of Section 111;
      (2) That the proposed design is satisfactory and that the alternate is, for the purpose intended, the equivalent of that prescribed in the Building Code;
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(3) That the proposed alternate will not weaken the general purposes of the Building Code;

(4) That the proposed alternate will be in harmony with the spirit and purposes of the Building Code;

(5) That the proposed alternate will not adversely affect the public health and safety;

(6) That the proposed alternate will not adversely affect the structural integrity of the building;

(7) That the proposed alternate will not adversely affect the fire safety of the building.

(8) That a written request for an extension of a temporary certificate of occupancy was filed at least 30 days prior to the expiration of any temporary certification of occupancy when applicable.

d. Stay of Enforcement. The Board shall have the power to stay the enforcement of any order issued by the Department unless the Building Official certifies that a stay of the order or denial would, in the opinion of the Building Official based on facts stated in the request for a variance, cause imminent peril to life or property. A stay shall not constitute a variance, shall be personal to the applicant and not transferable, and shall be subject to the terms and conditions imposed by the Board.

3. Decision of the Board. In the exercise of the powers described above, the Board may reverse or affirm, wholly or in part, or may modify the order, requirements, decision or determination appealed from; may impose conditions or requirements as deemed necessary; and may make such order, decision or determination as ought to be made and has the right to hold cases in abeyance until proper information needed by the Board is supplied. Decisions shall be filed with the Department as a matter of public record.

(g) Procedure and Notice. Upon written receipt of a request for a variance, notice of the request shall be sent to the Fire Department, the Health Department, the City Attorney, the owner of the real estate affected by the request for a variance, and those neighborhood organizations listed and described in Sec. 41-19 of the Revised Municipal Code. No variance shall be granted until 15 days after the required notifications are mailed.
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(b) Hardship or Error. Any person, firm, corporation or city agency aggrieved by a decision of the Department in the enforcement of this Building Code; any person, firm or corporation who feels that there are practical difficulties or unnecessary hardships involved in carrying out the strict letter of this Building Code; or where it is alleged there is error in any order, requirement, decision or determination made by the Department, may, within 30 days of the date of notice of such decision or order, appeal the decision or order of the Department by filing an application with the Board.

(c) Unsafe Condition. Whenever the owner or legally responsible person of an alleged unsafe building, structure or utility or other condition does not agree with the order from the Department as to the correction to be made, he shall have the right to appeal to the Board within 30 days from the date of said order. In his appeal, he shall state how he proposes to make the building, structure, utility or other condition safe and, if required by the Board, he shall submit detailed engineering analysis or recommendations, accompanied by plans and specifications prepared by a Colorado Licensed Architect or Colorado registered Professional Engineer, as prescribed in this Building Code. The Board may require substantiating data concerning the removal or other remedial steps to be taken to render the building, structure, utility or other condition safe.

(d) Hazard. In any matter in which an order or notice relating to an unsafe building or structure is appealed, the Department may certify to the Board that the building or structure could become an imminent hazard in which case the Board shall schedule a meeting within 3 work days to hear said appeal.

SECTION 122. APPEALS FROM DECISIONS OF THE BOARD.

(a) Procedure. Any person aggrieved, the City, or any officer, department or division of the City may have a decision of the Board reviewed in the manner provided by the Colorado Rules of Civil Procedure. The Board shall not be required to return the original papers acted upon by it, but shall return copies thereof. The returned copies shall concisely set forth other facts pertinent and material to the decision appealed from and shall be verified.

(b) Effect of Appeal. The issuance of a writ on a petition hereunder shall not stay proceedings upon the decision
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(h) Limitations of Powers.

1. The Board shall issue a written decision, based on evidence presented at the public meeting, setting forth the necessary findings of fact and the final decision of the Board. A copy of this decision shall be mailed by the Secretary to all interested parties who received notice under subsection (g), including the Department. The Board may order that a copy of the decision be recorded in the office of the Denver Clerk and Recorder.

2. The concurring vote of 3 members of the Board shall be necessary to decide any matter upon which the Board is required to pass under this Building Code.

3. The Board of Appeals shall have no authority to review administrative decisions or grant variances to the provisions of Chapters 1, 2 or 3 of this Code except where specifically provided by the following Sections: Section 104(b) Interpretations, Rules and Regulations; Section 104(c) Modifications; Section 104(f) Orders; Section 111 Alternate Materials and Methods of Construction; Section 202(c) Application and Fee; Section 209 Suspension or Revocation of License; Section 218 Suspension or Revocation of Certificate; Section 310 Certificate of Occupancy; and Section 312 Permits for a Temporary Building.

4. Any determination or order of the Department shall be presumed to be correct until evidence is introduced that would support a contrary determination.

(i) Compensation. Each member of the Board shall receive $35.00 per meeting attended regardless of number or type of cases heard.

SECTION 121. APPEALS.

(a) Method of Application Fee. Prior to an action by the Board, an application shall be filed with the Department on a form providing the necessary information required by the Board. An appeal shall not be considered unless filed with the Department at least 10 days prior to the meeting. Upon filing the application, a fee of $35.00 shall be paid to the City. All checks shall be made payable to the Manager of Revenue, and shall be paid in the office of the Department. This fee is not refundable.
appealed from; but the court, on application after notice to the Board and on due cause shown, may grant a restraining order.

(c) Transcript Costs. Whenever a transcript is demanded by the person taking the appeal, or when a transcript is furnished by the Board pursuant to court order, the cost of preparing the transcript of proceedings shall be borne by the appellant, in the amount of at least $200.00.

SECTION 123. VALIDITY OF BUILDING CODE. If any Section, subsection, sentence, clause or phrase of this Building Code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this Building Code.

SECTION 124. LIABILITY. The Director, or his authorized employee or representative charged with the enforcement of this Code, acting in good faith and without malice in the discharge of his duties, shall not thereby render himself personally liable for any damage that may accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of his duties. Any suit brought against the Director or employee because of such act or omission performed by him in the enforcement of any provision of the Codes or the Charter, or other pertinent laws or ordinances implemented through the enforcement of this Code or enforced by the Department, shall be defended in accordance with A10.8 of the Charter and Chapter 24, Article 10, C.R.S.

This Code shall not be construed to relieve from or lessen the responsibility of any person owning, operating or controlling any building or structure for any damages to persons or property caused by defects, nor shall the Department or City be held as assuming any such liability by reason of the inspections authorized by this Code or any certificates of compliance or occupancy issued under this Code.
CHAPTER 2 is amended in its entirety:

CHAPTER 2

LICENSING, CERTIFICATION, REGISTRATION, BOARDS OF STANDARDS

SECTION 200. GENERAL. This Chapter provides for the licensing of all persons, the certification of supervisory personnel, registration, other types of certifications, and Boards of Standards.

SECTION 201. AUTHORITY.
(a) Licenses. The Department is vested with the authority to establish licensing procedures, to qualify applicants for licenses and to issue, revoke, renew and suspend licenses.
(b) Certificates. The Department is vested with the authority to establish certification procedures, prequalify applicants, and issue, revoke, renew and suspend certificates.

SECTION 202. LICENSES OR REGISTRATION.
(a) Definitions. (1) A license is authority granted by the City to a person, agency or political entity to perform the work authorized by the license. (2) A registration is authority granted by the City to an electrical contractor registered by the State of Colorado to perform the work authorized by said registration.
(b) Licenses or Registration Required. Licenses shall be required for all types of work described in this Chapter. Plumbing contractors shall be licensed by the Department and shall have a master plumber license issued by the State of Colorado as the licensee or in the full time employ of the contractor. Electrical contractors registered by the State of Colorado shall also register with the Department. Electrical registrants are required to comply with all the requirements of this Code.

EXCEPTIONS:
1. Public utility companies will not be required to obtain licenses when engaged in the installation, operation and maintenance of their equipment used for the production, generation or distribution of the utility, product or service through the facilities owned or operated by the utility company to the point of customer service.
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2. Not Required. The following licenses and registrations shall not require a certified supervisor:
   a. Electrical Registration.
   b. Building Contractor Class E.
   c. Sign Contractor Class B.
   d. Lawn Sprinkler Contractor.

SECTION 203. CLASSIFICATION OF LICENSES AND REGISTRATION.

(a) General. There shall be various classes of licenses and an electrical registration and the holder thereof shall be authorized to perform the following:

1. Building Contractor Class A. To erect, add to, alter or repair any building or structure. The demolition of a building or structure is permitted when the licensee establishes that he will erect a new building or addition on the same site. All work shall be performed under the supervision of the holder of a Class A Construction Supervisor Certificate.

2. Building Contractor Class B. To erect, add to, alter or repair any building or structure of the following construction types:
   a. Types I or II limited in height to less than a high rise and in area to that allowed for a Type III building.
   b. Type III, IV or V buildings.
   The demolition of any I Occupancy or one-story building or structure is permitted when the licensee establishes that he will erect a new building or addition on the same site. The contractor may install nonbearing partitions or do interior finish work in any type of building or structure. All work shall be performed under the supervision of the holder of a Class A or B Construction Supervisor Certificate.

3. Building Contractor Class C. To erect, add to, alter or repair any Group R-3 or M Occupancy building. The Contractor may install nonbearing partitions or do finish work within any type of building or structure and also erect prefabricated patio covers, carports, canopies and awnings less than 1000 square feet area for a building of any occupancy classification. The demolition of any one-story Group R-3 or M Occupancy building or structure is permitted when the licensee establishes that he will erect a new building or addition on the same site. All work shall
Sec. 202

2. Work performed by owners of Group R-3 and M Occupancies when work is performed under a permit authorized by Chapter 3.

(c) Application and Fee. Every applicant for a license shall fill out a form provided by the Department and shall pay an application fee of $15.00 at the time of filing. This fee shall not be refundable and shall not apply to the license fee. The name of the certified supervisor shall appear on the license application. The applicant shall be notified of the action taken on the license application by the Department. If the license is approved, the applicant shall procure this license within 90 days after notification. Failure of the applicant to procure the license shall require the filing of a new application with fee. If the application for license is disapproved by the Department, the applicant may appeal to the Board of Appeals in the manner provided for in this Building Code.

(d) Certified Supervisor Required. Where required each licensee shall be required to have in his employ a supervisor who holds a Supervisor Certificate of Qualification for that particular license. A plumbing contractor, Class A or B, shall be required to have in his employ a holder of a State of Colorado Master Plumbers License as the required supervisor. The license shall be valid only as long as the named supervisor remains in the employ of the licensee in an active, full-time capacity. "Active, full-time capacity" shall mean that the supervisor shall be available at the local office of the company, at home, or at the job site within a reasonable period of time. The supervisor shall take an active role in supervising and reviewing all work performed and materials used by the company in the process of construction. If the supervisor should leave the employ of the licensee, the licensee shall notify the Department within 3 working days after the termination. Failure of the licensee to notify the Department shall be cause for suspension or revocation of the license. The licensee shall be required to obtain a certified supervisor within 30 working days after the date the supervisor leaves the employ of the licensee. If a supervisor is not obtained within the 30 working day period, the license shall be deemed suspended until the supervisor is obtained and the Department notified.

1. Individual. If the licensee is an individual, he also may qualify as the Supervisor for that license, after examination.
5. Building Contractor Class E. To perform the work involving the installation, altering or repair of the following:
   E-1 Garage door installers
       Gutters and downspouts
       Siding
       Prefabricated patio covers, carports, canopies and awnings less than 1000 square feet area.
       Storm window and door installers
       Security bars, grills and grates
       Glass and glazing installations for all occupancies and the installation of custom sized replacement windows for townhouses and dwellings which do not require any structural alterations.
   E-2 Building insulation
       Acoustical treatment
   E-3 Sandblasting and cleaning
       Dampproofing
   E-4 Fences
       Scaffold erection
   E-5 Power operated door installers
   E-6 Tents - Fabric covered structures
   E-7 Tile and marble
   E-8 Fireplace inserts
   E-9 Raised access floor
   E-10 Electric Locksmith - (Low voltage 24 volts or less AC/DC) - Installation of electric door strikes and magnetic door locks which may be connected to card access devices, closed circuit TV, TV and VCR, buzzers, bells, gate and door controls or similar security devices.

6. Construction Management Firm. To administer and coordinate those trades and contracts directly engaged in the construction of buildings, structures and utilities. The holder of this license shall conform to all the provisions of this Building Code and Chapter except that this licensee shall not be permitted to obtain permits in accordance with Chapter 3. This license shall require a Construction Certificate holder who shall be certified in the Class of Construction being performed and be in the employ of the construction management firm. See Table 2-B.

7. Demolition Contractor Class A. To demolish any building, structure, utility or portion thereof. All work shall be performed under the supervision of the holder of a Class A Demolition Supervisor Certificate.
be performed under the supervision of the holder of a Class A, B or C Construction Supervisor Certificate.

4. **Building Contractor Class D.** To perform work listed under any one of the crafts listed below. All work enumerated in this subsection shall be performed under the supervision of the holder of the particular Class D Construction Supervisor Certificate.

   **D-1 Lathing, Plastering and Dry Wall.** Installation of all lathing, plastering and dry wall including the installation of nonbearing partitions, stucco or exterior texturing of buildings or structures and suspended ceiling systems.

   **D-2 Roof Covering and Waterproofing.** Installation of roof coverings including valleys, gutters, downspouts and waterproofing.

   **D-3 Masonry.** Laying and forming all types of masonry.

   **D-4 Curtain Walls.** Installation of curtain walls and storefronts.

   **D-5 Excavating, Shoring, Piles, Caissons and Drilled Shafts.** All types of excavating work, shoring and the installation of caissons and drilled shaft foundations.

   **D-6 Wood Framing.** The fabrication and erection of wood framing for all types of buildings.

   **D-7 Swimming Pools.** Installation of swimming pools required by this Code.

   **D-8 Structural Metals.** The fabrication and erection of structural metal members for all buildings or structures.

   **D-9 Pre-Cast Concrete Building Units.** The erection of precast concrete structural units.

   **D-10 Dry Wall.** Installation of all dry wall including the installation of nonbearing partitions and suspended ceiling systems.

   **D-11 Concrete Reinforcing Steel Placers.** Placement of reinforcing bars, pre or post tensioning steel, bar supports and welded wire fabric for reinforced concrete construction.

   **D-12 Fireproofing.** Application of fireproofing and firestopping materials.

   **D-13 Cast-in-Place Concrete.** The forming and construction of all cast-in-place concrete including the placement of reinforcing steel, bar supports and welded wire fabric for reinforced concrete construction.
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13. **Hot Water Contractor.** To install, add to, alter or repair, in Group R-3 or M Occupancy only, hot water heating systems and their appurtenances, solar water heating, water heaters, gas piping and controls, pipe insulation, and low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway. All work shall be performed under the supervision of the holder of a Steam and Hot Water or Hot Water Supervisor Certificate.

14. **Heating and Ventilating Contractor Class A.** To install, add to, alter or repair warm air heating, venting, ventilation, evaporative cooling, exhaust systems and their appurtenances, ductwork, dust collection systems, domestic and commercial range hoods, water heaters not exceeding 100 Mbtu input, gas piping; burners, controls, and venting, trash and laundry chutes; exterior sheet metal, duct insulation, low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway and maximum of 10 tons of refrigeration when it is utilized for comfort cooling and the refrigerating system is self-contained. This refrigeration shall not include systems with precharged lines or separate air-cooled condenser or chilled water systems. All work shall be performed under the supervision of the holder of a Class A Heating and Ventilating Supervisor Certificate.

15. **Heating and Ventilating Contractor Class B.** To install, add to, alter or repair, in Group R-3 or M Occupancies only, warm air heating systems and their appurtenances, ductwork, ventilation, evaporative cooling, duct insulation, exterior sheet metal, gas piping; burners, venting and controls, water heaters not exceeding 100 Mbtu input and low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway. All work shall be performed under the supervision of the holder of a Class A or B Heating and Ventilating Supervisor Certificate.

16. **Gas Service Contractor.** To install, add to, alter or repair the following equipment which utilizes gas or liquid fuel:
   a. Gas and liquid fuel piping.
   b. Gas and liquid fuel controls.
   c. Commercial cooking equipment.
   d. After burners.
   e. Ranges.
   f. Dryers.
8. Demolition Contractor Class B. To demolish any building not more than 30 feet in height. All work shall be performed under the supervision of the holder of a Class A or B Demolition Supervisor Certificate.

9. Moving Contractor. Moving of all types of buildings or structures. All work shall be performed under the supervision of the holder of a Moving Supervisor Certificate.

10. Plumbing Contractor Class A. To install, add to, alter or repair sanitary plumbing, potable water supply piping and appliances connected thereto, storm sewer, gas piping, water heaters, gas ranges, domestic gas incinerators, swimming pool and spa piping, solar plumbing utilized for potable water and fire sprinklers not to exceed 10 heads. All work shall be performed under the supervision of the holder of a State of Colorado Master Plumbers License.

11. Plumbing Contractor Class B. To install, add to, alter or repair, in Group R-3 and M Occupancies only, sanitary plumbing, potable water supply piping and appliances connected thereto, storm sewer, gas piping, water heaters not exceeding 100 Mbtu input, gas ranges, domestic gas incinerators and gas dryers, swimming pool and spa piping. All work shall be performed under the supervision of the holder of a State of Colorado Master Plumbers License.

12. Steam and Hot Water Contractor. To install, add to, alter or repair steam and hot water heating systems, solar water heating; process piping and related appurtenances; piping used for the transmission of chemicals, gases, air and other products; all items regulated by the Mechanical and Plumbing Code for boilers, pressure vessels, steam and water heating systems and process piping; low-static gas-fired unit heaters; industrial ovens; burners; controls; piping and controls utilizing gas, liquid or solid fuel; water heaters; pipe insulation and low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway. All work shall be performed under the supervision of the holder of a Steam and Hot Water Supervisor Certificate.
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This work does not include termination to any fire alarm system. All work shall be performed under the supervision of the holder of an Elevator Supervisor Certificate.

22. Fire Protection Contractor Class A. To install, add to, alter or repair fire extinguishing systems of all types. All work shall be performed under the supervision of the holder of a Class A Fire Protection Supervisor Certificate.

23. Fire Protection Contractor Class B. To install, add to, alter or repair automatic fire sprinkler and standpipe systems of all types. All work shall be performed under the supervision of the holder of a Class A or B Fire Protection Supervisor Certificate.

24. Fire Protection Contractor Class C. To install, add to, alter or repair approved nonwater, factory engineered extinguishing systems. All work shall be performed under the supervision of the holder of a Class A or C Fire Protection Supervisor Certificate.

25. Lawn Sprinkler Contractor. To install, add to, alter or repair underground lawn sprinkler systems except for the connection to the water service line. A certified supervisor shall not be required for this license.

26. Electrical Signal Contractor. To install, add to, alter or repair electrical wiring and equipment for fire alarm, fire detection, emergency voice communication systems, electrical signallng and control wiring. Voltages shall not exceed 48 volts or the system shall be power limited as defined by the National Electrical Code. Complete conduit or raceway systems shall not be installed by the holder of this license. All work shall be performed under the supervision of the holder of an Electrical Signal Supervisor Certificate.

27. Domestic Appliance Contractor. To install, repair and replace Domestic Appliances as required in the Plumbing Code. All work shall be performed under the supervision of the holder of a Domestic Appliance Supervisor Certificate or a State of Colorado Master Plumber’s License.

28. Boilermaker Contractor. To install, assemble or repair steam and hot water boilers, all pressure and nonpressure vessels, precipitators; breeching, metal stacks, plates and casings. All work shall be performed under the supervision of the holder of a Boilermaker Supervisor Certificate.
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g. Conversion burners.

h. Venting of domestic water heaters, dryers and incinerators.

i. Water heaters not exceeding 100 Mbtu input.

j. Low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway.

All work shall be performed under the supervision of the holder of a Gas Service Supervisor Certificate or a Heating and Ventilating Class A Supervisor Certificate.

17. Refrigeration Contractor Class A. To install, add to, alter or repair refrigeration systems and appurtenant cooling towers, pipe insulation, and low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway. A permit or license is not required for the installation of self-contained window type air conditioners. All work shall be performed under the supervision of a Class A Refrigeration Supervisor Certificate.

18. Refrigeration Contractor Class B. To install, add to, alter or repair, in Group R-2, R-3 and M Occupancies only, refrigeration systems consisting of self-contained refrigeration systems of 5 tons or less, the installation of precharged systems utilizing Group 1 Refrigerants, and gas fired absorption chillers. All work shall be performed under the supervision of the holder of a Class A or B Refrigeration Supervisor Certificate.

19. Sign Contractor Class A. To fabricate, install, erect or maintain all types of signs. All work shall be performed under the supervision of the holder of a Class A Sign Supervisor Certificate.

20. Sign Contractor Class B. To install, erect or maintain the following types of non-illuminated signs:

1. Cloth signs mounted directly on a wall.
2. Wall signs not exceeding 200 square feet in area.
3. Ground signs not exceeding 150 square feet in area.
4. Arcade signs not exceeding 25 square feet in area per side.

A certified supervisor shall not be required for this license.

21. Elevator Contractor. To install, add to, alter or repair elevators, escalators, moving sidewalks, moving ramps, dumbwaiters, stage lifts, manlifts, and amusement devices which employ ropes, cables, pulleys or platforms. In addition, this license shall include electrical work from the elevator controls to elevator equipment.
Sec. 207

6. To obtain a permit when required prior to commencing work.
7. To faithfully construct, without departure from drawings and specifications filed and approved by the Department and permit issued for same, unless changes are approved by the Department.
8. To complete all work authorized by the permit issued under the authority of this Building Code, unless acceptable cause is indicated to the Department.
9. To obtain inspection services where required by this Building Code.
10. To pay any fee assessed under authority of this Building Code.
11. To obey all orders or notices issued under the authority of this Building Code.
12. To provide all vehicles used in the operation of the business with identification in letters a minimum of 2 inches in height and a color contrasting to the background. The identification shall include the following information:
   a. Name of company.
   b. Business address.
   c. Business telephone.
13. To provide toilet facilities prior to and during construction or demolition.
14. To maintain with the Department a current mailing address. Any Order, Notice, Summons and Complaint or other Departmental communication, whether delivered by personal service or by certified, registered or first class mail sent to that address, shall constitute service.

SECTION 208. LICENSE CHANGES.
(a) Change of Name. The change of name by a licensee shall be reported to the Department within 15 days after making the change, on a form provided by the Department. A $15.00 application fee shall be required.
(b) Change of Address. A change of address of a licensee shall be reported to the Department within 15 days after making the change.
(c) New Licenses Required. A new license shall be obtained within 30 days after the creation of a new legal entity, even through one or more of the members, officers or directors have a license.
29. **Water Service Contractor.** To install service lines and appurtenances, on new installations only, from the corporation cock on the main up to and including:
   a. The first valve downstream of the meter, for an inside meter setting; or
   b. The first valve inside the structure, for an outside meter setting.

   This license shall not permit the installation of the water meter. All work shall be performed by or under the supervision of the holder of a Water Service Supervisor Certificate or a State of Colorado Master Plumbers License.

30. **Electrical Registration.** Performs all work authorized by the Registration issued by the State of Colorado.

**SECTION 204. LICENSE FEES.**

(a) **Annual Fees Required.** The annual license fee shall be paid to the Department in accordance with Table 2-A.

(b) **License Fee Refund.** License fees shall not be refundable.

**SECTION 205. LICENSE RENEWAL.** All licenses are subject to annual renewal.

**SECTION 206. REISSUANCE OF A LICENSE.** The Department shall have the authority to reissue a license without the filing of a new application, provided that the reissuance is accomplished within one year after the license has expired.

**SECTION 207. LICENSEE RESPONSIBILITY.**

(a) **General.** Licensees shall be responsible for performing all work in conformity with the provisions of this Building Code, including, but not limited to the following items:

1. To report in writing to the Department, within 3 working days, any accident occurring on any construction which results in injury or damage to the building, structure or utility, and any accident occurring during demolition.

2. To provide minimum safety measures and equipment to protect workmen and the public.

3. To present the license card when requested by the Department.

4. To employ a full time qualified supervisor certified in accordance with the requirements of this Building Code.

5. To employ qualified journeymen certified in accordance with the requirements of this Building Code.
4. When a hearing is conducted, the licensee, the Department and other interested parties may be in attendance. Upon completion of the hearing, the Director shall take all evidence available as a result of the Department's investigation and all evidence presented at the hearing under advisement, and shall notify the licensee in writing of the findings and decision, including length of suspension or revocation if any, by certified mail or personal service.

(c) Emergency Suspension. If the Director finds that cause exists for emergency suspension or revocation of a license and that continued work under the license could be hazardous to life or property, he may enter an order for the immediate suspension of the license, pending further investigation. The licensee may, within 7 days of receiving notice of the suspension, request a hearing before the Department in the manner prescribed by other Sections of this Chapter. The suspension or revocation is not stayed while the hearing is pending.

(d) Time of Suspension or Revocation. Time of suspension may be up to one year. Time of revocation may be from one year to five years.

(e) Delegation of Authority. The Director may appoint a qualified member of the Department to sit in his stead as Hearing Officer to conduct the hearing. Final decision shall be rendered by the Director.

(f) Right to Appeal. The Board of Appeals may review a Department suspension or revocation under Section 121 upon appeal by an aggrieved party within 30 days after notice of the decision.

SECTION 210. CERTIFICATES.

(a) Definition. A Certificate of Qualification is authority to perform certain skills and is issued by the Department on the successful completion of an examination. This certificate is not transferable. The term "Certificate" means Certificate of Qualification.

(b) Temporary Certificate. The Department may issue a temporary Certificate when the applicant has previously exhibited his skills to the satisfaction of the Department and the applicant's qualifications are acceptable. The Department shall determine the period of validity of the temporary Certificate.
Sec. 208

(d) Dissolution. The dissolution of a corporation, partnership or other legal entity which has been licensed terminates the license and no person may operate under that license.

SECTION 209. SUSPENSION OR REVOCATION OF LICENSE.
(a) Authority. The Director may suspend or revoke a license when the licensee commits one or more of the following acts or omissions:
1. Fails to comply with any of the licensee responsibilities as outlined in this Building Code.
2. Conspires with any person to permit a license to be used by another person.
3. Acts in any capacity with persons to evade the provisions of this Building Code.
4. Willfully violates or disregards any of the provisions of this Building Code.
5. Intentionally fails to perform in accordance with any written contract to perform work which is regulated by this Building Code.
6. Creates, as a result of work performed, an unsafe condition as defined in Chapter 1 of this Building Code.
7. Intentionally or fraudulently misrepresents the condition of any structure or utility, or the requirements of this Building Code.
8. Repeatedly violates the provisions of this Code or repeatedly fails to obey orders in a timely fashion.

(b) Procedure. When any of the acts or omissions enumerated herein are committed by a license holder and the Director deems that the license shall be suspended or revoked, the action shall be as follows:
1. The Department shall notify the licensee in writing by certified mail or personal service at least 7 days prior to suspension or revocation.
2. Upon receipt of the notice, the licensee may request a hearing to show cause why the license should not be suspended or revoked. This request shall be in writing to the Department within 7 days after receipt of the notice.
3. If a hearing is requested by the licensee, the Director shall set a time, date and place, and so notify the licensee. Suspension or revocation of the license shall be stayed until after the hearing.
trades and shall entitle the individual to work only in the trade for which he is certified under a Certified Supervisor.

1. **Journeyman Steam Fitter Certificate.** Permits the installation of steam and hot water heating systems; solar water heating; process and industrial piping and related appurtenances; piping used for the transmission of chemicals, gases, air, milk and other products transmitted through piping; and all items regulated by the Mechanical and Plumbing Code for boilers, pressure vessels, steam and water heating systems and process piping; low-static gas-fired unit heaters; industrial ovens; burners, piping and controls utilizing gas; low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway; commercial cooking equipment; commercial incinerators; and after burners. The holder of this Certificate may perform this work only in the employ of a Steam and Hot Water Contractor or a Hot Water Contractor.

2. **Journeyman Water Service Certificate.** Permits the installation of the initial water service from the main tap through the stop box and meter pit and continuing to and through the wall of the building and capped at that point. This Certificate shall not permit the installation of the water meter. The holder of this Certificate may perform this work only in the employ of a Water Service Contractor or a Plumbing Contractor Class A or B.

3. **Journeyman Gas Service Certificate.** Permits the installation of the following equipment utilizing gas or liquid fuel:
   a. Gas and liquid fuel piping.
   b. Gas and liquid fuel controls.
   c. Commercial cooking equipment.
   d. After burners.
   e. Ranges.
   f. Dryers.
   g. Conversion burners.
   h. Venting of domestic water heaters, dryers and incinerators.
   i. Water heaters not exceeding 100 Mbtu input.
   j. Low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway. The low voltage wiring permitted by this Certificate shall apply to gas or liquid fuel-fired appliances only. The holder of this Certificate may perform this work only when
Sec. 210

(c) **Certificate Application.** Every applicant for a Certificate shall be required to complete a form provided by the Department and to pay an application fee of $15.00 at the time of the filing. The fee shall not be refundable and shall not apply to the Certificate fee. The payment of the fee shall entitle the applicant to one examination only. If the applicant is re-examined for any reason, a new application and fee shall be required.

(d) **Successful Applicants.** If an applicant who has successfully passed the examination given by the Department fails to procure this Certificate within 90 days after notification, the Certificate shall be declared to be null and void and a new application and fee shall be filed.

(e) **Failure to Pass Examination.** When an applicant has failed to pass the examination, he shall be notified in writing by the Department.

(f) **Certified Supervisors.**
   1. Every supervisor required for a particular license shall be examined by the Department, and if qualified, shall be issued a Supervisor Certificate of Qualification. The Certificate holder shall be entitled to perform and supervise the work in the particular skill for which he is qualified and certified. This Certificate is personal to that holder and shall not be construed to be a license.
   2. The Certificate holder shall actively supervise the workmen of the licensee by whom he is employed in accordance with Section 202(d).

SECTION 211. **CLASSIFICATION OF SUPERVISOR CERTIFICATE OF QUALIFICATION.** A Supervisor Certificate for the particular work to be performed shall permit the holder to be a Supervisor under the licenses listed in Table 2-B.

SECTION 212. **CLASSIFICATION OF JOURNEYMAN AND OPERATOR CERTIFICATE OF QUALIFICATION.**

(a) **General.** Unless otherwise provided for in this Section or in this Building Code, all journeymen and operators required to be certified shall perform that work permitted under the provisions of licenses for a particular type of work. The work permitted by the certification shall be performed in the employ of the licensee as hereinafter set forth.

(b) **Journeyman Certificate of Qualification.** A Journeyman Certificate of Qualification shall be required in the following
located 2 feet outside the buildings and continue to the main sewer and shall include digging and backfilling of ditches. The holder of this Certificate may perform this work only in the employ of a Plumbing Contractor Class A or B.

(c) **Stationary Engineer and Operator Certificates.** It shall be unlawful to operate any of the following equipment without the personal attendance of a properly Certified Stationary Engineer or a properly Certified Operator.

1. Any steam boiler and appurtenances thereto, steam pumps, steam turbines, and steam engines where the steam pressure is in excess of 15 psi working pressure and where the equipment produces a total of 10 boiler horsepower or more at Denver altitude.

2. Water heating systems when the water temperature exceeds 250 degrees F. in the system.

3. Composite grouping of refrigeration machines where machines are 25 tons in capacity and parallel to a common refrigerant piping system. The total charge in the entire system shall determine the capacity of the system.

4. Refrigeration systems utilizing Group 2 or 3 refrigerants as defined in the Mechanical Code and which contains a charge of 200 lbs. or more.

5. Refrigeration systems having manual or semi-automatic control with charges of 1500 lbs. or more of Group 1 refrigerants as outlined in the Mechanical Code.

6. Refrigeration systems with fully automatic controls with charges of 1500 lbs. or more of Group 1 refrigerants.

**NOTE:** As used in this Section, semi-automatic shall mean plants or systems which are provided with automatic safety controls by manual load proportioning controls requiring other than seasonal adjustments.

(d) **Stationary Engineer Certificate.** Permits the holder to take charge of and operate all steam boilers and appurtenances thereto, steam pumps, steam turbines, steam engines and mechanical refrigeration systems.

(e) **Boiler Operator Certificate, Class A.** Permits the holder to take charge of and operate all steam boilers and appurtenances, steam pumps, steam turbines and steam engines.

(f) **Boiler Operator Certificate, Class B.** Permits the holder to take charge of and operate all steam boilers and appurtenances, steam pumps, steam turbines and steam engines containing a
in the employ of a Gas Service Contractor or a Heating and Ventilating Contractor Class A or B.

4. **Journeyman Heating and Ventilating Certificate.** Permits the installation of warm air heating, ductwork, ventilation and evaporative cooling, exterior sheet metal, water heaters not exceeding 100 Mbtu input, gas piping, burners, venting and controls, exhaust systems and appurtenances thereof, and low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway. The holder of this Certificate may perform this work only in the employ of a Heating and Ventilating Contractor Class A or B.

5. **Journeyman Refrigeration Certificate.** Permits the installation of refrigeration systems and appurtenant cooling towers, pipe insulation and low voltage wiring which does not exceed 48 volts and is not enclosed in a conduit or raceway. The holder of this Certificate may perform this work only in the employ of a Refrigeration Contractor Class A or B.

6. **Journeyman Domestic Appliance Certificate.** Permits the installation of domestic appliances as required in the Plumbing Code. The holder of this Certificate may perform this work only in the employ of a Domestic Appliance Contractor or a Plumbing Contractor Class A or B.

7. **Journeyman Boilermaker Certificate.** Permits the installation and erection of steam and hot water boilers, pressure vessels, precipitators, incinerators, breaching, chimneys, plate and casings. The holder of this Certificate may perform this work only in the employ of a Boilermaker Contractor.

8. **Journeyman Electrical Signal Certificate.** Permits the installation of electrical wiring and equipment for fire alarm, fire detection, emergency voice communication system, and electrical signalling and control wiring. Voltages shall not exceed 48 volts or the system shall be power limited as defined in the National Electrical Code. Complete conduit or raceway systems shall not be installed by the holder of this Certificate. The holder of this Certificate shall perform this work only in the employ of an Electrical Signal Contractor.

9. **Journeyman Drainlayer Certificate.** Permits the installation of sanitary, storm sewer and sewer connections. This work shall commence at the pipe
Sec. 213

(f) Employer. All apprentices or trainees shall be in the employ of the licensed crafts where Journeymen Certificate holders are required.

SECTION 214. CERTIFICATE FEES.
(a) Annual Fees. Annual Certificates of Qualification fees shall be paid the Department as follows:
   Supervisor Certificate .................. $25.00
   Journeyman Certificate ................. $10.00
   Engineer Certificate ................... $10.00
   Operator Certificate ................... $10.00

EXCEPTION: The certificate fee for employees of the City shall be waived when performing work for the City or when employed by the Department.

(b) Certificate Fee Refund. Certificate fees are not refundable.

SECTION 215. CERTIFICATE RENEWAL. Certificates shall be renewed annually and expire on the date specified on the Certificate. No work shall commence or continue after the date of expiration.

SECTION 216. REISSUANCE.
(a) General. The Department shall have the authority to renew a Certificate, provided that the renewal is accomplished within the limits set forth herein:
   1. The Certificate may be reissued without a new application, provided that such reissuance is accomplished within one year after the Certificate has expired.
   2. If the Certificate holder reapplies within 3 years of the date of expiration, re-examination shall not be required.
   3. If the Certificate holder applies more than 3 years after expiration, re-examination shall be required.

SECTION 217. CERTIFICATE HOLDER RESPONSIBILITY.
(a) General. All Certificate holders shall be responsible to insure that the work performed by the licensee is in accordance with the requirements of this Building Code, without limitation, and to:
   1. Have in possession at all times a Certificate.
   2. Present a Certificate when requested by the Department.
   3. Faithfully construct without departure from or disregard of approved drawings and specifications.
steam pressure between 15 and 100 psi and where the equipment produces a total of between 10 and 100 horsepower at Denver altitude.

(g) Refrigeration Operator Certificate. Permits the holder to take charge of and operate mechanical refrigeration systems.

(h) Hoist Operator Certificate. It shall be unlawful to operate a construction hoist powered by steam, electricity or other power when such hoist serves buildings or structures under construction or demolition exceeding 25 feet in height unless said hoist is operated by a properly Certified Hoist Operator. This Section shall not be construed to include elevators regulated and as defined in this Building Code.

EXCEPTION: Single drum material hoists not more than 25 feet in height and not carrying personnel do not require a Hoist Operator Certificate Holder.

SECTION 213. APPRENTICES AND TRAINEES.

(a) General. This Section shall govern the requirements for apprentices and trainees and shall be limited to the crafts listed in this Chapter where a Journeyman Certificate holder is required.

(b) Requirements. Apprentices and trainees shall not be required to possess a Certificate, but shall be permitted to work as prescribed in other Sections of this Chapter.

(c) Definition.

1. An apprentice shall mean any person who has entered into an apprentice agreement which provides for participation in a program of training through employment and education in related and supplementary subjects.

2. A trainee shall mean any person working at the trade under the direct supervision of a certified Journeyman or Supervisor.

(d) Work. An apprentice or trainee may perform any work which is distinctive to a specific craft, but only under the direction and supervision of a Certified Supervisor or Journeyman of the craft, during working hours. Persons working on tasks not distinctive to any specific craft shall not be classed as an apprentice.

(e) Employment of Apprentices. Contractors may employ apprentices or trainees for the licensed crafts or trades. The ratio of apprentices and trainees to Journeyman employed shall not exceed one apprentice or trainee to one Journeyman.
4. Obey any order issued under authority of this Building Code.
5. Pay any fee assessed under the authority of this Building Code.
6. Observe the safety requirements of this Building Code.
7. Actively supervise and oversee all work performed by or for the licensee by whom he is employed.
8. Be responsible for all permits being issued prior to the beginning of work.
9. Maintain a current local mailing address and accept all mail so addressed.
10. Notify the Department within 3 days whenever he leaves the employ of licensee.
11. Provide minimum safety measures and equipment to protect workmen and the public.
12. Faithfully construct, without departure from drawings and specifications filed and approved by the Department and permit issued for same, unless changes are approved by the Department.
13. Complete all work authorized by the permit issued under the authority of the Department, unless the cause of incomplete work is determined by the Department to be not the fault of the Certificate holder.
14. Obtain inspection services where required by the Department.

SECTION 218. SUSPENSION OR REVOCATION OF CERTIFICATE.
(a) Authority. The Director may suspend or revoke a Certificate for any one or more of the following acts or omissions:
1. Incompetence.
3. Violation of any of the provisions of this Building Code.
4. Failure to comply with any of the Certificate holder responsibilities outlined in Section 217.
5. Knowingly conspire with a person to permit a license to be used by another person.
6. Act as agent, partner, associate or in any capacity with persons to evade the provisions of this Building Code.
7. Willfully violate or disregard any of the provisions of this Building Code.
8. Intentionally fail to perform in accordance with any written contract to conduct work which is regulated by this Building Code.
9. Create, as a result of work performed, an unsafe condition as defined in Chapter 1 of this Building Code.
10. Intentionally or fraudulently misrepresent the condition of any structure or utility or the requirements of this Building Code.
11. Repeatedly violate the provisions of this Code or repeatedly fail to obey orders in a timely fashion.

(b) Procedures. When a Certificate holder commits any acts or omissions enumerated above and the Director deems that the Certificate shall be suspended or revoked, the action shall be as follows:

1. Notification. The Department shall send written notice to the Certificate holder, by certified mail or by personal service, at least 7 days prior to suspension or revocation.

2. Request Hearing. Upon receipt of the notice, the Certificate holder may request a hearing to show cause why a certificate should not be suspended or revoked. This request shall be in writing to the Department within 7 days after receipt of the notice.

3. Time of Hearing. If a hearing is requested by the Certificate holder, the Director shall notify the Certificate holder of the time, date and place of the hearing. Suspension or revocation of the certificate shall be stayed until after the hearing. In the event the Certificate holder fails to appear, the Certificate may be suspended by the Director.

4. Attendance. The Certificate holder, the Department and other interested parties may be in attendance at the hearing. Upon completion of the hearing, the Director shall take all evidence available as a result of the Department’s investigation and all evidence presented at the hearing under advisement, and shall give written notice of the findings and ruling to the Certificate holder by certified mail or personal service.

(c) Emergency Suspension or Revocation. If the Director finds that cause exists for emergency suspension or revocation of a Certificate, and that continued work under the Certificate could be hazardous to life or property, an order may be entered for immediate suspension or revocation of the Certificate, pending further investigation. The Certificate holder may, upon notice of the emergency suspension or revocation, request an immediate hearing before the Department. The hearing shall be conducted in the manner prescribed herein.
Sec. 218

(d) Delegation of Authority. The Director may appoint a qualified member of the Department to sit in his stead as the Hearing Officer to conduct the hearing. The final decision shall be rendered by the Director.

(e) Right to Appeal. The Board of Appeals may review the suspension or revocation under Section 121.

SECTION 219. BOARDS OF STANDARDS.

(a) Creation of Boards of Standards. There are hereby created and established Boards of Standards which shall have the duties, powers and functions prescribed by this Section.

(b) Members. The members of the Boards shall be appointed by the Mayor to serve a period of 2 calendar years and may be re-appointed for an additional 2 years; but no member shall serve more than 4 consecutive years.

(c) Procedures and Bylaws. The Boards of Standards are authorized to make rules of procedure and adopt bylaws necessary for the transaction of business consistent with this Building Code. Each Board shall elect its own Chairman at the first meeting of each calendar year and that person shall be Chairman for the entire year. A simple majority shall constitute a quorum. Each member shall receive $25.00 for attendance per meeting.

(d) Examination Standards. The Board of Standards shall develop standards for the examination of applicants for Certificates and shall submit the standards to the Department for approval. The standards shall be consistent with the purpose of this Building Code, which is the protection of the public health, safety and welfare of the people of the City to the extent that those persons recommended to be certified under this Building Code are qualified in terms of their skills, knowledge, practical experience and knowledge of pertinent law to perform the work for which they may be certified.

1. The Examination Section of the Department shall examine applicants in the following areas:
   b. Technical knowledge.
   c. Skills.

2. The Boards shall furnish the Examination Section of the Department with suggested test material which reflects the examination standards.

3. The Department shall establish minimum standards for education and experience of applicants.
(e) **Annual Review.** The standards shall be reviewed annually, or more frequently if necessary, to maintain the standards current with changes in the Building Code and building practices.

(f) **Members.** The qualifications for members of the respective Boards shall be as follows:

1. **Building Board.**
   - Construction Class A Certificate Holder.
   - Construction Class B Certificate Holder.
   - Construction Class C Certificate Holder.
   - Professional Engineer registered in the State of Colorado.
   - Architect licensed in the State of Colorado.
   - Sign Class A Certificate Holder.
   - Demolition Class A Certificate Holder.
   - This Board shall develop standards for the examination of applicants for the following Certificates:
     - Construction Class A, B, C, D and Moving; Demolition Class A and B; Sign Class A.

2. **Heating, Ventilating and Gas Service Board.**
   - Heating and Ventilating Class A Certificate Holder.
   - Gas Service Certificate Holder.
   - Professional Engineer registered in the State of Colorado.
   - Journeyman Heating and Ventilating Certificate Holder.
   - This Board shall develop standards for the examination of applicants for the following Certificates:
     - Heating and Ventilating Class A, B; Gas Service; Journeyman Gas Service; Journeyman Heating and Ventilating.

3. **Mechanical Board.**
   - Steam and Hot Water Certificate Holder.
   - Journeyman Steamfitter Certificate Holder.
   - Stationary Engineer Class A Certificate Holder.
   - Professional Engineer registered in the State of Colorado.
   - Refrigeration Class A Certificate Holder.
   - Boilermaker Certificate Holder.
   - Journeyman Boilermaker Certificate Holder.
   - Journeyman Refrigeration Certificate Holder.
   - Water Service Certificate Holder.
   - Domestic Appliance Certificate Holder.
   - Journeyman Drainlayer Certificate Holder.
   - This Board shall develop standards for the examination of applicants for the following Certificates:
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Refrigeration Class A, B; Stationary Engineer; Boiler Operator Class A, B; Refrigeration Operator; Steam and Hot Water; Hot Water; Fire Protection Class A, B, C; Boilermaker; Water Service; Journeyman Steamfitter; Journeyman Refrigeration; Journeyman Water Service; Journeyman Boilermaker; Journeyman Drainlayer; Domestic Appliance; Journeyman Domestic Appliance.

4. **Electrical Board.**
Hoist Operator.
Professional Engineer registered in the State of Colorado.
Electrical Signal Certificate Holder.
Elevator Certificate Holder.
This Board shall develop standards for the examination of applicants for the following certificates:
Hoist Operator; Elevator; Electrical Signal; Journeyman Electrical Signal.

**SECTION 220.** Has been purposely omitted.
### SECTION 221. TABLES AND FEES.

#### TABLE NO. 2-A

**CONTRACTOR LICENSE AND REGISTRATION FEE**

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</table>
Sec. 300

Chapter 3 is amended in its entirety:

CHAPTER 3

PERMITS, PLANS, INSPECTIONS, CERTIFICATE OF OCCUPANCY

SECTION 300. PERMITS REQUIRED.
(a) General. No person, business, corporation, agency or public, private or governmental institution shall erect, construct, enlarge, remodel, alter, repair, move, improve, remove, convert, demolish or change the occupancy of any building, structure or utility, or perform any other work regulated by this Building Code, or cause the same to be performed, in the City and County of Denver, without first having obtained a permit from the Department for the specific work to be performed. This permit shall be displayed or available on the job site at all times.

Exempted Work:
1. One-story detached accessory buildings or structures used as tool and storage sheds, playhouses and similar uses, provided that the projected roof area does not exceed 150 square feet and a maximum height of 8 feet.
2. Fences not over 4 feet high.
3. Oil derricks.
4. Movable cases, counters and partitions not over 5 feet 9 inches high.
5. Retaining walls which are not over 4 feet high measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II or III-A liquids. See Section 1107.
6. Water tanks supported directly upon grade where the capacity does not exceed 5000 gallons and the ratio of height to diameter or width does not exceed two to one.
7. Platforms, walks and driveways not more than 30 inches above grade and not over any basement or story below.
8. Painting, papering and similar finish work.
9. Temporary motion picture, television and theater stage sets or scenery.
10. Window awnings supported by an exterior wall of Group R-3 and M Occupancies when projecting not more than 54 inches over privately owned property.
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11. Prefabricated swimming pools accessory to a Group R-3 and M Occupancy in which the pool walls are entirely above the adjacent grade and when utilities are provided.

12. A permit shall not be required of a Public Utility for the repair and maintenance of their equipment and facilities used in the distribution of their utility.

13. A permit shall not be required of the State and Federal Governments, their agencies or subdivisions, or contractors constructing improvements for said State and Federal Governments, their agencies or subdivisions, when constructing improvements to be used for and maintained entirely and strictly for the operation of said Governments.

14. Replacement of glass not in hazardous locations.

15. Site development work including grading, water detention/retention ponds and soil erosion control. The Wastewater Division will require permits for this type of work.

Unless otherwise exempted, separate plumbing, electrical and mechanical permits shall be required for the above exempted items. Wastewater Management Division and Zoning Administration permits may be required. Exemption from the permit requirements of this Code shall not be deemed to grant authorization for any work to be done in any manner that violates the provisions of this Code or any other laws or ordinances of this jurisdiction.

(b) Nontransferable. Permits shall not be transferable.

(c) Validity. The issuance of a permit or the approval of drawings and specifications shall not be construed to be a permit for, nor an approval of, any violation or deviation from the provisions of this Building Code or other ordinances, laws, rules or regulations. The Department shall take any action it deems necessary to ensure that all work performed meets all requirements of this Building Code.

SECTION 301. ISSUANCE OF PERMITS.

(a) General. The Department shall, upon application, issue permits to perform the work shown on submitted documents and as specified on the permit when the following conditions are met:

1. All phases of the project conform to the requirements of this Building Code, Department of Public Works, Zoning Administration, Department of Health and Hospitals, and Fire Department; and
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2. The applicant is a person licensed under this Building Code to do work authorized by the permit; or

3. The applicant is a person who owns a single family dwelling, a duplex, a Group M Occupancy or a dwelling unit in a townhouse building, or who owns property and wishes to construct a single family dwelling or Group M Occupancy which is an accessory to an owner-occupied single unit dwelling or owner-occupied half of a duplex, provided that:

   a. Any work done under a homeowner's permit shall be done by the owner personally unless otherwise approved by the Department.

   b. The applicant for a permit to perform electrical, heating, cooling or plumbing work shall hold an appropriate Certificate of Qualification or shall pass an examination appropriate to the work to be performed and shall personally perform the work.

   c. Any electrical work, work involving fuel-fired appliances or structural work that is done on a homeowner's permit shall be restricted to work in an owner-occupied single family dwelling, the owner-occupied unit of a duplex or Group M occupancy. When the applicant does electrical work, he must intend to occupy the unit for at least 12 months after the completion of the permitted work and shall submit a written statement to the Department before an electrical permit will be issued.

   d. A permit for minor work involving the volunteer services of persons working through a recognized volunteer organization, or of other qualified individuals, may be issued to the applicant of a single family, duplex or miscellaneous building. A request for permit shall be in writing and shall be issued only when approved by the Director.

EXCEPTIONS:

   a. A permit shall not be issued to the owner of a townhouse dwelling unit for structural or utility work.

   b. Only one permit to construct a single family or duplex building shall be issued to any person under subsection 301(a)3 in any 12-month period.

4. The applicant is the owner or owner's agent of a Group R Division 1 building for the purpose of installing battery-operated smoke detectors.
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5. A permit for any work to the exterior or common elements of a townhouse or condominium apartment building must be issued to a licensed contractor and approved by the Homeowner's Association.

(b) Application.

1. The application for a permit shall be on forms furnished by the Department and shall contain the required information necessary. The applicant should exercise care in completing information, especially addresses, as permits are non-transferable, unless the address change is approved by the Address Section of the Design Engineering Division of the Department.

EXCEPTION: The Department may correct minor errors in the address if the change can be made on all copies of the permit and initialed by the inspector.

2. An owner may apply for a permit under subsection 301(a)3.

3. Every application for a permit shall be signed by: (a) the license holder; (b) an authorized representative of the license holder; or (c) the owner applying for a permit under subsection 301(a)3.

(c) Suspension-Cancellation-New Permits.

1. A permit may be cancelled by the Department when:
   a. Work is not commenced within 60 days from the date of issuance unless this time is extended by the Department.
   b. Work is suspended or abandoned for a period of 60 days after work is commenced unless this time is extended by the Department.
   c. No request for inspection has been made for a period of 60 days unless this time is extended by the Department.

2. A demolition or moving permit may be cancelled by the Department when:
   a. Work is not commenced within 30 days after the date of issuance.
   b. Work is suspended or abandoned for a period of 10 days after work is commenced unless otherwise approved by the Department.

3. A new permit may be issued to replace an expired permit, provided that no changes have been made in the original drawings and specifications for the work, when:

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a. The holder of a cancelled permit demonstrates that the suspension or abandonment of work was occasioned by circumstances beyond his control and that it would be an injustice to require a new fee; or

b. Payment of a fee equal to \( \frac{1}{2} \) the current permit fee, provided that the application is made within one year after cancellation.

4. The Department may suspend or cancel any permit or may stop the work for any of the following reasons:

a. Whenever there is a violation of any provisions of this Building Code or any City ordinance which the Department is empowered to enforce.

b. When the owner or permit holder has failed to comply with the requirements of the Department of Public Works, Zoning Administration, Health and Hospitals, and the Fire Department.

c. Whenever the continuance of any work becomes dangerous to life or property.

(d) Notice. Notice of the suspension or cancellation for reasons stated in subsection (c) shall be in writing and shall be served upon the holder of the permit, the owner or the person in charge of the work. If the original notice is not served on the owner, a copy of the notice shall be sent to the owner. It shall be unlawful to proceed with any work once the notice is served.

SECTION 302. PERMIT FEES.

(a) Permit Fees. The fee for each permit shall be as set forth in Table No. 3-A. The determination of value or valuation under any of the provisions of this Code shall be made by the Building Official. The value to be used in computing the building permit and building plan review fees shall be the total value of all construction work for which the permit is issued as well as all finish work, painting, roofing, electrical, plumbing, heating, air conditioning, elevators, fire-extinguishing systems and any other permanent equipment. Permit fees provide for the customary inspections only.

(b) Plan Review Fees. The plan review fee shall be 40% of the building permit fee shown in Table No. 3-A and shall be paid at the time of submitting plans and specifications for review. The plan review fees specified in this subsection are included in and not in addition to the permit fees specified in subsection 302(a). Where plans are incomplete or changed
so as to require additional plan review, an additional plan review fee shall be charged at the rate shown in Table No. 3-A but shall not exceed the original plan review fee.

(c) **Type Approval.** When construction documents have been approved for a typical structure and duplicate structures are to be constructed by the same contractor, 80% of the original permit fees will be required for the building permits of duplicate or typical buildings.

(d) **Expiration of Plan Review.** If no permit is issued within 180 days following the date of application, the application shall expire and plans and other data submitted for review may thereafter be returned to the applicant or destroyed by the Building Official. The Building Official may extend the time for action by the applicant for a period not exceeding 180 days upon a written request showing that circumstances beyond the applicant’s control have prevented action from being taken. No application shall be extended more than once. In order to renew action on an application after expiration, the applicant shall submit a new application with the plans and pay a new plan review fee.

(e) **Allowed Inspections.** Permit fees provide for the customary inspections only.

(f) **Late Fees.** When work for which a permit is required by this Building Code is started without a permit, the fees stated in Table No. 3-A shall be doubled. The payment of this double fee shall not relieve any person from fully complying with the requirements of this Building Code in the execution of the work or from other penalties for performing work without a permit.

**EXCEPTION:** For items of work performed on an emergency basis, as determined by the Department, to maintain an existing service or utility when the maintenance is necessary to protect health, life or safety, the penalties stated herein shall not apply if application for a permit is made within 3 normal working days after commencement of the emergency work.

(g) **Permit Fees for Denver Agencies.** Enterprise fund agencies of the City and County of Denver which are not subsidized by the General Fund shall pay permit fees for all construction and repair work for which building permits are required. General Fund agencies and Enterprise Fund agencies subsidized by the General Fund shall pay permit fees for new construction projects only.
(h) **Additional Fees.** A supplementary permit shall be obtained for any additional valuation not included in the original permit. The fee shall be the difference between the fee paid and the fee that would have been required had the original permit included the entire valuation.

(i) **Additional Permit Fees for Rejected Drawings.** When drawings are rejected, an additional fee shall be charged in accordance with Table No. 3-A.

(j) **Modified Drawings.** When an approved set of drawings is modified or substantially changed so as to require rechecking by the Department, an additional fee shall be charged in accordance with Table No. 3-A.

(k) **Refunds.** No refund will be granted for any permit fee paid to the Department. 

**EXCEPTION:** Fees for duplicate or out of City permits may be refunded. A processing fee of $25.00 per permit will be charged and that amount will be deducted from the refund. Request for refund must be made in writing within 60 days of the date of the permit.

**SECTION 303. DRAWINGS AND SPECIFICATIONS.**

(a) **General.** Drawings and specifications shall be required for review and approval by the Department prior to the issuance of a permit, except as set forth in subsection (f).

(b) **New Construction, Additions, Alterations or Repairs.** Application for a permit shall be accompanied by the following:

1. Drawings including the information required in Section 305.

2. Copies of an engineering report containing studies and test results concerning the hazards present on the building, demolition or moving site when such site is within an area designated as a Special Construction Zone under Article VII Chapter 10 of the Revised Municipal Code. Each report shall contain adequate information as a result of tests to allow identification of the hazards present and recommendations as to methods of minimizing the hazards during construction and methods for controlling the identified hazards likely to be present after construction. The Department of Health and Hospitals and the Fire Department shall approve all reports required by this subsection before any permit is issued.
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3. When required by the Department, additional drawings shall be submitted for approval.

(c) **Approval.** Drawings and specifications complying with the provisions of this Building Code and approved by the Department shall bear the Department stamp of approval on the first page thereof. When corrections are required, the Department may require that the drawings and specifications be revised and resubmitted for approval prior to the issuance of a permit.

(d) **Distribution.** One set of approved drawings and specifications shall be returned to the applicant to be maintained at the job site. One set of approved drawings and specifications shall remain in the office of the Department.

(e) **Disposal.** Upon completion of the work and the final inspections by the Department, the Department's copy of the approved drawings and specifications may be disposed of after 6 years have elapsed from the date of issuance of the permit. If no permit is issued, plans and specifications may be disposed of after 90 days from the date of application.

(f) **Not Required.** Drawings, specifications and an engineering report need not be submitted for the construction, demolition or moving of minor buildings, additions, structures or utilities; or for minor alterations and repairs to existing buildings, structures or utilities when the Department is satisfied that the strength, safety, sanitation and fire resistance are adequately described on the permit application, or when it is satisfied that such construction, alterations, repair, demolition or moving will not substantially increase the hazard present in a Special Construction Zone.

(g) **Utility Companies.** With the approval of the Department, the design of buildings, structures or utilities for the authorized Public Utilities may vary from these Building Code requirements.

**SECTION 304. PREPARATION OF DRAWINGS AND SPECIFICATIONS.** Any person may submit drawings and specifications with an application for a building permit, subject to the following limitations:

(a) **Architect and/or Engineer required.** Construction documents for all buildings, structures, additions, alterations or repairs shall bear the seal and signature of the design professional responsible for each design phase except as provided in subsection (f).
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(b) Seal. The authorized seal, either the crimp type imprint or a rubber stamp facsimile with an original signature, shall be placed on:

1. Reproductions of all original drawings produced by or under the direct supervision of the design professional.
2. The cover, title page and table of contents of specifications.
3. Subsequent issues of revisions, addenda clarifications or other modifications.

(c) Consultant Drawings. Consultant drawings and specifications prepared by architectural or engineering subdisciplines shall be so designated by their name, address and phone number and shall bear the seal and signature of the responsible architect or engineer for the subdiscipline.

(d) Statement. When a design professional signs and seals a document, a statement shall also be included setting forth the aspects of the project for which the design professional is responsible (i.e. civil, structural, mechanical). If there is no statement, it is presumed that the design professional has assumed responsibility for the entire document.

(e) Reproducible drawings. The design professional's seal and signature shall not be placed on reproducible drawings that are used for multiple copies or on reproducible drawings that are transferred away from the design professional's possession and supervision.

(f) Architect or engineer not required. Drawings and specifications for the following buildings, structures, additions, alterations, or repairs need not bear the seal of an architect or engineer:

1. Single family, duplex or miscellaneous buildings.
2. Group R-1 Occupancies and townhouse buildings when the floor area of the building does not exceed 5,000 square feet and the building is not more than one story without basement or cellar.
3. Garages, industrial buildings, warehouses, stores, mercantile buildings or office buildings where the floor area of the building does not exceed 5,000 square feet and the building is not more than one story, without a basement, cellar or excavated subfloor area.
4. Nonstructural alterations, including alterations to utilities, approved by the Department, which are to any building or structure, provided that the alterations do not affect the stability of the building or the health and safety of the occupants.
5. If after review of the drawings and specifications, the Department is unable to determine that the proposed building or structure is adequately designed, the Department may require that the drawings and specifications bear the seal of an architect and engineer who will be responsible for the design phases of the building or structure.

SECTION 305. INFORMATION REQUIRED FOR PREPARATION OF DRAWINGS AND SPECIFICATIONS. Drawings and specifications shall be complete and of sufficient clarity to indicate the entire work proposed and to show in detail that the building, structure or utility conforms to the provisions of this Building Code and relevant laws, ordinances, rules and regulations. Each set of drawings and specifications shall contain at least the following:

(a) Architectural, Structural, Mechanical, Electrical Drawings, Specifications and Analysis.
   1. The exact address, legal description and location of the work performed.
   2. The name and address of the owner.
   3. Name and address of the person or firm responsible for the preparation of the drawings and specifications. The seal and signature of the architect and or engineer responsible for the preparation of the drawings and specifications when required by Section 304.
   4. A plot plan showing the location of the proposed construction and the location of every adjacent existing building on the property, roads, walks, utilities and other site improvements, all property lines, streets, alleys, easements and other public areas. A plot plan is not required for interior alterations and repairs. The proposed construction shall not project beyond property lines except as provided for in Chapter 45.
   5. A completed “Building Profile Form.” The form shall be provided by the Department.
   6. Two complete sets of construction documents showing the construction of architectural, structural, mechanical and electrical arrangements.
   7. One copy of specifications or notes that clearly describe the type, quality and finish of materials and the method of assembly, erection and installation of equipment to be installed with proper reference to accepted standards.
8. Architectural drawings and specifications as follows:
   a. Plans showing the arrangement of each floor, elevations, sections and details to show the construction of all architectural features, including the location and type of fire rated construction.
   b. The gross area in square feet of (1) buildings or portions of buildings in which new construction or remodeling work is intended; and (2) different occupancy groups.
   c. A complete Code analysis, including the building occupancy groups, the type of construction, and a comparison of actual floor areas and number of stories to those allowed under the provisions of Chapter 5 of this Code on the front sheet of drawings.

9. Structural drawings, specifications and analysis as follows:
   a. Design criteria indicating all lateral loads and allowable stresses in all structural materials.
   b. Foundation, floor and roof plans indicating (1) location of concentrated loads and varying live loads; (2) roof areas used to impound water; and (3) pressurized shafts required for Sections 1807 and 1907.
   c. Elevations, sections and details showing all structural requirements.
   d. Foundation design criteria shall be submitted when requested by the Department for all new construction in accordance with a soils investigation report signed and sealed by an engineer responsible for the preparation of the report.

10. Mechanical drawings, specifications and analysis as follows:
    a. Single line drawings, including typical isometric, of plumbing, heating, air treatment systems and gas piping layout.
    b. Btu rating of gas units, method of combustion and ventilation air supply, type and horsepower of refrigeration, and gas meter locations.
    c. Heating, cooling, ventilating, plumbing and fire protection details, and fire or smoke damper locations.
Sec. 305

d. Plans and details showing (1) the location of impounded water; and (2) shafts used for pressurization as required by Sections 1807 and 1907

11. Electrical drawings, specifications and analysis as follows:
   a. Complete electrical drawing, including a single-line power distribution diagram showing sizes of service, feeder conductors and overcurrent protection and panel ratings.
   b. Electrical diagrams for fire protection systems as required in Chapters 38 and 53.
   c. Three complete sets of drawings for fire alarm and fire detection systems shall be submitted prior to installation. Each drawing shall bear the seal and signature of the engineer responsible for the design of the system.
   d. Drawings of all new or replacement services of 400 amperes or more. Drawings shall indicate all information, including calculated loads. Each drawing shall bear the seal and signature of the engineer responsible for the design of the system when required by the Department.

12. A field survey under Section 306 shall be required for all additions and new construction.

13. A complete elevator and dumbwaiter layout, if applicable.

(b) Additional Information When Requested.
1. Reports from an independent testing agency which substantiate requirements of this Building Code regarding structural or fire-resistive requirements.
2. Engineering design calculations.
3. Other information deemed necessary to determine compliance with the requirements of this Building Code.

SECTION 306. FIELD SURVEYS.
(a) General. Prior to the issuance of a permit, a field survey shall be conducted by a land surveyor registered by the State of Colorado establishing the following:
1. Location of property corners and placement of corner stakes or markers.
2. Lines and locations of all existing buildings on the property.
3. Building site boundaries.
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4. Items 1 through 3 shall be shown on a surveyor's certificate and shall be drawn to scale.

(b) Access for Department. The contractor or property owner shall provide unobstructed access for the Department to the required corner stakes or markers.

SECTION 307. INSPECTIONS.

(a) General. All work for which a permit is required shall be subject to inspection by the Department and all such work shall remain accessible and exposed for inspection until approved by the Building Official. In addition, certain types of construction shall have continuous inspection as specified in Section 308. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this Code or of other Denver ordinances. Inspections presuming to give authority to violate or cancel the provisions of this Code or of other ordinances shall not be valid. It shall be the duty of the permit applicant to cause the work to remain accessible and exposed for inspection. Neither the Building Official nor the City shall be liable for expense entailed in the removal or replacement of any material required to allow inspection. A survey of the lot may be required by the Building Official to verify that the structure is located in accordance with the approved plans.

(b) Inspection Record Card. Work requiring a permit shall not be commenced until the permit holder or his agent has posted or otherwise made available an inspection record card so as to allow the Building Official to conveniently make the required entries regarding inspection of the work. This card shall be maintained by the permit holder until final approval has been granted by the Department.

(c) Inspection Requests. It shall be the duty of the person doing the work authorized by a permit to notify the Department when such work is ready for inspection. The Department may require that every request for inspection be filed at least one working day before such inspection is desired and such request may be in writing or by telephone. It shall be the duty of the person requesting any inspections required by this Code to provide access to and means for inspection of such work.

(d) Approval Required. Work shall not be done beyond the point indicated in each successive inspection as provided in subsections (e) and (f) without first obtaining the approval of the Department. There shall be a final inspection and
approval of all buildings and structures when completed and ready for occupancy and use.

(e) **Required Inspections.** The Department, upon notification, shall make inspections and shall either approve that portion of the construction as completed or shall notify the permit holder or his agent that the same fails to comply with this Code. Inspections will be required at progressive phases for the installation of plumbing, mechanical, electrical, boiler, elevator and roofing systems along with the following:

1. **Foundation Inspection:** To be made after excavations for footings are complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. All materials for the foundation shall be on the job, except that concrete need not be on the job when it is ready mixed in accordance with UBC Standard No. 26-13. When the foundation is to be constructed of approved treated wood, additional inspections may be required by the Department.

2. **Waterproofing/Dampproofing Inspection:** To be made after the waterproofing/dampproofing systems or materials are completely in place and exposed for inspection.

3. **Concrete Slab, Reinforcing Steel or Under-Floor Inspection:** To be made after all reinforcing steel, in-slab or under-floor building service equipment, conduit, piping accessories and other ancillary equipment items are in place but before any concrete is placed or floor sheathing installed, including the subfloor.

4. **Frame Inspection:** To be made after the roof, all framing, fire blocking and bracing are in place and all pipes, chimneys and vents are complete and the rough electrical, plumbing and heating wires, pipes and ducts are approved.

5. **Insulation Inspection:** To be made after all insulation is in place and exposed for inspection.

6. **Lath and/or Gypsum Board Inspection:** To be made after all lathing and gypsum board, interior and exterior, is in place but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.

7. **Final Inspection:** To be made after finish grading and the building is completed and ready for occupancy.
(f) **Other Inspections.** In addition to the inspections specified above, the Building Official may make or require other inspections of any construction work to ascertain compliance with the provisions of this Code and other laws which are enforced by the Department.

(g) **Reinspections.** A reinspection fee may be assessed for each inspection or reinspection when the inspected work is not complete or when corrections called for have not been made. This subsection is not to be interpreted as requiring reinspection fees the first time a job is rejected for failure to comply with the requirements of this Code, but as controlling the practice of calling for inspections before the job is ready for inspection or reinspection. Reinspection fees may be assessed for failure to properly post the permit card on the work site, for failure to have approved plans readily available to the inspector, for failure to provide access on the date for which inspection is requested, or for deviating from plans requiring the approval of the Department. To obtain a reinspection, the applicant shall file an application therefor in writing upon a form furnished for that purpose and pay the reinspection fee of a minimum of one hour in accordance with Table No. 3-A. Where reinspection fees have been assessed, no additional inspection of the work will be performed until the required fees have been paid.

(h) **Inspections.**

1. **Boilers, incinerators, crematories and Pressure Vessel Annual Inspection.** Boilers, pressure vessels, crematories, pool heaters, incinerators of all types and water heaters located in all occupancies, except one and two unit dwellings, townhouses and miscellaneous buildings, shall be inspected by the Department at least once each year.

   a. If, after inspection by the Department, the equipment is found to be in safe condition, the Department shall issue a certificate stating that the equipment may be operated. The certificate shall be posted in a conspicuous place in the boiler room only, mounted in a tamper-proof frame.

   b. **Owner to Provide Facilities.** Every person owning or having in his possession or control the equipment enumerated herein shall provide, at his expense, proper arrangements and facilities for the required inspections.
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c. **Annual Inspection Fees.** The annual inspection fee for boilers, pressure vessels, incinerators and crematories shall be as specified in Table No. 3-B.

**EXCEPTION:** Listed storage-type direct-fired water heaters of less than 200,000 Btu/h input do not need a yearly inspection.

2. **Vertical Transportation Semi-Annual Inspection.** The following units shall be inspected by the Department and City Licensed Elevator Contractors as indicated in this subsection: passenger or passenger service elevators, combination passenger and freight elevators, freight and freight service elevators, escalators, dumbwaiters, sidewalk elevators, stage lifts, orchestra lifts and manlifts.

   a. **Required Inspections.** The owner, agent or lessee shall, at his expense, cause the elevator to be thoroughly checked by an Elevator Contractor licensed by the City. This inspection shall include the requirements of Chapter 51. The car safety device shall be tested without load at the lowest possible speed each year; and full load at the rated car speed every 2 years for winding machines and every 5 years for traction machines. The overspeed governor actuating the safety device shall be checked for calibration every 3 years.

   b. **Certificate.** If, after inspection by the Department, the equipment is found to be in safe condition, the Department shall issue a certificate stating that the equipment is ready for use and indicating the maximum load permitted. Certificates shall be maintained, in the building for which they are issued, by the owner, agent or lessee in a manner easily accessible for checking by the Department or other interested persons. Valid elevator certificates shall be mounted in a tamper-proof frame in the elevator for which they were issued or a metal plaque indicating where the certificate is located within the building may be mounted in the car in lieu of the current certificate of inspection.

   c. **Equipment Tag.** The owner or operating agent shall cause the equipment to be tagged so as to indicate the contractor's name and date when the test and work were performed.
d. Semiannual Inspection Fee. The semiannual inspection fee for vertical transportation units shall be as specified in Table No. 3-C.

SECTION 308. SPECIAL INSPECTIONS.
(a) General. In addition to the inspections required by Section 307, the owner, engineer or architect of record, acting as the owner's agent, shall employ one or more special inspectors to conduct inspections during construction on the following types of work:
   1. Concrete: During the taking of test specimens and placing of reinforced concrete and pneumatically placed concrete.

   EXCEPTIONS:
   a. Concrete for foundations conforming to minimum requirements of Table No 29-A or for one and two unit dwellings and miscellaneous buildings, provided that the Department finds that a special hazard does not exist.
   b. For foundation concrete when the structural design is based on a $f'_c$ no greater than 2500 psi.
   c. Nonstructural slabs on grade, including prestressed slabs on grade when effective prestress in concrete is less than 150 psi.
   d. Site work concrete full-supported on earth and concrete where no special hazard exists.

   2. Bolts Installed in Concrete: During installation of bolts and placing of concrete around such bolts when stress increases permitted by Footnote No. 5 of Table No. 26-F are utilized.

   3. Ductile Moment-Resisting Concrete Frame: As required by subsection 2625(j) of this Code.

   4. Reinfoncing Steel And Prestressing Steel:
      a. During all stressing and grouting of prestressed concrete.
      b. During placing of reinforcing steel, tendons and prestressing steel for all concrete required to have special inspection by Item No. 1.

   EXCEPTION: The special inspector need not be present during entire reinforcing steel- and prestressing steel-placing operations, provided that he has inspected for conformance with the approved plans, prior to the closing of forms or the delivery of concrete to the job site.
5. **Welding:**
   a. Ductile moment-resisting steel frames. As required by subsection 2722(f) of this Code.
   b. All structural welding, including welding of reinforcing steel.

**EXCEPTION:**
   (1) When welding is done in an approved fabricator's shop.
   (2) When approved by the Building Official, single-pass fillet welds when stressed to less than 50% of allowable stresses and floor and roof deck welding and welded studs when used for structural diaphragm or composite systems may be periodically inspected in accordance with subsection 306(e) of this Code. For periodic inspection, the inspector shall check qualifications of welders at the start of work and then make final inspection of all welds for compliance prior to completion of welding.

6. **High-Strength Bolting:** During all bolt installations and tightening operations.

**EXCEPTION:**
   a. The special inspector need not be present during installation and tightening operation, provided that he:
      (1) Has inspected the surfaces and bolt type for conformance to plans and specifications prior to start of bolting; and
      (2) Will, upon completion of all bolting, verify the minimum specified bolt tension for 10% of the bolts for each connection with a minimum of two bolts per connection.
   b. Inspection prior to or during installation will not be required in bearing-type connections when threads are not required by design to be excluded from the shear plane.

7. **Structural Masonry:** During preparation of masonry wall prisms, sampling and placing of all masonry units, placement of reinforcement, inspection of grout space, immediately prior to closing of cleanouts, and during all grouting operations.
EXCEPTION:

a. Special inspection need not be provided when design stresses have been adjusted to permit noncontinuous inspection.

b. For hollow-unit masonry when the $f'_{m}$ is no more than 1500 psi for concrete units or 2600 psi for clay units, special inspection for placing of units may be performed on a periodic basis in accordance with subsection 306(e).

8. **Reinforced Gypsum Concrete:** When cast-in-place Class B gypsum concrete is being mixed and placed.

9. **Insulating Concrete Fill:** During the application of insulating concrete fill when used as part of a structural system.

EXCEPTION: The special inspections may be limited to an initial inspection to check the deck surface and placement of reinforcing. The special inspector shall supervise the preparation of compression test specimens during this initial inspection.

10. **Spray-Applied Fireproofing:** As required by UBC Standard No. 43-8.

11. **Piling, Drilled Piers and Caissons:** During driving and testing of piles and construction of cast-in-place drilled piles or caissons. See Items Nos. 1 and 4 for concrete and reinforcing steel inspection.

12. **Shotcrete:** During the taking of test specimens and placing of all shotcrete and as required by subsections 2621 (j) and (k).

EXCEPTION: Shotcrete work fully supported on earth, minor repairs and when, in opinion of the Department, no special hazard exists.

13. **Special Grading, Excavation and Filling:** During earthwork excavations, grading and filling operations inspection to satisfy requirements of Chapter 29 and Chapter 70 (Appendix) of this Code.

14. **Special Cases:** Work which, in the opinion of the Department, involves unusual hazards or conditions.

(b) **Special Inspector.** The special inspector shall be a qualified person who shall demonstrate his competence, to the satisfaction of the Department, for inspection of the particular type of construction or operation requiring special inspection.
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(c) Duties and Responsibilities of the Special Inspector.
1. The special inspector shall observe the work assigned for conformance with the approved design drawings and specifications.
2. The special inspector shall furnish inspection reports to the Department, the engineer or architect of record, and other designated persons. All discrepancies shall be brought to the immediate attention of the contractor for correction; then, if uncorrected, to the proper design authority and the Department.
3. The special inspector shall submit a final signed report stating whether the work requiring special inspection was, to the best of his knowledge, in conformance with the approved plans and specifications and the applicable workmanship provision of this Code.

(d) Waiver of Special Inspection. The Department may waive the requirement for the employment of a special inspector if the construction is minor in nature.

(e) Periodic Special Inspection. Some inspections may be made on a periodic basis and satisfy the requirements of continuous inspection, provided that this periodic scheduled inspection is performed as outlined in the project plans and specifications and approved by the Department.

(f) Structural Observation. When required by the Department, the owner shall employ an engineer to make visits to the site to observe general compliance with the approved structural plans, specifications and change orders. The engineer shall submit a statement in writing to the Department stating that site visits have been made and that any deficiencies noted have been corrected. He shall also submit a final report as required in subsection 308(c)3.

(g) Approved Fabricators. Special inspections required by this Section and elsewhere in this Code shall not be required where the work is done on the premises of a fabricator registered and approved by the Department to perform such work without special inspection. The Certificate of Registration shall be subject to revocation by the Department if it is found that any work done pursuant to the approval is in violation of this Code. The approved fabricator shall submit a Certificate of Compliance that the work was performed in accordance with the approved plans and specifications to the Department and to the engineer or architect of record. The approved fabricator's qualifications shall be contingent on compliance with the following:
1. The fabricator has developed and submitted a detailed fabrication procedural manual reflecting key quality control procedures which will provide a basis for inspection control of workmanship and the fabricator plant.

2. Verification of the fabricator's quality control capabilities, plant and personnel as outlined in the fabrication procedural manual shall be by an approved inspection or quality control agency.

3. Periodic plant inspections shall be conducted by an approved inspection or quality control agency to monitor the effectiveness of the quality control program.

4. It shall be the responsibility of the inspection or quality control agency to notify the approving authority in writing of any change to the procedural manual. Any fabricator approval may be revoked for just cause. Reapproval of the fabricator shall be contingent on compliance with quality control procedures during the past year.

SECTION 309. CERTIFICATE OF COMPLIANCE. A Certificate of Compliance will be issued by the Department, when a certificate of occupancy is not required, upon the request of the General Building Contractor when the inspection card issued by the Department is returned indicating that all final inspections by the Department have been made. There shall be a processing fee of $5.00 for each certificate issued.

SECTION 310. CERTIFICATE OF OCCUPANCY.

(a) Required. All new buildings or structures except miscellaneous buildings or structures shall not be used or occupied until a certificate of occupancy is issued by the Department. No building or portion thereof shall be used or occupied for an occupancy other than the one designated on the certificate until a new certificate of occupancy is issued by the Department.

(b) Requirements Prior to Issuance. A Certificate of Occupancy shall be issued to the owner after approval by the Department and the following:

1. Construction Engineers Division, Wastewater Management and Zoning Administration.

2. Department of Health and Hospitals and the Fire Department when specifically requested by either department in writing at the time of application.
3. Department of Health and Hospitals, Fire Department and the Department of Public Works showing compliance with all provisions of this Building Code applicable to buildings or structures located in a Special Construction Zone designated pursuant to Article 647 of the Revised Municipal Code.

(c) **Issuance of Certificate.** When all the conditions of this Chapter have been fulfilled, the Department, in conjunction with Zoning Administration, shall issue a Certificate of Occupancy indicating:
   1. The use and occupancy for which the certificate is issued.
   2. Approval by the Department and Zoning Administration.

(d) **Duplicate Certificate of Occupancy.** Upon payment of $5.00 to the Department, a duplicate Certificate of Occupancy may be secured by the owner, architect, engineer, contractor, permit holder or tenant.

(e) **Temporary Certificate of Occupancy.** The Department may issue a temporary Certificate of Occupancy to the owner where unusual construction difficulties have delayed the completion of the construction work covered by the Building Permit. The certificate may be issued provided that no substantial hazard will result from the occupancy and subject to the following items being provided to the Department:
   1. A written request by the owner or the owner's agent, itemizing the uncompleted work and justifying the T.C.O. This list shall not waive, reduce or diminish any Building Code requirements required by the Building Permit.
   2. Payment of the following processing fees:
      a. Zoning Administration $10.00
      b. Building Department $30.00
   3. Approval from the following City Agencies:
      a. Construction Engineering Division
      b. Wastewater Management Division
      c. Department of Health and Hospitals
      d. Fire Department
      e. Zoning Department.

This temporary Certificate of Occupancy shall be valid for a period of 6 months. Upon written request by the owner, showing reasonable cause, the Department may grant an extension of the T.C.O. for an additional 6 months. The fee for this extension shall be $50.00. The request for an extension of a Temporary Certificate of Occupancy shall be filed at least 30 days prior to the expiration of the certificate. After the expiration date of the Temporary Certificate of Occupancy, the
building or structure shall require a permanent Certificate of Occupancy in accordance with other provisions of this Chapter.

Additional inspections required for the T.C.O. shall be charged as indicated in Table 3A and shall be paid before the permanent Certificate of Occupancy is issued.

(f) **Change of Occupancy.** Changes in the character or occupancy of all buildings or structures shall not be made except as specified in Chapters 5 and 31 of this Building Code. A new Certificate of Occupancy is required for all such changes.

(g) **Cancellation of Certificate of Occupancy.** A Certificate of Occupancy may be cancelled when:
   1. The owner has failed to comply with the requirements of the Department of Public Works.
   2. The continued occupancy of the structure is dangerous to the public health, safety or welfare.

(h) **Violation.** It shall be a violation of this Building Code to occupy a building or structure prior to obtaining a Certificate of Occupancy when required.

(i) **Right to Appeal.** The Board of Appeals may review any appeal of the Department's suspension or denial of Certificate of Occupancy under Section 121. One extension of a temporary Certificate of Occupancy may be sought from the Board of Appeals subject to Section 121.

SECTION 311. ADDRESS.

(a) **On Job Site.** The construction permit holder shall post, at the front of the job site in a conspicuous place, a sign indicating the following:
   1. The address number and street, avenue, court, parkway or other, as assigned by the office of the City Engineer.
   2. The name of the firm, address, business phone number and emergency phone number of permit holder.
   3. The building permit number.

(b) **Permanent Address.** The owner or occupant of every building shall display the permanent address of each building in a permanent visible location with numbers made of durable materials and of a size to be visible and legible from the street fronting the property.
SECTION 312. PERMITS FOR TEMPORARY BUILDINGS.
(a) A permit for a temporary building may be issued by the Department if the applicant can substantiate a definite need for the temporary building. The permit shall not exceed 6 months duration. However, after the expiration date of the permit, if the applicant can demonstrate that there have been no complaints or hazards as a result of this temporary occupancy, the Department may issue a renewal of the permit for one additional 6 month period. The request for a permit shall be in writing, detailing the reason for the request. The approval shall be based on the need, extent of time and type of unit installed. A renewal permit fee equal to the original permit fee will be required.

EXCEPTION: Temporary buildings for use by licensed contractors at the construction or demolition sites shall not require a permit.

(b) Right of Appeal. One 6-month extension of a permit for a temporary building may be sought from the Board of Appeals subject to Section 121.

SECTION 313. FOUNDATION PERMITS.
(a) General. A foundation permit for all buildings and structures except one and two unit dwellings and miscellaneous structures may be issued to a contractor who holds a license qualifying him as a general contractor for the entire project, prior to the issuance of the construction permit for the building, provided that:
1. The total valuation of the project, excluding utilities, exceeds $200,000 or as approved by the Department.
2. Drawings of the proposed superstructure containing sufficient detail relating to the design of the foundation or substructure are submitted to the Department. Complete calculations shall be submitted to validate the design of footings, caissons and all other substructure elements.
3. Approvals required by the appropriate City agencies are obtained prior to issuance of the permit.
4. For purposes of this Section, the term "Project" shall mean one building only with a valuation in conformance with subsection 312(a).

(b) Fee. The plan review fee and the permit fee charged at the time of issuance of the foundation permit shall be based on the total valuation of the construction for both the substructure and the superstructure, plus an additional 25%. See Table No. 3-A.
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(c) **Deviations.** Any deviation from the approved foundation permit drawings shall be cause for the cancellation of the permit. However, if changes are substantiated by engineering calculations and revised drawings, the deviations may be approved by the Department.

(d) **Responsibility.** The contractor shall assume full responsibility for the installation of all utilities in the substructure. Any changes in design or construction to meet the requirements of this Building Code for the combined substructure shall be the sole responsibility of the contractor. A permit issued under this Section shall not be construed as approval for any portion of the structure not covered by the foundation permit.

(e) **Not Applicable.** Foundation permits are not applicable to phased construction.

SECTION 314. PHASED CONSTRUCTION PERMITS.

(a) **General.** The Department may issue permits for the construction of a portion or phase of a building, structure or utility prior to the submission of the complete drawings and specifications, provided that:

1. The minimum total valuation of the building, structure or utility is more than $1,000,000.
2. The approval of appropriate City agencies has been obtained prior to application for the initial permit.
3. The valuation of the portion of the work, including utilities, is stated on each application.
4. Drawings shall show on each sheet the note "Phased Construction" with a brief description of the phase covered by the permit.

(b) **Fees.** Plan review fees and permit fees shall be assessed at 150% the amount of those specified in Table No. 3-A. A permit issued under this Section shall not be construed as approval for any portion of the structure not covered by the permit.

SECTION 315. TABLES AND FEES.

(a) **Permit Fees.** The fee specified in Table No. 3-A shall be assessed for all permits except as otherwise provided for in this Chapter.

(b) **Other Fees.** Annual and semi-annual fees shall be as specified in Table No. 3-B and No. 3-C. Inspections outside of normal business hours shall be charged in accordance with Table No. 3-A.
### TABLE NO. 3-A
FEES FOR REQUIRED PERMITS
PERMITS NOT OTHERWISE SPECIFIED

<table>
<thead>
<tr>
<th>VALUATION OF WORK</th>
<th>PERMIT FEE</th>
<th>APPLICATION FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.00 - $500.00</td>
<td>$15.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>$501.00 - $2,000.00</td>
<td>$20.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>$2,001.00 - $50,000.00</td>
<td>$8.00 per $1,000 in Valuation for fraction thereof of Total Valuation.</td>
<td>$20.00</td>
</tr>
<tr>
<td>$50,001.00 - $100,000.00</td>
<td>$50.00 plus $7.00 per $1,000 in Valuation for fraction thereof of Total Valuation.</td>
<td>$30.00</td>
</tr>
<tr>
<td>$100,001.00 - $500,000.00</td>
<td>$150.00 plus $6.00 per $1,000 in Valuation for fraction thereof of Total Valuation.</td>
<td>$40.00</td>
</tr>
<tr>
<td>Over $500,001.00</td>
<td>$650.00 plus $5.00 per $1,000 in Valuation for fraction thereof of Total Valuation.</td>
<td>$50.00</td>
</tr>
</tbody>
</table>

**BUILDING MOVING PERMITS**

| Per Each Address | $100.00 |

**OTHER INSPECTIONS AND FEES**

1. Inspections outside of normal business hours ... $30.00 per hour\(^1\) (minimum charge - two hours)
2. Reinspection fees assessed under provisions of Section 302(e) ... $30.00 per hour\(^1\) (minimum charge - one hour)
3. Inspections required by the Department for which no fee is specifically indicated ... $30.00 per hour\(^1\) (minimum charge - one-half hour)
4. Additional plan review required by changes, additions or revisions to approved plans ... $30.00 per hour\(^1\) (minimum charge - one-half hour)

\(^1\) Or the total hourly cost to the jurisdiction, whichever is the greatest. This cost shall include supervision, overhead, equipment, hourly wages and fringe benefits of the employees involved.
TABLE NO.3-B
PERIODICAL INSPECTION FEES
BOILERS, PRESSURE VESSELS,
INCINERATORS
AND CREMATORIES

<table>
<thead>
<tr>
<th>HORSEPOWER¹</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 50</td>
<td>$25.00</td>
</tr>
<tr>
<td>51 to 100</td>
<td>35.00</td>
</tr>
<tr>
<td>101 to 250</td>
<td>45.00</td>
</tr>
<tr>
<td>251 to 500</td>
<td>55.00</td>
</tr>
<tr>
<td>501 to 1000</td>
<td>65.00</td>
</tr>
<tr>
<td>1001 and over</td>
<td>75.00</td>
</tr>
</tbody>
</table>

STEAM BOILERS - CAST IRON
15 PSI OR LESS IN PRESSURE

<table>
<thead>
<tr>
<th>SQUARE FEET OF RADIATION</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 1,400</td>
<td>$20.00</td>
</tr>
<tr>
<td>1,401 to 5,000</td>
<td>25.00</td>
</tr>
<tr>
<td>5,001 to 10,000</td>
<td>30.00</td>
</tr>
<tr>
<td>10,001 to 25,000</td>
<td>35.00</td>
</tr>
<tr>
<td>25,001 and over</td>
<td>40.00</td>
</tr>
</tbody>
</table>

BOILERS - HOT WATER

<table>
<thead>
<tr>
<th>SQUARE FEET OF RADIATION</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 1,400</td>
<td>$20.00</td>
</tr>
<tr>
<td>1,401 to 5,000</td>
<td>25.00</td>
</tr>
<tr>
<td>5,001 to 10,000</td>
<td>30.00</td>
</tr>
<tr>
<td>10,001 to 25,000</td>
<td>35.00</td>
</tr>
<tr>
<td>25,001 and over</td>
<td>40.00</td>
</tr>
</tbody>
</table>

WATER HEATERS

<table>
<thead>
<tr>
<th>BTU/HR INPUT²</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>200,000 to 1,673,750 BTU/HR</td>
<td>$20.00</td>
</tr>
<tr>
<td>1,673,751 BTU/HR and over</td>
<td>25.00</td>
</tr>
</tbody>
</table>

MISCELLANEOUS EQUIPMENT

<table>
<thead>
<tr>
<th></th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool Heaters All Sizes</td>
<td>$20.00</td>
</tr>
<tr>
<td>Unfired Pressure Vessels</td>
<td>$20.00</td>
</tr>
<tr>
<td>Incinerators and Crematories</td>
<td>$20.00</td>
</tr>
</tbody>
</table>

Saturday, Sunday and Holiday Inspection Fees shall be double the fees indicated in Table 3-B.

¹For purposes of determining fees for electric boilers one boiler horsepower is equivalent to 10 kilowatts.

²For electric water heaters divide kilowatt rating by 0.000293 to obtain BTU/HR equivalent.

TABLE NO.3-C
PERIODICAL INSPECTION FEES
(VERTICAL TRANSPORTATION)

<table>
<thead>
<tr>
<th>TYPE OF INSPECTION</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevators</td>
<td>$37.00 (each unit)</td>
</tr>
<tr>
<td>For each additional landing over 3</td>
<td>$1.00</td>
</tr>
<tr>
<td>Escalators*</td>
<td>$37.00 (each unit)</td>
</tr>
<tr>
<td>Dumbwaiters</td>
<td>$37.00 (each unit)</td>
</tr>
<tr>
<td>Stage Lifts</td>
<td>$37.00 (each unit)</td>
</tr>
<tr>
<td>Orchestra Lifts</td>
<td>$37.00 (each unit)</td>
</tr>
<tr>
<td>Man Lifts</td>
<td>$37.00 (each unit)</td>
</tr>
</tbody>
</table>

*This shall mean each unit, floor to floor, in either direction.

Saturday, Sunday and Holiday Inspection Fees shall be double the fees indicated in Table 3-C.
Section 401 is amended:

SECTION 401. GENERAL. For purposes of this Building Code, certain words, phrases and terms shall be given the defined meaning. Words, phrases and terms not defined in this Code shall be given their usual and customary meanings. The text of this Code shall control captions, titles, maps, figures and diagrams. The word "shall" is mandatory and not permissive; the word "may" is permissive and not mandatory. Words used in the singular shall include plural, the words used in the plural shall include singular. Words used in the present tense shall include the future tense, and words used in the future tense shall include the present tense. Words used in the masculine gender shall include the feminine, and words used in the feminine gender shall include the masculine. Other terms and abbreviations used only with specialized application are defined in the Chapter in which they are used.

SECTIONS 402-427 definitions are amended, and where conflicts occur these definitions shall govern:

ABANDON. The desertion of a building, structure or utility. Abandon shall also apply when the building, structure or utility is left to the effects of vandalism, dilapidation and deterioration, thereby creating a fire hazard, unsafe condition or public nuisance.

ACCESSORY USE, MINOR. A secondary occupancy or use closely associated with the principal use.

ADEQUATE. Determined to be acceptable to the Department.

AISLE. A free, unobstructed passageway in a building for public ingress and egress to and from seats or other similar use areas leading to a lobby, foyer, corridor or exit.

AMBULATORY. A physical condition under which a person is capable of leaving an area, within a reasonable length of time, without assistance of any kind in the event of an emergency.

ARCHITECT. An architect licensed by the State of Colorado.

AREAWAY. An excavated space outside the wall of a building used for access, lighting or ventilation.

ASSISTED CARE FACILITIES. Assisted care shall mean a facility where protective care of a resident who does not require chronic or convalescent medical or nursing care. Protective care includes a daily awareness by the management of the resident’s functioning and his or her
whereabouts, supervision of functions of daily living, nutrition and medication, and actual provision of transient medical care.

**ATRIUM.** A space within a building formed by openings through two or more floor construction systems other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air conditioning or other equipment shafts, which is closed at the top and not defined as a mall. Floor construction systems, as used in this definition, do not include balconies within assembly occupancies nor mezzanines which comply with Section 1716. Atrium openings shall have a common axis. See Table No. 17-B.

**BOARD.** The Board of Appeals.

**BUILDING.** A structure, including utilities, enclosed with a roof and within exterior walls built and designed for the housing, shelter, enclosure and support of individuals, animals or property of any kind.

**BUILDING, TEMPORARY.** A building not intended for permanent use.

**CARPORT.** A covered shelter for private or pleasure type motor vehicles.

**CITY.** The City and County of Denver.

**CLINIC.** A building or portion thereof that contains offices for the diagnosis and treatment of outpatients requiring health services excluding facilities for overnight accommodation of patients.

**COMBUSTIBLE MATERIAL.** Material that will ignite and burn when subjected to fire under ordinary conditions. See noncombustible.

**CONSTRUCTION.** The act of using labor and materials used for erection, demolition or removal of a building, structure, utility, appliance or device.

**CRAWL SPACE.** A space located under the first floor of a building that provides a clear height of less than 5 feet.

**DAY CARE.** Shall include any building or portion thereof used for nonsleeping purposes, other than napping on cots or pads, for less than 24 hours per day to house one or more children or adults other than their relatives or legal guardians. Supervision is necessary. Adults shall include those who:

1. May require the administration of dry or liquid oral medications by staff personnel when and as prescribed by a licensed medical practitioner, and

2. May require limited attendance, supervision or observation, and
3. Exhibit acceptable behavior (not harmful to self or others), and
4. Possess adequate mobility and dexterity to use sanitary facilities and feed self, but are otherwise home bound.

Day care shall not include social, religious, educational or similar activities organized specifically for independent senior adults.

DAY CARE CENTER. A facility which is used for the care of 7 or more adults or children, who are not related to the owner, operator or manager thereof. The children shall be between the ages of 6 weeks and 16 years. The facility may operate with or without compensation for such care and with or without stated educational purposes. The term includes facilities commonly known as "adult day care centers," "child day care centers," "day nurseries," "nursery school," "play groups," "day camps" or "summer camps". The use shall be for more than 12 hours per week or 4 hours or more in any one day.

DECORATION. Painting, wall papering, wall coverings, cabinets, curtains and drapes and similar items.

DEMOLITION. The destruction and removal of a building, structure or utility.

DEPARTMENT. The Building Inspection Division of the Department of Public Works of the City and County of Denver.

DESIGN PROFESSIONAL. The architect or engineer of record responsible for the production of construction documents.

DETERIORATION. The effect upon buildings, structures, utilities, equipment and materials through corrosion, decay, wear and tear due to use or abuse, obsolescence, effects of the elements, fire damage, disaster, flood, earthquake, lack of maintenance, vandalism, or any other cause, including fatigue due to overstressing and disintegration of component parts and the separation of materials and structural parts occurs.

DIRECTOR. The officer charged with the administration and enforcement of this Building Code.

DORMITORY. A building or portion thereof occupied as a residence for unrelated persons sharing common living facilities.

DRAFT STOPS. Physical barriers to stop or control the movement of air. The term draft stops, curtain boards and draft curtains as required by sections of this Code and the Mechanical Code may be used interchangeably to accomplish the particular intention of that section. Noncombustible
construction of draft stops is required in noncombustible types of construction.

ENGINEER. An engineer registered by the State of Colorado.
FIRE DEPARTMENT. The Fire Department of the City and County of Denver.

FLAME-SPREAD. The propagation of flame over a surface.
FLOOR. The structural framing system which supports the applied loads within a building and divides the building into stories.
FLOOR SPACE. The volume of space developed between floors and walls. See story.
GARAGE, REPAIR. A building or portion thereof used for the repair of internal combustion engines; motor vehicle transmission, differentials, frames or bodies where any part is removed for repairs rendering the vehicle inoperative; repairs requiring welding or brazing; stripping of inoperative motor vehicles; painting; or any other work not permitted in a storage garage.
GARAGE, STORAGE. A building, other than a private, repair or open parking garage, used exclusively for the housing of motor vehicles.
HIGH RISE BUILDING. Any building having floors used for human occupancy more than 75 feet above the lowest level of Fire Department vehicle access.
HOTEL. A building or portion thereof used for the living and/or sleeping accommodation of guests and which will be licensed by the City as a hotel.
LANDING. A continuation of the floor of a building giving access to stairs, ramps or an escalator, and any level space between runs.
MACHINE ROOM. A room used for the housing of elevator, heating, refrigeration or air handling equipment.
MAINTENANCE. The normal upkeep of property or equipment to keep it in an existing state, such as minor repairs to keep equipment operational. This definition shall not invalidate the requirement for a permit when so determined by the Department as beyond the scope of maintenance.
NONAMBULATORY. A physical condition under which a person is incapable of leaving an area, within a reasonable length of time, without assistance in the event of an emergency.
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NONCOMBUSTIBLE. Noncombustible, as applied to building construction material, means a material which, in the form in which it is used, is either one of the following:
1. Material of which no part will ignite and burn when subjected to fire. Any material conforming to U.B.C. Standard No. 4-1 shall be considered noncombustible within the meaning of this section.
2. Material having a structural base of noncombustible material as defined in Item No. 1 above, with a surfacing material not over 1/8 inch thick which has a flame-spread rating of 50 or less.

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

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

NURSERY. A place where parents may temporarily leave children with trained attendants.

NURSING HOME. A facility that is operated in connection with a hospital or where nursing care and medical services are prescribed by or performed under the general direction of persons licensed to practice medicine or surgery by the State of Colorado or for the accommodation of convalescents or other persons who are not actually ill and not in need of hospital care and related services. The term "nursing home" is restricted to facilities designed to provide skilled nursing care and related medical services for a period of not less than 24 hours per day.

OCCUPANCY, MIXED. The use of a building for more than one occupancy as provided for in Chapter 5.

OCCUPIED ROOF. The roof of a building or structure used for purposes other than maintenance, repair or servicing of the building or equipment.

PARTITION, PERMANENT. Permanent partitions are those walls within a building which are required to provide protection of specific areas such as machine and equipment rooms, service areas, shafts, etc. Permanent partitions may be bearing or nonbearing walls.
PARTITION, TEMPORARY. Temporary partitions are those walls or portions of walls which are used to divide a floor space into rooms or spaces. Corridor and occupancy separations are special types of temporary partitions which must comply with specific fire-resistive construction requirements. Temporary partitions shall be nonbearing walls only.

PENTHOUSE. An enclosed structure built on or above the roof of a building and used for the housing of machinery or equipment, and not used for habitation.

PERSONAL CARE BOARDING HOME. A facility which provides meals and personal care for ambulatory tenants. Personal care shall include the following services: housekeeping, maid service, laundry, social supervision and other services of a personal nature.

PORCH. A roofed structure providing shelter at the entrance of a building or an open or enclosed room at the outside of a building.

PREFABRICATED ASSEMBLY. See Chapter 50.

PROSCENIUM. A vertical plane or separation between an assembly area and a stage or enclosed platform.

PUBLIC UTILITY. An authorized or franchised firm given the right to perform services necessary under the authorization or franchise.

RECOGNIZED VOLUNTEER ORGANIZATION. A nonprofit organization, recognized by the Internal Revenue Service as a charitable or religious organization.

REFUGE AREA. A specified area within a building constructed and mechanically ventilated to protect the occupants from fire and/or smoke.

REHABILITATION CENTER. A center for the rehabilitation of handicapped persons.

RESTAURANT. A restaurant shall mean any place which is kept or maintained for the purpose of preparing and/or serving food for sale and consumption, but does not include food processing establishments or retail food stores. For the purposes of this Building Code, the provisions for restaurants shall pertain to those permanent facilities within buildings or structures only.

RETAIL FOOD STORE. Any establishment or portion of a building where food or food products are offered to the consumer for off-premise consumption.

ROOF, OPEN FRAME. A roof with all supporting members exposed on the underside and without a ceiling.
ROOF STRUCTURE. A structure above or on the roof of a building including cooling towers, tanks, heating and cooling equipment, spires, towers or any other projection above the roof, not used for habitation.

SCHOOL, PUBLIC OR PRIVATE. An institution which provides instruction or education at elementary, secondary and high school learning levels.

SCHOOL, VOCATIONAL. An institution which provides instruction or education for a trade, art, voice, music, modeling or similar endeavors.

SMOKE CONTROL SYSTEM. An engineered mechanical and electrical system designed to control the development and movement of smoke as a product of combustion.

STAIRWAY. Two or more risers.

STRUCTURE. An assembly of materials forming a construction for a specific use including among others, building, stadiums, tents, reviewing stands, platforms, stagings, observation towers, radio and television towers, water tanks, swimming and wading pools, retaining walls, open sheds, coal bins, shelters, fences and display signs. This definition shall not include utilities.

TENANT. A person occupying a building or portion thereof and separated from other tenants by walls, floors and ceilings. The tenant shall have a lease to occupy the specified space from the owner.

TOWNHOUSE. A specific type of arrangement for attached dwelling units which may be arranged as cluster homes, row houses or attached dwelling units for three or more units. See special provisions for Group R, Division 2 Occupancies.

TREAD. The horizontal portion of a step, including nosing.

UNDERGROUND. Embedded by completely burying pipe, cable, etc., in earth.

UNSAFE BUILDING, STRUCTURE OR UTILITY. See Chapter 1.

USE. The purpose for which a building is occupied.

USEABLE SPACE. Space that may be used. This definition does not apply when a useable or potential useable space is sealed off so that access to the area is not provided.

UTILITIES. For the purpose of this Code, utilities shall be defined, without limitation, to include the following:

Refrigeration systems and their appurtenances; electrical systems and all appurtenances, such as motors, etc; heating and ventilating systems and appurtenances; elevators, dumbwaiters, escalators and similar
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conveyances; fire protection systems and apparatus; air conditioning or air treatment systems, including ductwork; exhaust or ventilating systems, including ductwork; plumbing and sanitary systems and all appurtenances; signal and annunciator systems; gas, oil and solid fuel-fired appliances, piping, controls, burners and their appurtenances; evaporative cooling, antennae, wells and equipment; water heaters; gas lights; swimming pool piping; gasoline pumps; and L.P.G. liquid fuel and gasoline tanks and piping.

VALUE OR VALUATION. The building replacement value for permit purposes including labor, profit, overhead, materials, base building equipment and appliances. The determination of value or valuation shall be made or directed to be made by the Department.

VEHICULAR SERVICE FACILITIES.
1. Fueling Station - A building and/or lot with pumps and tanks the purpose of which is the dispensing of motor vehicle fuel.

2. Vehicular Service (when more than one service is in the same space, the most restrictive will govern).
   a. Minor repairs or maintenance exchange of parts and maintenance which requires no open flame, welding or use of Class I, II, or III A liquids (i.e. radio, tires, upholstery, car wash, windows, lubrication service without pits).
   b. Major repairs or maintenance (i.e. repair garages, paint and/or body shops, transmission, mufflers and tune-up shops. See the Fire Code requirements for vehicular service with pits).

VERTICAL OPENING. An opening extending vertically through one or more floors of a building.

WALL. A vertical structural member which encloses, divides, supports or protects a building or room.

WEATHER EXPOSED SURFACE. Any building surface exposed to the elements.

WORK. All construction or repair excluding decoration or maintenance of existing utilities or appliances.

WRECKING. See Demolition.
Sec. 502

Section 502 is amended by adding a new paragraph:

Historic structures as designated by the Denver Landmark Preservation Commission shall be inspected and reviewed by the Department and shall be made to comply only with those Code requirements that are deemed necessary for public safety. See Chapter 31.

Section 503(d) exceptions 4 and 5 are added:

EXCEPTION:

4. Occupancy separations in covered mall buildings and between attached structures shall comply with the provisions of Chapter 56.

5. A one-hour occupancy separation need not be provided between fuel-dispensing pumps covered with a canopy that is open on 3 or more sides, and a Group B, Division 2 retail store having an area of less than 2500 square feet. Two exits separated as required by Section 3303(c) shall be provided and shall not be located in the same exterior wall. Buildings for an attendant or cashier only may have one exit.
Section 506(b) is amended:

(b) **Unlimited Area.** The area of any building shall not be limited, provided that it meets the requirements of one of the following categories:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>OCCUPANCY</th>
<th>MAXIMUM</th>
<th>TYPE</th>
<th>AUTO</th>
<th>MINIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B, H-5</td>
<td>1</td>
<td>ALL</td>
<td>YES</td>
<td>20'</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>2</td>
<td>ALL</td>
<td>YES</td>
<td>60'</td>
</tr>
<tr>
<td></td>
<td>H-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>1</td>
<td>II</td>
<td>NR</td>
<td>40'</td>
</tr>
<tr>
<td></td>
<td>III 1 HR.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>B-4</td>
<td>1</td>
<td>IV</td>
<td>NR</td>
<td>60'</td>
</tr>
</tbody>
</table>

**NOTE:**

(1) **NR**

(2) **ENTIRELY SURROUNDED AND ADJOINED BY PUBLIC MAYS OR YARDS NOT LESS THAN DISTANCE INDICATED. ADDITIONAL OPEN SPACE MAY BE REQUIRED FOR FIRE DEPARTMENT ACCESS. SEE FIRE CODE.**

(3) **SEE SECTION 507**

(4) **RESTRICTED TO THE USES ALLOWED UNDER B-4 AND THE FOLLOWING:**

Manufacturing plants, factories, or workshops utilizing noncombustible, non-explosive or not highly combustible materials and sales rooms incidental to their operation. A building storing non-explosive materials, noncombustible or not highly combustible materials and sales rooms incidental to their operation. Automobile parking garages.
Section 508 is amended:

SECTION 508 FIRE-RESISTIVE SUBSTITUTIONS. When an approved automatic sprinkler system is not required throughout a building by other sections of this Code, it may be used in a building of Type II 1 HR, Type III 1 HR, Type IV HT and Type V 1 HR construction to substitute for the 1 HR fire-resistive construction. Such substitution shall not waive or reduce the required fire-resistive construction for:

1. Occupancy separations [Section 503(c)].
2. Exterior wall protection due to proximity of property lines [Section 504(b)].
3. Area separations [Section 505(c)].
4. Dwelling Unit Separations [Section 1202(b)].
5. Shaft enclosures (Section 1706).
6. Corridors [Sections 3305(g) and (h)].
7. Stair enclosures (Section 3309).
8. Exit passageways [Section 3312(a)].
9. Type of construction separation (Section 1701).

Buildings which are only required to be partially sprinklered may use an automatic sprinkler system throughout the building to substitute for the one-hour construction requirement as provided for in this Section.

Section 509(h) is amended:

(h) Pedestrian Walkways Over Public Streets. Pedestrian walkways over public streets shall be subject to the requirements of Chapter 45.

Section 510(a) is amended:

(a) Water Closet Room Separation. A room in which a water closet is located shall be separated from food preparation or storage rooms by a tight-fitting self-closing door.

Section 510(c) is added:

(c) Plumbing Fixtures. For plumbing fixture requirements see Section 910 and Appendix C of the Uniform Plumbing Code.
Sec. 511

Section 511(a) is amended:

SECTION 511. ACCESS TO TOILETS AND OTHER FACILITIES.
(a) Access to Water Closets. Each water closet shall be centered in a clear space not less than 30 inches in width and have a clear space in front of the water closet of not less than 24 inches.

See Appendix Chapter 64 for handicapped accessibility to toilets.
Table No. 5-A is amended for Group M and R Occupancies.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Minimum Fire Resistance</th>
<th>Permitted Fire Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2</td>
<td>1- Private garages, carports, sheds and agricultural buildings</td>
<td>1 hour less than 3 feet (or may be protected on the exterior with materials approved for 1-hour fire-resistive construction)</td>
<td>Not permitted less than 3 feet</td>
</tr>
<tr>
<td></td>
<td>(See also Section 1101, Division 1.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2- Fences over 4 feet high, tanks, towers and other miscellaneous structures.</td>
<td>Not regulated for fire resistance</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>See also Section 1202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-Hotels and apartment houses Convents and monasteries (each accommodating more than 10 persons)</td>
<td>1 hour less than 5 feet</td>
<td>Not permitted less than 5 feet</td>
<td></td>
</tr>
<tr>
<td>2-Townhouses, row houses and attached dwelling units containing 3 or more units</td>
<td>1 hour less than 3 feet</td>
<td>Not permitted less than 3 feet</td>
<td></td>
</tr>
<tr>
<td>3-Dwellings and Group Homes (A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-Group Homes (B) and Lodging Houses.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sec. 605

Section 605 is amended:

SECTION 605. LIGHT, VENTILATION AND SANITATION. All enclosed portions of Group A Occupancies customarily used by human beings and all dressing rooms shall be provided with natural light by means of exterior glazed openings with an area not less than one-tenth of the total floor area or shall be provided with artificial light. A mechanically operated ventilating system shall be provided which complies with ASHRAE Standard 62-1989 Ventilation for Acceptable Indoor Air Quality. If the velocity of the air at the register exceeds 10 feet per second, the register shall be placed more than 8 feet above the floor.

Toilet rooms shall be provided with a fully openable exterior window at least 3 square feet in area; or a vertical duct not less than 100 square inches in area for the first toilet facility, with 50 additional square inches for each additional facility; or a mechanically operated exhaust system capable of providing a complete change of air every 15 minutes. Such systems shall be connected directly to the outside, and the point of discharge shall be at least 5 feet from any openable window.

For plumbing fixture requirements, see Sections 510 and 511.
Section 702(b)1 is amended:

(b) Special Provisions. 1. Group B, Division 1 and 3 Occupancies. Marine or motor vehicle service buildings shall be of noncombustible, fire-retardant-treated wood or of one-hour fire-resistive construction. Canopies and supports over exterior pumps shall be of noncombustible construction.

EXCEPTIONS:
1. Roofs of one-story vehicular service buildings may be of heavy timber construction.
2. Canopies conforming to Section 5213 may be erected over pumps.

In buildings where motor vehicles, boats or aircraft are stored, and in vehicular service facilities, floor surfaces shall be of noncombustible, non absorbent materials. Floors shall drain to an approved oil separator or trap discharging to sewers in accordance with the Plumbing Code.

EXCEPTION: Floors may be surfaced or waterproofed with asphaltic paving materials where motor vehicles, boats or airplanes are stored or operated within buildings.

Section 702(b)5 is amended:

5. Parking Garage Requirements.
   a. Headroom. Parking garages shall have an unobstructed headroom clearance of not less than 7 feet above the finish floor to any ceiling, beam, pipe or similar construction, except for wall-mounted shelves, storage surfaces, racks or cabinets.
   b. Garage layout, ramps, slopes, break points, turning radiiuses, parking spaces and other related items shall comply with accepted engineering practice as approved by the Department.

Section 705 is amended:

SECTION 705. LIGHT, VENTILATION AND SANITATION. In Group B Occupancy buildings, all enclosed portions customarily occupied by human beings, other than rooms and areas for which requirements are specified elsewhere in this Section, shall be provided with natural light by means of
Sec. 705

exterior glazed openings with an area equal to one-tenth of
the total floor area of such portions or shall be provided with
artificial light. A mechanically operated ventilating system shall
be provided which complies with ASHRAE Standard 62-1989
Ventilation for Acceptable Indoor Air Quality.

In all buildings or portions thereof where Class I, II, or III-A
liquids are used, exhaust ventilation shall be provided
sufficient to produce 6 air changes per hour. Such exhaust
ventilation shall be taken from a point at or near the floor level.

In all parking garages, other than open parking garages as
defined in Section 709(b), used for storing or handling of
automobiles operating under their own power and on all
loading platforms in bus terminals, ventilation shall be
provided capable of exhausting a minimum of 1.5 cfm per
square foot of gross floor area. The building official may
approve an alternate ventilation system designed to exhaust a
minimum of 14,000 cfm for each operating vehicle. Such
system shall be based upon the anticipated instantaneous
movement rate of vehicles but not less than 2.5% (or one
vehicle) of the garage capacity. Automatic CO sensing
devices may be employed, upon approval of the building
official, to modulate the ventilation system to maintain a
maximum average concentration of CO of 50 ppm during any
8-hour period, with a maximum concentration not greater than
200 ppm. Connecting offices, waiting rooms, ticket booths,
etc., shall be supplied with conditioned air, from a source
other than the garage, under positive pressure.

EXCEPTION: In gasoline service stations without
lubrication pits, storage garages and aircraft hangars, the
building official may authorize the omission of such
ventilating equipment where, in his opinion, the building is
supplied with unobstructed openings to the outer air
sufficient to provide the necessary ventilation.

Every building or portion thereof where persons are
employed shall be provided with at least one water closet.
Such toilet facilities shall be located either in such building or
conveniently in a building adjacent thereto on the same
property within 300 feet travel distance.
Sec. 705

Water closets in connection with food establishments where food is prepared, stored or served shall have a nonabsorbent interior finish as specified in Section 510(b), shall have hand-washing facilities therein or adjacent thereto, and shall be separated from food preparation or storage rooms as specified in Section 510(a).

Toilet rooms shall be provided with a fully openable exterior window at least 3 square feet in area; or a vertical duct not less than 100 square inches in area for the first toilet facility, with 50 additional square inches for each additional facility; or a mechanically operated exhaust system capable of providing a complete change of air every 15 minutes. Such systems shall be connected directly to the outside, and the point of discharge shall be at least 5 feet from any openable window.

For other plumbing fixture requirements, see Sections 510 and 511.

Section 706 is amended:

Exits shall be enclosed as specified in Chapter 33.

Elevator shafts, vent shafts and other vertical openings shall be enclosed, and the enclosure shall be as specified in Section 1706.

EXCEPTIONS:
1. In Group B, Division 4 Occupancies, exits shall be enclosed as specified in Chapter 33, but other vertical openings need not be enclosed.
2. In buildings of Group B Division 1 Occupancies, vehicular ramps in enclosed parking structures and storage garages:
   a. Less than 4 stories/levels in height need not be enclosed.
   b. 4 or more stories/levels in height, basement and underground parking structures need not be enclosed, provided that:
      (1) An approved automatic fire sprinkler system is installed throughout the parking structure, or
      (2) An approved automatic supervised fire detection system is installed throughout the parking structure using heat detectors, and
Sec. 706

(3) Manual controls are installed for the operation of a mechanical smoke exhaust system which are located as approved by the Department and Fire Department.

EXCEPTION: When natural ventilation is provided as required for open parking garages, a mechanical smoke exhaust system is not required.

3. In buildings of Group H, Division 4 Occupancies, vehicular ramps in repair garages:
   a. Less than 3 stories/levels in height need not be enclosed.
   b. Three or more stories/levels in height need not be enclosed provided that an approved sprinkler system is installed throughout.

Section 708 third paragraph is amended:

Open flame appliances or devices shall not be installed or used within 8 feet of the floor in any B occupancy where Class I flammable liquids are used or stored.

Section 709(b) Open Parking Garage definition is amended:

OPEN PARKING GARAGE is a separate and single use structure of Type I or Type II construction with the openings as described in subsection 2 on two or more sides and which is used exclusively for the parking or storage of private or pleasure-type motor vehicles.
Sec. 801

Section 801, Division 3 is amended.

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

For occupancy separations, see Table No. 5-B.

Section 802(e) is added:

(e) Conversion of Existing Buildings to Small Day Care Centers. An existing building may be converted to a small day care center without complying with all the requirements for a change of use Section 502, provided that the following provisions are met:

1. Drawings and specifications need not bear the seal of an architect and engineer. However, if after review of the drawings and specifications, the Department is unable to determine that the conversion is adequately designed, the Department may require that the drawings and specifications bear the seal of an architect and engineer who will be responsible for the design phases of the conversion.

2. Any building additions or new facilities installed or erected as part of the conversion shall comply with present Building Code provisions.

3. The number of occupants, excluding staff, shall not exceed 12 and shall be permitted on the first story only.

EXCEPTIONS:

a. Basements as allowed per Section 802(c)

b. Any floor level with an exterior door leading directly to an exterior landing or walk located within.

(1) Two feet vertically of directly surrounding grade shall be allowed for children 2½ years or younger.

(2) Five feet vertically of directly surrounding grade shall be allowed for children older than 2½ and less than 5 years of age.

(3) Eight feet vertically of directly surrounding grade shall be allowed for children over 5 years of age and ambulatory adults.

Egress from landing to grade may be by stairs or ramps.
Sec. 802

4. A level occupied for day care activities shall have two exits. Two exits may include one exit directly to grade or as provided in item #3 above with a second exit as an interior stair or ramp. Egress through a window shall not be accepted as an exit.

5. There shall be no dead end corridors.

6. All openings to corridors and stairways shall be protected by at least a ¾-hour fire rated assembly.

7. Gas-fired heating appliances must comply with Section 808 and the Uniform Mechanical Code.

8. Existing partitions, walls and ceilings may be approved if the existing surface is of a fire-resistive material consisting of lath and plaster or gypsum board of at least ½ inch thickness.

9. The basement or second floor shall be separated from the first floor by a minimum of one-hour fire-separation.

10. Paragraph 3809(a)3 shall apply to all conversions. Residential type multiple single station smoke detectors may be installed with field inspector approval. System type smoke detectors will require drawings signed and sealed by an electrical engineer.

11. Handicapped access shall not be required.

12. Requirements of other City and State agencies must be complied with. When a conflict occurs between regulations of different agencies, the most restrictive will govern.

Section 805 is amended:

SECTION 805. LIGHT, VENTILATION AND SANITATION. All portions of Group E Occupancies shall be provided with light and ventilation, either natural or artificial, as specified in Section 605.

For plumbing fixture requirements, see Sections 510 and 511.
Sec. 905

Section 905(a) is amended:

(a) **General Ventilation.** In Group H Occupancy buildings, all enclosed portions customarily occupied by human beings, other than rooms and areas for which requirements are specified elsewhere in this Section, shall be provided with natural light by means of exterior glazed openings with an area equal to one-tenth of the total floor area of such portions or shall be provided with artificial light. A mechanically operated ventilating system shall be provided which complies with ASHRAE Standard 62-1989 Ventilation for Acceptable Indoor Air Quality.

Section 905(d) is amended:

(d) **Sanitation.** Every building or portion thereof where persons are employed shall have at least one water closet. Such toilet facilities shall be located in such building or conveniently in a building adjacent thereto on the same property within 300 feet travel distance.

Toilet rooms shall be provided with a fully openable exterior window at least 3 square feet in area; or a vertical duct not less than 100 square inches in area for the first water closet, with 50 additional square inches for each additional fixture; or a mechanically operated exhaust system capable of providing a complete change of air every 15 minutes. Such systems shall be connected directly to the outside, and the point of discharge shall be at least 5 feet from any openable window.

For other plumbing fixture requirements, see Sections 510 and 511.

Section 908 is amended to revise the third paragraph to read as follows:

In Division 4 occupancies, open flame appliances or devices shall be installed with the pilots and burners at least 8 feet above the floor. Electrical equipment shall be installed in accordance with the National Electrical Code.
Sec. 912

Section 912 is amended:

SECTION 912. HELIPORTS. Heliports shall not be erected on buildings. See the Denver Zoning Code for approved locations.
Sec. 1005

Section 1005 is amended:

SECTION 1005. LIGHT, VENTILATION AND SANITATION. All portions of Group I Occupancies customarily used by human beings shall be provided with natural light by means of exterior glazed openings with an area equal to 1/10 of the total floor area or shall be provided with artificial light. A mechanically operated ventilation system shall be provided as specified in Section 605. For other requirements on water closets, see Section 510.
Sec. 1101

Section 1101 is amended.

SECTION 1101. GROUP M OCCUPANCIES DEFINED. Group M Occupancies shall be:
Division 1. Private garages, carports, sheds and agricultural buildings. For occupancy separations, see Table No. 5-B.
EXCEPTION: Where applicable for agricultural buildings, see Appendix Chapter 11.
Division 2. Fences over 4 feet high, tanks, towers and other miscellaneous structures. Occupancy separations are not required for Division 2.

Section 1107 is added:

SECTION 1107. FENCES AND RETAINING WALLS.
(a) General.
1. This Section shall apply to all fences or walls in excess of 4 feet in height, all retaining walls in excess of 3 feet in height, combination fences and retaining walls in excess of 4 feet in height, and all fences, walls and retaining walls installed on corners or locations specifically provided for in this Section.
2. When the Department determines that the installation, removal or repair of a fence shall be for the public welfare and safety, the Department may order any action deemed necessary notwithstanding the provisions of this Section.
(b) Design. All fences, walls and retaining walls shall be designed in accordance with the following:
1. Retaining walls shall be designed and drainage provided so as to resist all lateral pressure to which they may be subjected.
2. Fences shall be designed to resist any wind load to which they may be subjected.
(c) Prohibitions. The following prohibitions shall apply to all fences, walls or retaining walls, regardless of height:
1. The use of barbed wire or any other sharp pointed material as a fencing material or on top of fences or retaining walls is prohibited except when specifically approved by the Department.
2. The use of electrically charged fences or on top of fences or retaining walls is prohibited except when specifically approved by the Department.
Sec. 1107

(d) **Review and Approval.** Fences, walls or retaining walls to be installed on corners or locations which may create a traffic hazard or be in violation of other City ordinances shall be subject to review by the appropriate City agency. No fence, wall or retaining wall shall be installed or maintained if disapproved of by any City agency.

(e) **Repair or Removal.** The Department may order any fence, wall or retaining wall it declares to be dilapidated or hazardous to be repaired or removed.
Sec. 1201

Section 1201 is amended:

SECTION 1201. GROUP R OCCUPANCIES DEFINED. Group R Occupancies shall consist of:

Division 1. Hotels and apartment houses, convents, monasteries and dormitories accommodating more than 10 persons.

Division 2. Townhouses, row houses and attached dwelling units containing 3 or more units.

Division 3. Dwellings and Group Homes (A). Group Homes (A) are defined as homes for not more than 8 residents which do not require skilled or intermediate care and are licensed and approved by the State of Colorado or approved by the Denver Department of Health and Hospitals. Not more than 2 resident managers will be permitted in addition to the 8 residents.

Division 4. Group Homes (B) and Lodging Houses. See Appendix Chapter 12 Division II UBC Group Homes (B).

Section 1202 is amended:

SECTION 1202. CONSTRUCTION, HEIGHT AND ALLOWABLE AREA.

(a) General. Buildings or portions thereof classified as Group R Occupancies because of the use or character of the occupancy shall be limited to the types of construction set forth in Tables No. 5-C and No. 5-D and shall not exceed the area or height limits specified in Sections 505, 506 and 507.

(b) Special Provisions for Group R, Division 1 Occupancy.

1. Group R Occupancies more than 2 stories high or having more than 3000 square feet of floor area above the first story shall be not less than one-hour fire-resistive construction throughout except as provided in Section 1705(b)2.

2. Storage or laundry rooms within Group R, Division 1 Occupancy that are used in common by tenants shall be separated from the rest of the building by not less than one-hour fire-resistive occupancy separation.

3. Group R Occupancies with a Group B, Division 1 Occupancy parking garage in the basement or first floor shall comply with Section 702(a).

4. Attic space partitions and draft stops shall comply with Section 2516(f).
Sec. 1202

5. Walls and floors separating dwelling units in the same building shall be of not less than one-hour fire-resistant construction.

6. Assisted Care Facilities or Personal Care Boarding Homes may occupy Group R, Division 1 Occupancy with the following provisions:
   a. Establish a care plan and evacuation capability of building occupants.
   b. Obtain approval from the following agencies:
      (1) State of Colorado Health Department
      (2) City of Denver - Building Department
           Excise and License
           Fire Department
           Health and Hospitals Department
           Zoning Department
   c. Wherever in any specific case the requirements of different agencies vary, the most restrictive shall govern.

(c) Special Provisions for Group R, Division 2 Occupancy.

1. Group R, Division 2 Occupancy shall consist of 3 or more attached dwelling units, not more than 3 stories in height, with each unit having independent access to the exterior of the building in the ground story. For purposes of this Section, if living quarters are located in a basement, the basement shall be considered a story.

2. Each dwelling unit shall be provided with separate sewage, water supply, heating, electric and plumbing systems, together with all other housing utilities and equipment.

3. Each dwelling unit shall be separated by a two-hour fire-resistive wall extending from the foundation to the highest point of the building, to the underside of the roof sheathing or deck, and to the exterior walls. Voids or openings shall not be permitted. Utilities, including plumbing, electrical, heating, air conditioning and telephone, shall not be permitted in the two-hour fire-resistive separation wall.

4. Electrical, heating, plumbing and construction installations shall conform to all the requirements of Group R, Division 3 Occupancy.
Sec. 1202

5. The second story or basement of any Group R, Division 2 Occupancy shall not be utilized to house another family.

6. Where a conflict exists between this Section and other Sections of this Building Code, this Section shall apply.

7. Group R, Division 2 Occupancy shall not be mixed with any occupancy except Group M Occupancies, in which case a one-hour occupancy separation wall is required.

8. Roof coverings shall comply with the roof classes of Group R, Division 1 Occupancy.

(d) Special Provisions for Group R, Division 3 Occupancy.

1. A minimum of one-hour fire-resistive construction shall be provided between dwelling units or a dwelling unit and an attached garage. See Table No. 5-B.

EXCEPTION: A carport open on 2 or more sides need not have a fire separation between the carport and the dwelling. Windows between the carport and the dwelling shall not be openable. Doors may be of any type, provided that any sash used in a door shall be fixed.

2. See Chapter 33 for occupant loads. Group R, Division 3 Occupancy shall not be mixed with any other occupancy except Group M Occupancies.

3. Group R, Division 3 Group Home (A) Occupancy shall comply with the following requirements in addition to other requirements for one- and two-unit dwellings:

a. The Group Home (A) shall be provided with approved residential type single station smoke detectors wired to a 115-volt AC unswitched electric power source. Activation of any one detector shall cause all detectors to alarm. The detectors shall be located in corridors adjacent to sleeping rooms, general living areas and basements as required by the Department and the Fire Department. When the Group Home has nonambulatory occupants, the system shall be a supervised detection system conforming to the requirements of Chapter 38 and be connected to a Central Station.

b. All doors separating floors, sleeping rooms and
fuel-fired equipment rooms shall be solid core construction and be a minimum of 1-3/8 inches in thickness. All walls and ceilings shall be covered with a minimum of 1/2 inch plaster or gypsum board. Openings through floors shall be protected by a 1-3/8 inch solid core door or as approved by the Department.

c. Fuel-fired equipment rooms shall be enclosed with 5/8 inch type X gypsum board on the ceiling and on each side of the walls. Fire dampers need not be installed in air ducts passing through the wall, floors or ceilings. Adequate outside combustion and relief air ducts are required from the furnace room.

d. Each habitable floor shall have 2 approved exits.

e. Handicap access shall be provided in all Group Homes licensed for nonambulatory occupants in accordance with the Colorado Department of Health regulations.

f. Plans and building permits shall designate whether the Group Home is for ambulatory or nonambulatory occupants and the maximum number of occupants permitted.

g. Plans for the renovation of an existing building or the construction of a new building shall bear the seal and signature of the architect or engineer responsible for the design phases of the building.

h. All construction shall be performed by a contractor licensed under this Code to perform such work.

Section 1205(d) is amended:

(d) Sanitation. Every building shall have at least one water closet.

> For other plumbing fixture requirements, see Sections 510 and 511.

Section 1214 is amended:

SECTION 1214. ACCESS TO BUILDINGS AND FACILITIES.

> See Appendix Chapter 64 for handicapped accessibility < requirements.
Section 1705(d) is amended:

(d) Walls Fronting on Streets or Yards. Regardless of fire-resistant requirements for exterior walls, certain elements of the walls fronting on streets or yards having a width of 40 feet may be constructed as follows:

1. Bulkheads below show windows, show-window frames, aprons and showcases may be of combustible materials, provided that the height of such construction does not exceed 15 feet above the lowest point of Fire Department access.

2. Wood veneer of boards not less than 1 inch nominal thickness or exterior-type panels not less than 3/8 inch nominal thickness may be applied to walls, provided that the veneer does not exceed 15 feet above lowest point of Fire Department access and further provided that such veneer shall be placed either directly against noncombustible surfaces or furred out from such surfaces not to exceed 1-5/8 inches with all concealed spaces fire-stopped in accordance Section 2516(f). Where boards, panels and furring as described above comply with Section 407 as fire-retardant treated wood suitable for exterior exposure, the height above the lowest point of Fire Department access may be increased to 35 feet.

Section 1707(d) is amended:

(d) Dampproofing Foundation Walls.

1. All foundation walls enclosing a basement or crawl space below finished grade shall be dampproofed outside by the application of dampproofing material.

2. When masonry units are used in foundation walls below grade, the exterior surfaces shall be plastered with at least ¼ inch cement plaster before the application of dampproofing.

Section 1711 second paragraph is amended by adding:

EXCEPTIONS:

4. The top of guardrails around roof-mounted appliances shall be at least 36 inches unless 6 feet is maintained between the appliance and the roof edge or other hazard.
Section 1711 third paragraph is amended to read:

Open guardrails shall have vertical intermediate rails or an ornamental pattern such that a sphere 4 inches in diameter cannot pass through.

EXCEPTION:

1. The open space between horizontal or vertical intermediate rails or ornamental pattern of guardrails in areas of commercial and industrial-type occupancies which are not accessible to the public may be such that a sphere 12 inches in diameter cannot pass through.

2. The triangular openings formed by the riser, thread and bottom element of a guardrail at the open side of a stairway may be of such size that a sphere 6 inches in diameter cannot pass through.

Section 1713 (d) through (h) are added:

(d) R-Factor Requirements. Insulation installed in new or existing Group R-2 and R-3 Occupancies shall provide a minimum R Factor of 11 for walls and 19 for ceilings.

(e) Identification Tag. Each application of insulating material shall be identified by an appropriate tag or card permanently affixed in a conspicuous place near the insulated areas. The tag or card shall be on a form approved by the Department and shall include, without limitation, the following information:

1. The manufacturer’s name, address and trade name of material used.
2. The contractor’s name and address.
3. Type of insulation (batt, blanket, loose, etc.).
4. Density, depth (inches), number of bags if loose fill, weight of each bag.
5. R-Factor (wall and ceiling).
6. Laboratory approval number indicating conformance with ASTM C-739 requirements. Also label listing and follow-up service indication, flame spread and smoke.
7. Date of installation.
8. Signature of applicator certifying that these requirements have been complied with.

(f) Prohibitions. Insulation shall be prohibited in the following locations:
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1. Insulation shall not be placed closer than 3 inches horizontally to transformers, recessed lighting. See National Electrical Code.

2. Insulation shall not be placed within 1 inch of Type B heating equipment vents, and 6 inches from any other of heating vents or flues.

3. Insulation shall not be placed within 24 inches of attic-type furnaces unless of noncombustible material.

4. Insulation shall not be placed over soffit, roof or foundation vents.

5. Loose-type insulation shall not be placed over attic access doors. The access doors shall be insulated with batts or blanket insulation and securely fastened to the access door.

6. Insulation shall not be permitted in air plenums unless approved by the Department.

7. Foam plastics shall not be left exposed.

(g) Combustible Insulation Bag Identification. In addition to the markings on each bag desired by the manufacturer, markings shall be provided in compliance with ASTM C-739, Section 12, and shall also include the following:

1. CAUTION (in enlarged letters). Do not cover recessed light fixtures and attic vents. Loose fill insulation shall be no closer than one inch to any Type B furnace or water heater vent pipe, bathroom vents or kitchen vents. Loose fill insulation shall not be placed closer than 24 inches of an attic-type (horizontal) furnace or air handling equipment, or within 6 inches of any chimney.

2. Manufacturer's name, address, city and state including the zip code.

3. Average minimum weight in pounds.

4. The label of an approved independent testing laboratory listing compliance with CSPC Cellulose Insulation Standards HH-1-515 C or D.

(h) Roof Insulation. Insulation to be installed in roofs shall conform to the manufacturer's instructions and shall be approved by the Department. When a Class A, B or C roof is required, the insulation shall not deter from its classification.
Section 1715 is amended:

SECTION 1715. ATRIUMS.
(a) General. Buildings of other than Group I Occupancies with automatic sprinkler protection throughout may have atriums complying with the requirements of this Section.
EXCEPTION: Individual guestrooms or dwelling units in Group R, Division 1 Occupancy may be equipped with a supervised smoke detection system in lieu of a sprinkler system.

(b) Floor Area. When calculating the floor area for a refuge area as required by Section 1807 or for occupant load, the area of the atrium may be subtracted from the gross floor area.

(c) Separation. Atriums shall be separated from adjacent occupied spaces by not less than a one-hour fire-resistive construction. Openings in the atrium wall shall be protected in accordance with Sections 1706 and 4306.
EXCEPTIONS:
1. Any 3 levels may open directly to the atrium.
2. Open exit balconies are permitted within the atrium.
3. The tenant space may be separated from the atrium by a wired or laminated glass wall, subject to the following:
   a. The glass shall be protected by a sprinkler system equipped with 135°F heads. The heads shall be installed on 6-foot centers spaced 6 to 12 inches from the glass. The system may be used to protect the glass exposure and the floor plate to the limit of the head’s coverage. The sprinkler system shall completely wet the entire surface of the glass wall when actuated. Where there are walking surfaces on both sides of the glass, both sides of the glass shall be so protected.
   b. The glass shall be in a gasketed steel frame so installed that the glazing system may deflect without breaking (loading) the glass before the sprinkler system operates.
   c. Obstructions such as curtain rods, drapery traverse rods, curtains, blinds, drapes or similar materials shall not be installed between the sprinkler system and the glass nor between the sprinkler system and the surrounding area if the
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sprinklers are used for floor plate protection as in paragraph a above.

(d) Smoke Detection. The atrium shall be fully detected per NFPA 72E (see Chapter 38). Smoke detectors shall be placed on the occupied side of any door opening into the atrium. Where a level is open to the atrium as in subsection (c) Exception 1 above, that level or portion of that level open to the atrium shall be fully detected.

(e) Smoke Control. Smoke control shall be provided in all atriums as follows:

1. Buildings not classified as high-rise shall be provided with an atrium exhaust system as specified in this Section.

2. High-rise buildings with atriums shall have pressurization and exhaust systems conforming to Section 1807 and this Section. Atrium supply air for smoke control under this Section shall be by mechanical means.

3. Existing high-rise buildings with new atriums shall have pressurization and exhaust systems conforming to this Section and Section 1807 as approved by the Department and the Fire Department.

4. Ventilation for Smoke Control.

   a. In atriums 55 feet or less in height with a volume of 600,000 cubic feet or less, the system shall exhaust 6 air changes per hour. Gravity supply or fan inlets shall be provided within 10 feet of the lowest level of the atrium and be sized for 75% of the exhaust. A maximum velocity of 1500 feet per minute shall be maintained across the net free area of the gravity openings.

   b. In atriums 55 feet or less in height with a volume in excess of 600,000 cubic feet, the system shall be sized to provide a minimum of 4 air changes per hour. Gravity supply or fan inlets shall be provided as in paragraph a above.

   c. In atriums in excess of 55 feet in height, regardless of volume, the exhaust system shall be sized to provide a minimum of 4 air changes per hour. Supply air shall be mechanically introduced within 10 feet of the lowest level of the atrium at a rate of 75% of the exhaust.
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d. In all 3 cases above, outside air intakes shall be less than 50 feet above grade. The atrium volume shall include all spaces open to the atrium.

5. In high-rise buildings, pressurization systems shall be designed to provide a positive pressure in the atrium in relation to adjacent areas utilizing 100% outside air (see Section 1807). When pressurization and exhaust systems operate simultaneously, the pressurization system shall provide 75% of exhaust quantity. Air shall be introduced within 10 feet of the lowest level of the atrium with outside air intakes located less than 50 feet above grade.

(f) Activation of Systems.
1. Other than High-Rise Buildings. The activation of a smoke detector in the atrium zone or a sprinkler flow alarm in the atrium zone shall operate the atrium supply and exhaust systems.

2. High-Rise. In addition to the requirements of Section 1807, the activation of any smoke detector or sprinkler flow alarm, in a zone other than the atrium zone, shall activate the atrium supply air system. The activation of a smoke detector in the atrium zone or a sprinkler flow alarm in the atrium zone shall operate the atrium supply and exhaust air systems.

(g) Annunciation.
1. Other than High-Rise Buildings. Other than high-rise buildings shall have a main annunciator panel in accordance with Chapter 38. The manual control for the atrium smoke control systems shall be located at a location approved by the Department and the Fire Department.

2. High-Rise. High-rise buildings shall have an Operations Center in accordance with Section 1807. In addition, the following are required:
   a. Smoke detectors in the atrium shall be on a separate zone per floor.
   b. Manual controls and status indicators for the atrium smoke control system shall be provided.

(h) Exiting Through Atrium. When a required exit enters the atrium space, the travel distance from the doorway of the tenant space to an enclosed stairway, horizontal exit, exterior door or exit passageway shall not exceed 100 feet.
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(i) Interior Finish. The interior finish of walls and ceilings of the atrium and all unseparated tenant spaces allowed under Exception 1 of Subsection (c) above shall be Class I with no reduction in class for sprinkler protection.

(j) Occupancy Separation Exceptions. The vertical portion of the occupancy separation which is adjacent to the atrium may be omitted between a Group B, Division 2 Occupancy office or sales area or Group A, Division 3 Occupancy and Group R, Division 1 apartment or guest room located on another level.

Section 1717 is added:

SECTION 1717. TRANSMISSION OF CITY MICROWAVE SIGNALS. No construction permits or Certificates of Occupancy shall be issued for any building or structure exceeding 60 feet in height which interferes or may interfere with the transmission or reception of City microwave communication signals unless the owner of such building or structure provides for installation of equipment to retransmit or redirect the signal as necessary to eliminate any interference. Such equipment shall be approved by and installed at the direction of the affected City agency. A service agreement must also be approved by the City or agency whose transmission is affected by the proposed building or structure prior to the issuance of any permit or Certificate of Occupancy. Such agreement shall include provisions for easements and access for maintenance, electricity for operation and provision for the replacement of equipment.

Section 1718 is added:

SECTION 1718. EMERGENCY POWER EQUIPMENT ROOM ENCLOSURES. Emergency power equipment rooms shall be provided with a one-hour fire-resistive occupancy separation. Doors shall be one-hour rated with self-closing devices. See National Electrical Code.

Section 1719 is added:

SECTION 1719. TENTS AND FABRIC-COVERED STRUCTURES. Tents and fabric-covered structures constructed of pliable materials may be erected for a period of time not to exceed 180 days for tents exceeding 200 square
feet and other fabric-covered structures exceeding 400 square feet, subject to the approval of the Department and Fire Department.

Section 1720 is added:

SECTION 1720. MOBILE HOMES OR TRAILERS. In addition to the requirements of Chapter 35 of the Denver Revised Municipal Code, the following shall apply:

(a) Definition. For the purpose of this Building Code, a mobile home or trailer shall be considered a vehicle when it is mobile, equipped with wheels and not connected to a sewer or power supply.

(b) Location. Mobile homes or trailers shall be permitted for dwelling occupancies only when located in a trailer park as defined in Chapter 35 of the Denver Revised Municipal Code, and when approved by the Zoning Administration.

(c) Other Occupancies. Mobile homes or trailers shall not be permitted for any other occupancy unless meeting the requirements for buildings of this Building Code and specifically approved by the Department.

EXCEPTION: Mobile homes or trailers used for temporary occupancy at construction sites.

Section 1721 is added:

SECTION 1721. VEHICLE EXIT FACILITIES. Where ramps are provided for vehicle exiting from buildings or from private drives onto public right of ways, the ramps shall be sloped at 0.5% min. to 2.0% max. for a distance at least 20 feet inside of the building or property line. Vertical curves shall be used at all grade breaks.

Section 1722 is added:

SECTION 1722. CEILING HEIGHTS. Ceilings shall have a clear height of not less than 7 feet measured to the lowest projection from the ceiling.

EXCEPTION: Group R Occupancies.
Section 1723 is added:

SECTION 1723. CONSTRUCTION IN A FLOOD PLAIN.

(a) Construction. All new buildings and additions to existing buildings hereafter erected in a flood plain shall comply with the requirements for location and elevation contained in Chapter 56, Article V of the Denver Revised Municipal Code.

(b) Design. New buildings, substantial improvements and additions of nonresidential structures may be located below the level of the 100-year flood elevation, provided that the structure and utilities are designed by a professional engineer in conformance with the provisions of the Federal Emergency Management Agency (FEMA) National Flood Insurance Program and Related Regulations.

(c) Water Supply and Sanitary Sewer System. New or replacement water supply and sanitary sewer systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into the flood waters.

(d) One-Hundred-Year Flood. A flood that has the frequency of occurrence of once every 100 years as determined from an analysis of floods on a particular watercourse and other watercourses in the same general region. It has approximately a 1% chance of occurring in a given year.

Section 1724 is added:

SECTION 1724. VIEW PROTECTION ORDINANCES.

Mountain view and central business district view protection ordinances contained in the Revised Municipal Code shall be enforced by the Department and shall require the following:

1. A written statement by the owner that the proposed building is within a view protection district.

2. A certification by an Engineer, with appropriate calculations, that the proposed building does not exceed the allowable height within the view protection district.
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Section 1725 is added:

SECTION 1725. SIGNS AND SIGN STRUCTURES. The Uniform Sign Code, 1988 Edition, shall regulate all signs and sign structures not located within a building.

EXCEPTION: See Denver Zoning Code for temporary signs.
Section 1807 is amended:

SECTION 1807. SMOKE CONTROL IN HIGH-RISE BUILDINGS.
(a) General. Every building having a passenger elevator and having floors used for human occupancy more than 75 feet above the lowest level of Fire Department vehicle access and housing Groups A, B, E, I and Group R, Division 1 Occupancies shall conform to the requirements of this Section.
1. All new high-rise buildings shall conform to the requirements of this Section.
2. Existing high-rise buildings whose occupancy is being changed shall conform to the requirements of this Section.
3. Smoke barriers and smoke dampers shall be required as follows:
   a. Required fire-rated assemblies that separate areas to be pressurized or exhausted as part of a smoke control system shall be considered smoke barriers.
   b. Smoke dampers shall be required only at the point where ducts pass through required smoke barriers and at connections between outside air and building exhaust air. The smoke dampers shall be installed before the first duct inlet or outlet and in no case more than 2 feet from the barrier.
   c. Smoke dampers shall meet the standards of UL 555S Class II with a minimum temperature classification of 250°F and shall be listed by an approved testing laboratory.
(b) Refuge Area.
1. A refuge area to allow for elevator evacuation shall be provided at the elevator entrances of each story served by a passenger elevator. Each refuge area shall have an area of at least 1% of the gross floor area of that story.
   EXCEPTION: Stories opening directly to grade or having ramps to grade.
2. The refuge area shall be enclosed by one-hour fire-resistant construction, extending from the floor to the underside of the floor above. The exception noted in Section 3305 allowing deletion of one-hour corridor construction for fully sprinklered buildings does not apply to this requirement.
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a. Openings into refuge areas shall be protected by ¾-hour-rated self-closing fire assemblies in accordance with Section 4308. Table No. 33-B, note C shall not apply.

b. Locks or latches shall be in accordance with Section 3303(c) except that doors from occupied areas into the refuge area and into stairways shall have lever-type door handles or panic devices. Devices that act to hold any door from an occupied area into the refuge area in an open position are not permitted.

EXCEPTION: Type B closing devices which close refuge area doors throughout the building upon activation of the fire alarm system or the fire detection system are permitted.

c. Door-closing devices and pressurization systems shall be designed so that opening of doors to the refuge area can be accomplished with a force of not more than 25 pounds applied at the latch side of the door on the door opening device.

3. Each refuge area shall exit directly to required exit stairways.

EXCEPTION: In office buildings only, either stairway pressurization or full smoke detection may be substituted for direct access to required exit stairways if such a substitution is made to the entire building and complies with the following criteria. (This substitution does not delete the required refuge area.)

a. Stairway Pressurization. Each interior enclosed exit stairway shall be mechanically pressurized with outside air, when activated by any manual or automatic alarm initiating device, to maintain a minimum positive pressure of 0.05 inch of water column across any closed stairway door. The maximum pressure shall not create an opening force on any stairway door greater than 25 pounds, applied at the latch side of the door on the door-opening device. Each interior exit stairway shall have a separate dedicated pressurization system. Supply air for the stairway shall be obtained from outside air intakes mounted so that they will not be contaminated by products of combustion, with a minimum of one intake located not more than 50 feet above grade. Stairway pressurization systems shall not have fire dampers. Each pressurization system
shall be enclosed in a 2-hour fire resistive enclosure when extended outside the stairway. Air volume introduced into the stairway shall be at least 15,000 cubic feet per minute, plus 200 cubic feet per minute per floor level.

b. Full Floor Smoke Detection. The entire building, excluding areas used for automobile parking garages, shall be provided with smoke detection in accordance with NFPA 72E.

4. Finish materials in refuge areas, atriums and corridors connecting stairways with refuge areas shall be of a minimum Class II Flame Spread Classification. See Tables Nos. 42-A and 42-B.

5. Carpeting may be installed on the floors of refuge areas, atriums and corridors but shall not cover up the walls for more than 8 inches. See Appendix IV, A, Uniform Fire Code.

(c) Pressurization.

1. Refuge areas and elevator hoistways, including elevator machine rooms that physically connect to hoistways, shall be pressurized when activated, to maintain a minimum positive pressure of 0.05 inch of water column with respect to adjacent occupied spaces on all floors with doors to the refuge areas closed and general building pressurization systems not activated. The maximum pressure shall not create an opening force on any refuge area door greater than 25 pounds applied at the latch side of the door on the door-opening device. Pressure shall not interfere with the opening and closing of elevator doors. When general building pressurization systems and refuge area systems are both activated, and 4 doors into a refuge area from a tenant area on the fire floor and one door on each other floor into a refuge area from a tenant area are opened, a minimum air flow of 150 feet per minute shall be maintained through each of the door openings on the fire floor. (If less than 4 doors open into the refuge area, all doors shall be opened and 150 feet per minute air flow shall be maintained.) Supply air for refuge areas shall be obtained from outside air intakes mounted so that they will not be contaminated by products of combustion, with a minimum of one intake located not more than 50 feet above grade. Each intake shall be provided with a smoke detector which shall close intake upon smoke detection.
2. All refuge areas shall be exhausted to outside when a fire is detected within the refuge area. Exhaust systems shall be designed and sized to exhaust a minimum of 60 air changes per hour to provide a negative pressure relative to elevator shafts and occupied areas. The exhaust system shall be sized assuming supply air is available.

3. Atriums. See Section 1715.

4. A general building pressurization system shall be provided which will, when activated, shut off all supply air to the fire floor (except refuge area) and shall exhaust air from the fire floor to the outside at a minimum design of 15 air changes per hour. The exhaust system is to be sized assuming supply air is available. Return air from all other floors must be shut off. Supply air to all other floors shall be provided from the outside.

   EXCEPTION: General building pressurization systems are not required in a Group R, Division 1 Occupancy provided that the stairways are pressurized. See Section 1807(b)3A for design requirements.

5. Smoke venting of elevator hoistways and elevator machine rooms to the exterior of the building shall not be required as provided for in ANSI A17.1. See Chapter 51.

6. The refuge areas and the elevator hoistway shall each be served by a separate dedicated pressurization system.

   EXCEPTIONS:
   a. The refuge areas may be pressurized using the elevator hoistway pressurization system by transferring air to the refuge areas with the use of transfer (grills) openings. Penetration of the elevator shaft wall shall be protected with fire dampers listed under UL 555 and smoke dampers listed under UL 555S.
   b. The general building pressurization system may be used to pressurize refuge areas if the system consists of more than one piece of air handling apparatus whose outside air intakes are located on opposite sides of the building and which comply with all other requirements of this Code. Each air handling apparatus shall be of sufficient size to provide required pressurization. Each piece of air handling apparatus shall be capable of being individually overridden from the Fire Department Operations Center. Sufficient air handling apparatus shall be connected to the emergency generator to
provide required pressurization. Provisions shall be made so that fans on either side of the building may be operated by the emergency generator, although not simultaneously. Air handling apparatus shall be defined as a fan or bank of fans and return air/outside air damper assemblies dedicated to these fans.

(d) Detection. In addition to any other requirements of this Code, approved smoke detectors shall be provided in the following locations:

1. Downstream from air filters and in each fan system supplying air during alarm activation. The detector shall stop the fan when products of combustion are detected. A system shall be designed so that smoke will not recirculate through the building when the fan has stopped.

2. Not less than one foot and not more than 3 feet from the door on the occupied side of each door entering a refuge area.

**EXCEPTION:** In apartment buildings and where permitted by the Department and the Fire Department, a supervised rate of rise detector located per subsection (d)2 above and a single station smoke detector conforming to the requirements of Section 3810 shall be installed in lieu of the supervised smoke detector required above. The supervised rate-of-rise detector shall actuate all systems in the same manner as the smoke detector required in subsection (d)2. The single station smoke detector shall be wired to a 115-volt AC unswitched electric power source. When additional supervised smoke detectors are required by this Code, a supervised smoke detector or a supervised rate-of-rise detector with a single station smoke detector as specified above shall be provided. When more than one single station smoke detector is installed within a unit, they shall be interconnected so that activation of any one single station detector shall cause all to sound an alarm. (See Sections 3810 and 3816.)

3. Not less than one foot and not more than 3 feet outside of each door into an exit stairway which is not directly exiting from a refuge area.

4. Refuge areas in accordance with NFPA 72E.

5. Mechanical, electrical and telephone equipment rooms.
6. At openings extending vertically through floors which are not required to be enclosed. Detectors shall be located on each level in locations approved by the Department.

7. Return air openings at each floor.

(e) Activation.

1. General System Activation.
   a. Activation of smoke detectors (except in refuge areas), water flow devices or operation of manual fire alarm boxes shall activate the pressurization system for the refuge areas and elevator hoistways.
   b. Activation of smoke detectors (except in refuge areas) or water flow devices shall activate the general building pressurization system.
   c. Activation of any manual or automatic alarm-initiating device shall cause the fire alarm system on the fire floor and the floors immediately above and below to sound.

2. Refuge Area System Activation.
   a. Activation of a smoke detector in a refuge area shall activate the pressurization systems for the refuge areas, elevator hoistways and stairways, and the general building ventilation system; shall close the air supply to that refuge area; and shall close the return air damper within the tenant area. The refuge area exhaust system shall provide 15 air changes per hour from the refuge area.
   b. Activation of a smoke detector in a refuge area shall cause the fire alarm system on the fire floor and the floors immediately above and below to sound.

3. Activation of any manual or automatic fire alarms causing activation of the general systems, refuge systems or stairwell systems shall override all normal operating controls as required to comply with this Code and to prevent improper smoke control system operation which cannot be overridden at the Fire Department Operations Center, e.g., temperature, time clock and energy management.

(f) Elevators.

1. All passenger elevators serving a floor shall open into a refuge area. Elevators used exclusively for service must open into a refuge area if they occupy a common hoistway with passenger elevators.
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2. Any fire-alarm-initiating device shall return to grade level, nonstop, all elevators serving that zone. Elevators without a landing at grade level shall be returned to the landing closest to grade level or other approved level. Elevators will remain at that level with doors open until manually overridden by the key operator switch required by ANSI A17.1, Section 211.3a-1. See Chapter 55.

3. Provisions shall be made to prevent water from fire sprinkler systems from interfering with elevator operation.

(g) Fire Department Operations Center Equipment. A Fire Department Operations Center (F.D. Operations Center) shall be provided in a space approved by the Department and the Fire Department. The F.D. Operations Center shall be contained in a room separated from the remainder of the building by 2-hour fire resistive construction. The room shall be used for no other purpose unless that use is approved by the Department and the Fire Department. No piping, ducts or equipment foreign to the required operations shall be permitted to enter, pass through or be installed within the room. The room shall be equipped with a smoke detection system and shall not be sprinklered. The F.D. Operations Center shall be located on the ground floor with the door opening directly into the main lobby at a point in the lobby accessible directly from the exterior. The door to the F.D. Operations Center shall not be located on a dead-end corridor. The F.D. Operations Center shall contain the following:

1. A HVAC status/control panel, utilizing graphics outlining the building and placing individual smoke control system fan and damper controls relative to location within building. The HVAC status/control panel shall be combined with the fire alarm annunciator panel. The panel shall have a maximum height from the floor of 6 feet 6 inches and may be in more than one section to accommodate height limitations. The following features shall be incorporated:
   a. Individual manual override switches for orientation of all system components utilized for smoke control, such as fans and/or dampers for pressurization and exhaust. Provide an individual switch, one per zone or level for exhaust components and individual switch for orientation of 100% outdoor air dampers.
b. Manual override switches shall be 3-function type, such as "Open-Auto-Close" for dampers or "On-Auto-Off" for fans. Manual positions shall override all automatic modes.

c. Independent positive indication of orientation of each system component provided with manual override per subsection 1807(g)1A above such as damper indication shall be for full closed and fan indication shall be for "Run". Control signals cannot be used for indication purposes.

d. Provide controls and indication for each refuge area's supply and exhaust dampers. Controls shall consist of an "exhaust-automatic-pressurize" selector switch to control the dampers when the refuge area pressurization system is operating. In the automatic position, the dampers shall be controlled by the smoke detectors within the refuge area. The indication required shall indicate whether the dampers are in pressurization or exhaust position.

e. A push-to-test switch shall be provided for all lights on control board.

2. One-Way Voice Communication (PA) System with the following features:
   a. Provide one-way communication on an individual and all-call basis to each level. See Section 3816.
   b. Stairwell and elevator speakers shall be separate zones, controlled manually from the F.D. Operations Center.

3. Two-Way (Firefighters') Telephone Communication System, with the following features:
   a. A firefighters' telephone jack shall be at every manual fire alarm box and elevator lobby. The firefighters' telephone communication system shall have "In Use" indication, by zone, at the F.D. Operations Center master panel, and switching provisions at the master panel to allow the selecting of any zone. Zones shall be by level plus separate zones for each of following:
      (1) Building Engineer Office
      (2) Each Mechanical Room
      (3) Emergency Generator Room
      (4) Fire Room
      (5) Electrical Room
      (6) Each Elevator Bank
      (7) Elevator Equipment Room.
b. The firefighters' telephone communication system shall be designed to serve as backup to the PA voice communication system.

c. Firefighters' telephone jacks shall be designed to prevent feedback by being arranged in such a manner that when a handset is inserted, it will disconnect any speaker in the immediate area while maintaining full supervision on the speaker circuit.

d. A permanently mounted firefighters' telephone handset shall be located at the building engineer's office, each mechanical room, emergency generator room, fire pump room, main electrical areas, each elevator cab and each elevator equipment room. These units shall initiate a signal from the F.D. Operations Center to the individual handset and from the individual handset to the F.D. Operations Center.

4. Emergency Generator Panel with the following features:
   a. Operating status (on-off) and malfunction indication panel as required by NFPA 70.
   b. Generator start/stop controls.
   c. Indication of transfer switch position (normal-emergency).
   d. Indication that generator is in automatic mode.
   e. Main fuel oil storage tank fuel level gauge.
   f. If pumping is required from a main fuel tank to a diesel generator, a duplex pumping system shall be provided. Emergency fuel flow controls are required in the F.D. Operations Center.

5. If main electrical disconnects are located higher than 75 feet from grade, remote tripping switches shall be located within the F.D. Operations Center.

6. Fire Pump Panel with the following features:
   a. Operating status indication (motor on or off).
   b. If pumping is required from a main fuel tank to a diesel fire pump, a duplex pumping system shall be provided. Emergency fuel flow controls are required in the F.D. Operations Center.
   c. Fuel level indicator for fire pump fuel tank is provided.
   d. Fire pump start control.

7. Fire Alarm Annunciation with the following features:
   a. Automatic fire sprinkler system zoned and annunciated per level with main water flow indication.
b. Manual fire alarm boxes zoned and annunciated per level.

c. Fire detection (duct and space) system zoned per level.

**EXCEPTION TO 7C:** With all concealed detectors (duct, electrical closet, etc.) provided with remote indicating pilot lights mounted directly below the detector or directly outside door (electrical closers, etc.) for annunciation purposes, all initiating devices may be combined and annunciated as one zone per level. Remote indicating lamps may be mounted on a graphic plate at an alternate approved location.

d. In Group R, Division 1 Occupancy, every detected space shall be annunciated individually. Annunciation shall be at the main F.D. Operations Center annunciator panel by individual detected space or individual level with a remote annunciator annunciating each detected space at each level at approved location. Main water flow annunciation shall be at the main annunciator panel. Individual level water flow shall be annunciated in the same manner as detected space. With individual level remote annunciators, water flow, detection and manual fire alarm boxes may be annunciated as one zone per level.

e. The annunciator shall be graphic, detailing building and placing annunciation indication relative to building level. The fire alarm annunciator panel may be combined with the HVAC status/control panel. The following are items to be included on graphic panel (See graphic panel Table No. 18-A):

1. Fire alarm zoned annunciation.
2. Lamp test switch.
3. Power on and trouble indications.
4. Fire alarm power source (e.g., normal or standby - generator or battery).
5. Smoke control/pressurization status and control switches.
6. Garage exhaust system control switch.
7. Fire pump running status.
9. Special extinguishing systems.
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(10) Fire mode indication with switch "on/auto". Fire mode means that the General Building Pressurization System Dampers are as follows: O.A. - Open 100%, R.A. - Closed 100%, E.A. - Open 100%

(11) Minimum height of letters shall be 3/16 inch.

The panel shall be graphic to clearly indicate a detailed layout of the building geography. A combination of vertical (section) and horizontal (plan) graphic arrangements may be necessary. Primary ingress and egress routes, including stairs (indicating those which open to the roof) and elevator shafts shall be shown. The graphic panel shall be oriented to the building and include a compass point.

Identification and location of major building features and functions shall be indicated, (e.g. refuge areas, stairwells, elevator shafts, fire pump room, emergency generator room, electrical rooms, mechanical rooms, atriums, F.D. Operations Center and special extinguishing equipment), and other features as required by the Department and the Fire Department. If the panel has colored graphics, the graphics shall be colored coded as follows:

- White - general building layout (black lines on white background)
- Yellow - exhaust air systems
- Orange - supply air systems
- Green - pressurization air systems

Indicator lights (status) shall be color coded as follows:

- Red - Alarm conditions
- Amber - Trouble or supervisory
- Green - Power on, fans operating, or dampers open
- White - Fans off, or dampers closed

Lamps shall be clearly visible and easily distinguishable between lighted and unlighted modes when operating. Full-size shop drawings (indicate color coding, if any) of the graphic annunciator shall be submitted to the Department.
and the Fire Department prior to the issuance of a Fire Alarm Permit.

f. Automatic fire detection in individual level refuge areas shall be zoned and annunciated individually and separate from occupied area.

g. Special extinguishing systems shall be annunciated separately (hood extinguishing system, halon, etc.)

8. Elevator Control/Status Panel with the following features:
   a. Identify each elevator cab numerically and the floors it serves. Locate corresponding cab number in elevator cab at permanent handset.
   b. Indication of which elevators are on emergency power.
   c. Placard at elevator status/control panel stating how many elevators can operate under emergency power simultaneously.
   d. Elevator car position indicator.

9. Emergency graphics and signs required by this Section shall be of durable construction, easily readable in normal room or corridor light, and have a smooth plastic surface.
   a. Diagrammatic Building Floor Plans (Table No. 18-A) shall be permanently mounted, unobstructed, on an interior wall of the F.D. Operations Center. One drawing may be used for all typical levels. Plans shall depict the following:
      Location of general building features,
      A brief legend listing the levels on which general building features are located,
      Stairtowers (identified by building directional location),
      Elevators (numerically identified),
      Elevator machine rooms,
      Emergency generator,
      Fire pumps,
      Fire sprinkler and standpipe valves,
      Mechanical areas,
      Main electrical areas,
      Fuel tanks,
      Locations of building services controls,
      Electricity,
      Gas,
      Water supply (domestic), all valves and building entry location,
Water supply (fire), all valves and building entry location,
Ammonia, Freon, chlorine, etc.,
Utility property line valves,
Location of features on individual levels. One drawing may be used for all typical levels,
Elevators,
Stairwell doors,
Refuge areas,
Fire sprinkler sectional valves,
Vertical shafts,
HVAC supply and return ducts (main each level),
Concealed detectors (duct, electrical closet, ammonia, etc.), and
Portions of buildings where partitions may be relocated from time to time. (This information may be in notebook form.)

b. A sign of 6 inches by 6 inches minimum size shall be mounted within each standpipe valve cabinet at each level of the building. This sign shall graphically depict the locations of sprinkler sectional valve(s), duct detector(s), and electrical closet(s) on that level. (Table No. 18-A.)

c. A sign of 6 inches by 6 inches minimum size reading "Use stairs in case of fire unless otherwise instructed" and graphically depicting exiting scheme (Table No. 18-A) shall be installed at each elevator call button in each refuge area.

(h) Emergency Generation. (See Electrical Code.)

1. Sufficient emergency power shall be provided to operate enough elevators serving the fire floor to evacuate the occupants of the required refuge area on the fire floor to a minimum of 2 floors above or below the fire floor with a maximum of 2 elevator trips (assume one person per 3 square feet of required refuge area). A minimum of 2 elevators supplied with emergency power shall serve the fire floor refuge area at any time. In addition, emergency power shall be provided to operate an elevator that serves all other floors, to operate air handling equipment for pressurization and exhaust systems as required, and to operate other emergency system as required by this Code.
EXCEPTION: Where an elevator transfer floor is provided, only elevators in one bank providing access to the ground floor are considered to be serving that floor.

2. Emergency switchboards, panel boards, transfer switches and conductors supplying this equipment shall be separated from main service equipment by a one-hour fire-rated wall.

3. Provide sufficient on site fuel supply for 8 hours continuous operation under full load.

4. The emergency generation system shall be operated not less than once a month for not less than 30 minutes at a minimum of 30% of full load. An accurate log shall be maintained on the premises indicating the person or agency conducting test, dates tested and length of test. Any defect, modification or repair shall be recorded in the log. Logs shall be made available to the Fire Department.

(i) Testing.

1. Each installation shall be tested prior to occupancy. Testing shall be scheduled in advance to allow for Department and Fire Department observation, prior to issuance of any Certificate of Occupancy. The following tests shall be performed at the following intervals thereafter:
   a. Smoke detectors, fire alarms, communications systems, in accordance with Section 3809(h)7 at the intervals stated.
   b. Pressure differential, air flow and door-opening force, in accordance with the criteria set forth in this Section, one time each year. Pressure differentials, air flows and door-opening forces shall be measured at a minimum of 3 locations - a floor in the lower third of the building, a floor in the middle third, and a floor in the upper third.

2. Test reports shall:
   a. Detail procedures followed, equipment used, outside air temperature, wind conditions, humidity and barometric pressure.
   b. State sequence and timing of operation of smoke control systems.
   c. Record any defects noted in system operation, action taken to correct such defects, and results of subsequent testing.
   d. Verify that the system, as installed, operated as required by this Code.
Sec. 1807

3. Copies of test reports, certified by a Registered Professional Engineer licensed in the State of Colorado, shall be filed with the Fire Department following the pressure differential, air flow and door-opening force testing each year thereafter. An accurate log of tests shall be maintained in the F.D. Operations Center. Any defects, modification or repair shall be recorded in the log.
Section 2304(d) is amended:

(d) **Partitions Loads.** Floors in office buildings and other buildings where partition locations are subject to change shall be designed to support a uniformly distributed dead load equal to 1/10th the weight of one lineal foot of partition with a minimum of 10 pounds per square foot in addition to all other loads. Access floor systems may be designed to support a uniformly distributed dead load equal to 10 pounds per square foot in addition to all other loads.

Section 2304(f) is added:

(f) **Fire Truck Loading.** When parking structures are designed to accommodate fire trucks, the beams and slab shall be designed for a concentrated load of 31,000 pounds bearing on an area with dimensions of 20 inches by 32 inches. The condition of concentrated or equivalent uniform live load (as given in Table No. 23-A) producing the greater stresses shall govern the design. Refer to the Fire Department for concentrated loads for fire trucks.

Section 2305(d) is amended:

(d) **Snow Loads.** Snow loads full or unbalanced shall be considered in place of loads set forth in Table No. 23-C, where such loading will result in larger members or connections. The load reduction provisions of Section 2306 shall not be used to reduce snow loads. Rain on snow need not be considered. Design shall be per one of the following methods:

1. **Method 1.** Design shall be for a uniformly distributed snow load of 30 psf on the horizontal projected area. This method is applicable only under the following conditions:
   a. The structure is in occupancy category IV according to Table 23-K.
   b. The roof has no abrupt changes in roof elevation, parapets or similar obstructions more than 3 feet in height with widths greater than 15 feet.
   c. The unbalanced loading condition in Section 2305(c) is satisfied.
2. **Method 2.** The roof shall be designed for snow loads in compliance with the procedures specified in either Appendix 23, Division I, or in American National Standard A58.1 - 1982 edition. The 2 procedures may not be mixed; one or the other must be used consistently throughout the design. The ground snow load for such procedures shall be as follows:

25 pounds per square foot for structures in occupancy category IV according to Table 23-K.

35 pounds per square foot for all other structures.

With these ground snow loads the importance factor I shall be 1.0 for all structures. In no case shall a structure be designed for less than 20 pounds per square foot or 70% of the ground snow load, whichever is greater.

**Section 2311(a) is amended:**

(a) **General.** Every building or structure and every portion thereof shall be designed and constructed to resist the wind effects determined in accordance with the requirements of this Section. Wind shall be assumed to come from any horizontal direction. No reduction in wind pressure shall be taken for the shielding effect of adjacent structures. Structures sensitive to dynamic effects, such as buildings with a height-width ratio greater than 5, structures sensitive to wind-excited oscillations, such as vortex shedding or icing, and buildings over 400 feet in height shall be, and any structure may be, designed in accordance with ANSI A58.1

**Section 2311(b) is amended:**

(b) **Basic Wind Speed.** The following parameters shall be used for Denver, Colorado:

1. Basic wind speed = 85 miles per hour.
2. qs = 19 psf
3. Exposure B, unless flat and generally open terrain extends uniformly \( \frac{1}{2} \) mile or more from the site in any full quadrant, in which case Exposure C shall be used.

*UBC 23 - 2*
### Table No. 23-A is amended:

#### TABLE NO. 23-A

**UNIFORM AND CONCENTRATED LOADS**

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>USE OR OCCUPANCY</th>
<th>Uniform Load</th>
<th>Concentrated Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Access floor systems</td>
<td>Office use</td>
<td>50</td>
<td>2000²</td>
</tr>
<tr>
<td></td>
<td>Computer use</td>
<td>100</td>
<td>2000²</td>
</tr>
<tr>
<td>2. Armories</td>
<td></td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>3. Assembly areas and auditoriums and balconies therewith</td>
<td>Fixed seating areas</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Movable seating and other areas</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Stage areas and enclosed platforms</td>
<td>125</td>
<td>0</td>
</tr>
<tr>
<td>4. Cornices, marquees and residential balconies</td>
<td></td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>5. Exit facilities</td>
<td></td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>6. Garages</td>
<td>General storage and/or repair</td>
<td>100</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Private or pleasure-type motor vehicle storage</td>
<td>50</td>
<td>6</td>
</tr>
<tr>
<td>7. Hospitals</td>
<td>Wards and rooms</td>
<td>40</td>
<td>1000²</td>
</tr>
<tr>
<td></td>
<td>Operating and X-ray Rooms</td>
<td>60</td>
<td>1500²</td>
</tr>
<tr>
<td>8. Libraries</td>
<td>Reading rooms</td>
<td>60</td>
<td>1000²</td>
</tr>
<tr>
<td></td>
<td>Stack rooms</td>
<td>125</td>
<td>1500²</td>
</tr>
<tr>
<td>9. Manufacturing</td>
<td>Light</td>
<td>75</td>
<td>2000²</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>125</td>
<td>3000²</td>
</tr>
<tr>
<td>10. Offices</td>
<td></td>
<td>50</td>
<td>2000²</td>
</tr>
<tr>
<td>11. Printing Plants</td>
<td>Press rooms</td>
<td>150</td>
<td>2500²</td>
</tr>
<tr>
<td></td>
<td>Composing and linotype rooms</td>
<td>100</td>
<td>2000²</td>
</tr>
<tr>
<td>12. Residential</td>
<td>Lounge, recreational areas and exterior balconies</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>13. Rest rooms</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14. Reviewing stands, grandstands and bleachers</td>
<td></td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>15. Roof deck</td>
<td>Same as area served or for the type of occupancy accommodated</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>16. Schools</td>
<td>Classrooms</td>
<td>40¹⁰</td>
<td>1000²</td>
</tr>
<tr>
<td>17. Sidewalks and driveways</td>
<td>Public access</td>
<td>250</td>
<td>6</td>
</tr>
<tr>
<td>18. Storage</td>
<td>Light</td>
<td>125</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Heavy</td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td>19. Stores</td>
<td>Retail</td>
<td>75</td>
<td>2000²</td>
</tr>
<tr>
<td></td>
<td>Wholesale</td>
<td>100</td>
<td>3000²</td>
</tr>
<tr>
<td>20. Kitchens</td>
<td>Other than residential</td>
<td>100¹¹</td>
<td>0</td>
</tr>
<tr>
<td>21. Penal Institutions</td>
<td>Cell blocks</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>22. Racquet ball &amp; Tennis Courts</td>
<td></td>
<td>60</td>
<td>0</td>
</tr>
</tbody>
</table>

UBC 23 - 3
1 See Section 2306 for live load reductions.
2 See Section 2304(c), first paragraph, for area of load application.
3 Assembly areas include such occupancies as dance halls, drill rooms, gymnasiums, playgrounds, plazas, terraces and similar occupancies which are generally accessible to the public.
4 Exit facilities shall include such uses as corridors serving an occupant load of 10 or more persons, exterior exit balconies, stairways, fire escapes and similar uses.
5 Individual stair treads shall be designed to support a 300-pound concentrated load placed in a position which would cause maximum stress. Stair stringers may be designed for the uniform load set forth in the table.
6 See Section 2304(c), second paragraph, for concentrated loads.
7 Residential occupancies include private dwellings, apartments and hotel guest rooms.
8 Rest room loads shall be not less than the load for the occupancy with which they are associated, but need not exceed 50 pounds per square foot.
9 Garage loadings shall not include an impact factor for floors or roofs. Ramp loadings shall be the same as for floors. Garage roofs shall be designed for a non-reducible live load of 55 psf which includes snow and snow-removal equipment. Garage roofs that provide access for fire trucks shall be designed for the live loads required. Contact the Fire Department for specifications.
10 School class and lecture rooms in excess of 1200 square feet in area without fixed seats shall be designed for a uniform live load of 75 pounds per square foot.
11 Use weight of actual equipment when greater.
Table No. 23-B is amended:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>DESCRIPTION</th>
<th>VERT. LOAD</th>
<th>LAT. LOAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Construction, public access site (live load)</td>
<td>Walkway, see Sec. 4406</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Canopy, see Sec. 4407</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>2. Grandstands, reviewing stands and bleachers (live load)</td>
<td>Seats and footboards</td>
<td>120²</td>
<td>See Footnote 3</td>
</tr>
<tr>
<td>3. Stage accessories (live load)</td>
<td>Gridirons and fly galleries</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loft block wells</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>Head block wells and sheave beams</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>4. Ceiling framing (live load)</td>
<td>Over stages</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All uses except over stages</td>
<td>10⁶</td>
<td></td>
</tr>
<tr>
<td>5. Partitions and Interior walls, see Sec. 2309 (live load)</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>6. Elevators and dumbwaiters (dead and live load)</td>
<td></td>
<td>2 x Total loads</td>
<td></td>
</tr>
<tr>
<td>7. Mechanical and electrical equipment (dead load)</td>
<td></td>
<td>Total loads</td>
<td></td>
</tr>
<tr>
<td>8. Cranes (dead and live load)</td>
<td>Total load including impact increase</td>
<td>1.25 x Total loads⁷</td>
<td>0.10 x Total load⁸</td>
</tr>
<tr>
<td>9. Balcony railings, guard rails and handrails</td>
<td>Exit facilities serving an occupant load greater than 50 Other</td>
<td></td>
<td>50⁹</td>
</tr>
<tr>
<td>10. Storage racks</td>
<td>Over 8 feet high</td>
<td>Total loads¹⁰</td>
<td>See Table No. 23-P</td>
</tr>
<tr>
<td>11. Fire sprinkler structural support</td>
<td></td>
<td>250 pounds plus weight of water filled pipe</td>
<td>See Table No. 23-P</td>
</tr>
<tr>
<td>12. Mechanical Equipment Rooms¹¹</td>
<td>Aisle Areas</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Equipment Areas</td>
<td>Actual Loads</td>
<td></td>
</tr>
</tbody>
</table>
1 The tabulated loads are minimum loads. Where other vertical loads required by this code or required by the design would cause greater stresses they shall be used.

2 Pounds per lineal foot.

3 Lateral sway bracing loads of 24 pounds per foot parallel and 10 pounds per foot perpendicular to seat and footboards.

4 All loads are in pounds per lineal foot. Head block wells and sheave beams shall be designed for all loft block well loads tributary thereto. Sheave blocks shall be designed with a factor of safety of five.

5 Does not apply to ceilings which have sufficient total access from below, such that access is not required within the space above the ceiling. Does not apply to ceilings if the attic areas above the ceiling are not provided with access. This live load need not be considered acting simultaneously with other live loads imposed upon the ceiling framing or its supporting structure.

6 Where Appendix Chapter 51 has been adopted, see reference standard cited therein for additional design requirements.

7 The impact factors included are for cranes with steel wheels riding on steel rails. They may be modified if substantiating technical data acceptable to the building official is submitted. Live loads on crane support girders and their connections shall be taken as the maximum crane wheel loads. For pendant-operated traveling crane support girders and their connections, the impact factor shall be 1.10.

8 This applies in the direction parallel to the runway rails (longitudinal). The factor for forces perpendicular to the rail is 0.20 x the transverse traveling loads (trolley, cab hooks and lifted loads). Forces shall be applied at top of rail and may be distributed among rails of multiple rail cranes and shall be distributed with due regard for lateral stiffness of the structures supporting these rails.

9 A load per lineal foot to be applied horizontally at right angles to the top rail.

10 Vertical members of storage racks shall be protected from impact forces of operating equipment or racks shall be designed so that failure of one vertical member will not cause collapse of more than the bay or bays directly supported by that member.
Sec. 2401

Section 2401(d) is added:

(d) **Acceptable Alternate.** Design and construction of masonry structures in conformance with the American Concrete Institute and American Society of Civil Engineers standards ACI-ASCE 530 "Building Code Requirements for Masonry Structures" and ACI-ASCE 530.1 "Specifications for Masonry Structures". The material and testing standards referenced therein are acceptable alternates to this Chapter.
Section 2501(g) is added:

(g) **Acceptable Alternate.** Design and construction of wood structures in accordance with the following standards are an acceptable alternate to the corresponding portions of this chapter:

3. Glued-laminated and heavy timber construction in accordance with the standards of the American Institute of Timber Construction.

Use of the materials and test standards specifically referred by these cited standards is also acceptable. Sections 2513 through 2517 are not replaceable by these cited standards and shall be satisfied in all cases, except that the ASTM, ANSI, AITC, NFPA or Department of Commerce standards for materials or tests may be substituted for the UBC standard where the equivalent standard is listed in Chapter 60.

Section 2516(c)6 is amended:

6. **Crawl Space Ventilation.** The space between the bottom of floor joists and the ground under the building (except the space as may be occupied by a basement) shall be provided with ventilation openings through foundation walls or exterior walls to ensure ventilation of the crawl space area. The openings shall be covered with a corrosion-resistant wire mesh not greater than ½ inch nor less than ¼ inch in any dimension. The minimum total area of ventilating openings shall be proportioned on the basis of ½ square foot for each 25 lineal feet of exterior wall. Openings shall be located on opposite sides of the building, and as near to the corner as practicable. Minimum clearance between any obstruction and the ground within a crawl space shall be at least 18 inches. Access to a crawl space shall be at least 18
Sec. 2516

by 24 inches. See the Mechanical Code for equipment access requirements.

Section 2516(1) is amended:

(i) **Structural Roof Sheathing.** Structural roof sheathing shall be designed in accordance with the general provisions of this Code and the special provisions in this subsection. Structural roof sheathing shall be designed to support all loads specified in this Code and shall be capable of supporting concentrated loads of not less than 300 pounds without failure. The concentrated load shall be applied by a loaded disc, 3 inches or smaller in diameter. Structural roof sheathing shall meet the following requirement:

Deflection under uniform design live and dead load limited to 1/180 of the span between supporting rafters or beams and 1/240 under live load only.

Roof sheathing shall conform to the provisions of Table Nos. 25-R-1 and 25-R-2 or 25-S-1, 25-S-2 or Table 25-S-3 with the exception that the minimum thickness of plywood or particle board roof sheathing shall be:

1. 15/32-inch plywood; or
2. 7/16-inch nonveneer APA Rated Sheathing (oriented strand board panels, structural particle board panels, composite panels or wafer board panels).

Plywood roof sheathing shall be bonded by intermediate or exterior glue. Plywood roof sheathing exposed on the underside shall be bonded with exterior glue.
Section 2601 is amended:

SECTION 2601. SCOPE. The design of structures in concrete of cast-in-place or precast construction, plain, reinforced or prestressed, shall conform to the rules and principles specified in this Chapter. Design and construction of concrete structures in conformance with American Concrete Institute Standards ACI 318, "Building Code Requirements for Reinforced Concrete" and ACI 318.1 "Building Code Requirements for Structural Plain Concrete," 1983 editions (revised 1986). The material and testing standards referenced therein are acceptable alternates to this Chapter, except that Sections 2618(j)2, 2621, 2624 and 2627 apply in all cases.
Section 2701(d) is added:

(d) **Acceptable Alternate.** Design and construction of steel structures in accordance with the following standards is an acceptable alternate to this Chapter:

1. **Structural Steel:** "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" or "Load and Resistance Factor Specification for Structural Steel Buildings," both of the American Institute of Steel Construction.

2. **Cold-Formed Structural Steel:** "Specification for the Design of Cold-Formed Structural Steel Members" or "Specification for the Design of Cold-Formed Stainless Steel Structural Members," both of the American Iron and Steel Institute.

3. **Open Web Steel Joists, Longspan Steel Joists, Deep Longspan Steel Joists, and Joist Girders by the "Standard Specifications" of the Steel Joist Institute.**

Use of the materials and test standards specifically referenced by these cited standards is also acceptable.
Sec. 2801

Section 2801(e) is added:

(e) Acceptable Alternate. Design and construction of aluminum structures in accordance with the "Specifications for Aluminum Structures" of the Aluminum Association. The materials and testing standards referenced therein are acceptable alternates to this Chapter.
Sec. 2901

Table No. 29-A is amended:

TABLE NO. 29-A
FOUNDATIONS FOR STUD BEARING WALLS
MINIMUM REQUIREMENTS\(^1\), \(^2\)

<table>
<thead>
<tr>
<th>NUMBER OF FLOORS SUPPORTED BY THE FOUNDATION(^3)</th>
<th>THICKNESS OF FOUNDATION WALL (INCHES)</th>
<th>WIDTH OF FOOTING(^6) (INCHES)</th>
<th>THICKNESS OF FOOTING (INCHES)</th>
<th>DEPTH BELOW UNDISTURBED GROUND SURFACE(^4) (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>12</td>
<td>6</td>
<td>36(^5)</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>15</td>
<td>7</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>18</td>
<td>8</td>
<td>36</td>
</tr>
</tbody>
</table>

\(^1\) Where unusual or frost conditions are found, footings and foundations shall be as required in Section 2907(a).

\(^2\) The ground under the floor may be excavated to the elevation of the top of the footing.

\(^3\) Foundations may support a roof in addition to the stipulated number of floors. Foundations supporting roofs only shall be as required for supporting one floor.

\(^4\) Exterior foundations, footings and grade beams of permanent structures except when founded on rock.

\(^5\) See 2907(a)1 for Group M Occupancies.

\(^6\) Does not apply in the case of expansive soils.

Section 2901 is amended:

SECTION 2901. SCOPE. This chapter sets forth requirements for excavation and fills for any building or structure and for foundations and retaining structures.

See Wastewater Management Division for requirements governing excavation, grading and earthwork construction, including fills and embankments.

All foundations shall be designed in accordance with accepted engineering practice by an engineer or as approved by the Department.
Section 2903(b) is amended:

(b) **Protection of Adjoining Property.** The requirements for protection of adjacent property and depth to which protection is required shall be as defined by prevailing Colorado law. Before commencing the excavation, the person making or causing the excavation to be made shall notify in writing the owners of adjoining buildings not less than 10 days before such excavation is to begin that the excavation will be made and the adjoining buildings should be protected. The owners of the adjoining properties shall be given access to the excavation for the purpose of protecting such adjoining buildings.

Section 2903(c) is added:

(c) **Trench Excavations.** All vertical walled trenches more than 5 feet deep shall be furnished with minimum protection of 2-inch by 10-inch uprights held tightly against the banks with trench jacks or cross braces.

1. The horizontal spacing of pairs of uprights shall not exceed 10 feet and the vertical spacing of pairs of uprights shall not exceed 10 feet; and the vertical spacing of trench jacks or cross braces shall not exceed 5 feet.

2. The Department may determine that a shoring or support system is inadequate and may require additional shoring and/or sheeting.

3. A trench shoring system designed by an engineer to meet the loading and soil requirements for a particular job, when approved by the Department, shall constitute an adequate support system.

4. Trench shoring as above specified may be omitted after investigation and written justification by a registered professional engineer and approval by the Department in the following circumstances.
   a. Trenches in sound rock formations.
   b. Trenches in which approved mobile shoring is provided so that workmen in the trench are at all times protected from caving.

5. Failure to comply with the minimum requirements of this Section shall be an unlawful act subject to penalty in accord with Section 112 of the Building Code.
Sec. 2905

Sections 2905(a) through (d) are amended:

(a) General. The classification of the soil at each building site shall be determined by an engineer when required by the Department.

(b) Investigation. The classification shall be based on observation and any necessary tests of the materials disclosed by borings or excavations made in appropriate locations. A soil investigation report by an engineer evaluating soil strength, the effect of moisture variation on soil-bearing capacity, compressibility and expansiveness shall be provided when Table No. 29-B does not apply.

(c) Reports. The soil classification and design-bearing capacity shall be shown on the plans unless the foundation conforms to Table No. 29-A. The written report of the investigation shall include, but need not be limited to, the following information:
   1. A plot showing the location of all test borings and/or excavations.
   2. Descriptions and classifications of the materials encountered.
   3. Elevation of the water table, if encountered.
   4. Recommendations for foundation type and design criteria including bearing capacity, provisions to minimize the effects of expansive soils, and the effects of adjacent loads.
   5. Expected total and differential settlement.

(d) EXPANSIVE SOILS. When expansive soils are present, special provisions shall be made in the foundation design and construction to safeguard against damage due to this expansiveness. A special investigation and report to provide this design and construction criteria shall be provided.

Section 2907(a) is amended:

(a) General. Footings and foundations, unless otherwise specifically provided, shall be constructed of masonry, concrete or treated wood in conformance with UBC Standard No. 29-3 and in all cases shall extend below the frost line. Footings of concrete and masonry shall be of solid material. Foundations supporting wood shall extend at least 6 inches above the adjacent finish grade.
1. Depth. Exterior foundations, footings and grade beams of permanent structures, except when founded on rock, shall be placed not less than 3 feet below the finished grade.

EXCEPTIONS: The following may be placed on a minimum 4-inch reinforced concrete slab, with thickened edges. The bottom of the thickened edges shall extend at least 12 inches below the final exterior finished grade.

a. Single Group M, Division 1 buildings of less than 1000 square feet and not a mixed-occupancy.

b. Single occupancy buildings, other than Group R, of less than 400 square feet without a basement and of only one story.
Chapter 31 is added:

CHAPTER 31

REHABILITATION OF OLDER BUILDINGS
(HERITAGE)

SECTION 3101. GENERAL

(a) Scope. Chapter 31 applies to the rehabilitation of all existing buildings, structures and utilities of any occupancy classification constructed prior to January 1, 1950, and which are intended to be rehabilitated for use within the following occupancy classifications of A2.1, A3, B2, E, M and R. The intended occupancy classifications specifically not listed cannot be considered under Chapter 31 and must be renovated by the other appropriate sections of the Building Code. This Chapter shall supersede all the requirements of this Building Code that are in conflict with the provisions of this Chapter, except the requirements of Chapter 1 relating to unsafe buildings, structures or utilities.

(b) Declaration. It is hereby declared, as a matter of public policy, that the rehabilitation, preservation and restoration of older buildings located within the City are a public necessity and are required in the interest of the general welfare of the people. Special consideration shall be given to buildings that are Denver Landmarks, on the National Register of Historic Places or National Historic Districts.

(c) Exception for the Rehabilitation of Existing Buildings. Buildings, structures and utilities conforming with Section 3101(a) of this Building Code may be granted an exception from the requirements of this Building Code, permitting the repair, rehabilitation or change of use or occupancy (within the occupancy as enumerated in Section 3101(a), when such would not comply with the provisions of this Building Code. No exception shall be authorized hereunder unless the Director shall find the following conditions to exist:

1. The building, structure or utility was constructed prior to January 1, 1950.

2. The building, structure or utility, is structurally sound and the proposed repair, rehabilitation or change of use or occupancy will substantially improve the use, safety and welfare of the occupants. The Director in making this determination may request an engineer's or architect's
Sec. 3101

report to determine the condition of the building, structure or utility.

3. The proposed repair or rehabilitation of a building, structure or utility for residential use does not violate the provisions of the Housing Code, Article 631 of the Revised Municipal Code.

4. The Fire Department concurs in any exception to be granted hereunder.

SECTION 3102. REHABILITATION ADVISORY PANEL

(a) Creation. An Advisory Panel of 25 persons, with experience in the rehabilitation of buildings, structures or utilities, shall be appointed by the Mayor. Individual members of City Council may submit names to the Mayor for consideration for appointment to this Advisory Panel. Their term of office shall be as follows at the discretion of the Mayor:

1. Five persons for one year.
2. Five persons for 2 years.
3. Five persons for 3 years.
4. Five persons for 4 years.
5. Five persons for 5 years.

After the initial appointments are made, each appointment shall be for a 5-year term. This Advisory Panel shall serve without compensation.

(b) Composition of the Advisory Panel. The Advisory Panel shall consist of the following:

1. Three members shall be Architects.
2. Three members shall be Engineers.
3. Two members shall be Class A or B Licensed Building Contractors.
4. One member shall be a Certified Plumbing Journeymen.
5. Two members shall be Class A Licensed Heating and Ventilating Contractors.
6. One member shall be a Certified Heating and Ventilating Journeymen.
7. Two members shall be Licensed Steam and Hot Water Contractors.
8. Two members experienced in accessible design and/or construction shall represent the disabled community.
9. Two members shall be Colorado Electrical Master Licensees.
10. One member shall be a Colorado Electrical Journeymen Licensee.
11. Two members shall be Licensed Class A Plumbing Contractors.
12. The remaining four members of the Panel shall be appointed from the Real Estate and Financial fields.

(c) Fire Department and Health and Hospitals Representative. The Chief of the Fire Prevention Bureau or his authorized representative and the Manager of the Department of Health and Hospitals or his authorized representative shall be ex officio members to the Panel, but shall have no voting power. Terms of office and compensation shall not be applicable to these members.

(d) Vacancy. Should a vacancy occur on the Panel during a member's term, the Mayor may fill the vacancy for the remainder of the unexpired term. Any member of the Panel, after serving a complete term, may be reappointed to another full term.

SECTION 3103. REHABILITATION BOARD.

(a) Creation. The Chairman of the Advisory Panel, in determining compliance with this Chapter, shall upon the request of the Director establish a Rehabilitation Board consisting of 9 voting members. These members shall be taken from the Advisory Panel. The Fire Department and Health and Hospitals representatives to the Board shall be nonvoting members.

The Board shall consist of the following:

1. Chairman of the Advisory Panel.
2. One person and an alternate who are licensed Architects.
3. One person and an alternate who are professional Engineers.
4. One person and an alternate who are holders of a Building Contractor Class A, B or C license.
5. One person and an alternate who are holders of a Class A Plumbing Contractor license.
6. One person who is the holder of a Colorado Electrical Master license or Journeyman license.
7. A person who is the holder of a City Class A Heating and Ventilating or Steam and Hot Water license.
8. A person from the Real Estate or Financial field.
9. One person with experience in accessible design and/or construction shall represent the disabled community.

The Department shall furnish to the Chapter 31 Committee a coordinator and a secretary. The duties of the Secretary shall be those as outlined by the Board. In the absence of any member of the Board, the respective alternates shall be
authorized to fill the vacancy so created, with the full power and compensation accorded the regular member.

(b) **Meetings.** There shall be at least one meeting in each month. For purposes of this Chapter, a meeting shall consist of a simple majority of the Board. Rules and regulations governing this body shall be established by a majority of the Board using Robert's Rules of Procedure and Order as a guideline. Matters brought before the Board shall be discussed and dates may be set for physical inspection of buildings.

(c) **Compliance.** The Director, in determining compliance with the conditions set forth in this Chapter, shall receive recommendations from the Board. Upon completion of his review, the Director shall notify the applicant and the Board of his decision and findings.

(d) **Compensation.** Each member of the Board, except the Fire Department and Department of Health and Hospitals representatives, shall receive $35.00 per regular meeting. No compensation shall be paid for meetings held in excess of 2 per month.

(e) **Board Guidelines.** From time to time, the Board shall establish guidelines for use by the Director and the Board in the implementation of this Chapter. These guidelines shall be approved by the Advisory Panel prior to their use by the Board or the Director. These guidelines shall not be changed more often than twice a year.

**SECTION 3104. METHOD OF APPLICATION AND FEE.** Prior to any action by the Board, an application for a variance shall be filed in the office of the Department on a form providing the necessary information required by the Board. Upon filing the application with the Department, a fee of $100.00 shall be paid to the Department. All checks shall be made payable to the Manager of Revenue. This fee is not refundable.

**SECTION 3105. PROCEDURE AND NOTICE.** Upon written receipt of the application for a variance, notice of the application shall be sent to the Fire Department, the Health Department, the City Attorney, the owner of the real estate affected by the application for a variance, and those organizations listed and described in § 41-19 of the Revised Municipal Code. No variance shall be granted until 15 days after the required notifications are mailed. The application for a variance shall stay enforcement of the order or denial
Sec. 3105

appealed from unless the Building Official certifies that a stay of the order or denial would, in the opinion of the Building Official based on facts stated in the certificate, cause imminent peril to life or property.

SECTION 3106. DECISION. The decision on the application for variance, including findings, shall be sent to all parties who received notice under Section 3105. Decisions shall be filed with the Department as a matter of public record. Decisions may be appealed to the Board of Appeals under Section 121.

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Section 3207 is amended:

SECTION 3207. ROOF DRAINAGE.
(a) General. Roof systems shall be sloped a minimum of 1/4 inch in 12 inches for drainage. All roofs or other enclosed structures shall be provided with drains or gutters and downspouts sufficient to drain the roof deck. All downspouts shall discharge away from the building or structure. Where it is necessary, concrete blocks at least 12 inches in width by 36 inches in length or with permanently attached or hinged metal downspout extensions, 36 inches long, shall be used.

EXCEPTION: Structures and greenhouses, where the roof extends at least 3 feet horizontally beyond the building wall and the wall is at least 10 feet from adjacent property lines, shall not be required to have gutters and downspouts, except when the roof drains into a sidewalk or pedestrian way.
(b) Roof Drains. Except when roofs are sloped to drain to the roof perimeter, interior drains shall be installed and shall be sized to convey the water to the storm drainage system. See the Plumbing Code.
(c) Flashing. Flashing for interior roof drains shall be one of the following:
   1. A minimum of 2 x 2 feet, 4-pound lead sheet or lead-copper coated sheet, set on completed felts in flashing cement.
   2. The metal shall be turned a minimum of 1/2 inch into a drain sump and plied with two plies of Type 15 felt.
   3. A 2-component drain system. The membrane flashing shall be polyvinylchloride sheet measuring 22 inches in its overall length, and factory-attached to the underside of the strainer flange. The membrane flashing shall be applied on top of the completed felt, shall extend a minimum of 7 inches from the outside diameter of the drain throat, shall be set into hot asphalt or roofing cement, and plied in with two plies of Type 15 felt.
(d) Overflow Drains, Scuppers, and Downspouts.
   1. When roof drains are installed, overflow drains (1 per roof drain) shall be installed with the inlet flow line a maximum of 4 inches above the low point of the roof. In lieu of overflow drains, overflow scuppers having 3 times the capacity of the roof drains shall be installed in adjacent parapet walls. The scupper drain inlet flow line shall be 4 inches above the low point of the adjacent roof and have a minimum opening height of 4 inches. No overflow
drains or scuppers are required if the maximum water depth cannot exceed 4 inches. 

EXCEPTION: If greater water detention is required, overflow drains and scuppers may extend beyond 4 inches height provided that roof loading calculations are submitted and approved by the Department. See Chapter 23.

2. Overflow drains shall be connected to leader piping after the first 90° offset serving a roof drain or shall be taken independently down through the building and discharged on grade or into storm sewer. When overflow drains and roof drains are combined into single piping system, all connection to that system must be offset 90° from the vertical prior to connection.

(e) Concealed Piping. Roof drains and overflow drains when concealed within the construction of the building shall be installed in accordance with the Plumbing Code.

(f) Discharge Water. Water shall not be discharged from any conductor pipes onto any public sidewalk, but shall be conducted underneath the walk to the gutter or street.

(g) Gutters and Downspouts.

1. Gutters shall be installed so that the line of the slope of the roof intersects the inside face of the gutter. Gutters shall slope to drain.

2. Hangers shall be the same material as the gutters and installed level with the gutter.

3. Maximum spacing of hangers shall be as follows:  
   Stainless steel gutter: 60 inches on centers. 
   Galvanized steel gutters: 36 inches on centers. 
   Copper, aluminum, or zinc-copper alloy gutters: 24 inches on centers.

4. Gutters shall be anchored to the roof deck.

5. All joints within the gutter trough shall be soldered or riveted and sealed with an approved sealant.

6. Gutter backs shall extend beneath roof covering a minimum of one inch, or be provided with a drip edge one inch beneath the roof covering and extending down a minimum of 2 inches into the gutter trough.

7. Downspouts shall be anchored to the building by supporting straps not more than 8 feet on centers and be of the same material as the gutter.
Section 3209 is added:

SECTION 3209. FLASHING.
(a) General. Flashing shall be installed on all vertical walls and curbs in accordance with the manufacturer's specifications and:
1. All flashing surfaces shall be primed.
2. A minimum of one ply of finishing felt shall be used, but shall not be less than the manufacturer's flashing recommendations.
   EXCEPTION: For Group I and J Occupancies, the flashing shall be equivalent to the type of roofing being installed.
3. All flashing shall extend at least 8 inches, but not more than 12 inches, up all vertical surfaces and at least 4 inches out onto the roof.
4. The top edges of the flashing shall be fastened at 3-inch intervals and sealed with plastic cement.
5. End laps shall be at least 3 inches long, nailed vertically and covered with 4 inches of felt embedded in plastic cement.
6. The entire base of the flashing shall be covered with a coating of the applicable surfacing materials in accordance with the manufacturer’s specifications.
7. The top edges of all felts and roofing shall be given a coating of approved plastic cement upon completion of the nailing requirements.
8. On smooth-surfaced roofs, the bottom edge of the flashing extending out onto the roof shall be covered with a 4-inch strip of asbestos felt.
9. All vertical walls and projections shall be counterflashed with a 2-piece metal system installed watertight.
10. Nailer strips shall be provided on vertical walls, drips in edge and curbs which will not accept conventional nailing.
11. All existing flashing shall be removed before installing new flashing and/or roofing.
(b) Valley Flashings.
1. Metal valley flashing for shingle roofing shall be at least 28-gauge galvanized or corrosion-resistant metal over an underlayment of one layer of type 30 felt or 2 layers of type 15 felt. The metal shall extend at least 10 inches on each side of the center line of the valley.
2. When noninterlocking asphalt shingles are used, the valley flashing may be woven, closed-cut or open-valley type, in accordance with the UBC Standards.

3. When interlocking composition shingles are used, valley flashing shall be open type.

4. Open valley flashing shall be constructed of metal or type 90 roofing applied in 2 layers, the first layer 18 inches in width and the second 36 inches in width.

5. All valley flashings shall be centered in the valley.

6. When wood shakes, slate, tile or shingles are used, they shall have an open type metal flashing.

7. Closed valleys shall be lined with a 36-inch-wide type 90 roll roofing.

(c) **Vertical Surfaces.** Flashing shall be provided wherever vertical surfaces meet a roof, and shall be constructed as follows:

1. On new construction, when the roofs are of slate, wood or asphalt shingles, a metal base flashing and metal counterflushing of at least 28-gauge galvanized metal shall be installed.

2. Base flashing of the step type shall be installed between each course of material.

3. Under clay or concrete shingles, a metal base flashing and counterflushing shall be installed on all roofs.

4. Where the new roof is installed over an existing composition shingle roof, all pipes and vertical projections shall be flashed with plastic cement.

5. A saddle or cricket shall be installed on the upper side of all projections 30 inches or more in width on all sloping roofs.

   a. All saddles or crickets on the upper side of all projections shall be covered with galvanized metal, with soldered joints, or asphalt rolled roofing at least 18 inches wide and equivalent to the type of roofing being applied, nailed over the saddles or crickets and sealed with plastic cement.

   b. Areas where saddles and crickets are not required on the upper side of projections shall be flashed with galvanized metal with a minimum width of 18 inches or asphalt-rolled roofing 18 inches wide, equivalent to the type of roofing being applied, and shall be nailed and sealed with plastic cement.
Sec. 3209

(d) Vertical Projections.
1. All projections penetrating the roof deck shall be finished off with a roofjack. The roofjack shall provide a 4-inch flange and 6 inches of pipes.
2. Pitch pans shall be used with all objects setting on top of completed roofs but not penetrating the roof deck, with a 4-inch flange and 2 inches in depth.

Section 3210 is added:

SECTION 3210. EQUIPMENT ON ROOFS.
(a) Mechanical Equipment. Mechanical equipment placed, replaced or reset over roofing shall be supported by curbs or legs which shall be flashed to the roofing and made watertight. Mechanical equipment shall include, by way of example and not limitation, heating, cooling refrigeration, ventilating fans, blowers and similar type equipment.
(b) Flat Roofs. On roofs having a pitch of less than 2 inches rise in a 12-inch run, mechanical equipment shall be supported on a square or rectangular platform, which shall be sheathed over solid and covered with metal of at least 26-gauge and surrounded by curbs. All seams and miter corners of the metal on the platform shall be riveted and soldered so as to be watertight. The platform shall be a minimum of 9 inches above the finished roof, or the units may be set on legs when the following is adhered to:
1. Units and ductwork in which at any point one horizontal dimension of the equipment on a roof is less than 4 feet shall have a clearance of at least 18 inches from the bottom of the unit or ductwork to the finished roof.
2. Units and ductwork in which at any point one horizontal dimension of the equipment on a roof is more than 4 feet but less than 8 feet shall have a clearance of at least 36 inches from the bottom of the unit or ductwork to the finished roof.
3. Units and ductwork in which at any point one horizontal dimension of the equipment on a roof is in excess of 8 feet shall have a clearance of at least 48 inches from the bottom of the unit or ductwork to the finished roof.
(c) Sloped Roofs. On roofs having a pitch of more than a 2-inch rise in a 12-inch run, mechanical equipment may be set on legs which provide a minimum of 11 inches clearance between the equipment frame and the finished roof.
Sec. 3210

(d) Piping and Conduits. Except where they vertically penetrate the roof, all piping or conduits shall protrude a minimum of 12 inches above the surface of the finished roof and shall be supported on metal stands installed in pitch pans no more than 10 feet between stands.

(e) Structures. Supports for signs, mansard roofs and other miscellaneous structures shall be installed in pitch pans with a minimum of 12 inches clear distance above the finished roof to the structure.

Section 3211 is added:

SECTION 3211. STAPLES. Staples shall be permitted on new installations only.
Sec. 3301

Section 3301(b) definition is added:

**SCISSOR STAIRS.** Two stairways in the same enclosure but completely separated from each other constitute 2 independent escape paths even though the 2 stairs are not remote.

Section 3301(c) is amended:

(c) **Exit Obstruction.** Obstructions shall not be placed in the required width of an exit except projections permitted by this Chapter. For handicapped accessibility requirements see Table No. 33-A and Appendix Chapter 64.

Section 3303(c) is amended:

(c) **Arrangement of Exits.**
1. When only 2 exits are required, they shall be placed at a distance apart equal to not less than ½ of the length of the maximum overall diagonal dimension of the building or story to be served measured in a straight line between exits.

EXCEPTION: When exit enclosures are provided as a portion of the required exit and are interconnected by a corridor conforming to the requirements of Section 3305(g), exit separations may be measured along a direct line of travel within the exit corridor. Exits shall be not less than 30 feet apart along the line of travel. Exits shall be accessible from 2 directions.

2. When more than one exit is required from a portion of a building, at least 2 of the exits shall be remote from each other and arranged and constructed to minimize any possibility that both may become blocked by any one fire or other emergency condition. Means of egress shall be arranged so that exits will be accessible in at least 2 different directions from any room door, except as permitted in Section 3305(e).

3. When 3 or more exits are required, they shall be arranged a distance apart so that if one becomes blocked the others will be available.
4. Scissor Stairs.
   a. General. Scissor stairs are allowed with the following provisions:
      (1) The separation between exit doors along the line of travel shall be a minimum of 30 feet.
      (2) The corridor shall be wrapped around the building core so that each exit door can be reached from two different directions.
      (3) The wall between the 2 separate stairs shall be two-hour fire-rated and with no penetrations allowed.
   c. Other than High-Rise Buildings.
      (1) Both stairs shall be mechanically pressurized upon fire alarm activation to maintain a minimum positive pressure of 0.15 inch of water column with all doors closed.
      (2) Activation of the mechanical equipment shall be through the Fire Alarm System which shall be provided per Chapter 38:
         A. Provide a smoke detector in front of each stair door on the corridor ceiling of each floor.
         B. Provide a smoke detector on the ceiling adjacent to the elevator lobby.
         C. In buildings with air conditioning systems or pressure air supply serving more than one story, provide a smoke detector in the return air duct or plenum on each floor. The activation of any detector shall cause the return air to exhaust completely from the building without any recirculation through the building.
      (3) Power for the mechanical equipment and the fire alarm system, herein required, shall be provided through the required emergency power section of the building electrical supply.
Sec. 3303

(4) Stair shafts shall be provided with emergency lighting from emergency power supply same as above. In addition, battery backup supply shall be provided for these fixtures.

(5) Acceptance Testing. Before the mechanical/electrical equipment is accepted by the Building Official, it shall be tested to confirm that the equipment is operating in compliance with these requirements.

Section 3303(f) is added:

(f) Elevator Call Button Signs. In all buildings with an elevator, all required exit stairs shall be graphically located on elevator call button signs. The graphics shall indicate handicapped refuge areas where they are required.

Section 3304(h) first paragraph is amended:

(h) Special Doors. Revolving, sliding and overhead doors shall not be used as required exits. Overhead fire doors shall be allowed in factories, plants, parking garages, storage areas and warehouses only.

Section 3304(j) is amended:

(j) Landing at Doors. Landings shall have a width not less than the width required by Section 3306(g) or the width of the door, whichever is greater. Doors in fully open position shall not reduce a required dimension by more than 7 inches when a landing serves an occupant load of 50 or more. Doors in any position shall not reduce the landing dimension to less than ½ its required width. Doors shall not swing into the wheelchair space required by Section 3306(g), Exception 2, and the door shall not obstruct access to the wheelchair space. Landings shall have a length measured in the direction of travel of not less than 44 inches.
Sec. 3304

EXCEPTION: In Groups R, Division 2 and 3, and M Occupancies and within individual units of Group R, Division 1 Occupancies, such length need not exceed 36 inches.

Section 3304(m) is added:

(m) Exit Doors in High-Rise Building Stairway Enclosures. Exit doors in high-rise stairway enclosures shall comply with the other requirements of this Code and the following if building/floor security requires that these exit doors are to be locked:

1. All stairway doors which are required to be locked shall be locked from the stairway side only.

2. All stairway doors which are locked shall have the capability of being unlocked simultaneously upon alarm or power failure or from a manual control at the fire department response point. The system shall be designed so that if deactivated under emergency conditions as herein noted, the mechanical latching system shall still be functional.

3. A telephone or other 2-way communications system connected to an approved emergency service which operates continuously shall be provided at not less than every fifth floor when doors are locked for more than 5 consecutive floors.

4. Signage shall be provided:
   a. On all locked doors for more than 5 consecutive floors "This door is locked - Emergency Phones are located at floors _____ and _____."
   b. At all phones "Emergency Phone".
   c. On all locked doors for 5 consecutive floors or less. "This door is locked. The next open door is down to Floor ____ or up to Floor _____."
   d. Stairway identification - signage shall be provided as required by the Fire Code.

Section 3305(g) Exception 5 is amended:

EXCEPTION:

5. Corridor walls and ceilings need not be of fire-resistant construction within single-tenant office spaces.
Sec. 3305

Section 3305(g) Exception 7 is added:

EXCEPTION:
7. For Group B2 Occupancies, when the entire building is provided with an automatic fire extinguishing system throughout. See Section 1807 for corridors in high rise buildings.

Section 3305(h)2 is amended by adding a second paragraph:

Approved window assemblies shall be fire-rated window assemblies meeting the requirements of Chapter 43 or a labeled 20 min. type window frame fire tested without hose stream. There shall be a minimum of 2 feet between adjacent windows unless stated otherwise in individual classifications.

Section 3306(g) is amended:

(g) Landings. Every landing shall have:
1. A dimension measured in the direction of travel not less than the width of the stairway. Such dimension need not exceed 44 inches when the stair has a straight run. For landings with adjoining doors see Section 3304(j).
   EXCEPTION: Stairs serving an unoccupied roof are exempt from these provisions.
2. On all floors above the first floor, a space at least 30 inches by 48 inches shall be provided for one wheelchair in each stairway enclosure as an area of refuge for handicapped persons confined to wheelchairs where exits usable by the handicapped persons are not provided. The refuge area shall be required only in buildings with elevators to upper floors.
   EXCEPTION: See Section 1807 for refuge areas in high rise buildings.

Section 3306(i) is amended:

(i) Distance Between Landings. There shall be not more than 13 feet vertically between landings.
Section 3306(m) is amended:

(m) **Interior Stairway Construction.** Interior stairways shall be constructed as specified in Part IV of this Code. Except when enclosed usable space under stairs is prohibited by Section 3309(f), the walls and soffits of the enclosed space shall be protected on the enclosed side as required for one-hour fire-resistive construction and sprinklered as required by Chapter 38.

Section 3306(n) is amended:

(n) **Exterior Stairway Construction.** Exterior stairways shall be constructed as specified in Part IV of this Code. Exterior stairways shall not project into yards where openings are not permitted or protection of openings is required. Enclosed usable space under stairs shall have the walls and soffits protected on the enclosed side as required for one-hour fire-resistive construction and sprinklered as required by Chapter 38.

Section 3309(a) is amended:

**SECTION 3309**

(a) **General.** Every interior stairway, ramp or escalator shall be enclosed as specified in this Section.

**EXCEPTIONS:**

1. In other than Groups H and I Occupancies, an enclosure need not be provided for a stairway, ramp or escalator serving only one adjacent floor and not connected with corridors or stairways serving other floors. For escalators serving Group B Occupancies, see Section 1706. Escalators in other Occupancies, except Groups H and I, may be installed as required for Group B Occupancies.

2. Stairs in Group R, Division 2 and 3 Occupancies and stairs within individual dwelling units in Group R, Division 1 Occupancies need not be enclosed.
Sec. 3309

Section 3309(f) Exception is added:

EXCEPTION: Enclosed usable space will be allowed when enclosed with a minimum one-hour construction and sprinklered as required by Chapter 38. The door to the space can not open into the exit enclosure.

Section 3310 is amended:

SECTION 3310. STAIRWAYS IN HIGH-RISE BUILDINGS. See Sections 1807 and 1907.

Section 3313(b) is amended:

(b) Separate Sources of Power. The power supply for exit illumination shall normally be provided by the premises' wiring system. In the event of its failure, illumination shall be automatically provided from an emergency system for Group I, Division 1 Occupancies and for all other occupancies where the exiting system serves an occupant load of 100 or more. For high-rise buildings see Section 1807. Emergency systems shall be supplied from storage batteries or an on-site generator set and the system shall be installed in accordance with the requirements of the National Electrical Code. Battery-backup-operated exit illumination shall provide a minimum of 2 hours of 100% output.

Section 3314(b) is amended:

(b) Graphics. Lettering, arrows and other symbols on exit signs shall be white on a green field. Words on the sign shall be in block letters 6 inches in height with a stroke of not less than 3/4 inch.

Table No. 33A title is amended:

Table No. 33A - Minimum Egress and Access Requirements

Table 33A is amended by deleting Footnotes 4, 7, 8, 9 and 10 and by adding Footnote 13:

Footnote 13—For handicapped accessibility requirements see Appendix Chapter 64.
Section 3703(f) is amended:

(f) Height and Termination. Every chimney shall extend a minimum of 3 feet above the roof and any part of the building within 10 feet of the chimney, unless this Code or the Mechanical Code requires a greater height. See Table No. 37-B.

All incinerator chimneys shall terminate in a substantially constructed spark arrester having a mesh not exceeding \( \frac{1}{2} \) inch.
Chapter 38 is amended in its entirety:

CHAPTER 38
FIRE PROTECTION SYSTEMS

SECTION 3801. GENERAL
(a) Scope. The provisions of this Chapter shall govern the design, installation, operation, maintenance and repair of fire protection systems in all Group A, B, E, H, I and R Occupancies. See also Chapter 31 (Rehabilitation). The requirements of this Chapter shall supersede conflicting requirements in other Chapters.

(b) Nonrequired Systems. Where a fire alarm and/or detection system not required by the Code is installed, the installation shall meet the requirements of Section 3811 except that a Central Station connection need not be provided. Where fire sprinkler or standpipe systems not required by the Code are installed, the installation of these systems shall meet the requirements of this Chapter except that a Central Station connection need not be provided. Where nonrequired systems are connected to a Central Station, the Central Station shall be an approved Class I or Class II Central Station. When a nonrequired system is abandoned, all external appurtenances, including heads, manual fire alarm boxes, valves, outlets and fire department connections, shall be removed.

(c) Fire Protection System Shutoff. When a fire protection system is interrupted for repairs or other necessary reasons, the owner and tenant shall advise the Fire Department prior to disconnection, and shall diligently pursue the restoration of the system. The Fire Department shall be notified when the system is reactivated and returned to service.

(d) Threads. All threads provided for Fire Department connections, hose outlets or other threads to be used for the connection of fire hose shall comply with Fire Department specifications.

(e) Signs. A sign shall be provided on the door of the entrance to the room housing the fire sprinkler and standpipe controls. The sign shall be red in color with white lettering and at least 4 inches in height, with contrasting lettering at least 1 1/4 inches in height, and shall read “Fire Valves.”
(f) Interconnection and Annunciation of Fire Protection Equipment. The method of establishing interconnection, activation and annunciation of system alarms shall be determined in conjunction with the Department and the Fire Department.

1. Interconnection. Where a fire alarm system is required by the Code, all fire alarm, fire detection equipment, fire sprinkler and special extinguishing systems shall be interconnected in such a manner so that activation on any initiating device or system shall cause all audible and visual alarms to be actuated and a signal to be transmitted to a Central Station, if one is required. See Section 3815. Interconnection may be made by supervised dry contacts.

2. Annunciation. Fire alarm control panels, annunciator panels and their locations shall be approved by the Department and the Fire Department. Refer to Sections 3804 and 3809(h) for zoning and specific location requirements.

(g) Special Extinguishing Systems. A special extinguishing system may be installed in lieu of, or in addition to, a required system when approved by the Department and the Fire Department.

(h) Material and Equipment. All materials and equipment used in a fire protection system shall be approved in accordance with the requirements of the Code and the Standards listed in Section 3818.

(i) Corrosion Protection. All underground piping shall be adequately protected from corrosion. Galvanized and black pipe and fittings shall be provided with approved coverings.

(j) Maintenance. The owner and tenant of every building or structure shall be responsible for the care and maintenance of all fire protection systems.

(k) Fire Alarm Permit. Prior to issuance of a Fire Alarm Permit, the following information on drawings prepared to scale shall be provided to and approved by the Department and the Fire Department.

1. Zone Schedules.
   a. Fire alarm and detection.
   b. Fan controls.
   c. Communications systems.
      (1) One-way voice communication (PA) systems.
      (2) Two-way (firefighters') telephone communication systems.
2. Sequence of Operation.
   a. Fire alarm and detection.
   b. Communications systems.
   c. Smoke control.
   d. Special extinguishing systems.
3. Device and equipment locations and types.
4. Riser locations.
5. Fire alarm and fire detection system one-line diagrams indicating the following: method of interconnection, wiring method, wiring color coding, control functions and Central Station interface.
6. Standby battery calculations per NFPA 72A, 72B, 72C or 72D. Specify the size in ampere-hours of the battery(s) selected.
7. General layout and requirements of graphic panels including damper and HVAC controls.
8. Any items required as a result of requirements of the Board of Appeals, the Department or the Fire Department.

(l) Drawings. Two sets of installation drawings, prepared to scale and showing detailed design of the fire sprinkler, standpipe or special extinguishing systems for systems required by Section 1807, shall be submitted to and approved by the Department and the Fire Department prior to issuance of a Fire Protection Permit for these systems. Drawings shall provide the information as required by NFPA 13 and Chapter 3 herein.

(m) Job Site. One set of fire alarm and detection and communications systems shop drawings with the engineer's review stamp affixed and approved by the Department and the Fire Department shall be kept at the job site during installation.

SECTION 3802. DEFINITIONS. For purposes of this Chapter, certain terms are defined as follows:

ANNUNCIATOR. Equipment which indicates the zone or area of a building from which an alarm has been initiated, the location of an alarm-initiating device or the operational condition of the alarm circuits of the system.

APPROVED - APPROVAL. See Chapter 4.

APPROVED EXTINGUISHING AGENTS. As approved by the Department and the Fire Department.
AUDIBLE ALARM. An approved horn or electronically generated signal for the purpose of alerting building occupants. (Bells are not permitted.) See Section 3809 for use of chimes in Group I Occupancies.

AUTOMATIC DETECTION DEVICE. An individual device or combination of devices designed to detect flame, heat, smoke or combustion gases resulting from a fire and to automatically operate electrical signalling contacts. Detectors shall be classified as one of the following:

(a) SMOKE TYPE. A device designed to detect one or more products of combustion. These products may consist of gases, ions, water vapor, visible or invisible smoke particles.

(b) FLAME TYPE. A device designed to detect flames, either in the infrared and/or ultra-violet regions.

(c) HEAT SENSING TYPE. An integral assembly of heat-responsive elements and noncoded electrical contacts which function automatically under conditions of increase in air temperature.

CENTRAL STATION SYSTEM. An approved system of electrically supervised circuits employing a connection between signalling devices at the protected premises and signal receiving equipment at the fire alarm headquarters or other location approved by the Fire Department.

COMPATIBLE. Means tested by a nationally recognized testing agency to function properly with the control unit monitoring the system.

FIRE ALARM CONTROL PANEL. A unit comprising the controls, relays, switches and associated circuits necessary to (1) distribute power to a fire alarm system; (2) receive signals from alarm initiating devices and transmit them to alarm signaling devices and accessory equipment; and (3) electrically supervise the system circuitry.

FIRE ALARM SYSTEM. An approved integrally supervised system consisting of manual fire alarm boxes which will actuate audible and visual alarm signals throughout the building or structure and an annunciator at an approved location.

FIRE DETECTION SYSTEM. An approved integrally supervised system of automatic detection devices. Single station detectors and/or duct detectors shall not, by themselves, constitute a fire detection system.

FIRE PROTECTION SYSTEM. Includes fire sprinkler systems, fire alarm systems, fire detection systems, standpipe systems, special extinguishing systems, water supplies and other extinguishing
agents suitable for the specific purpose for which they are
designed and installed.

FIRE SPRINKLER SYSTEM. An approved arrangement of open or
closed fire sprinkler heads, automatically or manually operated,
attached to piping containing an approved extinguishing agent.
GRADE. See Chapter 4.

PARTIAL SYSTEM. A fire suppression system designed to protect
a portion of a building or less than the entire floor area.

PRE-SIGNAL SYSTEM. A fire alarm or detection system which,
when activated, will immediately transmit a signal to an approved
Central Station and transmit a local alarm to predetermined
locations on the protected premises.

SPECIAL EXTINGUISHING SYSTEM. An approved fire
extinguishing system utilizing a particular agent for a specific use
or application.

SPRINKLER ZONE. A sprinkler zone shall be defined to include an
isolation valve (with tamper switch if required), a water flow switch
and a system (inspector’s) test valve.

STANDPIPE SYSTEM. An approved system of wet or dry piping
and all required appurtenances.

VISUAL ALARM. An approved pulsating nominal white light for the
purpose of alerting building occupants.

ZONE. A building or defined area of a building as approved by
the Department and the Fire Department for purposes of
identifying locations.

SECTION 3803. FIRE SPRINKLER SYSTEMS.

(a) Where Required. Fire sprinkler systems shall be installed and
maintained in full operating condition as specified in this
Chapter and the standards herein in the following locations:

1. In every story, cellar and basement of all buildings when
   the floor area exceeds 1,500 square feet, except in Group
   R, Division 3 and Group M Occupancies.

EXCEPTIONS:

a. Sprinkler systems shall not be required when at least
   20 square feet of window opening is provided in
   each 50 linear feet, or fraction thereof, of exterior wall
   in each story, cellar or basement. These windows
   shall be provided on at least 2 sides of the building.
   Such openings shall be accessible to the Fire
   Department from the exterior and shall not be
   obstructed in a manner that fire fighting or rescue
cannot be accomplished. Access shall be subject to approval by the Fire Department.

1. When the side of a building is less than 50 feet in length, the required window area may be in proportion to the actual length. Minimum window dimensions shall be maintained.

2. The required window opening shall be a glazed surface at least 30 inches clear in its smallest dimension and shall not be obstructed in a manner that fire fighting or rescue cannot be accomplished from the exterior.

3. Side hinged pedestrian doors may be included as required openings if provided with the minimum glazing requirements.

4. Required window openings shall not be approved if fully covered or filled with:
   A. Plastics, glass or safety glass; in excess of ¼ inch thickness unless approved by the Department and the Fire Department.
   B. Glass block or louvers.
   C. Metal bars or mesh exceeding ¼ inch in any cross-sectional dimension.

5. Windows located below grade shall be provided with areaways which provide enclosing walls of masonry, concrete or metal extending 4 inches above grade and 4 inches below the bottom of the window. The bottom of the areaway shall provide a masonry, concrete or gravel floor. The inside dimensions of the areaway shall be at least 4 feet in length, 30 inches in width and not more than 4 feet in depth. The areaway shall extend the full length of the window when the window is longer than 4 feet.

   EXCEPTION: The maximum depth may be increased to 5½ feet with an approved permanent noncombustible ladder within the areaway.

b. 1. In Group I Occupancies in attended nurseries, and attended specialized diagnostic and attended treatment rooms.

2. In the individual dwelling units of Group R, Division 1 apartment house occupancies. See Section 1807(d)2.
2. When any portion of a basement or cellar is more than 50 feet in line of travel from required openings, the entire basement or cellar shall be provided with an approved fire sprinkler system.

3. When any portion of a story is more than 75 feet in line of travel from required window openings, the entire story shall be provided with an approved fire sprinkler system.

EXCEPTION: Where any portion of a story or tier of an open parking garage is more than 200 feet from required openings, an automatic fire sprinkler system shall be installed throughout that story or tier.

4. Throughout open parking garages and storage garages which exceed 75 feet in height above grade and all parking garages which are part of high-rise buildings.

5. Throughout buildings or structures housing Group H Occupancies.

EXCEPTION: In Group H, Division 2 Subdivision 6, Division 3 Subdivision 7 and Division 4 Occupancies 3,000 or less square feet in area, not over one story in height, entirely above grade and with the window openings required in Section 3803(a).1. Exception 1.

6. Stages of any size at the following locations.
   a. The proscenium arch, by providing a line of open type fire sprinklers installed on the stage side and immediately back of the proscenium arch or curtain, not more than 5 feet above the arch and spaced not more than 6 feet on centers. The system shall be controlled by manually operated quick opening valves located on each side of the proscenium opening, not more than 5 feet above the stage floor.
   b. Under the gridiron.
   c. Under the stage floor.
   d. In tie and fly galleries.
   e. In areas adjacent to a stage, without limitation, such as: dressing rooms, storerooms, property rooms, carpenter shops, paint shops and passageways.

7. Under platform floors containing usable space beneath.

8. Spray painting rooms, booths and any area where painting, brushing, dipping or mixing of flammable materials is regularly conducted. Sprinkler systems in stacks or ducts shall be automatic and of a type not subject to freezing.
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9. At the top of rubbish and linen chutes and in their terminal rooms. Chutes extending through 3 or more floors shall have additional sprinkler heads installed within such chutes at alternate floors. Sprinkler heads shall be accessible for servicing. These systems shall be a separate zone with an approved indicating type valve.

10. Throughout existing buildings or structures where a fire hazard is determined to exist. See Uniform Fire Code.

11. Underground tunnels which exceed 6 feet in width or height and are more than 10 feet in length. Overhead passageways more than 65 feet above grade and which exceed 6 feet in width or height and are more than 10 feet in length.

12. Unenclosed vertical openings penetrating two or more floors, where permitted by other sections of this Code.
   a. When escalator openings are unenclosed, the floor opening involved shall be protected by draft stops in combination with fire sprinklers provided around the perimeter of the opening spaced not more than 6 feet apart at each level and 6 to 12 inches from the draft stop on the side away from the opening. The draft stop shall extend from the ceiling downward at least 12 inches on all sides.
   EXCEPTION: Closely spaced sprinklers and draft stops are not required around large openings such as those found in shopping malls, atrium buildings and similar structures where all adjoining levels and spaces are protected by automatic sprinklers in accordance with this standard, when the openings have all horizontal dimensions between opposite edges of 20 feet (6 m.) or greater, and an area of 1,000 sq. feet (93 sq. m.) or greater.
   b. Fire sprinklers shall be provided in all ceiling surfaces directly above and parallel to each escalator flight, and at the ceiling above the vertical opening required for the escalator.

13. Enclosed usable space under stairs.


15. Tire storage warehouses with storage capacity for 10,000 units or more shall comply with NFPA 231-D.
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(b) Partial Fire Sprinkler Systems. A maximum of 10 fire sprinkler heads in a building or structure may be supplied from the domestic water system, provided that the water supply and pressure are adequate to operate the fire sprinklers. See Section 3818 Standards.

(c) Signs. Legible signs, tags or labels are required on all valves. Instructions for care and maintenance of the valve shall be attached to the riser or mounted on the wall adjacent to it.

(d) Water Supply. See Section 3808.

(e) Curtain Boards. Curtain boards shall be provided on all fully sprinklered levels. See Chapter 32. When required solely to augment sprinkler protection, the Section on curtain boards shall delete the word "vented" and the curtained area shall be limited to 52,000 square feet and coincide with sprinkler zoning.

(f) Valves. Automatic fire sprinkler system valves shall be electrically monitored or secured in the open (operating) position with heavy duty locks and chains sufficiently durable to withstand any cutting device less than heavy duty bolt cutters.

(g) Nonmetallic Piping Systems. Approved and listed nonmetallic piping systems may be installed for fire sprinkler piping in accordance with their listings and the following requirements:
   1. Nonmetallic piping shall not be used as a vertical riser or combination riser and standpipe in a multi-story building.
      A control valve shall be installed at the point of connection to metal riser.
      EXCEPTION: Group R, Division 2, 3 and 4 and Group M Occupancies.
   2. Penetrations of fire-rated walls shall comply with Chapter 43.

SECTION 3804. FIRE SPRINKLER ALARMS.

(a) Zoning. Fire sprinkler piping systems shall be zoned as follows:
   2. In a multi-story building each floor shall be zoned separately. If the floor area exceeds that allowed by NFPA 13, additional zoning shall be provided.
EXCEPTION: Buildings of 4 stories or less above grade and 2,500 square feet or less per floor may be one zone (see Section 3801(f) when other types of fire protection are involved.)

3. When the system serves more than one building, each building shall be zoned separately.

4. Atriums shall be zoned separately.

5. Additional zones may be required for special hazards by the Department and the Fire Department.

(b) Annunciation. Fire sprinkler systems shall be annunciated as follows:

1. Each main fire sprinkler supply shall be equipped with a水流 alarm device which shall actuate the following alarms or signals:
   a. The exterior visual and audible alarm required in (c) below.
   b. The building fire alarm system, if so equipped. See Section 3801(f).
   c. The fire sprinkler zone annunciator panel required in 2 below.
   d. Interior alarms required in (c) below.

2. Each individual zone shall be equipped with a水流 alarm device. The水流 devices shall be electrically connected to a fire sprinkler zone annunciator panel located as approved by the Department and the Fire Department. The annunciator shall indicate the floor and/or area of the alarm. When the building has a fire alarm system, the sprinkler zone and automatically initiated fire alarm zone may be combined where the zones are the same area and the main fire alarm control panel and annunciator panel indicate there is a水流 alarm. When the水流 devices are connected to a fire alarm system, the fire sprinkler zone annunciator shall be part of the fire alarm system annunciator.

EXCEPTION: In buildings with one fire sprinkler zone, a zone annunciator panel will not be required.

3. The above水流 and annunciator systems will not be required to be electrically supervised unless interconnected with a fire alarm or detection system. See Section 3801(f).

(c) Fire Sprinkler Alarms. Exterior and interior alarm devices shall be installed as follows:
1. An approved exterior audible and visual alarm device shall be connected to every fire sprinkler system. The device shall be located on the exterior of the building at least 10 feet above grade and within 25 feet horizontally of, and visible from, the fire department connection. When more than one building is supplied by a yard main, the alarm devices shall be located on the exterior of each building in an approved location. The exterior audible and visual alarm shall be connected to, and activated directly by, the main water flow alarm device.

2. Interior audible and visual alarm devices shall be installed as follows:
   a. Each required fire sprinkler system shall provide a minimum of two alarm devices, one located at the main sprinkler shutoff valve, the second at the sprinkler zone annunciator panel required in 3804(b) above.
      EXCEPTION: Buildings not requiring an annunciator shall have an alarm device located at the main sprinkler shutoff valve.
   b. In addition to the requirements in subsection a above, required fire sprinkler systems in new retail sales establishments shall be connected to a Central Station. See Section 3815.
   c. Group H Occupancies shall have audible and visual alarms located throughout the building.
   d. Alarms and alarm attachments shall not be required for partial fire sprinkler systems supplied from the domestic water system. See Section 3803(b).

SECTION 3805. FIRE DEPARTMENT CONNECTIONS. See Section 3807 for temporary standpipes.
(a) Required. All fire sprinkler and standpipe systems shall be provided with at least one 2-way fire department connection. Each inlet of the fire department connection shall be 2½ inches in diameter. The pipe from the system to the fire department connection shall not be smaller than 4 inches in diameter. Single fire department connections may be installed on a 3-inch or smaller riser when approved by the Department and the Fire Department. Additional fire department connections and increased pipe size shall be provided based on system water flow requirements.
EXCEPTION: Fire department connections shall not be required for partial fire sprinkler systems supplied from the domestic water system. See Section 3803(b).

(b) Connections. Fire department connections shall be arranged so that the use of any one connection will serve all the fire sprinklers and standpipes within the building, unless otherwise approved by the Department and the Fire Department.

(c) Location. Fire department connections shall be located and be visible on a street front in a location approved by the Department and the Fire Department. Connections shall be located so that ready access can be made by the Fire Department. Obstructions such as fences, bushes, trees, walls or any other object shall not be permitted.

(d) Height. Fire department connections shall not be less than 1 foot 6 inches and not more than 3 feet 6 inches in elevation above the ground level on the center line of the inlets.

(e) Projection. When the fire department connection would project beyond the property line or into the public way, flush type fire department connections shall be provided.

(f) Hose Threads. Hose threads shall meet Fire Department specifications.

(g) Fittings. Fire department inlet connections shall be installed with check valves, ball drip valves, with caps and chains.

(h) Signs. A metal sign with raised letters at least one inch in height shall be mounted on all fire department connections serving fire sprinklers and standpipes. The sign shall read "Automatic Sprinklers" or "Standpipe."

SECTION 3806. STANDPIPE SYSTEMS.

(a) When Required. Wet standpipes shall be installed in all buildings or structures 4 or more stories in height above grade and shall be installed and maintained in full operating condition as specified in this Chapter and the Standards. See Chapter 7 for additional requirements for open parking garages.

EXCEPTION: Open parking garages may have dry standpipes in lieu of wet standpipes. The standpipes shall conform to all the requirements of wet standpipes, except water supply.

(b) Location. Outlets shall be located in a public corridor within 10 feet of the opening of a required stairway, on all floor levels, or as approved by the Department and the Fire Department. In no case shall the outlet be located in a
stairway. Outlets are not required at every stairway, provided that they are in compliance with hose reach distances required by subsection (c) and (k).

**EXCEPTION:** Where the maximum distance from the required standpipe outlets is exceeded and a horizontal fire separation is provided in a corridor, a standpipe and the required outlets shall be provided on each side of the separation. The standpipe outlets shall not be located more than 10 feet from either side of the fire separation.

(c) **Distance.** The maximum distance from a required standpipe outlet to any point in the building or structure shall not exceed 100 feet in the line of travel.

**EXCEPTION:** In open parking garages, standpipe outlets shall be accessible and shall be located within 10 feet of required stairwells so that all portions of the structure are within 200 feet in line of travel.

(c) **Size.**

1. Buildings, or portions thereof, having 4 or more stories above grade, shall be equipped with one or more 4-inch standpipes extending from the lowest portion of the building to a height 5 feet above the finished floor of the topmost story.

2. All buildings having any portion of a story used for human occupancy more than 75 feet above the lowest level of fire department vehicle access shall be equipped with one or more 6-inch standpipes extending from the lowest portion of the building to the topmost outlet. At least one 2-way roof manifold with 2½ inch hose valves with caps and chains, connected to a standpipe, shall be provided on each building rooftop. The main control valve on a roof manifold shall be located in a heated area and equipped with an automatic drain. These valves shall be accessible from the outside, within 3 feet of the manifold, and shall be plainly marked.

(e) **Extinguishers and Hose.** A 2½-gallon approved water-air pressure type extinguisher, or other extinguisher approved by the Fire Department shall be provided at each standpipe outlet location at each floor level. Hose shall not be required for standpipes.

(f) **Material.** Standpipes shall be constructed per NFPA 14.

(g) **Capacity.** Standpipes shall be capable of discharging a minimum of 500 gallons per minute for the first standpipe and 250 gallons per minute for each additional standpipe, the total supply not to exceed 2,500 gallons per minute, for a period of
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at least 30 minutes. The supply shall be sufficient to maintain a minimum residual pressure of 65 pounds per square inch at the topmost outlet.

(h) **Outlets.** At each floor level a 2½ inch hose valve with a 2½-inch to 1½-inch adaptor with cap and chain shall be connected to each standpipe. Outlets shall be at least 3 feet and not more than 6 feet above finished floor. The valves shall be readily accessible and plainly identified.

(i) **Valves.** All main control valves of a standpipe shall be electrically monitored or secured with a chain and padlock which will lock the valve in an open (operating) position with heavy duty locks and chains sufficiently durable to withstand any cutting device less than heavy duty bolt cutters.

(j) **Water Supply.** See Section 3808.

(k) **Standpipes in Fully or Partially Sprinklered Buildings.** The sprinkler water supply riser may be used for the standpipe. The maximum distance from required standpipe outlets to any portion of the building or structure shall not exceed 200 feet in the line of travel in fully sprinklered buildings only. All other requirements for standpipes shall apply.

(l) **Pressure.** Where the pressure at any standpipe outlet exceeds 100 psi, an approved pressure regulating device which regulates pressure under both flow and no-flow conditions shall be installed to reduce the pressure with required flow at the outlet to 100 psi.

(m) **Hose Threads.** Hose threads shall meet Fire Department specifications.

SECTION 3807. STANDPIPES FOR BUILDINGS UNDER CONSTRUCTION OR DEMOLITION.

(a) **General.** Wet or dry standpipes shall be provided for all buildings or structures under construction 4 or more stories in height above grade, and shall comply with all the requirements of Section 3806. Standpipes shall be available for use when construction reaches the third floor level, and remain in service until the permanent installation is completed and in service.

(b) **Height.** The standpipe and outlets shall be operable on all floors below the top floor of construction.

(c) **Fire Department Connections.** At the street level there shall be provided, for each temporary or permanent standpipe installation, one or more 2-way Fire Department inlet connections. Fire Department inlet connections shall be
prominently marked and readily accessible at all times. See Section 3805.

(d) Standpipes for Buildings Under Demolition. When a building is being demolished, and a standpipe is existing within the building, the standpipe shall be maintained in an operable condition so as to be available for use by the Fire Department. The standpipe shall be demolished with the building, but in no case shall the standpipe be inoperable more than one floor below the top remaining floor of the structure.

SECTION 3808. WATER SUPPLY AND OTHER EXTINGUISHING AGENTS.

(a) Required. Fire sprinkler systems and wet standpipes shall be provided with at least one reliable water supply. Other types of extinguishing agents permitted by this Building Code shall supply the extinguishing material in quantities adequate to perform the function intended.

(b) Insufficient Pressure. When the city water pressure is insufficient to produce the volume and pressure required in this Chapter and standards, a booster pump system shall be installed and maintained in operating condition at all times.

(c) Booster Pumps. Booster pumps shall be of an approved type, and shall have a rated capacity sufficient to produce and maintain the required volumes and pressures. Booster pumps shall be equipped with a controller which will provide both automatic and manual operation. Booster pumps taking suction from a street water main shall be installed in a bypass. Electric wiring to the pump motor shall be on a separate circuit and connected to the emergency system. See Electrical Code. Booster pumps driven by diesel engines shall have sufficient fuel supply, on site, for 8 hours of continuous operation under full load. Fuel tank installations shall be as approved by the Fire Department. Booster pumps shall be installed in a separate noncombustible room or pump house of at least one-hour fire-resistive construction. Room doors shall be equipped with a self-closing device and shall be rated ¾-hour fire resistive.

(d) Combined Water Supply. Where both sprinklers and standpipes are installed, they shall have a common water main as their combined source of supply. The connection shall not be made to any city water main of less than 4 inches in diameter. The common water supply for both standpipes and sprinkler systems shall be the larger connection required for either.
(e) **Combination Domestic Water Supply.** A fire sprinkler system may be connected to the domestic water supply system, provided that the supply system is of adequate pressure, capacity and size for the combined fire sprinkler system and domestic water needs. An indicating gate valve and check valve shall be installed in the sprinkler supply line.

(f) **Size.** The water supply for complete or partial fire sprinkler systems shall be sized in accordance with NFPA 13, for the quantity of heads provided. See Section 3818 Standards.

(g) **Standpipes.**
1. Standpipes shall be connected to a street water main at least equal to the size of the largest standpipe within the building. The size of the water service at the base of the standpipe risers shall be at least the size of the largest standpipe.
2. The required water supply shall be connected to the base of each standpipe. Where more than one standpipe is required, all standpipes shall be interconnected at their base. An approved shutoff valve shall be installed at the base of each standpipe.

(h) **Water Supplies for Buildings over 550 Feet to Highest Standpipe Outlet.**
1. Water storage tanks, with the top of the tank located less than 550 feet above the lowest level of Fire Department access, shall be installed to provide water to the sprinkler and standpipe systems above 550 feet. The tank shall conform to the following requirements:
   a. Construction and maintenance of the tank and appurtenances shall conform to the requirements of NFPA 22.
   b. The minimum total capacity shall be equal to 30 minutes of required flow.
   c. The tank shall consist of at least 2 approximately equal sections, capable of being drained independently for cleaning and maintenance. The Fire Department shall be notified prior to draining of the tank section and after refilling. Not more than one section of the tank shall be out of service at the same time. A minimum of 15 minutes at required flow shall be available at all times.
   d. Under emergency conditions the low zone fire pump and standpipe system shall be capable of automatically refilling the tank. The low zone risers shall be interconnected at the top.
e. Low water level and overflow indication shall be provided in the Operations Center. Supervisory monitoring shall be provided with a trouble signal to the Central Station.

f. The tank refill shall be so arranged to prevent an alarm condition during normal refilling due to evaporation. Domestic water system may be used for non-emergency refilling.

g. The room containing the tank shall be sprinklered.

2. Each high zone shall be served by two automatic fire pumps, with one pump serving as a standby pump. The pump system shall conform to the following requirements.

a. The high zone pumps may be individually driven by diesel engines or electric motors or a combination of both. If both pumps are driven by electric motors, the electrical system including the emergency generator shall be capable of powering one pump and automatic selector switching shall be provided so that either pump may be operated off the generator. If both pumps are diesel, fuel supply shall be sized for one pump per Section 1807.

b. If both pumps are electric, the controllers shall be interlocked to allow only one pump to run at a time.

c. Controller shall be protected against the entry of water per NFPA 20.

d. Each fire pump and its associated controller shall be located in a separate 1-hour fire-rated enclosure, and the room shall be sprinklered.

e. A fire department connection is not required for any zone supplied from the tank. All other zones shall comply with Section 3805. Fire department connections shall be provided for the low zone pumps.

(i) Fire Pump Test Connections. Fire pump test connections shall be provided, sized in accordance with fire pump capacity, and at a location approved by the Fire Department.

SECTION 3809. FIRE ALARM AND DETECTION SYSTEMS

(a) Fire Alarm System. A fire alarm system shall be required, installed and maintained in all new Group A, E, I and Group R, Division 1 Occupancies and in all new Group B, Division 2 Occupancies.
EXCEPTIONS:

1. Group B, Division 2 Occupancies of 4 stories or less above grade.
2. Apartment buildings of two stories or less, or which contain 15 or less dwelling units, and hotels of two stories or less, or which contain less than 20 guest rooms.
3. Churches.
4. Group E, Division 2 and 3 Occupancies with 20 or less occupants.
5. Group E, Division 2 and 3 Occupancies of more than 20 occupants and less than 50 shall be provided with a complete fire alarm system that need not be connected to an approved Central Station system.
6. Group A, Division 3 Occupancies with an occupant load of 150 or less and Group A, Division 4 Occupancies.

(b) Fire Alarm System and Fire Detection System. A complete fire alarm system and a complete fire detection system shall be required and maintained in all new Group E, I and Group R, Division 1 Occupancies, and all new Group A, Division 2.1 and 3 and Group B, Division 2 Occupancies which provide for the serving of malt or alcoholic beverages. New hotels and apartment houses shall have systems as required by this Section. For additional requirements for high-rise buildings, see Sections 1807 and 3816.

EXCEPTIONS:

1. Group E, Division 2 and 3 Occupancies with more than 20 and less than 50 occupants need not be connected to a Central Station.
2. Day care homes housing 6 or less children shall be provided with battery-type smoke detectors as approved by the Department and the Fire Department.
3. Existing Group E, Division 2 and 3 Occupancies (7 through 20 occupants) and Group I, Division 1 and 2 Occupancies with 10 or less occupants shall be provided with approved residential-type single-station smoke detectors wired to a 115 volt AC unswitched electric power source. The detectors shall be installed in routes of egress and as may be required by the Department and the Fire Department.
4. Apartment buildings of 2 stories or less, or which contain 15 or less dwelling units, and hotels of 2 stories or less, or which contain less than 20 guest rooms.
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(c) **Not Required.** A fire alarm and fire detection system may be installed in lieu of a fire sprinkler system, when approved by both the Department and the Fire Department. When a fire sprinkler system is installed in a building or area where a fire alarm and detection system was originally required, the fire alarm and detection system need not be provided when approved by both the Department and the Fire Department.

(d) **Manual Fire Alarm Boxes.** Manual fire alarm boxes shall be provided and shall be approved for the particular application, and shall be used for fire protection signaling purposes only. Alarm boxes shall be red with white lettering.

(e) **Location and Signs.** Manual fire alarm boxes shall be located in each corridor of each story, basement or cellar so that from each corridor door not more than 100 feet will be traversed in order to reach a manual fire alarm box. Boxes shall be located as near as possible, but not more than 5 feet from each exit of each story, basement or cellar. The height of the boxes shall be not less that 4½ feet, and not more than 6 feet above the floor. In areas required to be accessible to the handicapped, the height of the boxes shall conform to the requirements of Chapter 64. When corridors are not provided, manual fire alarm boxes shall be located so that no point in the building is more than 100 feet from a box. When a stage is provided, a manual fire alarm box shall be located adjacent to the lighting control panel. Manual fire alarm boxes shall be located at or near each exit from the building. Where a Central Station is not required, an engraved plaque with lettering no smaller than ½ inch in height shall be provided within 4 inches of each box. The plaque shall read "AFTER PULLING ALARM - PHONE 911, THIS IS A LOCAL ALARM ONLY," and shall be red with white lettering.

**EXCEPTION:** In Group E Occupancies, manual fire alarm boxes may be located in areas under supervision of persons in authority as approved by the Department and the Fire Department.

(f) **Coding.** Coded stations shall be coded in conformance with the Standards as listed in Section 3818.

(g) **Power Supply.** Electric power supply shall be provided from the building emergency system. Standby batteries shall be provided as required by the NFPA as listed in the Standards.

(h) **Detailed Requirements.** Fire alarm and detection systems shall be of an approved type, compatible, shall be electrically supervised, and shall comply with the following:
1. Wiring shall conform to the requirements of the NFPA as listed in the Standards and manufacturer's recommendations. See Section 3818. Wiring shall be color-coded. The color code shall be consistent for the entire system. Separate sets of colors shall be used for the following:
   a. Audio and alarm indicating.
   b. Initiation circuits.
   c. Low voltage control, monitoring and power.
   d. Line voltage control, monitoring and power.
2. Audible and visual alarms conforming to Section 3802 shall be provided.
   a. Audible and visual alarms shall be provided as required by this Chapter and Chapter 64 Appendix. Visual alarms shall be located wherever audible alarms are required.
   b. Audible alarms shall be located to be heard above normal ambient sound levels by the occupants in all spaces in the building.
      EXCEPTION: In Group I Occupancies, chimes may be installed in lieu of audible alarms required above when approved by the Department and the Fire Department. When chimes are installed, visual alarms shall also be provided.
   c. The fire alarm control panel shall incorporate an audible alarm silencing switch which shall not cancel the visual alarm until the full system is manually reset.
   d. The operation of any manual or automatic detection device shall cause all audible and visual alarms to operate. (Refer to Section 1807 for high-rise buildings.)
3. Fire detection systems shall incorporate smoke detectors.
   EXCEPTION: Rate-of-rise detectors shall be used in toilet and shower rooms, janitor sink rooms, areas that normally produce fumes; Group A, Division 2.1 and 3 and Group B, Division 2 Occupancies which provide for the serving of malt or alcoholic beverages; and where approved by the Department and the Fire Department.
   a. All spaces shall be provided with the type of detectors suitable for the particular environmental application.
   b. Fire detecting devices shall be installed to comply with the lineal and square footage allowances as specified in Section 3818 Standards.
4. A presignal system may be installed in Group I Occupancies. Presignal systems shall not be installed in other occupancies, unless approved by the Department and the Fire Department. All presignal systems shall be connected to an approved Central Station system.
   a. When a presignal system is installed, 24-hour personnel supervision will be provided at locations approved by the Department and the Fire Department.

5. The master keys for manual fire alarm boxes and for the master fire alarm panel shall be located within the elevator fire control key cabinet or other location approved by the Department and the Fire Department.

6. Each floor shall be zoned and annunciated separately. If the floor area exceeds 20,000 square feet, additional zoning and annunciation shall be provided. In no case shall the length of any zone exceed 200 feet in any direction.
   a. Zone and Annunciation Per Building Level.
      (1) Manual devices.
      (2) Automatic devices.
      (3) Waterflow (when fire alarm and sprinkler zones are not identical).
      (4) Atrium.
      (5) Refuge area.
   b. Zone and Annunciation Per Building.
      (1) Main waterflow.
      (2) Individual dry pipe/pre-action systems.
      (3) Fan duct detection per fan unit.
      (4) Common alarm.
         A. Stairs.
         B. Elevator hoistways.
      (5) Special extinguishing systems.
      (6) System trouble.
      (7) System supervisory.
   c. Zoning indicator panels and controls shall be in a location approved by the Department and the Fire Department. Annunciators shall lock in until the system is reset with a dedicated reset switch located on the annunciator.
   d. The required supervised fire detection device in each dwelling unit in Group R, Division 1 and 2 Occupancies shall be annunciated at either the main
annunciator, at an annunciator located on each floor, or over the doorway to the dwelling unit.

e. Annunciators for new buildings over 75 feet in height (high-rise) shall be the graphic type and shall conform with the requirements of Section 1807.

f. Annunciators for buildings under 75 feet in height may be the approved indicating light type if building plans are permanently mounted adjacent to the fire alarm annunciator. Plans shall be of durable construction, easily readable in normal lighting, and have a smooth plastic surface. One drawing may be used for all typical levels. Drawings shall locate the following items:

1. Stairtowers (identified by building directional location).
2. Elevators (numerically identified).
3. Elevator machine rooms.
4. Emergency generator.
5. Fire pump.
7. Switchgear room and panelboards.
8. Detectors.

7. All systems shall be tested semiannually. Accurate logs and as-built drawings shall be maintained on the premises indicating box numbers, location and type of devices tested. Any defect, modification or repair shall be recorded in the log and on as-built drawings. Logs shall be made available to the Fire Department.

8. Apartment houses over 2 stories or which contain more than 15 dwelling units, and hotels and motels over 2 stories or which contain 20 or more guest rooms, and where permitted by the Department and the Fire Department, shall provide in the dwelling units supervised rate-of-rise detectors located per Section 3810(b), and a single station smoke detector conforming to the requirements of Section 3810 may be installed in lieu of the required supervised smoke detector. The supervised rate-of-rise detector shall actuate the fire alarm system. The single station smoke detector shall be wired to a 115-volt AC unswitched electric power source. When additional supervised smoke detectors are required by other sections of the Code, a supervised smoke detector, or a supervised rate-of-rise detector with a single station smoke detector, as above, shall be provided. When
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more than one single station smoke detector is installed within a dwelling unit, they shall be interconnected so that activation of any one single station detector shall cause all to sound an alarm. (Refer to Section 3816 for special requirements for high-rise buildings.)

   a. Remote indicating lights shall be installed in a readily accessible area outside of the door of any room where a smoke or heat sensing detector is located.
   b. Remote indicating lights shall be installed on the ceiling directly below detectors located above ceilings.
   c. Minimum requirements. Remote indicating lights shall be a minimum of ½ inch in diameter, with a 3/16-inch lighted projection and shall be visible from 20 feet at normal ambient lighting levels.
   d. The first remote indicating light activated by a smoke detector shall remain lit until the system is reset, regardless of additional detectors being activated.

   EXCEPTION: In Group I, Division 3 and Group R, Division 1 dormitory occupancies, the first remote indicating light activated by either a smoke or a thermal detector shall remain lit until the system is reset regardless of additional detectors being activated.

10. There shall be maintained on the premises at least 3 spare detectors so that any detector that requires replacement after operating or that may have been damaged in any way may be promptly replaced.

SECTION 3810. SINGLE STATION DETECTING DEVICES.
(a) Household Fire Warning Equipment. (See NFPA 74.) Household fire warning detectors shall be installed in the following occupancies and areas:

1. New Group E, Division 2 and 3 and Group I, Division 1 and 2 Occupancies as required in Section 3809(b) and new Group R, Division 1 and 2 Occupancies.

   EXCEPTION: Where a fire alarm system is required, the detectors required herein shall be of the supervised type and shall be interconnected with the fire alarm system. Refer to Section 3809(h)8 for further requirements for Group R, Division 1 Occupancy.
2. New Group R, Division 3 and 4 Occupancies. See Chapter 12 for special requirements for Group R, Division 3 Group Home (A) Occupancies.

3. Approved supervised smoke detectors connected to an approved household fire warning system may be installed in lieu of single station detectors when approved by the Department and the Fire Department. Central Station connection is not required.

(b) Location. Location of detectors in Group K, Division 2 and 3 Occupancies (7 through 20 occupants) shall be in the corridor or central area or as approved by the Department and the Fire Department. Detectors in Group R, Division 1 hotel and motel occupancies shall be located in each room utilized for sleeping purposes. Detector(s) in Group R, Division 1 apartment house occupancies and Division 2, 3 and 4 Occupancies shall be located in the corridor or central area within each unit adjacent to the sleeping area or as approved by the Department and the Fire Department.

(c) Power Supply. Detectors required by this Section shall be wired to a 115-volt AC unswitched electric power source and when activated shall initiate an audible alarm.

EXCEPTION:
1. Battery-powered detectors shall be permitted in existing Group R, Division 3 Group Home (A) and Division 4 Occupancies, and no permit shall be required for this installation.

2. Detectors installed in Group R, Division 1 and 2 Occupancies of more than 4 stories in height and not covered in Section 3816 shall be installed in accordance with Section 3809.

SECTION 3811. NONREQUIRED SYSTEMS.
(a) Nonrequired Systems. Nonrequired fire alarm and/or detection systems shall be installed to meet the following requirements.

1. In new or existing occupancies not requiring a fire alarm and/or detection system, fire alarm and/or detection systems may be installed in all or part of the building. The area to be protected shall be separated from unprotected areas by an occupancy separation as required in Table No. 5-B or by a one-hour fire-resistive assembly if occupancy separation is not required by the Code. Any openings in this separation shall be protected by not less than a ½-hour fire-resistive assembly. If a
system or systems are installed in only a portion of the building, the system shall be provided with an annunciator at the building entrance that identifies the type of alarm and its location (e.g. "detectors suite 310," "detectors 2nd floor," etc.) The annunciator shall provide for trouble indication and key-operated alarm activation. A sign shall be posted at this annunciator identifying that the fire alarm system is only a partial system. Where the system is not connected to a Central Station, an engraved plaque on the annunciator with lettering no smaller than ½ inch in height shall be provided. The plaque shall read "LOCAL ALARM ONLY - PHONE 911," and shall be red with white lettering. Where the fire alarm control panel is remotely located from the annunciator, the location of the fire alarm control panel shall be indicated on the annunciator. If additional partial systems are installed in a building already having a partial systems, these new systems shall have annunciators identifying the area the systems protect, trouble indication and key-operated alarm activation. These annunciators shall be located as approved by the Department and the Fire Department. Where a Central Station is provided, all systems shall be connected to this one Central Station transmitter.

Partial fire alarm and/or detection systems installed in one or more tenant spaces in a building without a building fire alarm system shall not be required to be interconnected.

Partial fire alarm and/or detection systems installed in one or more tenant spaces in a building with a building fire alarm system shall be interconnected with the building fire alarm system. The partial systems shall be annunciated as a separate zone in the building fire alarm system.

2. In existing Group R, Division 1 and 2 Occupancies more than 4 stories above finished grade, single station smoke detectors may be installed in dwelling units in accordance with Section 3810(b). Detectors may be installed in corridors and common areas, but shall be electrically supervised and connected to the building fire alarm system.

3. In existing Group R, Division 1 and 2 Occupancies of 4 stories or less above finished grade, single station smoke detectors may be installed in accordance with Section 3810(b). A fire alarm system may be installed with
supervised detectors in the corridors and common areas, with single station smoke detectors in the dwelling units.

4. In new Group R, Division 1 and 2 Occupancies of 4 stories or less, a fire alarm and/or detection system may be installed, but shall be installed in accordance with this Chapter.
   EXCEPTION: Single station smoke detectors may be used in the dwelling units.

SECTION 3812. SPECIAL EXTINGUISHING SYSTEMS.
(a) Kitchen Hoods. An approved special extinguishing system shall be installed and maintained in range hoods, connecting duct systems and special hazards such as deep fat fryers, ranges, griddles and broilers used in conjunction with frying and cooking operations in food preparation centers within any Group A, B, E, H, I and R, Division 1 Occupancies.
   EXCEPTIONS:
   a. New or existing restaurants in one-story buildings with an occupant load of less than 50.
   b. Churches, schools and noncommercial installations when the food preparation center is used less than 8 hours per week.
   c. Dwelling units.

(b) General Requirements. All systems shall comply with the following:
1. A manual station controlling the actuation of the extinguishing system shall be located in the path of egress from the cooking area and a minimum of 10 feet from the range hood, unless otherwise approved by the Department and the Fire Department. Manual stations shall be securely mounted at an approved location not less than 4½ feet or more than 6 feet above the floor.
2. Extinguishing systems required by this Section shall provide both automatic and manual actuation.
3. System nozzles shall be accessible for cleaning and replacement.
4. Operating instructions shall be posted at the manual station.
5. When a fire alarm system is required by other sections of the Code, the special extinguishing system shall be connected to the fire alarm system.
6. Containers for the extinguishing agent shall not be subject to weather conditions affecting proper operation,
physical damage, chemical or other damage, or exposure to fire or explosion occurring in the hazard area.

7. Upon activation of the extinguishing system, a valve shall shut off the gas pilot and burners and electric power supplying the cooking equipment. In addition, water and wet chemical extinguishing systems, upon activation, shall shut down other appliances located under ventilating equipment protected by the extinguishing system. Fan operation and fire damper installation and control shall be in accordance with the standards governing the particular system. See Section 3818.

8. A visual indicator shall signify the readiness of the extinguishing system.

9. Approved portable fire extinguishers shall be installed and maintained as required by the Fire Code.

10. The system shall be maintained in full operating capacity as required by the Code and shall be serviced at least once every 6 months. A record of the service company and dates of service shall be posted and available for inspection.

(c) Other Locations. Special fire extinguishing systems not covered in (a) shall be approved and installed in accordance with approved Standards.

SECTION 3813. VEHICULAR FUELING STATIONS INSIDE BUILDINGS. Vehicular fueling stations inside building are prohibited. See Chapter 9 and the Uniform Fire Code.

SECTION 3814. FIRE HYDRANTS. See Fire Code.

SECTION 3815. CENTRAL STATIONS.
(a) Central Stations Required. Required fire protection systems shall be connected to an approved Central Station system. When approved by the Fire Department, the fire protection system may be connected to the City alarm signaling system.

EXCEPTIONS:
1. Group E, Division 2 and 3 (with less than 50 occupants) and Group H, and Group R, Division 2, 3 and 4 Occupancies.
2. Special extinguishing systems unless otherwise required. See Section 3812(a)1.E.
3. Standpipes.
4. Group B, Division 2 Occupancies when 4 stories or less above grade, except new retail sales establishments (see Section 3809 for fire alarm and detection systems in new retail sales establishments). Occupancies serving malt or alcoholic beverages shall be connected to an approved Central Station system.

5. Churches.

6. Group A, Division 3 (with max. occupancy limited to 150) Occupancies not including those serving malt or alcoholic beverages.

(b) Responsibility. It shall be the responsibility of the owner and tenant of a building or structure to provide and maintain the required Central Station connection.

SECTION 3816. SPECIAL REQUIREMENTS FOR HIGH-RISE BUILDINGS.

(a) Scope. In addition to the other requirements of the Code, this Section shall apply to all buildings having any portion of a story used for human occupancy more than 75 feet above the lowest level of Fire Department vehicle access.

(b) Fire Sprinkler System.

1. Required. Automatic fire sprinkler systems installed in accordance with the requirements of this Chapter shall be provided throughout high-rise buildings.

   EXCEPTIONS: An approved fire alarm and fire detection system complying with the requirements of this Chapter may be installed in lieu of sprinklers:

   a. In Group I Occupancies in attended nurseries, attended specialized diagnostic, and attended treatment rooms.

   b. In the individual dwelling units of Group R, Division 1 apartment house occupancies. See Section 1807(d)2.

2. Valves. Automatic sprinkler valves required by this Section shall be electrically monitored or secured in the open (operating) position with heavy duty locks and chains sufficiently durable to withstand any cutting device less than heavy duty bolt cutters.

(c) Fire Detection Systems. Approved duct detectors shall be installed in accordance with the requirements of Chapters 18, 38 and the Mechanical Code. The actuation of any detector shall activate the fire alarm system as required in Chapter 18 and this Chapter.
(d) **Communications Systems.** A communications system shall be provided and shall function as follows:

1. A One-Way Voice Communication (PA) System designed to be clearly heard by all occupants of the building and operated from the F.D. Operations Center. The detection system, fire alarm system and sprinkler system may activate the one-way voice communication system. It shall provide one-way communication on a selective or general basis to the following locations.
   a. Each floor including tenant areas, guest rooms, dwelling units, public corridors, elevator lobbies and restrooms.
   b. Exit stairways.
   c. Elevator cabs.

2. A Two-Way (Firefighters') Telephone Communication System designed to provide two-way communications between the F.D. Operations Center and the locations specified in Chapter 18. The communications system shall be designed and installed so that damage to any station will not affect the operation of the remainder of the system.

3. The communications system shall be continuously electrically supervised. Design of the communications systems shall be such that the speakers and telephone jacks on any one floor or in any one area shall be connected to an alternate cable system so that damage or loss of any one speaker, telephone jack, cable, amplifier or pre-amplifier will not cause the failure of more than \( \frac{1}{2} \) of the communications systems of a given floor or area. The communications cable system shall be routed in a minimum of 2 separate vertical risers remotely located from each other.

(e) **Fire Department Operations Center.** See Chapter 18 for F.D. Operations Center requirements.

(f) **Standby Power System.** See Chapter 18 for Standby Power Systems (Emergency Generator) requirements. The standby power requirements shall be sufficient to provide for the following:

1. Fire alarm and detection systems.
2. Exit and emergency lighting.
3. Fire pumps.
4. Mechanical ventilation as required by Chapter 18.
5. Emergency elevators.
6. Communications systems.
SECTION 3817. FIRE PROTECTION IN EXISTING HIGH RISE BUILDINGS.

(a) Scope. This Section provides for the installation of fire protection systems in existing high rise office, retail and hotel buildings. The provisions of this Section shall become effective per the following schedule. Plans and specifications for the necessary alterations shall be filed with the building official within 18 months after the date of owner notification. Work on the required alterations to the building shall commence within 42 months of the date of owner notification and such work shall be completed within 5 years from the date of owner notification.

(b) Requirements for Group R, Division 1 Hotel Occupancies In Buildings over 75 feet (High-Rise) in Height.

1. A fire sprinkler system conforming to the requirements of this Chapter shall be installed throughout the building. For purposes of this Section only, bathrooms of 55 square feet or less and closets of 25 square feet or less that are within residential units need not be equipped with sprinkler heads.

EXCEPTION 1: In lieu of the above requirements on floors with residential units, one of the following alternate systems may be used:

a. Alternate 1. Corridors in all areas shall be fully sprinklered. Annunciation of sprinkler shall be by individual level water flow indication. Residential units shall have supervised smoke detectors, installed and annunciacted per Section 3809(c), (d), (e), (f), (g) and (h), except an emergency generator will not be required.

EXCEPTION: In lieu of individual level water flow annunciation, supervised smoke detectors shall be provided in front of stairwell doors on the corridor side and at entrances to elevator lobbies or in front of elevators. Main riser water flow indication will be required.

b. Alternate 2. Corridors in all areas shall be fully sprinklered. Annunciation shall be by individual level. Each residential unit shall have a sprinkler head in the foyer of the room within 3 feet of the door opening onto the corridor. Each residential unit shall also have a single station detector wired to a 115-volt AC unswitched electric power source.
EXCEPTION: In lieu of individual level waterflow annunciation, supervised smoke detectors shall be provided in front of stairwell doors on the corridor side and at entrances to elevator lobbies or in front of elevator. Main riser waterflow indication will be required.

c. Alternate 3. All areas shall be provided with a supervised fire detection system installed per Section 3809(c), (d), (e), (f), (g) and (h), except an emergency generator will not be required. Doors opening into public corridors shall be provided with automatic closers per Section 4306(f).

EXCEPTION 2: In lieu of a sprinkler system, assembly, service and retail areas and equipment rooms shall be provided with a fire detection system per Section 3809. Assembly areas with the ceiling heights in excess of 16 feet shall have a specially engineered system.

EXCEPTION 3: In lieu of a sprinkler system, kitchens may be equipped with fixed temperature heat detection in addition to requirements of Section 3812.

2. Standpipe systems shall be required as follows:

a. All buildings shall have a standpipe system complying with the requirements of this Chapter.

EXCEPTION 1: In buildings with an existing standpipe, a separate sprinkler riser, sized per NFPA 13 and interconnected with the standpipe system at the base of the riser, may be installed to serve the sprinkler system.

EXCEPTION 2: Where the building is fully or partially sprinklered, the combination standpipe or sprinkler riser shall operate the sprinklers on any floor properly as per NFPA 13 without Fire Department pumping into the system to increase the pressure. In addition, the standpipe shall have adequate capacity to supply two 1½-inch hose outlets with each outlet capable of maintaining a pressure of 100 psi with 150 gallons per minute flowing at the topmost outlet with the Fire Department pumping into the system.

EXCEPTION 3: Where the building is fully detected, the standpipe shall supply two 1½-inch hose outlets with each outlet capable of maintaining a pressure of 100 psi with 150 gallons per minute flowing at the topmost outlet with the Fire Department pumping into the system.
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b. A fire department connection shall be provided as required in this Chapter.

c. 1½-inch hose connections shall be provided on each floor.

d. Provide a main riser waterflow indication/annunciation.

3. Communications systems shall be required as follows:

a. A one-way voice communication (PA) system conforming to the requirements of this Code shall be provided.

\textbf{EXCEPTION:} Speakers will not be required in individual guestrooms, elevators, elevator lobbies and stairways, but shall be audible in those areas.

b. A two-way (firefighters') telephone communication system shall be provided conforming to the requirements of this Code.

\textbf{EXCEPTION 1:} Phone jacks will be required only at stairway entrances adjacent to manual fire alarm boxes.

\textbf{EXCEPTION 2:} Phone jacks at stairway entrances may be on one zone per stairway.

4. The F.D. Operations Center shall be located on the first floor (ground) level at a location approved by the Department and the Fire Department. The F.D. Operations Center shall consist of the main fire alarm panel and/or annunciator panel, controls for the voice communications systems, controls for the firefighters' communication system and a graphic diagram of the building by floor (typical floors may use a single graphic).

(c) Requirements for Retail and Office Occupancies in Buildings over 75 feet (High-Rise) in Height.

1. A fire sprinkler system conforming to the requirements of this Chapter shall be installed throughout the building.

\textbf{EXCEPTION 1:} In buildings utilizing a central structural concrete or masonry core, the areas outside the core shall be provided with a fire sprinkler system conforming to the requirements of this Chapter; areas within the core may be provided with supervised fire detection system installed per Section 3809 in lieu of the fire sprinkler system.

\textbf{EXCEPTION 2:} In lieu of a full sprinkler system, all areas shall be provided with a supervised fire detection system installed per Section 3809.
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EXCEPTION 3: A sprinkler system shall be provided in the corridor with smoke detectors provided outside each door into an exit stairway and on the occupied (tenant) side of each door opening into the corridor. The above detectors shall be located not less than 1 foot nor more than 3 feet from the protected door. Detectors shall also be installed in mechanical, electrical and telephone equipment rooms and in all janitor closets and storage closets opening into the corridor. Detectors not located in the corridor shall have a remote indicating light above the door in the corridor or be annunciolated on a panel at an approved location.

EXCEPTION 4: Where the building has at least 2 means of exiting from each floor complying with the requirements of Chapter 33 and has a fire standpipe system complying with the requirements of Section 3817(c)2.A. Exception 3, a fire detection system shall be installed as follows: detectors shall be provided in the corridor outside each door into an exit stairway and on the occupied (tenant) side of each door opening into the corridor. The above detectors shall be located not less than one foot nor more than 3 feet from the protected door. Detectors shall also be provided in the corridor connecting the exit stairways; in all elevator lobbies; in mechanical, electrical and telephone equipment rooms; and in all janitor and storage closets opening into the corridor. Where there is no enclosed corridor (open floor plan), detectors shall be located as above at each stairway entrance, in all elevator lobbies, equipment rooms, janitor closets and closets intended to be entered (walk-in) and used for storage of combustible materials, and with a minimum of 4 additional detectors provided for the rest of the floor area. Detectors installed in enclosed areas such as equipment rooms and closets shall have a remote indicating light over the door in the corridor, or outside the room, or be annunciolated on a panel at an approved location.

2. Standpipe systems shall be required as follows:
   a. All buildings shall have a standpipe system complying with the requirements of this Chapter.

   EXCEPTION 1: In buildings with an existing standpipe, a separate sprinkler riser, sized per NFPA 13 and interconnected with the standpipe system at
the base of the riser, may be installed to serve the sprinkler system.

**EXCEPTION 2:** Where the building is fully or partially sprinklered, the combination standpipe or sprinkler riser shall operate the sprinklers on any floor properly as per NFPA 13 without the Fire Department pumping into the system to increase the pressure. In addition, the standpipe shall have adequate capacity to supply two 1½-inch hose outlets with each outlet capable of maintaining a pressure of 100 psi with 150 gallons per minute flowing at the topmost outlet with the Fire Department pumping into the system.

**EXCEPTION 3:** Where the building is fully or partially detected, the standpipe system shall supply two 1½-inch hose outlets with each outlet capable of maintaining a pressure of 100 pounds per square inch with 150 gallons per minute flowing at the topmost outlet with the Fire Department pumping into the system.

b. A Fire Department connection shall be provided as required in this Chapter.

c. 1½-inch hose connections shall be provided on each floor.

d. Main riser flow indication/annunciation shall be provided.

e. When the existing standpipe cannot meet the above criteria, a new standpipe system sized per Section 3806 shall be required.

**EXCEPTION 1:** Connection to City main water supply and the installation of a fire pump is not required.

**EXCEPTION 2:** The system shall be supervised by air pressure or by water (as approved by the Denver Water Board).

**EXCEPTION 3:** New standpipe risers may be installed in stairwells, provided that the exitway is not obstructed. Outlets shall be located per Section 3806.

3. A communication system shall be required as follows for existing retail and office high-rise occupancies:

a. A one-way communication system shall be provided. The system shall be provided with a minimum of 2 one-way communication zones. Design of the communication system shall be such that half the
speakers on each floor are connected to one zone and half connected to the other zone, so that damage or loss of any one speaker, cable, amplifier, preamplifier or any other single component will not cause the failure of more than ½ of the communications systems on each floor. The cable system shall be routed in a minimum of 2 vertical risers remotely located from each other. Speakers connected to each system shall be evenly distributed on each floor with adjacent speakers connected to opposite zones.

EXCEPTION 1: Speakers will not be required in stairways but shall be audible in these areas.

EXCEPTION 2: Speakers will not be required in elevators.

b. A 2-way (firefighters') telephone communication system shall be provided conforming to the requirements of this Code.

EXCEPTION 1: Phone jacks will be required only at stairway entrances adjacent to manual fire alarm boxes.

EXCEPTION 2: Phone jacks at stairway entrances may be on one zone per stairway.

4. The F.D. Operations Center shall be located on the first floor (ground) level at a location approved by the Department and the Fire Department. The F.D. Operations Center shall consist of the main fire alarm panel and/or annunciator panel, controls for the voice communications systems, controls for the firefighters' communication system and a graphic diagram of the building by floor (typical floors may use a single graphic).
SECTION 3818. STANDARDS. Unless provided for in other portions of the Code, the following Standards shall apply.

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Section 4304(e) first paragraph is amended:

(e) Penetrations. Penetrations in walls requiring protected openings shall be fire stopped. Firestopping shall be of an approved material securely installed and capable of maintaining its integrity when subjected to the test prescribed in UBC Standard No. 43-1 and ASTM E814-81. Fire Tests of Through-Penetration Fire Stops for the specific wall or partition.

Section 4305(a) first paragraph is amended:

(a) General. Fire-resistive floor-ceiling or roof-ceiling construction systems shall be assumed to have the fire-resistance ratings set forth in Table No. 43-C. Penetrations in floors and ceilings requiring protected openings shall be fire stopped. Firestopping shall be of an approved material, securely installed and capable of maintaining its integrity when subjected to the test of UBC Standard No. 43-1 and ASTM E814-81. Fire Tests of Through-Penetration Fire Stops for the specific floor-ceiling or roof-ceiling construction.

Section 4306(j)3 Exception is deleted.
Section 4410 is added:

SECTION 4410. EXCAVATIONS ABUTTING PUBLIC PROPERTY. Prior to the issuance of a permit by the Department for the construction of any building involving excavation extending within one foot of the angle of repose or natural slope of the soil under any public sidewalk, street, alley or other public property, the owner of the property or proposed building shall submit to the Manager of the Department of Public Works an indemnity bond in an amount determined by the Manager in a form approved by the City Attorney.
Section 5007 is added:

SECTION 5007. MANUFACTURED HOUSING.

(a) Definitions.

1. Manufactured Housing shall mean factory-assembled structures which are completely finished to include all utilities and are transported to a site for permanent installation as residential units. This shall include mobile homes and factory-built housing as defined by state and federal regulations.

2. Federal Act shall mean the National Manufactured Home Construction and Safety Standards Act of 1974, 42 USCA, Section 5401 to 5426, and the rules and regulations promulgated thereunder.


(b) Factory Approval of Manufactured Housing Units (MHU).

1. MHU manufactured in or out of state under the Federal Act are inspected and approved by a HUD-authorized product Primary Inspection Agency (PIA). The manufacturer shall permanently attach a HUD label (seal) to the exterior of the home on the tail light end of each transportable section. Each manufactured home shall bear a data compliance sheet (plate) permanently affixed to the interior of the home near the electrical panel in a visible location. The data compliance sheet (plate) shall show structural zone, snow and wind loads for which the home has been designed, thus determining whether the home does or does not meet the Colorado requirements of the Federal Act.

2. MHU manufactured in-state and not constructed to the Federal Act shall be constructed in compliance with the Colorado Housing Act. The Colorado Division of Housing shall be the inspection agency and shall require a permanent Colorado approval label (seal) on each unit and shall contain a factory-built (FB) certification number.

3. Other MHUs are not allowed. Prefabricated systems for residential use shall comply with the other sections of this Chapter. For example:
   a. Stressed skin panels assembled at the site for roof, floor and walls.
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b. Shell type units.

(c) Permits Required.
1. The installation of MHUs shall comply with all provisions of the Building Code except that plans for the MHU are not required when either of the following items are provided to the Department:
   a. A data compliance sheet for HUD-approved manufactured housing units.
   b. A copy of the Colorado approval label (seal) with a legible factory-built certification number.

(d) Seal. A Colorado Division of Housing approval label (seal) must be permanently affixed to each factory built home.

(e) Inspection and Notice. The Federal Act and the Colorado Housing Act preempt the Building Code in relation to MHUs, therefore the Department does not inspect them. However, the Department shall inspect the foundation, installation of utilities to the MHU, and the installation of the MHU to the foundation.

1. The following notice shall be given to all persons applying for any permit relating to manufactured homes and factory built homes from any agency of the city:

   In accordance with Federal and Colorado law, this manufactured housing unit has not been inspected by the City and County of Denver and may or may not meet the requirements of the Denver Building Code.

   It shall be the obligation of the permit applicant to forward this notice to the owner of the manufactured home or factory built home.

2. The notice set forth in subsection 1 above shall be permanently installed in a visible location by the permit applicant adjacent to the data plate required by the Federal Act or in the furnace closet on factory-built homes.
Section 5104 is amended.

SECTION 5104. HOISTWAY VENTING. Shafts (hoistways) housing elevators extending through more than 2 floor levels shall be vented to the outside. The area of the vent shall be not less than 3½% of the area of the elevator shaft, provided that a minimum of 3 square feet per elevator is provided.

EXCEPTION: Elevator shafts (hoistways) required to comply with Section 1807.

For all other hoistway vents, energy conservation requires these vents shall be normally closed and they shall be opened automatically by the activation of:

(a) The elevator hoistway detector, and
(b) A power failure.
(c) In addition, a manual override shall be provided by a key switch adjacent to the elevator emergency controls.
Chapter 56 is amended in its entirety:

CHAPTER 56

COVERED MALL BUILDINGS

SECTION 5601. SPECIAL PROVISIONS FOR COVERED MALL BUILDINGS.

(a) Purpose. The purpose of this Chapter is to establish minimum standards of safety for the construction and use of covered mall buildings having not more than 3 floors.

(b) Scope. The provisions of this Chapter shall apply to buildings or structures defined herein as covered mall buildings. This Chapter does not apply to terminals for transportation facilities or lobbies of hotel, apartment and office buildings. Covered mall buildings conforming with all other applicable provisions of this Code are not required to comply with the provisions of this Chapter.

(c) Definitions. For the purpose of this Chapter, certain terms are defined as follows:

ANCHOR STORE is an exterior perimeter department store or major merchandising center having direct access to a covered mall building but having all required exits independent of the covered mall.

COVERED MALL BUILDING is a single building enclosing a number of tenants and occupancies such as retail stores, drinking and dining establishments, entertainment and amusement facilities, offices and other similar uses wherein 2 or more tenants have a main entrance into the covered mall. This building includes the covered mall.

COVERED MALL is a roofed or covered common pedestrian area within a covered mall building which serves as access for 2 or more tenants and may have 3 floors that are open to each other.

GROSS LEASABLE AREA is the total floor area designed for tenant occupancy and exclusive use. The area of tenant occupancy is measured from the center lines of joint partitions to the outside of the tenant walls. All tenant areas, including areas used for storage, shall be included in calculating gross leasable area.

(d) Applicability of Other Provisions. Covered mall buildings shall meet all applicable provisions of this Code, except where specifically provided for in this Chapter.
SECTION 5602. OCCUPANCY.
(a) General. Covered mall buildings shall be classified as Group B, Division 2 Occupancy for the following uses: retail and wholesale stores, drinking and dining establishments with an occupant load less than 50, paint stores without bulk handling and offices, and may contain accessory uses consisting of Group A and E Occupancies. The area of individual accessory uses within a covered mall building shall not exceed 3 times the basic area permitted by Table No. 5-C of this Code for the type of construction and the occupancy involved. The aggregate area of all accessory uses within a covered mall building shall not exceed 25% of the gross leasable area.
(b) Mixed Occupancy. Individual tenant spaces within a covered mall building which comprise a distinct "Occupancy," as described in Chapters 5, 6, 7 and 8 of this Code, shall be separated from any other occupancy as specified in Section 503(d) of this Code.
EXCEPTION: A main entrance which opens onto a covered mall need have no separation. See Section 5603.

SECTION 5603. CONSTRUCTION.
(a) Construction. One-floor and two-floor covered mall buildings may be of Type II N construction. Three-level covered mall buildings shall be at least Type II one-hour construction. Anchor stores and parking garages shall be limited in height and area in accordance with Sections 505, 506, 507 and 709 and shall be considered separate buildings. Separation walls shall be as required in Section 505(e) except as provided in subsection (d) below. All anchor stores and attached structures open to the covered mall building shall be fully protected by an automatic sprinkler system.
(b) Required Yards for Unlimited Area. Covered mall buildings may be of unlimited area, provided that the covered mall building, attached anchor stores and parking garages are adjoined by public space, streets or yards with not less than 40 feet of clear width along all exterior walls. For emergency access, refer to the Uniform Fire Code.
(c) Tenant Separation. Each tenant space shall be separated from other tenant spaces by a wall having a fire-resistive rating of not less than one hour. The separation wall need only extend from the floor to the ceiling above. Except as required by other provisions of this Code, the ceiling need not be part of a fire-resistive assembly. A separation is not required between
any tenant space and a covered mall except for occupancy separations required by Section 5602 or for smoke control purposes.

(d) **Mixed Type of Construction.** Unprotected openings between an anchor store of Type I, II and II one-hour construction and the covered mall need not be protected, provided that anchor stores provide and maintain a smoke control system that prevents smoke from migrating to the covered mall in accordance with Section 5608(d).

**EXCEPTIONS:**

1. The entire anchor store may be considered as one smoke zone and area detectors are not required.
2. Open parking garages shall not require a smoke control system.

(e) **Kiosks, Display Booths, Concession Equipment.** Kiosks, display booths, concession equipment or similar facilities may be placed in the covered mall area with the following restrictions:

   1. The minimum horizontal separation between kiosks and other structures within the covered mall shall be 20 feet.
   2. Kiosks or similar structures shall have a maximum area of 300 square feet.
   3. Kiosks or similar structures shall not be located within the covered mall unless constructed of noncombustible material or fire-retardant treated wood throughout conforming to Section 407.
   4. Kiosks or similar structures that are covered or have roofs and are located within the covered mall shall be protected by an approved automatic fire suppression system.

(f) **Temporary Use.** Requirements for the temporary use (up to 60 days) of the covered mall area for promotional, educational, assembly, sales or similar activities are provided for in the Uniform Fire Code, Article 35.

(g) **Obstructions to Life Safety Devices.** All signs, structures, displays and other equipment shall not obstruct or interfere with any life safety devices.

**SECTION 5604. EXITS.**

(a) **General.** Each tenant space and the covered mall building shall be provided with exits as required by this Section and Chapter 33 of this Code. Where there is a conflict between the requirements of Chapter 33 and the requirements of this Section, the requirements of this Section shall apply.
(b) **Determination of Occupant Load.** The occupant load permitted in any individual tenant space in a covered mall building shall be determined as required by Section 3301(d). The area within the tenant space in which retail sales to the public are conducted shall have the occupant load computed at 30 square feet per occupant on all levels. Exit requirements for individual tenant spaces shall be based on the occupant load thus determined.

The occupant load permitted for the covered mall building shall be determined by dividing the gross leasable areas by 30 for covered mall buildings containing up to 150,000 square feet of gross leasable area, by 40 for covered mall buildings containing between 150,001 and 350,000 square feet of gross leasable area, and by 50 for covered mall building containing more than 350,000 square feet of gross leasable area. Exit requirements for the covered mall building shall be based on the occupant load thus determined.

The occupant load of anchor stores opening into the covered mall shall not be included in determining exit requirements for the mall.

(c) **Number of Exits.** The number of exits shall comply with Section 3303. When the distance of travel to the covered mall exceeds 75 feet within the public area of a tenant space or when the occupant load served by the exit to the covered mall exceeds 50, not less than 2 exits shall be provided. When the distance of travel to the covered mall exceeds 75 feet within the public area of a tenant space or when the occupant load served by the exit to the covered mall exceeds 50, not less than 2 exits shall be provided.

(d) **Arrangement of Exits.** Group A, Division 1.2 and 2.1 and Group B Occupancies, other than drinking and dining establishments, shall be so located in the covered mall building so that their entrance will be immediately adjacent to a principal entrance to the covered mall and shall have not less than ½ of their required exits opening directly to the exterior of the covered mall building. Required exits for anchor stores shall be provided independently from the covered mall exit system. Covered malls shall not exit through anchor stores. Malls terminating at an anchor store where no other means of egress are provided shall be considered as a dead-end mall.
(e) **Distance to Exits.** Within each individual tenant space in a covered mall building, the maximum distance of travel from any point to an exterior exit door, horizontal exit, exit passageway, enclosed stairway or entrance to covered mall shall not exceed 200 feet. The maximum distance of travel from any point within the covered mall to an exterior exit door, horizontal exit, exit passageway or enclosed stairway shall not exceed 200 feet.

(f) **Access to Exits.** Exits shall be so arranged that it is possible to go in either direction from any point in a mall to a separate exit, except for dead-ends not exceeding a length equal to twice the width of the covered mall measured at the narrowest location within the dead-end portion of the covered mall. The minimum width of exit from a covered mall shall be 66 inches. When exit passageways are present to provide a secondary exit from a tenant space, doors to the exit passageway shall be one-hour fire doors. Such doors shall be self-closing and be so maintained or shall be automatic closing by smoke detector actuation. Storage is prohibited in exit passageways. Exit passageways shall be posted with conspicuous signs so stating.

(g) **Covered Malls.** For the purpose of providing required egress, covered malls may be considered as corridors but need not comply with the requirements of Section 3304(g) and (h) of this Code when the width of the covered mall is as specified in this Section. The minimum width of the covered mall shall be 20 feet. There shall be a minimum of 10 feet clear width to a height of 8 feet between any projection from a tenant space bordering the covered mall and the nearest kiosk, vending machine, bench, display or other obstruction to egress. The covered mall width shall be sufficient to accommodate the occupant load immediately tributary thereto. Covered malls which do not conform to the requirements of this Section shall comply with the requirements of Section 3305(g) and (h).

(h) **Security Grilles and Doors.** Horizontal sliding or vertical security grilles or doors which are a part of a required means of egress shall conform to the following:

1. Doors or grilles must remain secured in the full open position during the period of occupancy by the general public.

2. Doors or grilles shall not be brought to the closed position when there are more than 10 persons occupying spaces served by a single exit or 50 persons occupying spaces served by more than one exit.
3. The doors or grilles shall be openable from within the space without any special knowledge or effort when the space is occupied.

4. When 2 or more exits are required, not more than 1/2 of the exits may be equipped with horizontal or vertical sliding rolling grilles or doors.

SECTION 5605. TOILET FACILITIES. See Chapter 5.

EXCEPTION: The area of the covered mall is not to be considered in the occupant load calculation. However, toilet facilities shall be accessible from the covered mall.

SECTION 5606. ACCESS. Rooms or areas containing controls for air-conditioning systems, automatic fire extinguishing systems or other detection, suppression or control elements shall be identified for use by the Fire Department.

SECTION 5607. LEASE PLAN. Each covered mall building owner shall provide both the Department and the Fire Department with a lease plan showing the location of each occupancy and its exits after the Certificate of Occupancy has been issued. Such plans shall be kept current. No modifications or changes in occupancy or use shall be made from that shown on the lease plan without prior approval of the Department. A copy of the lease plan shall be kept in the F.D. Operations Center.

SECTION 5608. SPECIAL PROVISIONS FOR FIRE PROTECTION.

(a) General. Fire protection systems required by this Section shall be installed in conformance with Chapter 38 except as specifically modified by this Section. Activation of the fire sprinkler system, the smoke detection system or manual fire alarm boxes shall cause an audible and visual alarm throughout the mall and tenant spaces.

(b) Automatic Sprinkler Systems. The covered mall building shall be provided with an automatic sprinkler system conforming to the provisions of Chapter 38. In addition, the automatic sprinkler system shall comply with the following:

1. All automatic sprinkler system control valves shall be electrically supervised.

2. The automatic sprinkler system shall be complete and operative throughout all spaces in the covered mall building prior to occupancy of any of the tenant spaces. The level of protection provided for unoccupied tenant
space shall be subject to the approval of the Department and the Fire Department.

3. Sprinkler protection for the covered mall shall be independent from that provided for tenant spaces. However, the covered mall and tenant spaces may be supplied by the same riser if each system can be independently controlled.

(c) Standpipes. There shall be a standpipe outlet at each of the following locations for Fire Department use:

1. Within the covered mall within 10 feet of the entrance to each exit passageway or exit corridor.

2. At each floor level landing within 10 feet of enclosed stairways opening directly onto the covered mall and adjacent to principal exterior entrances to the covered mall.

EXCEPTION: Only one standpipe located within 10 feet of a required enclosed stairway will be required in an anchor store of less than 4 stories.

Standpipes shall be installed in accordance with Chapter 38 of this Code.

(d) Smoke Control Systems.

1. Required. A mechanically operated air handling system shall be installed in covered mall buildings which will restrict the smoke to the general area of fire origin and maintain the exiting system in a condition that is safe for exiting. The system shall be designed so that exhausted smoke cannot contaminate the outside air intake of any system.

2. General. The smoke control system shall be connected to the automatic sprinkler system and the smoke detection system and shall automatically operate when either system is actuated. The smoke control system shall also be capable of manual operation from the F.D. Operations Center. During those hours when the building air-conditioning systems are not operating, either the automatic sprinkler system or the smoke detection system shall activate the smoke control system. All smoke control equipment for both tenant space and the covered mall building shall be in place and operational before any portion of the covered mall building is occupied. The level of protection of the fire detection system for unoccupied tenant space shall be subject to the approval of the Department and the Fire Department.
3. **Acceptance Testing.** Before the smoke control system is accepted by the Department and the Fire Department, it shall be tested in their presence to confirm that the system is operating in compliance with this subsection.
   a. Prior to acceptance testing of the smoke control system, a Registered Professional Engineer shall certify to the Department and the Fire Department that the entire smoke control system has been tested, balanced and installed in accordance with its design, plans, specifications and this Code.
   b. The following shall be notified so that they may witness the system's performance test:
      (1) Registered Professional Engineer
      (2) Building Contractors
      (3) Owner's Representative
      (4) Fire Department
      (5) Building Department
   Special Note: All acceptance testing shall be done under the observation of the Department and the Fire Department.
   c. The engineer shall supply a plan of the floor or zone layout including cubic area and smoke bomb size. Smoke bomb placement and size shall be sufficient to give even disbursement in the area being tested.
   d. Sufficient smoke shall be generated to produce at least the volume of the smoke zone being tested within 5 minutes.
   e. After the system is activated, smoke shall not continue to migrate to other zones.
   f. All smoke-generating devices shall be supplied by the owner or his designee and shall meet with the approval of the Department and the Fire Department.
   g. Required tests:
      (1) A test shall be performed in full automatic mode with the building operating on emergency power.
      (2) More than one zone may be required to be tested.

4. **Tenant Space.**
   a. The tenant space shall be compartmentalized into smoke control zones not to exceed 52,000 square feet on a single floor. Except for openings between the covered mall and tenant spaces, smoke control zones shall be separated from each other by wall
construction having a fire-resistance rating of not less than one hour. The walls shall extend from the floor to the underside of the floor or roof above.

b. The tenant smoke control exhaust system shall be sized to provide a minimum of 4 air changes per hour or 20,000 cfm from each smoke control zone, whichever is greater.

c. Smoke detection shall be provided as follows:
   (1) On the tenant side at each opening into the mall and at each exit from the tenant space. For openings larger than 30 lineal feet, an additional detector shall be provided for each 30 lineal feet or fraction thereof.
   (2) Electrical equipment rooms.
   (3) Detector zones may not exceed 20,000 square feet and no detector zone shall serve more than one smoke control zone.
   (4) Detectors in tenant spaces shall be located per NFPA 72E in accordance with the detector manufacturers' UL listed spacing.

EXCEPTION:  Thermal detectors may be used in lieu of smoke detectors where approved by the Department and the Fire Department. See Section 3809(h)3 Exception.

d. A strobe-type remote annunciator shall be located in the mall above each tenant entry and shall annunciate those detectors within that space. Concealed detectors shall also be annunciated immediately outside the concealed space.

e. A detector in a smoke control zone shall actuate the smoke control equipment to pressurize the covered mall with 100% outside air while the affected tenant smoke control zone goes into exhaust. All other tenant smoke control zones shall remain in normal operation.

5. **Covered Mall.**

a. The smoke control equipment for the covered mall shall be separate from that serving tenant spaces. The tenant ventilation/smoke control system cannot be used to pressurize the covered mall.

b. The covered mall system shall have a product of combustion detector located in the supply air system after the air filters which will stop the supply fan. In addition, a product of combustion detector shall be
provided in the return or exhaust air stream to activate the fire alarm system.

c. The covered mall smoke removal system shall provide at least 4 air changes per hour and shall be located to preclude accumulation of smoke in any area of the covered mall. The covered mall smoke removal system shall be manually operated from the F.D. Operations Center.

d. Manual fire alarm boxes shall be located at each required exit from the covered mall building. The manual boxes shall activate the fire alarm system and an individual strobe light located directly above the station. Zoning shall be by floor.

6. Sprinkler Activation. A tenant or anchor store sprinkler flow shall activate the covered mall pressurization system.

(e) Communications Systems. A communications system shall be provided and shall be activated by the fire protection systems. When approved, the system may be used for the audible alarm required in subsection (a) above.

(f) Emergency Power. Covered mall buildings exceeding 50,000 square feet shall be provided with sufficient emergency power systems which are capable of operating the: (1) communications system; (2) exit signs; (3) emergency lighting; (4) smoke control activation system and the smoke control equipment from 4 adjacent tenant zones acting simultaneously; (5) covered mall pressurization system and smoke removal system; (6) fire pump system; (7) one elevator serving all levels; and (8) F.D. Operations Center.

1. The emergency generator shall be provided with sufficient fuel supply, on site, for 8 hours continuous operations under full load.

   EXCEPTION: If the fire pump is diesel operated or not required, then fuel supply for 2 hours is required.

2. Emergency generation system shall be operated not less than once a month for not less than 30 minutes at a minimum of 30% of full load. An accurate log shall be maintained on the premises indicating the person or agency conducting test, dates tested and length of test. Any defect, modification or repair shall be recorded in the log. Logs shall be made available to the Fire Department.
(g) Fire Department Operations Center. A F.D. Operations Center shall be provided in a location approved by the Department and the Fire Department. The F.D. Operations Center shall be contained in a room separated from the remainder of the building by 2-hour fire resistive construction. The room shall be located within the covered mall at a location near to and directly accessible from the exterior of the building. The door to the F.D. Operations Center room shall open to the mall. The room shall be used for no other purpose unless that use is approved by the Department and the Fire Department. No piping, ducts or equipment foreign to the required operations shall be permitted to enter, pass through or be installed within the room. The room shall be equipped with a smoke detection system and shall not be sprinklered. The F.D. Operations Center shall contain the following:

1. A HVAC status/control panel, utilizing graphics outlining the building, and placing individual smoke control system fan and damper controls relative to location within building. The panel shall have a maximum height from the floor of 6 feet 6 inches and may be in more than one section to accommodate height limitations. The following features shall be incorporated:
   a. Individual manual override switches for orientation of all system components utilized for smoke control, i.e., fans and/or dampers for pressurization and exhaust. Provide an individual switch, one per zone or level for exhaust components and individual switch for orientation of 100% outdoor air dampers.
   c. Independent positive indication of orientation of each system component provided with manual override per A and B above, e.g., damper indication shall be for "Full Closed" and fan indication shall be for "Run". Control signals cannot be used for indication purposes.
   d. A push-to-test switch shall be provided for all lights on control board.

2. One-Way Voice Communication (PA) System with the following features:
   a. Stairwell speakers shall be in separate zones, controlled manually from the F.D. Operations Center.
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b. The system shall provide one-way communication on a selective and general basis to the following locations:
   (1) In the means of egress.
   (2) Exit stairways.
   (3) Each smoke control zone.
   (4) Mall.

c. The alarm and communications systems shall be designed and installed so that damage to any terminal unit or speaker will not render more than one zone of the system inoperative.

3. Two-Way (Firefighters') Telephone Communication System, with the following features:

a. Firefighters' telephone jacks shall be provided at every standpipe location, elevator entrance, entrance to an anchor store and entrance to other connected structures from the covered mall. The firefighters' telephone communication system shall have an "In-use" indication, by zone, at the F.D. Operations Center master panel and switching provisions at master panel to allow silencing of any zones.

b. Firefighters' telephone jacks shall be designed to prevent feedback by being arranged in such a manner that when a handset is inserted, any speaker in the immediate area is disconnected while maintaining full supervision on the speaker circuit.

c. A permanently mounted firefighters' telephone handset shall be located at the building engineer's office, each mechanical room, emergency generator room, fire pump room and main electrical areas, and the mall security office, if any. These units shall initiate a signal from the F.D. Operations Center to the individual handset, and from the individual handset to the F.D. Operations Center.

4. Emergency Generator Panel with the following features:

a. Operating status (on-off) and malfunction indication panel as required by NFPA 70.

b. Generator start/stop controls.

c. Indication of transfer switch position (normal-emergency).

d. Indication that generator is in automatic mode.

e. Main fuel oil storage tank fuel level gauge.
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f. If pumping is required from a main fuel tank to a
diesel generator, a duplex pumping system shall be
provided. Emergency fuel flow controls are required
in F.D. Operations Center.

5. Fire Pump Panel with the following features:
a. Operating status indication (motor on or off).
b. If pumping is required from a main fuel tank to a
diesel fire pump, a duplex pumping system shall be
provided. Emergency fuel flow controls are required
in the F.D. Operations Center.
c. Fuel level indicator for fire pump fuel tank.
d. Fire pump start control.

6. Fire Alarm Annunciation with the following features:
a. Automatic fire sprinkler system flow indication by
zone. Main water flow indication.
b. Fire detection (duct, space) system per zone.
c. Annunciators shall be graphic, detailing building and
placing annunciation indication relative to building
smoke control zone. The fire alarm annunciator
panel shall be combined with the HVAC
status/control panel.
d. Special extinguishing systems shall be annunciated
separately (hood extinguishing system, halon, etc.).
e. Anchor store fire detection alarm.
f. Manual fire alarm boxes by floor regardless of zone.

7. Emergency Graphics and Signs required by this Section
shall be of durable construction, be easily readable in
normal room or corridor light, and have a smooth plastic
surface. Diagrammatic Building Floor Plans shall be
permanently mounted, unobstructed, on an interior wall
of the F.D. Operations Center. Plans shall depict the
following:
a. Location of general building features. A brief legend
shall be provided listing the levels on which general
building features are located.
b. Stairtowers (identified by building directional
location).
c. Elevators (numerically identified).
d. Elevator machine rooms.
e. Emergency generator.
f. Fire pumps.
g. All fire sprinkler and standpipe valves.
h. Mechanical areas.
i. Main electrical areas.
Sec. 5608

j. Fuel tanks.
k. Location of features on individual levels.
l. Elevators.
m. Stairwell doors.
n. Refuge areas.
o. Fire sprinkler sectional valves.
p. Vertical shafts.
q. HVAC supply and return ducts (main each level).
r. Concealed detectors (duct, electrical closet, ammonia, etc.).
Chapter 59 is added:

CHAPTER 59

CONSTRUCTION OF AIRPORT BUILDINGS AND STRUCTURES

SECTION 5901. GENERAL.
(a) General. The provisions of this Chapter apply to the special problems that are encountered in the construction and fire protection of airport buildings and related structures. Due to the exposure of these structures by normal airport operations and the large number of people who may occupy some of the buildings, special requirements are required to assure public safety and welfare.

(b) Federal Agencies. The facilities, buildings, structures or portions thereof, owned, occupied and managed by an agency of the federal government may not be subject to the provisions of this Code.

SECTION 5902. DEFINITIONS.

AIRCRAFT LOADING WALKWAY - An elevated device through which passengers move between a point in a passenger terminal building and an aircraft. Included in this category are walkways that may be essentially fixed and permanently placed, and walkways that are essentially mobile in nature and fold, telescope or pivot from a fixed point at the airport terminal building or at a fixed walkway.

AIRPORT RAMP - Any outdoor area, including aprons and hardstands, on which aircraft may be positioned, sorted, serviced or maintained, irrespective of the nature of the surface of the area.

CONCOURSE - A fully enclosed portion of the terminal building used for passenger handling and aircraft flight service functions with provisions for parking aircraft on one or more sides.

FREIGHT TERMINAL BUILDING - A structure used for the processing and/or storage of incoming or outgoing freight and other necessary functions in connection with air freight operations.

PASSenger TERMINAL BUILDING - A structure used for air passenger enplaning or deplaning, including ticket sales, flight information, baggage handling and other necessary functions in connection with air transport operations. Passenger terminal buildings shall include any concourse or satellite buildings used for passenger handling or aircraft flight service functions. Passenger walkways, aircraft loading walkways and "mobile lounges" are excluded.
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PASSENGER WALKWAY - A fully enclosed grade or ramp level walkway that is used for the enplaning or deplaning of passengers.

SATELLITE PASSENGER TERMINAL BUILDING - A structure which may be adjacent to but separated from the main passenger terminal building, accessible above ground or through subway passages, and used to provide flight service operations (i.e., passenger check-in, waiting rooms, food service, enplaning or deplaning).

SECTION 5903. GENERAL REQUIREMENTS.

(a) Type of Construction.

1. Passenger Terminal Buildings shall be Type I, II F.R., II 1 Hr or II N as required for the areas allowed by Section 505. Section 506(b) Unlimited Area shall not apply to Passenger Terminal Buildings.
   a. Concourse or Satellite Buildings. The concourse level (excluding elevated walkways, people movers and their interconnecting cross over landings) when the top level of the building may be enclosed with unprotected noncombustible construction, provided that the maximum height of the building is 55 feet. This height does not include ramp or Federal Aviation Administration (F.A.A.) control towers.
   b. Main Terminal Building. Where every part of the structural steel framework for the roof is more than 25 feet above any occupied level, the roof structure and its supports may be unprotected construction, except for the 25 feet of all support columns above the occupied level, which shall be fire-rated as required for the type of construction.

2. Freight Terminal Buildings shall be Type I, II F.R., II 1 Hr or II N.

3. All other buildings or structures may be of any type of construction allowed for the occupancy group per Chapter 5.

4. Aircraft Loading Walkways.
   a. Movable walkways construction shall meet the requirements of NFPA 417 - Aircraft Loading Walkways unless noted in this Section.
   b. Fixed walkways construction shall be at least one-hour noncombustible floor, wall and roof assemblies. Steel or concrete support columns may be unprotected.
c. Exit doors between walkways and the passenger terminal shall swing into the passenger terminal. Doors held open shall have automatic closing devices. All other doors shall have self-closing devices and be equipped with panic hardware on the aircraft side.

d. Sprinkler protection is not required in the interior or exterior of movable or fixed walkways.

e. Interface between fixed walkway and passenger terminal shall be fire-rated the same as required for the exterior wall.

5. Passenger Walkways.
   a. Construction shall be at least one-hour noncombustible construction.
   b. There shall be no openings except for doors at each gate. The doors shall be a minimum of ¾ hour and may have windows as provided for Fire Doors. All gate doors shall swing outward and have self-closing devices.
   c. Entrance doors between walkways and the passenger terminal shall swing into the passenger terminal and be equipped with panic hardware on the walkway side.

6. The F.A.A. Control Tower shall be as follows:

<table>
<thead>
<tr>
<th>Type of Construction</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>I - F.R.</td>
<td>Unlimited</td>
</tr>
<tr>
<td>II - F.R.</td>
<td>240</td>
</tr>
<tr>
<td>II - One Hour</td>
<td>100</td>
</tr>
<tr>
<td>II - N</td>
<td>85</td>
</tr>
</tbody>
</table>

(b) Occupancy Group. The primary occupancy of the passenger terminal shall be a Group B2 Occupancy with the special provisions specified in this Chapter. Every building or portion thereof shall be classified by the use or the character of its occupancy according to the provisions of Chapter 5.

(c) Limitation of Occupancy. Any occupancy considered "extra-hazardous" (as defined in NFPA 13, Standard for the Installation of Sprinkler Systems) shall be prohibited in an airport terminal building.
(d) **Occupant Load Factors and Occupancy Groups.**

<table>
<thead>
<tr>
<th>USE</th>
<th>OCCUPANCY GROUP</th>
<th>OCCUPANT LOAD FACTOR Sq. Ft/Occupant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hold Rooms:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Open Areas</td>
<td>B2</td>
<td>30</td>
</tr>
<tr>
<td>b. Seating Areas</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>or fixed seat count</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Passenger Circulation Space</td>
<td>B2</td>
<td>100</td>
</tr>
<tr>
<td>includes ticket area, check-in and baggage claim area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Office</td>
<td>B2</td>
<td>100</td>
</tr>
<tr>
<td>4. Retail</td>
<td>B2</td>
<td>30</td>
</tr>
<tr>
<td>5. Drinking and Dining</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establishments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Occupant Load less than 50</td>
<td>B2</td>
<td>7</td>
</tr>
<tr>
<td>Stand up service without seating</td>
<td>A3</td>
<td>15</td>
</tr>
<tr>
<td>Sit down service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Baggage Storage/Handling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Areas with or without vehicular access</td>
<td>B1</td>
<td>300</td>
</tr>
<tr>
<td>7. Transit Stations</td>
<td></td>
<td>as required by NFPA 130</td>
</tr>
</tbody>
</table>
SECTION 5904. EXITS.

(e) Building Exits. All building exits shall comply with Chapter 33, unless specifically provided for in this Chapter.

(b) Emergency Exits. If emergency exits discharge directly onto an airport ramp or service area, the doors shall be clearly marked "Emergency Exit Only" in letters at least 2 inches high with contrasting colors in addition to exit signs as required by Section 3312.

(c) Delay Panic Hardware. All emergency exits from a passenger terminal building that discharge onto an airport ramp or service area shall be equipped with delay panic hardware. The locking device shall release without unlatching when activated by 2 alarm devices or by a loss of electrical power.

(d) Numbering. Emergency exit doors shall be numbered on both sides, 3 inches high minimum on the inside and 5 inches high on the outside with contrasting colors.

(e) Control Tower. There shall be 2 exits from any control tower floor which exceeds 1500 sq. feet in area or where 2 or more adjacent floors have an occupant load of more than 15. Scissor stairs are allowed with the following provisions:

1. That the wall between the 2 separate stairs shall be 2-hour fire-rated minimum and with no penetrations allowed.

2. Both stairs shall be mechanically pressurized on alarm to maintain a minimum positive pressure of 0.15 inch water column relative to atmospheric pressure with all doors closed.

Activation of the mechanical equipment shall be through the Fire Alarm System which shall be provided per Chapter 38:

a. Provide a smoke detector in front of each stair door on the corridor ceiling of each floor.

b. Provide a smoke detector on the ceiling adjacent to the elevator lobby.

c. For air conditioning systems or pressure air supply serving more than one story, provide a smoke detector in the return air duct or plenum on each floor. The activation of any detector shall cause the return air to exhaust completely from the building without any recirculation through the building.

3. Power for the mechanical equipment and the fire alarm system smoke control shall be provided through the required emergency power section of the building electrical supply.
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4. Stair shafts shall be provided with emergency lighting from the emergency power supply described in paragraph 3. See Section 5910(c). In addition, battery backup supply shall be provided for these fixtures.

5. Before the mechanical equipment is accepted by the Department, it shall be tested to confirm that the mechanical equipment is operating in compliance with the requirements of this Section.

6. Stairways need not extend to the roof as required in Section 3306(o).

7. Control towers need not be accessible to the handicapped as required in Chapter 64, Appendix.

(f) Exterior Doors. Exterior doors shall include doors opening onto roadways on grade or elevated which provide public access/egress to passenger terminals, provided that:
1. The roadways have sidewalks, width based on occupant load, that lead to a dispersal area at grade.
2. Covered roadways are sprinklered and have at least one side open.

(g) Security Grilles and Doors. See Section 5604(h).

SECTION 5905. AIRPORT RAMP DRAINAGE.

(a) Definitions. Aircraft Fueling Ramp is defined as any outdoor area at an airport, including aprons and hardstands, on which aircraft are normally fueled or defueled.

(b) Scope. The requirements specified herein provide standards for the design of the water drainage system of an aircraft fueling ramp to control the flow of fuel which may be spilled on a ramp and to minimize the resultant possible danger therefrom. Such a drainage system is intended to limit spread of the fuel spill to aircraft loading walkways, terminal structures or passenger loading walkways that might result in liquid or vapors reaching a source of ignition or in the accumulation of dangerous or toxic vapors.

(c) Aircraft Fueling Ramp Slope and Drain Design.
1. Aircraft fueling ramps shall slope away from terminal buildings, passenger loading walkways, aircraft hangars and other structures (excluding aircraft loading walkways), with a minimum grade of 1% (1:100) for the first 50 feet (15.2m). Beyond this distance, the slope to drainage inlets may be reduced to a minimum of 0.5% (1:200). Drainage inlets, where provided, shall be a minimum of 50 feet (15.2m) from such structures.
2. Proximity of ramp drainage inlets and fueling hydrants to aircraft loading walkways shall not be restricted.

SECTION 5906. VAPOR PENETRATION PROTECTION. Below-grade areas or blind spaces in airport terminal buildings shall be protected against flammable fuel or vapor penetration or shall be mechanically ventilated to provide at least 4 complete air changes per hour. (See NFPA 91, Standard on Blower and Exhaust Systems.)

SECTION 5907. SMOKE CONTROL

(a) Required. A mechanically operated air-handling system shall be installed in the main passenger terminal building which will restrict the smoke to the general area of fire origin and maintain the exiting system in a condition that is safe for exiting. The system shall be designed so that exhausted smoke cannot contaminate the outside air intake of any system.

(b) General. The smoke-control systems shall be connected to the smoke detection and/or the automatic sprinkler systems, and shall automatically operate when either system is actuated. The smoke control system shall also be capable of manual operation from the F.D. Operations Center. During those hours when the building air conditioning systems are not operating, the smoke detection system shall activate the smoke control system. All smoke control equipment for both tenant space and terminal buildings shall be in place and operational before any part of the passenger terminal buildings are occupied. The level of protection of the fire detection system for unoccupied tenant space shall be subject to the approval of the Department and Fire Department. For any space or corridor which exceeds 20 feet in length connected to an atrium or passenger terminal area which has separate smoke control zones, provide supply air to the space or corridor at the farthest location from the point of connection to the atrium or passenger terminal area.

EXCEPTIONS:

1. Ramp service and nonpublic ramp level tenant areas of concourse buildings need not be provided with a smoke control system.

2. Unenclosed bag handling tenant areas of concourse or terminal buildings need not be provided with a smoke control system.

(c) High Rise Buildings. See Section 1807.
(d) Atriums. See Section 1715.

(e) Passenger Terminal Buildings.

1. The smoke control equipment for the main passenger terminal building may be separate from that serving tenant spaces.

2. The passenger terminal buildings systems shall have a product of combustion detector located in the supply air system after the air filters which will stop the supply fan upon detection. In addition, a product of combustion detector shall be provided in the return or the exhaust air stream to activate the smoke control system.

3. The passenger terminal buildings public circulation area smoke removal systems shall provide at least 4 air changes per hour, and shall be located to preclude accumulation of smoke in any part of the public circulation areas zoned not to exceed 52,000 square feet on a single floor and must coincide with required fire sprinkler zones. Within that sprinkler zone there may be one or more air moving systems but no single smoke control zone shall be larger than the sprinkler zone. The smoke removal system shall also be capable of manual operation from the F.D. Operations Center.

4. The tenant space shall be part of a smoke control zone, not to exceed 52,000 square feet on a single floor. Tenant spaces that are within 2 adjacent smoke control zones may be connected to either of the adjacent smoke control systems.

5. The smoke control exhaust system for tenant spaces shall be sized to provide a minimum of 4 air changes per hour or 20,000 cfm from each smoke control zone, whichever is greater.

6. For tenant spaces adjoining the concourse or terminal exceeding 7500 square feet, a separate smoke control zone shall be provided.

7. Ventilation for Smoke Control. See Section 1715(e)4.

(f) Smoke Detection. Smoke detection shall be provided as follows:

1. There shall be an average of one detector per 2500 square feet for areas with roof/ceilings over 25 feet above an occupied floor.

EXCEPTION: Thermal detectors or cross zone beam detectors may be used in lieu of smoke detectors where approved by the Department and Fire Department.
2. Detector zones may not exceed 20,000 square feet and no detector zone shall serve more than one smoke control zone.

3. A detector in a smoke control zone shall actuate all the adjacent zone smoke control equipment to pressurize those adjacent zones with 100% outside air while the affected smoke control zone goes into exhaust. All other smoke control zones shall remain in normal operation.

(g) Specific Requirements.

1. The mechanically operated supply and return exhaust systems servicing smoke control zones shall be arranged to exhaust at the indicated rates when activated by the smoke detection and/or sprinkler systems; all adjoining areas or smoke control zones shall be arranged to supply 100% outside air to prevent smoke migration to the unaffected areas.

2. In addition to other smoke zone area requirements, passenger holding areas shall be treated as tenant spaces if separate systems are used; otherwise they shall be treated as part of the concourse/passenger terminal public circulation space and horizontal smoke control zones shall be limited to 52,000 square feet maximum.

(h) Draft Stops. Draft stops shall be required in all terminal/concourse buildings at the passenger level to prevent migration of smoke throughout the building. Stops shall be constructed of noncombustible materials. They shall be arranged to coincide with smoke control zones described in this Section and as follows:

1. For ceilings or exposed roofs less than 25 feet above the floor, draft stops shall be a minimum of 20% of the roof/ceiling height. The roof/ceiling height shall be measured as follows:
   a. For flat roofs, from roof/ceiling to floor.
   b. For sloped roofs, from center of vent or point of exhaust to floor.

   The minimum depth of the draft stop shall be 2 feet with a minimum headroom clearance of 7 feet.

2. For ceiling spaces, the draft stop shall be provided through the ceiling space from ceiling to structure.

3. Location of all draft stops shall be approved by the Building and Fire Departments.

4. The volume is measured from the area of the smoke control zone to the ceiling/roof up to a maximum height of 12 feet above each pedestrian area. Exhaust system
inlets shall not be less than 6 feet above the walking surface of each level.

5. Each zone created by the construction of draft stops shall be mechanically exhausted at a rate of no less than 4 air changes per hour.

EXCEPTION: For ceilings or roof structures not at an interface and over 25 feet above the floor of any occupied space, draft stops shall not be required.

(i) Control Tower. Smoke control in the control tower shall be as follows:

1. Exhaust the occupied level where the fire alarm is activated at 6 air changes per hour.

2. Maintain normal HVAC operations on all other adjacent occupied levels.

3. Provide stairway pressurization and other requirements per Section 5904(e).

(j) Acceptance Testing. See Section 5608(d)3.

SECTION 5908. LIFE SAFETY SYSTEMS.

(a) Fire Sprinkler System.

1. Terminal/concourse buildings shall be fully sprinkled in accordance with NFPA 13, Standard for Installation of Sprinkler Systems. Design criteria for terminal buildings shall be in accordance with ordinary Hazard Group 2 for retail and service areas and light hazard for office and passenger areas. Design criteria for freight terminal buildings shall be in accordance with NFPA 13, NFPA 231 and NFPA 231C. Hotel occupancies connected to a passenger terminal building shall be sprinklered throughout.

EXCEPTION: Equipment rooms or areas approved by the Department and Fire Department.

2. Sprinkler systems shall be designed to provide a separate zone for each level. Any one zone shall not exceed 52,000 square feet on any one level and shall not exceed a length of 400 feet in any one direction. For tenant space, sprinkler systems that are:

a. Within the sprinkler zone may be serviced from an existing sprinkler zone.

b. Within 2 adjacent sprinkler zones exceeding 800 square feet shall be designed as a separate fire sprinkler zone.
3. In addition to these standards, the automatic sprinkler system shall be complete and operative throughout all spaces in the terminal and the concourse buildings prior to occupancy of any of the tenant spaces. The level of protection provided for unoccupied tenant space shall be subject to the approval of the Department and the Fire Department.

4. Other locations for sprinklers shall include
   a. Sprinklers shall be installed at 6 foot on center each side of draft stops required at the interface of a main terminal building and a concourse building.
   b. Kiosks or similar structures that are covered or have roofs and are located within the passenger terminal building or the concourse shall be protected by an approved automatic fire suppression system.

   EXCEPTION: No automatic fire suppression system is required if the kiosk is:
   (1) Noncombustible construction and less than 4 feet wide in any dimension; or
   (2) Portable vendor carts with a maximum size 4 feet x 8 feet spaced at more than 10 feet between carts.

   (b) Standpipe Systems. All terminal structures and control towers shall have standpipes with 2½-inch outlets. Outlets shall be located within 10 feet of stairways. The maximum distance from a required standpipe outlet to any point in the structure shall not exceed 200 feet in the line of travel. Any 4 adjacent standpipes on the same level shall be capable of discharging a minimum of 500 gallons per minute for the first standpipe and 250 gallons per minute for each of the remaining 3 standpipes, for a period of at least 30 minutes. The supply shall be sufficient to maintain a minimum residual pressure of 65 psi at the most hydraulically remote standpipe with 500 gallons per minute flowing. Water pressure at any hose outlet shall not exceed 100 psi. In all cases, the system shall be designed so that sprinkler zones can be isolated without affecting the water supply to the hose outlets.

   (c) Manual Pull Stations. Manual pull station zones must be provided at the required exits and shall be annunciated separately. There shall be 200 feet maximum between pull stations.
(d) **Fire Detection Systems.**
1. Detectors shall be located in all nonpublic areas that are not sprinklered and shall be annunciated separately. A remote status-indicating light shall be located in the terminal or concourse building above each entry of an enclosed tenant area greater than 2500 square feet as approved by the Department and Fire Department. Concealed detectors shall also be annunciated immediately outside the concealed space.
2. Smoke detectors shall be installed in all occupied levels for smoke control as required by Section 5907(f).
3. Area smoke detectors shall be cross-zoned or addressable type with verifiable function.

(e) **Emergency Communication Systems.** Both one-way and 2-way systems shall be installed in all passenger terminal buildings in public areas at required exits, Building Engineering Office, Airport Operations Office, each mechanical room emergency generator room, fire pump room, main switch gear rooms, and each elevator cab which serves 4 or more stories as allowed by the Fire Department. Fire Department telephone jack locations shall be approved by the Fire Department.

(f) **Fire Department Operations Center.** The F.D. Operations Center shall be provided in a space in each building as approved by the Department and the Fire Department and shall include:
1. Graphic Annunciator. A graphic annunciator shall be installed within the F.D. Operations Center. The graphic shall indicate airport building layout and arrangement to clearly communicate the building geography. A combination of vertical (section) and horizontal (plan) graphic arrangements may be necessary. Primary ingress and egress routes, including stairs and elevators shall be shown. See Section 1807.
2. A master graphic directory showing all electrical services shall be provided in the F.D. Operations Center. Each electrical service shall be provided with a permanent plaque denoting the area served. In addition, each shall denote "See Master Graphic Directory in F.D. Operations Center".
3. A microphone for the voice/alarm system and telephone handset for firefighters' telephone system.
(g) Fire Extinguishers. Hand fire extinguishers shall be provided throughout an airport terminal building in accordance with the requirements outlined by the Denver Fire Code.

(h) Security Systems. Security systems shall be separate from fire alarm systems.

EXCEPTION: Delay panic hardware systems as required in Section 5904 may be part of the fire alarm system.

(i) Zones. Zones for smoke control, sprinklers, detectors, etc., shall be coordinated to have the same zones or multiples thereof, not to exceed the maximum area required by other provisions of this Code.

(j) Interface Openings. An interface shall exist between a passenger terminal concourse and connecting concourses, hotel or office occupancy. Where occupancy separations are not required, openings may be provided at the interface with the following conditions:

1. The size of the opening shall be limited to provide effective smoke control which will restrict the migration of smoke across the interface. See Section 5907(h)1.

2. A noncombustible draft curtain shall be provided at the interface.

3. Automatic fire sprinklers shall be located on both sides of the draft curtain, spaced at 6 feet on center.

(k) Main Passenger Terminal Building Elevators and Stairs.

1. Pressurized stairs, elevators and exit passageways are required unless otherwise approved by the Department and Fire Department.

EXCEPTION: Elevators and enclosed stairways from the transitway station.

2. Elevator refuge areas are not required at the transitway station and on levels having adequate exterior doors per 5904(f).

SECTION 5909. MECHANICAL. Mechanical requirements shall comply with applicable sections of this Code and referenced National Standards.

EXCEPTION: Air exhaust openings for air conditioning or ventilating equipment, serving ramp level tenant spaces, shall be permitted where the ramp surrounds the building. Such openings shall be located a minimum of 7 feet above the ramp.
SECTION 5910. ELECTRICAL.

(a) General Requirements.
1. The purpose of this Section is the practical safeguarding of persons and property from hazards arising from the use of electricity and shall apply to all electrical installations, electrical systems and all their component parts.
2. Design, installation and materials shall conform to the requirement of NFPA 70, National Electrical Code and this Code, except:
   a. Runways, taxiways, ramps and all electrical systems required for their operations which are under FAA jurisdiction.
   b. Airplane parking light conduit runs and junction boxes which are fed from building power systems and may be within 1 inch minimum of ramp surface covered with FAA approved sealer.
3. All electrical materials and equipment shall be of a type tested and listed by an approved laboratory, shall bear their label, and shall be approved for the purpose for which the materials and equipment are to be used.

(b) Grounding. See the Electrical Code Article 1003.

(c) Emergency Systems.
1. Exit illumination shall be connected to an emergency power system. Exit ways shall be illuminated to an intensity of one foot candle at floor level during all times. Battery-operated exit illumination with a minimum of 1½ hours of 100% output can be connected to a reliable normal power source.
2. Exit signs with illuminated letters at least 6 inches in height shall be provided at each required exit doorway and elsewhere as required to clearly indicate the direction of egress. The letters shall be white on a green field and illuminated. Battery-operated exit signs with a minimum of 1½ hours of 100% output can be connected to a reliable power source.
3. Emergency power systems, emergency generator and/or battery backup shall provide power to the following equipment:
   a. Mechanical equipment for smoke control.
   b. Emergency egress and exit lighting.
   c. Emergency elevator power.
   d. Fire alarm and detection systems.
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e. Fire pump.

f. Emergency communication systems.

g. Delay panic hardware.

(d) Raceways. All wiring for power, lighting, signal, control, computer communications and telephone shall be installed in raceways. Cable tray systems shall be allowed for electrical systems not exceeding 50 volts between any conductors. Installation shall comply with the National Electrical Code, Article 318.

(e) Hazardous Areas - Class 1, Division II.

1. Hazardous wiring methods shall apply within a 15-foot radius of fuel connection (fuel pit or aircraft). All measurements are referenced from surface of ramp and the 18-inch vertical measurement shall not apply.

2. Electrical room access off of apron area is acceptable unless within 15 feet of fueling connections. Electrical equipment within 15 feet of a fuel connection shall comply with National Electrical Code Class 1, Division II methods.

SECTION 5911. SUBSURFACE TUNNELS.

All subsurface tunnels shall comply with the following provisions:

(a) Sprinklers. Utility Tunnels (Ordinary Group I) and Service Tunnels (Ordinary Group II) shall be sprinklered throughout as required by Section 3803. The transitway shall be sprinklered at the transit stations as approved by the Department and Fire Department.

(b) Smoke Removal System. A smoke removal system shall be provided.

(c) Life Safety System. All life safety systems shall be on an emergency generator.

(d) Exits.

1. A walkway with a minimum 74-inch width (2 exit path widths - 22 inches each plus 12 inches wall clearance and an 18-inch platform edge clearance) shall be provided within all people-mover transit tunnels.

2. Exit doors into adjacent protected tunnels shall be provided at a maximum spacing of 200 feet and shall be monitored by the airport operations center.

EXCEPTION: The walkway width and exit door spacing may be modified based upon an exit study submitted by the Design Professional and approved by the Department and Fire Department.
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(e) **Separation.** A minimum 2-hour separation shall be provided between tunnels.

(f) **Transit Station Separation.** The transitway shall be separated from the transit station by a minimum 2-hour fire-rated noncombustible wall with 1½ hour fire rated doors. Windows within these walls shall be

1. Approved 1½-hour fire-rated windows or
2. A ¾-hour-rated window assembly protected with approved directional sprinkler heads 6'-0" o.c. both sides of glass.

(g) **Transit Systems Construction Guide.** Fixed Guideway Transit Systems NFPA 130 shall be used as a construction guide unless specifically covered by this Code.

(h) **Transitway Tunnel.** The transitway tunnel shall be used exclusively for the movement of passengers between stations.

SECTION 5912. LIQUID FUEL LINES PENETRATING BUILDINGS OR STRUCTURES. Liquid fuel lines that pass through or over any building or structure shall be double walled and monitored for leakage. Liquid fuel lines that pass through buildings shall have control valves at the outside of the building penetration and shall be automatically closed upon detection of a break or leak.

SECTION 5913. TEMPORARY STRUCTURES USED IN PUBLIC AREAS. See Uniform Fire Code - Article 35.

**EXCEPTION:** Temporary construction enclosures, construction barricades, walkways and similar temporary construction structures.
SECTION 5914. STANDARDS. Unless provided for in other portions of this Building Code, the following Standards shall apply:

<table>
<thead>
<tr>
<th>ORGANIZATION</th>
<th>TITLE OF PUBLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPA</td>
<td>Installation of Sprinkler Systems Pamphlet 13-1987</td>
</tr>
<tr>
<td></td>
<td>Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying, Pamphlet 91-1983</td>
</tr>
<tr>
<td></td>
<td>Aircraft Fueling Ramp Drainage, Pamphlet 415-1987</td>
</tr>
<tr>
<td></td>
<td>Construction and Protection of Airport Terminal Buildings, Pamphlet 416-1987</td>
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<tr>
<td></td>
<td>Construction and Protection of Aircraft Loading Walkways, Pamphlet 417-1985</td>
</tr>
<tr>
<td></td>
<td>Fixed Guideway Transit Systems, Pamphlet 130-1988</td>
</tr>
<tr>
<td></td>
<td>Standard on Aircraft Hangers, Pamphlet 409</td>
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</table>
SECTION 6002 is added:

SECTION 6002. ADDITIONAL STANDARDS. Unless provided for in other portions of this Building Code, the following Standards shall apply:

Chapter 17

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<thead>
<tr>
<th>ORGANIZATION</th>
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<tr>
<td>CPSC</td>
<td>Cellulose Insulation Standards HH-1-515C, HH-1-515D.</td>
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### Chapter 26

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<tr>
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<td>Placing Reinforcing Bars</td>
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**LEGEND**

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<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
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<tr>
<td></td>
<td>1916 Race Street</td>
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<tr>
<td></td>
<td>Philadelphia, PA 19103</td>
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<tr>
<td>CPSC</td>
<td>Consumer Product Safety Commission</td>
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<td></td>
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<tr>
<td>CRSI</td>
<td>Concrete Reinforcing Steel Institute</td>
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<td>228 North La Salle Street</td>
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# APPENDIX

All Chapters and Sections of this Appendix are adopted as part of this Code except for those that are listed in this summary. Those that are amended or added shall also be adopted as part of this code.

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<thead>
<tr>
<th>Chapter/Section</th>
<th>Title</th>
<th>Status</th>
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<td>Life Safety Requirements for Existing Buildings</td>
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<tr>
<td>Chapter 42</td>
<td>Flammable Floor Coverings</td>
<td>Added</td>
</tr>
<tr>
<td>Chapter 46</td>
<td>Demolition and Moving</td>
<td>Added</td>
</tr>
<tr>
<td>Chapter 49</td>
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<tr>
<td>Section 4902</td>
<td>Patio Covers</td>
<td>Amended</td>
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<td>Section 4904</td>
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<td>Chapter 51</td>
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<td>Section 5110</td>
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<tr>
<td>Section 5113 (e)</td>
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<tr>
<td>Chapter 53</td>
<td>Energy Conservation in New Building Construction</td>
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<tr>
<td>Chapter 63</td>
<td>Construction in Designated Special Construction Zones</td>
<td>Added</td>
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<tr>
<td>Chapter 64</td>
<td>Requirements for Handicapped Persons</td>
<td>Added</td>
</tr>
<tr>
<td>Chapter 66</td>
<td>Sound Insulation Standards for Building Exposed to Aircraft</td>
<td>Added</td>
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<td>Chapter 70</td>
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Appendix Chapter 1 is amended:

Chapter 1
LIFE SAFETY REQUIREMENTS FOR EXISTING BUILDINGS
Division 1
LIFE-SAFETY REQUIREMENTS FOR EXISTING
BUILDINGS OTHER THAN HIGH-RISE
BUILDINGS LESS THAN 75 FT. HIGH
(SEE HIGH RISE DEFINITION CHAPTER 4 DENVER BUILDING
CODE)

SECTION 100. GENERAL
(a) Purpose. The purpose of this division is to provide a minimum
degree of safety to persons occupying existing buildings by
providing for alterations to such existing buildings which do
not conform with the minimum requirements of this code.
EXCEPTION: Group R, Division 3, Group M; and high-rise
occupancies.
(b) Effective Date. Within 18 months after the effective date of this
Division, plans for compliance shall be submitted and
approved, and within 18 months thereafter the work shall be
completed or the building shall be vacated, until made to
conform.

SECTION 101. SMOKE DETECTORS.
(a) General. Smoke detectors shall be provided in the following
locations:
1. Dwelling units and hotel or lodging house guest rooms.
2. All interior corridors which serve more than one tenant
and that provide a path of egress.
Detectors shall be installed in accordance with the approved
manufacturer’s instruction.
EXCEPTION: Buildings that have an approved sprinkler
system throughout.
(b) Power Source. Smoke detectors may be battery-operated or
may receive their primary power from the building wiring when
such wiring is served from a commercial course. Wiring shall
be permanent and without a disconnecting switch other than
those required for overcurrent protection.
(c) Location Within Dwelling Units. In dwelling units, detectors
shall be mounted on the ceiling or wall at a point centrally
located in the corridor or area giving access to each separate
sleeping area. Where sleeping rooms are on an upper level,
the detector shall be placed at the center of the ceiling directly
above the stairway. Detectors shall also be installed in the
basement of dwelling units having a stairway which opens from basement into the dwelling. Detectors shall sound an alarm audible in all sleeping areas of the dwelling unit in which they are located.

(d) Location in Efficiency Dwelling Units and Hotels. In efficiency dwelling units, hotel suites and hotel sleeping rooms, detectors shall be located on the ceiling or wall of the main room or hotel sleeping room. When sleeping rooms within an efficiency dwelling unit or hotel suite are on an upper level, the detector shall be placed at the center of the ceiling directly above the stairway. When actuated, the detector shall sound an alarm audible within the sleeping area of the dwelling unit, hotel suite or sleeping room in which it is located.

(e) Required Inspections.

1. All battery-powered smoke detectors must be tested for proper function and need for replacement of batteries on a semiannual basis. Batteries shall be replaced annually. A record-keeping log book must be maintained by the building or unit owner indicating location of detector, date and result of inspection, and date of battery installation.

2. In condominium dwelling units, the owner of the unit shall file a compliance certificate semiannually with the manager or board of directors of the homeowners association. The manager or board of directors of a homeowners association shall not be liable or responsible for enforcement or detector failure or any damages resulting therefrom within a unit, so long as a current compliance certificate is on file from the unit owners or the Department has been notified by the manager or board of directors of the failure of the unit owners to file the compliance certificate within 20 days of the date set for detector inspections. The Department or Fire Department may inspect the filed certificates and the Association's log book at any reasonable time to insure owner compliance. If the certificates or log book are maintained off the premises, then they shall be made available at the premises by appointment.

(f) Failure to Comply with Required Inspections. Failure to comply with the required inspections as required in subparagraph (e) shall constitute an unsafe and hazardous condition, in which case all the detectors in the building (or individual condominium unit) shall be required to receive their primary power from the building's commercial electric service.
SECTION 102. EXIT AND FIRE ESCAPE SIGNS.
(a) Exit Signs. Exit signs shall be provided as required by this Building Code.
(b) All doors and windows providing access to a fire escape shall be provided with approved fire escape signs.

Division II
LIFE-SAFETY REQUIREMENTS FOR EXISTING HIGH-RISE BUILDINGS

SECTION 200. SCOPE. These provisions apply to existing high-rise buildings. There shall be two subdivisions as follows:
(a) Division II A - Apartment Buildings (includes residential condominiums).
(b) Division II B - Hotels, Retail and Office Buildings

Division II A - Apartment Buildings (includes residential condominiums)

SECTION 201. GENERAL
(a) Purpose. The purpose of this Division II is to provide a minimum degree of life safety to persons occupying high-rise apartment buildings which do not conform with the minimum requirements of this Building Code.
(b) Compliance Date. Within 18 months after the effective date of the Code, plans for compliance shall be submitted and approved. Implementation shall be dependent upon the Code requirements for Division II, but in no case shall the time period exceed 60 months from the effective date of the Code. Violation shall require the building to be vacated by owners and/or occupants until all units within the structure are made to conform.

SECTION 202. EXITS.
(a) Number of Exits. Exits shall be provided as required in Section 3303(a). When 2 or more exits are required from upper floors, an exterior fire escape complying with subsection (d) of this Section may be used as one of the required exits.
(b) Stair Construction. All required stairs shall have a minimum run of 9 inches and a maximum rise of 8 inches and shall have a minimum width of 30 inches exclusive of handrails. Every
stairway shall have at least one handrail. A landing having a minimum 30-inch run in the direction of travel shall be provided at each point of access to the stairway.

**EXCEPTION:** Fire escapes as provided for in this Section. Exterior stairs shall be of noncombustible construction except on buildings of Types III, IV and V construction, provided that the exterior stairs are constructed of wood not less than 2-inch nominal thickness.

**(c) Corridors.** Corridors serving as an exit for an occupant load of 30 or more shall have walls and ceilings of not less than one-hour fire-resistive construction as required by this Code. Existing walls surfaced with wood lath and plaster in good condition or ½-inch gypsum wall board or openings with approved fixed wire glass set in steel frames are permitted for corridor walls and ceilings and occupancy separations when approved. Doors opening into such corridors shall be protected by 20-minute fire assemblies or solid wood doors not less than 1 ¼ inches thick. Where the existing frame will not accommodate the 1 ¾-inch thick door, a 1 3/8-inch thick solid bonded wood core door or equivalent insulated steel door shall be permitted. Doors shall be self-closing or automatic-closing by smoke detection. Transoms and openings other than doors from corridors to rooms shall comply with Section 3305(h) of this Code or shall be covered with a minimum of ¾-inch plywood or ½-inch gypsum wallboard or equivalent material on the room side.

**EXCEPTION:** Existing corridor walls, ceilings and opening protection not in compliance with the above may be continued when such buildings are protected with an approved automatic sprinkler system throughout.

**(d) Fire Escapes.**

1. Existing fire escapes which in the opinion of the Building Official comply with the intent of this Section may be used as one of the required exits. The location and anchorage of fire escapes shall be of approved design and construction.

2. Fire escapes shall comply with the following:
   a. Access from a corridor shall not be through an intervening room.
   b. All openings within 10 feet shall be protected by 45-minute fire assemblies. When located within a recess or vestibule, adjacent enclosure walls shall be of not less than one-hour fire-resistive construction.
Appendix Sec. 202

c. Egress from the building shall be by a clear opening having a minimum dimension of not less than 29 inches. Such openings shall be openable from the inside without the use of a key or special knowledge or effort. The sill of an opening giving access shall be not more than 30 inches above the floor of the building or balcony.

d. Fire escape stairways and balconies shall support the dead load plus a live load of not less than 100 pounds per square foot and shall be provided with a top and intermediate handrail on each side. The pitch of the stairway shall not exceed 60° with a minimum width of 18 inches. Treads shall be not less than 4 inches in width and the rise between treads shall not exceed 10 inches. All stair and balcony railings shall support a horizontal force of not less than 50 pounds per lineal foot of railing.

e. Balconies shall be not less than 44 inches in width with no floor opening other than the stairway opening greater than 5/8 inch in width. Stairway openings in such balconies shall be not less than 22 inches by 44 inches. The balustrade of each balcony shall be not less than 36 inches high with not more than 9 inches between balusters.

f. Fire escapes shall extend to the roof or provide an approved gooseneck ladder between the top floor landing and the roof when serving buildings 4 or more stories in height having roofs with less than 4:12 slope. Fire escape ladders shall be designed and connected to the building to withstand a horizontal force of 100 pounds per lineal foot; each rung shall support a concentrated load of 500 pounds placed anywhere on the rung. All ladders shall be at least 15 inches wide, located within 12 inches of the building and shall be placed flatwise relative to the face of the building. Ladder rungs shall be ¾ inch in diameter and shall be located 12 inches on center. Openings for roof access ladders through cornices and similar projections shall have minimum dimensions of 30 inches by 33 inches.

g. The lowest balcony shall be not more than 18 feet from the ground. Fire escapes shall extend to the ground or be provided with counterbalanced stairs reaching to the ground.
Appendix Sec. 202

h. Fire escapes shall not take the place of stairways required by the codes under which the building was constructed.

i. Fire escapes shall be kept clear and unobstructed at all times and maintained in good working order.

(e) Exit and Fire Escape Signs. Exit signs shall be provided as required by Section 3314(a) thru (d).

**EXCEPTION:** The use of existing exit signs may be continued when approved by the Building Official.

All doors or windows providing access to a fire escape shall be provided with fire escape signs.

SECTION 203. BASEMENT ACCESS OR SPRINKLER PROTECTION. An approved automatic sprinkler system shall be provided in basements or stories exceeding 1500 square feet in area and not having a minimum of 20 square feet of opening entirely above the adjoining ground level in each 50 lineal feet or fraction thereof of exterior wall on at least one side of the building. Openings shall have a minimum clear dimension of 30 inches. If any portion of a basement is located more than 75 feet from required openings, the basement shall be provided with an approved automatic sprinkler system throughout.

SECTION 204. STANDPIPES. All buildings in Division II A shall be provided with an approved Class I or Class III standpipe system.

SECTION 205. SMOKE DETECTORS.

(a) General. Smoke detectors shall be provided in the following locations:

1. Dwelling units.
2. All interior corridors which service more than one tenant and which provide a path of egress.

Detectors shall be installed in accordance with the approved manufacturer's instruction.

**EXCEPTION:** Buildings that have an approved sprinkler system throughout.

(b) Power Source. Smoke detectors within dwelling units may be battery-operated or may receive their primary power from the building wiring when such wiring is serviced from a commercial source. Smoke detectors within corridors serving more than one tenant shall receive their primary power from the building commercial electrical service and shall be annunciacted as required by the Fire Department and the Department. Wiring shall be permanent and without a
disconnecting switch other than those required for overcurrent protection.

(c) **Location Within Dwelling Units.** In dwelling units, detectors shall be mounted on the ceiling or wall at a point centrally located in the corridor or area giving access to each separate sleeping area. Where sleeping rooms are on an upper level, the detector shall be placed at the center of the ceiling directly above the stairway. Detectors shall sound an alarm audible in all sleeping areas of the dwelling unit in which they are located.

(d) **Required Inspections.**
1. All battery-powered smoke detectors must be tested for proper function and need for replacement of batteries on a semiannual basis. Batteries shall be replaced annually. A record-keeping log book must be maintained by the building or unit owner indicating the location of detector, date and result of inspection, and date of battery installation.

2. In condominium dwelling units, the owner of the unit shall file a compliance certificate semiannually with the manager or board of directors of the homeowners association. The manager or board of directors of a homeowners association shall not be liable or responsible for enforcement or detector failure or any damages resulting therefrom within a unit, so long as a current compliance certificate is on file from the unit owners or the Department has been notified by the manager or board of directors of the failure of the unit owners to file the compliance certificate within 20 days of the date set for detector inspections. The Department or Fire Department may inspect the filed certificates and the Association's log book at any reasonable time to ensure owner compliance. If the certificates or log book are maintained off the premises, then they shall be made available at the premises by appointment.

(e) **Failure to Comply with Required Inspections.** Failure to comply with the required inspections as required in subparagraph (e) shall constitute an unsafe and hazardous condition, in which case all the detectors in the building (or individual condominium unit) shall be required to receive their primary power from the building's commercial electrical service.
SECTION 206. SEPARATIONS OF OCCUPANCIES. Occupancy separations shall be provided as specified in Section 503 of this Code. When approved by the building official, existing wood lath and plaster in good condition or ½-inch gypsum wallboard may be acceptable where one-hour occupancy separations are required.

Division II B - Hotels, Retail and Office Buildings.

See Section 3817 for life safety requirements for existing high-rise hotel, retail and office buildings.
Appendix Chapter 42 is added:

CHAPTER 42

FLAMMABLE FLOOR COVERINGS
INTERIOR FLOOR FINISH

SECTION 4201. GENERAL. This appendix regulates exposed floor surfaces of buildings, including coverings that are applied over a previously finished floor.

EXCEPTION: Interior floor finish materials of a traditional type, such as wood, vinyl, linoleum, terrazzo and other resilient floor-covering materials.

Floor coverings shall meet the classification prescribed for the various occupancy groups listed in Table IV-A when tested in accordance with the requirements of Section 4202.

SECTION 4202. TESTING AND CLASSIFICATION OF MATERIALS.
(a) Testing. Critical radiant flux values of interior floor finishes shall be established by tests conducted in accordance with procedures specified within Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source, National Fire Protection Association Standard 253-1978 conducted by an approved testing agency.

(b) Classification. Interior floor finish materials which are to be installed in an exit enclosure, passageway or corridor shall be tested and classified on the basis of tests conducted in accordance with subsection (a) as follows:

1. Class 1 Interior Floor Finish. Materials having a minimum critical radiant flux of 0.45 watt per square centimeter.

2. Class 2 Interior Floor Finish. Materials having a minimum critical radiant flux of 0.22 watt per square centimeter.

SECTION 4203. MAXIMUM ALLOWABLE CRITICAL RADIANT FLUX.
(a) General. Interior floor finish materials shall meet the classification prescribed for the various occupancy groups listed in Table IV-A when tested in accordance with the requirements of Section 4202.

EXCEPTION: When an approved automatic sprinkler system is installed, Class 2 materials may be used in any area where Class 1 materials are required and the materials need not be classified in areas where Class 2 materials are permitted.
Appendix Sec. 4203

(b) **Test Report Availability.** All interior floor finish materials required by this Section to meet critical radiant flux limits in accordance with Section 4202 shall be tested by an approved laboratory. A copy of the test report identifying and representing the style to be installed shall be provided to the Department upon request. The test report shall identify the interior floor finish by manufacturer (or supplier) and style name and shall be representative of the current construction of the material to be installed.

(c) **Identification.** The interior floor finish material shall be identified by a hang tag or other suitable method as to manufacturer (or supplier) and style and shall indicate the classification of the material based upon the limits specified within Section 4202.
# TABLE IV-A

## INTERIOR FLOOR FINISH REQUIREMENTS

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<th>USE GROUPS</th>
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<th>CORRIDORS PROVIDING EXIT ACCESS</th>
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1. Combustible floor finish not permitted for stairs in Types I and II construction nor other types of construction exceeding three stories in height.

2. Combustible floor finish not permitted in rooms occupied by inmates or patients whose personal liberties are restrained.
Appendix Chapter 46 is added:

CHAPTER 46

DEMOLITION AND MOVING

SECTION 4601. GENERAL

(a) Scope. In addition to the other requirements of this Building Code, the Revised Municipal Code and the Fire Code, this Chapter shall govern the demolition and moving of buildings, structures and utilities. Any device or equipment such as scaffolds, ladders, derricks, hoists or similar equipment used in connection with demolition or moving shall be constructed, installed, maintained and operated in accordance with the requirements governing the construction, installation, maintenance and operation of such device or equipment as specified in other portions of this Building Code.

(b) Loads. Structures, floors, temporary support, scaffold, sidewalk barricade or bridge or any part thereof or any device or equipment shall not be loaded in excess of the safe carrying capacity.

(c) Danger Signs. Every demolition project shall be provided with danger signs posted around the property. See Chapter 1 for the posting of Danger Signs.

(d) Cleaning Brick. The cleaning of brick or lumber at the job site shall be performed only by employees of the demolition contractor.

(e) Dust. All dust resulting from demolition operations shall be settled with water and approved by the Department.

(f) Transportation Approval. Trucks and other equipment used by the contractor shall not interfere with or block either vehicular or pedestrian traffic, except when approved by the Department of Public Works. Where it becomes necessary to transport units of a wrecked building, structure or utility upon and through the public streets, alleys or other public ways and places, permission to do so shall be obtained from the Department of Public Works.

(g) Rubbish and Waste. All adjacent streets, alleys and other public ways and places shall be kept free and clear of all rubbish, refuse and loose material resulting from the moving, demolition or demolition removal operations.

(h) Sale of Material on Job Site. The sale of any material on a demolition or moving site is hereby prohibited, except as approved by the Department. See Chapter 1 for violations.
(i) **Sanitary Facilities.** Toilet facilities shall be provided on each demolition or moving site in accordance with the requirements of Chapter 3 and Chapter 50 of this Building Code.

(j) **Extinguishers.** When cutting torches are required on any demolition or moving project, approved type extinguishers shall be provided. The approval and number required shall be set forth by the Fire Department. See the Uniform Fire Code.

(k) **Liability Insurance.** Prior to the issuance of a permit by the Department, any person, firm or corporation demolishing or moving any building, structure or utility shall provide insurance to cover bodily injury and property damage to the public or public property. A copy of the certificate of liability insurance shall be provided to the Department. This insurance shall contain a noncancellation clause and be valid at all times during demolition or moving operations.

**EXCEPTION:** Homeowners for the demolition of Group R3 or M Occupancies when approved by the Department.

1. **Insurance.** The minimum amount of insurance to be provided shall be as follows:

   **CONTRACTOR INSURANCE COVERAGE**
   - Class A Wrecking $500,000.00
   - Class B Wrecking 300,000.00
   - House Moving 300,000.00

2. **Other Permittee.** Whenever any other permittee, except a homeowner, performs demolition work, he shall be required to show proof of insurance in the same amounts as indicated herein.

(l) **Damage to Public Property.** As a condition of obtaining a permit to wreck or move any building, structure or utility, the permittee assumes liability for any damage to public property occasioned by such moving, demolition or removal operations. The permittee agrees to repair any damage to public property, including any public sidewalks, occasioned by such moving, demolition or removal operations. Failure to make such repairs within 30 days shall be grounds for the revocation of the contractor’s license.

(m) **Permit.** A permit shall be required for the erection of all covered walkways and railings. See Chapter 3.

(n) **Protection of Utilities.** Materials or equipment used in, or required for, demolition or moving operations shall not be placed or stored so as to obstruct free and convenient approach to any fire hydrant, fire or police alarm box, utility box, catch basins or manhole, or so as to interfere with the
free flow of water in any street or alley gutter. Every street lamp, utility box, fire or police alarm box, fire hydrant, catch basin and manhole that might be damaged by any work being performed or by the placement or storage of any materials or equipment shall be protected adequately against such damage. This protection shall be maintained only as long as the actual work may require and shall be completely removed as soon as the work status permits.

SECTION 4602. PREPARATORY OPERATIONS.
(a) Survey. Prior to the start of demolition operations, a survey shall be made of the structure to determine the condition of the structure, and to determine the possibility of unplanned collapse of any portion of the building or structure. Any adjacent building or structure shall be similarly surveyed, and the demolition contractor shall possess, in writing, evidence that this survey has been performed. Except as approved by the Department, buildings 4 or more stories in height shall require a professional engineer’s report be filed with the Department prior to any demolition. This report shall contain information as to type of construction, method of demolition, street, sidewalk or other public way closures, method of protecting the public, and pertinent data pertaining to adjacent structures. The Department may request an engineer’s report for other demolition operations when deemed necessary. Buildings being demolished containing friable asbestos shall conform to the provisions of the National Emission Standard for Asbestos and all other federal and state regulations.
(b) Damage by Fire, Flood, or Other. When persons are required to work within a structure to be demolished which has been damaged by fire, flood, explosion or other cause, the structure shall be braced or shored for safety.
(c) Utility Shut Off. All electric, gas, water, steam, sewer and other service lines shall be shut off, capped or otherwise controlled outside the building line prior to beginning demolition work.
(d) Relocation of Utilities. Any power, water or other utilities required to be maintained during demolition shall be temporarily relocated and protected.
(e) Dangerous Utilities. A determination shall be made by the contractor if any type of hazardous chemicals, gases, explosives, flammable materials or similarly dangerous substances have been used in any pipes, tanks or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging
shall be performed by the demolition contractor and the
hazard eliminated prior to demolition operations.

(f) Glass Hazard. Hazards from the fragmentation of glass shall
be removed.

(g) Wall Opening Hazard. Wall openings shall be protected to a
height of approximately 42 inches above the floor.

(h) Exterior Wall-Floor Demolition. The demolition of exterior
walls and floor construction shall begin at the top of the
structure and proceed downward. Each story of exterior wall
and floor construction shall be removed and dropped into
storage space before commencing the removal of exterior
walls and floors in the story next below.

SECTION 4603. STAIRS, PASSAGEWAYS AND LADDERS.

(a) Access. Only those stairways, passageways and ladders
designated as means of access to the structure of a building
shall be used. Other access ways shall be closed at all times.

(b) Maintenance. All stairs, passageways, ladders and incidental
equipment thereto shall be periodically inspected and
maintained in a clean, safe condition.

(c) Stairwells. In a multistory building when a stairwell is being
used as access, the stairwell shall be properly illuminated by
either natural or artificial means and completely and
substantially covered over at a point not less than 2 floors
below the floor on which the work is being performed. Access
to the floor where the work is in progress shall be through a
properly lighted, protected and separate passageway.

(d) Doorways. All access doorways or thoroughfares to the
property shall be kept barricaded, except during the actual
passage of men or equipment.

SECTION 4604. CHUTES.

(a) Prohibition. Materials shall not be dropped to any point lying
outside the exterior walls of the structure unless the area is
protected. Where the distance from the property line or
sidewalk is equal to or greater than the height of the
demolition work, materials may be dropped by gravity to the
ground, provided that the dust control is maintained.

(b) Enclosure. All material chutes or sections thereof which are at
an angle of 45° or more from the horizontal shall be entirely
enclosed, except for openings equipped with closures at each
floor level for the insertion of materials. The opening shall not
exceed 48 inches in height measured along the wall of the
Appendix 4604

chute. At all stories below the top floor, openings shall be kept closed when not in use.

(c) **Gate.** A substantial gate shall be installed in each chute at or near the discharge end. When chutes are used, a competent employee shall be assigned to control the operation of the gate and the backing and loading of trucks. When operations are not in progress, the area surrounding the discharge end of the chute shall be securely closed off.

(d) **Guardrail.** Any chute opening used to dump debris shall be protected by a substantial guardrail, approximately 42 inches above the floor or other surface on which the men stand to dump material. Any space between the chute and the edge of the openings in the floors through which it passes shall be solidly covered over.

(e) **Toeboard or Bumper.** Where the material is dumped from motorized equipment or wheelbarrows, a securely attached toeboard or bumper not less than 4 inches thick and 6 inches high shall be provided at each chute opening.

SECTION 4605. REMOVAL OF WALLS, MASONRY SECTIONS AND CHIMNEYS.

(a) **Floor Loads.** Masonry walls or sections of masonry shall not be permitted to fall upon floors of the building in such masses as to exceed the safe carrying capacities of the floors.

(b) **Free-Standing Walls.** No wall section which is more than one story in height shall be permitted to stand alone without lateral bracing. All walls shall be left in a stable condition at the end of each shift.

(c) **Cutting Load-Supporting Members.** Structural or load-supporting members on any floor shall not be cut or removed until all stories above such floor have been demolished and removed. This provision shall not prohibit the cutting of floor beams for the disposal of materials or for the installation of equipment.

(d) **Skeleton-Type Buildings.** In buildings of steel or concrete frame construction, the framing may be left in place during the demolition of the masonry. Where this is performed, all beams, girders and similar structural supports shall be cleared of all loose material as the masonry demolition progresses downward.

(e) **Walls Serving as Support.** Walls that serve as retaining walls to support earth or adjoining structures shall not be demolished until the earth has been properly braced or adjoining structures have been properly supported.
Appendix 4605

(f) Walls Serving as Retainers. Walls which are to serve as retaining walls against which debris will be piled shall not be used unless they are capable of supporting the imposed loads.

SECTION 4606. CATCH PLATFORMS.

(a) General. During the demolition of the exterior walls of a structure originally more than 70 feet high, catch platforms shall be erected along the exterior faces of these walls. EXCEPTION: Catch platforms shall not be required when the engineer's report specified in Section 4602 specifically deletes this requirement.

(b) Height. The catch platforms shall be constructed and maintained not more than 3 stories below the story from which the exterior walls are being removed. Catch platforms shall not be considered necessary when the demolition has progressed to within 3 stories of ground level.

(c) Width. Catch platforms shall be at least 5 feet in width, measured in a horizontal direction from the face of the structure, and shall consist of outriggers and planks. Planks shall be laid tight together and without openings between such planks and the wall.

(d) Material. Catch platforms may be constructed of material other than wood, provided that such material is of equal strength and does not otherwise lessen the security against falling material.

(e) Loading. Catch platforms shall be capable of sustaining a live load of at least 125 pounds per square foot.

(f) Incline. The catch platforms shall be inclined so that the outer edge is at least 6 inches higher than the inner edge.

(g) Supports and Outriggers. Supports shall consist of outriggers of ample strength, secured against turning, and spaced not more than 20 feet apart. Each outrigger shall have ample support against the building or in window openings and shall be properly secured.

(h) Enclosure. The outer edge of each catch platform shall be provided with a substantial enclosure constructed at an angle of approximately 45° with the horizontal and having its outer edge at least 48 inches from the platform measured along the slope of the enclosure.

1. The enclosure shall consist of galvanized wire mesh made of at least No. 16 U.S. gauge wire and 1½ inch mesh. The enclosure shall be secured to supports placed not more than 10 feet apart.
2. There shall be no openings between the platform and the enclosure.
3. Supports for the enclosure shall be at least 2 inches by 6 inches in section with the greater dimension at right angles to the enclosure.

SECTION 4607. STORAGE. The storage of waste material and debris on any floor shall not endanger the structural stability of the building.

SECTION 4608. MACHINE DEMOLITION. Machine demolition shall be subject to approval by the Department.

SECTION 4609. USE OF EXPLOSIVES. For use of explosives see the Uniform Fire Code.

SECTION 4610. MOVING.
(a) Compliance. Buildings, structures or utilities which are moved from one location to another, within or from the City, shall conform to all requirements of this Building Code. These buildings, structures or utilities shall be inspected and approved by the Department prior to moving. See Chapter 3.

(b) Other Requirements. During actual moving operations on the public way, one or more men shall be stationed on the roof of the structure being moved to determine that there is no interference with trees, wires, traffic signals, signs or other obstructions.

(c) Utilities Disconnect. See Section 4602.

(d) Filling Holes and Clearing of Site. See Section 4611.

(e) Approvals. Prior to the issuance of a permit by the Department and the subsequent moving of any building, structure or utility, approval shall be obtained from the Traffic Engineer.

(f) Storage of Moved Buildings. Buildings, structures or utilities shall not be stored on any property for more than 72 hours, unless approved by the Department.

SECTION 4611. AFTER REMOVAL. Upon completion of the removal of a building, structure or utility, either by demolition or moving, the ground shall be left in a clean, smooth condition. Holes, basements or cellars shall be filled with an inorganic material; provided, however, that the top one foot of fill shall be clean earth. The filling of such excavations shall not be required...
when a building permit has been issued for a new building on the site and construction is to be started within 60 days after completion of the demolition or moving operations. The holder of the building permit shall provide a temporary barricade protecting the excavation on all sides as specified for safety by the Department. The temporary barricade may remain in position for a time not exceeding 3 days, after which a solid barricade or fence shall be provided or the excavation filled.

Section 4612. STANDARDS. Unless provided for in other portions of this Building Code, the following Standards shall apply:

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<thead>
<tr>
<th>ORGANIZATION</th>
<th>TITLE OF PUBLICATION</th>
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<tr>
<td>American National Standards</td>
<td>Demolition Safety Requirements</td>
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<td>Institute</td>
<td>A10.6-1969</td>
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<td>1430 Broadway</td>
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<tr>
<td>New York, NY 10018</td>
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Appendix Chapter 49 Section 4902 is amended:

SECTION 4902. DESIGN LOADS FOR PATIO COVERS. Patio covers shall be designed to sustain, within the stress limits of this Code, all dead loads plus a minimum vertical snow load of 30 psf, nonreducible. Such covers shall be designed to resist the minimum horizontal wind loads set forth in this Code, except that where less than 12 feet high the horizontal wind load shall be as indicated in Table No. 49-A. In addition, they shall be designed to support a minimum wind uplift equal to the horizontal wind load acting upward normal to the roof surface, except that for structures not more than 10 feet above grade the uplift may be ¾ of the horizontal wind load. When enclosed with insect screening or plastic that is readily removable translucent or transparent plastic not more than 0.125 inch in thickness, wind loads shall be applied to the structure, assuming it is fully enclosed.

Section 4904 is amended:

SECTION 4904. FOOTINGS. A patio cover may be supported on a concrete slab on grade without footings, provided that the slab is not less than 4 inches thick with thickened edges 12 inches below grade and further provided that the columns do not support live and dead loads in excess of 2000 pounds per column.
Appendix 5110

> Appendix Chapter 51 Section 5110 is deleted:

Section 5111 is amended:

SECTION 5111. STANDARDS. Unless provided for in other portions of this Building Code, the following standards shall apply:

- Practice for the Inspection of Elevators - Inspectors Manual A17.2-1985
- Safety Requirements for Personnel Hoists A10.4-1985
- Safety Standards for Manlifts ANSI-ASME A90.1-1985
- Safety Requirements for Powered Platforms for Exterior Building Maintenance A120.1-1970
- Base Mounted Drum Hoists B30.7-1977
- Lifting Devices B30.7b ANSI-ASME

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<td>New York, NY 10018</td>
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Section 5113(e) is amended:

(e) Inspection Reports. After each required inspection, a full and correct safety test report by the elevator contractor performing the test shall be filed with the Building Official.
Appendix 5301

Appendix Chapter 53 is amended:

Chapter 53

ENERGY CONSERVATION IN NEW BUILDING CONSTRUCTION

SECTION 5301. GENERAL

(a) Purpose. The purpose of this appendix is to regulate the design and construction of the exterior envelopes and selection of heating, ventilating and air conditioning, service water heating, electrical distribution and illuminating systems and equipment required for the purpose of effective conservation of energy within a building or structure governed by this Code.

(b) Model Energy Code Adopted. In order to comply with the purpose of this appendix, buildings shall be designed to comply with the requirements of the Model Energy Code promulgated jointly by the International Conference of Building Officials (ICBO); the Southern Building Code Congress International, Inc. (SBCCI); the Building Officials and Code Administrators International, Inc. (BOCA); and the National Conference of States on Building Codes and Standards, Inc. (NCSBCS); dated 1986.

EXCEPTION: Residential buildings that are (1) detached one- and two-dwelling units, and (2) multi-dwelling units not exceeding 3 stories above grade shall be excluded from the requirements of the Model Energy Code.
Appendix Chapter 63 is added:

CHAPTER 63
CONSTRUCTION IN DESIGNATED SPECIAL CONSTRUCTION ZONES

SECTION 6301. SCOPE. All construction, alteration, repairs, demolition or moving in areas designated under Article VII Chapter 10 of the Revised Municipal Code as Special Construction Zones shall conform to the provisions of this Chapter.

SECTION 6302. GENERAL PROVISIONS.
(a) Permits. No permits for construction, alteration, repairs, demolition or moving in a designated Special Construction Zone shall be issued without being in compliance with all recommendations contained in the engineer's report if required by Section 303.

(b) Engineer's Reports. If the applicant is required to prepare an engineer's report pursuant to Section 303, the Department may require such additional information and recommendations as it deems necessary and may require such additional measures as are necessary to minimize potential hazards during construction and control hazards from the completed structure.

(c) Inspections. All construction and excavation sites shall be subject to inspection by the Department, Fire Department and the Department of Health and Hospitals, and results of tests or monitoring required by this Chapter shall be available at the site for inspection.

(d) Work Stoppage. In the event of a material violation with the requirements of this Chapter, the Department may stop all construction activity until it is satisfied that the violation has been corrected.

SECTION 6303. HAZARDOUS GASES GENERATED BY LANDFILLS.
(a) New Construction. Except as provided in Sections 303(f) and 6303(c) of this Building Code, all new buildings, structures and utilities to be constructed in a Special Construction Zone, which is so designated because of the presence of hazardous gases generated by landfills, shall be designed by an engineer registered in the state of Colorado to control and protect against accumulation of over 1.0% by volume of
flammable gas in the building, structure or utility. The following precautions shall be taken during and after construction activity:

1. A flammable gas indicator shall be utilized at all times during trenching, excavating, drilling or when working within 10 feet of an open excavation.

2. When trenching, excavating or drilling deeper than 2 feet into the soil or fill, or in the presence of detectable concentrations of 1.0% by volume of flammable gas, the operating equipment shall be provided with spark proof exhausts.

3. A dry chemical fire extinguisher, approved by the Fire Department, shall be provided on all equipment used in the landfill.

4. Personnel within or near an open trench or drill hole deeper than 2 feet into the soil or fill shall be fully clothed, wear shoes with nonmetallic soles, and wear a hard hat and safety goggles or glasses.

5. Exhaust blowers shall be used in instances where trenches may show a build-up of flammable gas of 1.0% by volume or less than 19.5% by volume of oxygen.

6. Smoking and/or an open flame shall not be permitted in any area within 100 feet of the excavation.

7. Personnel shall be kept upwind of any open trench unless the trench and the downwind atmosphere are continuously monitored.

8. Before personnel are permitted to enter an open trench, the trench shall be monitored for flammable gas and at least an 19.5% by volume oxygen sufficiency. When in the excavation, each work party shall be working no more than 5 feet from a continuously operating flammable gas and oxygen monitor.

9. The applicant shall employ an inspector whose duty it shall be to effect continuous compliance with the foregoing precautions. The inspector shall be a qualified person approved by the Department or shall be an engineer registered with the state of Colorado or a person in the employ of, or subject to, the direct supervision and control of such an engineer. Said inspector shall submit a written report of his inspection to the applicant and to the Department at 10-day intervals during active construction stating that all new construction is in compliance with these regulations, and that all testing
and monitoring has been and is being done as required by the Code.

10. After construction is completed, hazardous gas monitoring devices approved by the Fire Department shall be installed in the completed building or structure in such number and in such places within the building or structure as may be required by the Fire Department.

(b) Alteration or Repair of Existing Building, Structures or Utilities. Except as provided in Sections 303(f) and 6303(c), no alterations or repairs to any existing building, structure or utility shall be made unless the following precautions are taken:

1. Within 5 days prior to applying for a permit under Chapter 3 of the Building Code to alter or repair an existing building, structure or utility, the work site shall be tested for the presence of flammable gas by an engineer registered in the state of Colorado.

2. The applicant shall be exempt from all other requirements of this Section 6303 if:
   a. Test results show that there is less than 2.0% of the Lower Explosive Limit (L.E.L.) of hazardous gas, then the permit for the work shall be issued; and
   b. Upon completion of the work, the applicant shall install hazardous gas monitoring devices approved by the Fire Department in such number and in such places within the building or structure as may be required by the Fire Department.

3. If the test results show that there is 2% or more of the Lower Explosive Limit (L.E.L.) of hazardous gas, then the applicant shall take all of the precautions pursuant to Section 6303(a) as if the construction were new construction.

(c) Exemption. Whether or not he is an applicant for a permit, the owner of real property within a Special Construction Zone may apply to the Building Department for a certificate of exemption from the provisions of Article 647 of the Revised Municipal Code and Section 6303 of the Building Code. To obtain such exemption, said owner shall have his property tested by an engineer registered in the state of Colorado and tests shall meet the following requirements:

1. A test for the presence of flammable gas shall be performed at a time when there is frost on his property to a depth of at least 6 inches in the soil, again at a time
Appendix 6303

when there is no frost in the soil, and again within 5 days of the date when an exemption certificate is applied for.

2. The test holes shall be placed along each major boundary line of the real property for which the exemption is sought in such number and at such locations as the engineer deems proper.

3. If the test results show that there is less than 2.0% of the lower explosive limit (L.E.L.) of flammable gas, and if such test results are satisfactory to the Department, then the Department shall issue a certificate stating that the real property described in the certificate is exempt from the provisions of Article 647 of the Revised Municipal Code and Section 6303 of the Building Code.

4. As a condition of receiving an exemption certificate from the Department, the owner shall acquire and install in all existing and future buildings and structures devices approved by the Fire Department to monitor for the presence of hazardous gas in such number and in such places within the building or structure as may be required by the Fire Department.

5. Upon a finding that flammable gas is present in amounts greater than 2% of the lower explosive limit on any property where an exemption certificate has been issued, the Department shall revoke the exemption certificate. Further, upon a finding that the monitoring devices on any property for which an exemption certificate has been issued are inoperative, the Department may suspend or revoke the exemption certificate.
Appendix 6401

Appendix Chapter 64 is added:

CHAPTER 64

REQUIREMENTS FOR HANDICAPPED PERSONS

SECTION 6401. GENERAL REQUIREMENTS.

(a) Scope. In addition to other requirements of this Building Code, all Occupancies shall be accessible to the handicapped in the manner provided in this Chapter.

EXCEPTION 1: Group R Division 2 Occupancies (attached housing) where all sleeping facilities are on the second floor, Group R Division 3 Occupancies, and M Occupancies accessory to R-3 Occupancies.

EXCEPTION 2: Multi-story buildings not exceeding 3 stories will not require elevators to provide accessibility if the provision of an elevator would represent 2½% or more of the total construction cost without an elevator.

(b) Design, Installation and Materials. Design, installation and materials used in all structures shall comply with this Building Code and the requirements of ANSI A117.1-1980, except when modified by this Chapter. Where a conflict exists between this Chapter and the standards indicated herein, the requirements of this Chapter shall govern. ANSI A117.1-1986 illustrations are acceptable substitutes for the corresponding illustrations herein.

(c) Site Development. For parking, passenger loading zone, curb, ramp and other site development requirements, refer to the Denver Zoning Ordinance and the Planned Unit Development/Planned Building Group Rules and Regulations.

(d) Exceptions. The Building Department may grant exceptions to or modify any particular standard or specification when it is determined that it is impractical and would create an unusual hardship or would unreasonably complicate the construction, alteration or repair in question. Any such exemption or modification of the provisions of this Chapter shall be made in writing as a matter of public record.

(e) Reference and Numbering. The numbering system used in this Chapter references ANSI A117.1-1980. See Section 6404. For purposes of this Building Code, numbers referencing the ANSI standard are preceded by an "A" and enclosed in parentheses. (ex.(A3.1)). All other numbers are consistent with the Building Code. Any Section or portions of a Section deviating from ANSI A117.1-1980 are in italics. Sections or
portions of Sections indicated as "Reserved" are omitted from this Code. Parts 1 and 2 of ANSI A117.1-1980 are not a part of this Code. The following material except otherwise noted in this Chapter is reproduced with permission from American National Standard Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People, ANSI A117.1-1980; copyright 1980 by the American National Standards Institute. Copies of this standard may be purchased from the American National Standards Institute at 1430 Broadway, New York, New York 10018.

SECTION 6402. MISCELLANEOUS INSTRUCTIONS AND DEFINITIONS.

(a) (A3.1) Graphic Conventions. Graphic conventions used in the illustration are shown in Table No. 64-B. Dimensions that are not marked "minimum" or "maximum" are absolute, unless otherwise indicated in the text or captions.

(b) (A3.2) Dimensional Tolerance. All dimensions are subject to conventional building industry tolerances for field conditions.

(c) (A3.3) Notes. The text of this standard does not contain notes or footnotes. Additional information, explanations and advisory materials are located in the Appendix of ANSI A117.1-1980. Paragraphs marked with an asterisk have related, nonmandatory material in the ANSI Appendix. In the Appendix, the corresponding paragraph numbers are preceded by an A. Numbering used in this text conforms to ANSI A117.1-1980.

(d) (A3.4) General Terminology. COMPLY WITH. Meet one or more specifications of this standard.

IF, IF..THEN. Denotes a specification that applies only when the conditions described are present.

MAY. Denotes an option or alternative.

SHALL. Denotes a mandatory specification or requirement.

(e) (A3.5) Definitions. The following terms shall, for the purpose of this Chapter, have the meaning indicated in this Section.

ACCESS AISLE. An accessible pedestrian space between elements such as parking spaces, seating and desks that provides clearances appropriate for use of the elements.

ACCESSIBLE. Describes a site, building, facility or portion thereof that complies with this standard and that can be approached, entered and used by physically disabled people.
ACCESSIBLE ELEMENT. Part of an accessible route or accessible functional space; an item specified by this standard (for example, controls and the like).

ACCESSIBLE ROUTE. A continuous unobstructed path connecting all accessible elements and spaces in a building or facility that can be negotiated by a severely disabled person using a wheelchair and that is also safe for and usable by people with other disabilities. Interior accessible routes may include corridors, floors, ramps, elevators, lifts and clear floor space at fixtures. Exterior accessible routes may include parking access aisles, curb ramps, walks, ramps and lifts.

ADAPTABILITY. The ability of certain building elements, such as kitchen counters, sinks and grab bars, to be added to, raised, lowered or otherwise altered so as to accommodate the needs of either the disabled or nondisabled, or to accommodate the needs of persons with different types or degrees of disability.

ADMINISTRATIVE AUTHORITY. The Department.

ASSEMBLY AREA. A room or space accommodating 50 or more individuals for religious, recreational, educational, political, social or amusement purposes or for the consumption of food and drink, including all connected rooms or spaces with a common means of egress and ingress. Such areas as conference rooms would have to be accessible in accordance with other parts of this standard but would not have to meet all of the criteria associated with assembly areas.

AUTOMATIC DOOR. A door equipped with a power-operated mechanism and controls that open and close the door automatically upon receipt of a momentary actuating signal. The switch that begins the automatic cycle may be a photoelectric device, floor mat or manual switch mounted on or near the door itself. (See power-assisted door.)

CHILDREN. People below the age of 12 years (that is, elementary school age and younger).

CIRCULATION PATH. An exterior or interior way of passage from one place to another for pedestrians, including, but not limited to, walks, hallways, courtyards, stairways and stair landings.

CLEAR. Unobstructed.

COMMON USE. Refers to those interior and exterior rooms, spaces or elements that are made available for the use of a restricted group of people (for example, residents of an apartment building, the occupants of an office building or the guests of such residents or occupants).
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COVERAGE. The extent or range of accessibility that a particular administrative authority adopts and requires.

CROSS SLOPE. The slope of a pedestrian way that is perpendicular to the direction of travel. (See running slope.)

CURB RAMP. A short ramp cutting through a curb or built up to it.

DETECTABLE. Perceptible by one or more of the senses.

DISABILITY. A limitation or loss of use of a physical, mental or sensory body part or function.

DWELLING UNIT. A single unit of residence which provides a kitchen or food preparation area, in addition to rooms or spaces for living, bathing, sleeping and the like. A single family home is a dwelling unit and dwelling units are to be found in such housing types as townhouses and apartment buildings.

EGRESS, MEANS OF. A path of exit that meets all applicable code specifications of the regulatory building agency having jurisdiction over the building or facility.

EMERGENCY. Facilities resulting from or anticipating unforeseen combinations of circumstances. (Ex., storm shelters, bomb shelters and comparable refuges.)

FUNCTIONAL SPACES. The rooms and spaces in a building or facility that house the major activities for which the building or facility is intended.

HANDICAPPED. Those with significant limitations in using specific parts of the environment.

HOUSING. A building, facility or portion thereof, excluding inpatient health care facilities, that contains one or more dwelling units or sleeping accommodations. Housing may include, but is not limited to, one- and two-family dwellings, apartments, group homes, hotels, motels, dormitories and mobile homes.

MARKED CROSSING. A crosswalk or other identified path intended for pedestrian use in crossing a vehicular way.

MULTIFAMILY DWELLING. Any building containing more than 2 dwellings units.

OPERABLE PART. A part of a piece of equipment or appliance used to insert or withdraw objects, or to activate, deactivate or adjust the equipment or appliance. (Ex., coin slot, pushbutton, handle).

POWER-ASSISTED DOOR. A door with a mechanism that helps to open the door, or relieve the opening resistance of a door, upon the activation of a switch or a continuous force.
applied to the door itself. If the switch or door is released, such doors immediately begin to close or close completely within 3 to 30 seconds. (See automatic doors.)
PRINCIPAL ENTRANCE. An entrance intended to be used by the residents or users to enter or leave a building or facility. This may include, but is not limited to, the main entrance.
PUBLIC USE. Describes interior and exterior rooms or spaces that are made available to the general public. Public use may be provided at a building or facility that is privately or publicly owned.
RAMP. A walking surface in an accessible space that has a running slope greater than 1:20.
REASONABLE NUMBER. Reasonable number shall mean 10% of the number provided.
RUNNING SLOPE. The slope of a pedestrian way that is parallel to the direction of travel. (See cross slope.)
SERVICE ENTRANCE. An entrance intended primarily for delivery or service.
SIGNAGE. Verbal, symbolic and pictorial information.
SITE. A parcel of land bounded by a property line or a designated portion of a public right-of-way.
SITE IMPROVEMENTS. Landscaping, paving for pedestrian and vehicular ways, outdoor lighting, recreational facilities and the like, added to a site.
SLEEPING ACCOMMODATIONS. Rooms in which people sleep, for example, dormitory and hotel or motel guest rooms.
TACTILE. Describes an object that can be perceived using the sense of touch.
TACTILE WARNING. A standardized surface texture applied to or built into walking surface or other elements to warn visually impaired people of hazards in the path of travel.
TEMPORARY. Applies to facilities that are not of permanent construction but are extensively used or essential for public use for a given (short) period of time, for example, temporary classrooms or classroom buildings at schools and colleges, or facilities around a major construction site to make passage accessible, usable and safe for everybody. Structures directly associated with the actual processes of major construction, such as porta-potties, scaffolding, bridging, trailers and the like, are not included.
VEHICULAR WAY. A route intended for vehicular traffic, such as a street, driveway or parking lot.
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WALK. An exterior pathway with a prepared surface intended for pedestrian use, including general pedestrian areas such as plazas and courts.

WALKING AID. A device used by a person who has difficulty walking. (Ex., a cane, crutch, walker or brace.)

SECTION 6403. ACCESSIBLE ELEMENTS AND SPACES.

(a) (A4.1) Minimum Requirements.

1. (A4.1.1) Accessible Sites and Exterior Facilities. An accessible site shall meet the following minimum requirements.

a. Reserved.

b. Reserved.

c. Reserved.

d. Reserved.

e. Reserved.

f. Stairs connecting levels that are not connected by an elevator shall comply with subsection (j) below.

g. All passenger elevators shall comply with subsection (j) below.

h. All doors or gates to accessible spaces and elements and along accessible routes shall comply with subsection (m) below.

i. If drinking fountains are provided, they shall comply with subsection (o) below.

j. If toilet rooms are provided, they shall comply with subsection (v) below. If bathing facilities are provided, a reasonable number, but always at least one, of the bathrooms shall comply with subsection (w) below. If toilet and bathing facilities are provided for both sexes, a reasonable number, but always at least one, of toilet rooms and bathrooms, bathing facilities, or shower rooms complying with subsections (v) and (w) shall be provided for each sex.

k. Tactile warnings shall be provided at hazardous conditions as specified in subsection (cc) below.

l. All signs shall comply with subsection (dd) below.

m. Reserved.

n. Reserved.

o. If places of assembly are provided, they shall comply with subsection (gg) below.

p. Ramped access shall be provided to temporary buildings that are used for public related activities.
2. **(A4.1.2) Accessible Buildings.** Accessible buildings and facilities shall meet the following minimum requirements:

a. At least one accessible route complying with subsection (c) below shall connect accessible building or facility entrances with all accessible spaces and elements within the building or facility.

b. All objects that overhang circulation paths shall comply with subsection (d) below.

c. Ground and floor surfaces along accessible route and in accessible rooms and spaces shall comply with subsection (e) below.

d. Stairs connecting levels that are not connected by an elevator shall comply with subsection (i) below. This requirement is not mandatory within dwelling units.

e. All passenger elevators shall comply with subsection (j) below.

f. Reserved.

g. All doors to accessible spaces along accessible routes shall comply with subsection (m) below.

h. An accessible building or facility shall have at least one accessible principal entrance that complies with subsection (n) below.

i. If drinking fountains are provided, they shall comply with subsection (o) below.

j. If toilet rooms are provided, they shall comply with subsection (v) below. If bathing facilities are provided, a reasonable number, but always at least one, of the bathrooms shall comply with subsection (w) below. If toilet and bathing facilities are provided for both sexes, a reasonable number, but always at least one, of toilet rooms and bathrooms, bathing facilities or shower rooms complying with subsections (v) and (w) shall be provided for each sex.

k. If storage facilities such as cabinets, shelves, closets and drawers are provided in accessible spaces, a reasonable number, but at least one, shall comply with subsection (y) below.

l. Controls and operating mechanisms in accessible spaces, along accessible routes, or as parts of accessible elements (for example, light switches and dispenser controls) shall comply with subsection (aa) below.
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m. If emergency warning systems are provided, they shall comply with subsection (bb) below.

n. Tactile warnings shall be provided at hazardous conditions as specified in subsection (cc) below.

o. If signs are provided, they shall comply with subsection (dd) below.

p. Reserved.

q. If seating, tables or work surfaces are provided in accessible spaces, a reasonable number, but always at least one, of seating spaces, tables or work surfaces shall comply with subsection (ff) below.

r. If places of assembly are provided, they shall comply with subsection (gg) below.

3. (A4.1.3) Accessible Housing. Accessible housing shall comply with the minimum requirements in subsection (a)1 and subsection (a)2. It shall also meet the requirements of subsection (hh) below.

(b) (A4.2) Space Allowances and Reach Ranges.

1. (A4.2.1*) Wheelchair Passage Width. The minimum clear width for single wheelchair passage shall be 32 inches (815mm) at a point and 36 inches (915mm) continuously (see Fig. 1).

2. (A4.2.2) Width for Wheelchair Passing. The minimum width for two wheelchairs to pass is 60 inches (1525mm) (see Fig. 2).

3. (A4.2.3*) Wheelchair Turning Space. The space required for a wheelchair to make a 180° turn is a clear space of 60 inches (1525mm) diameter (see Fig. 3(a)) or a T-space (see Fig. 3(b)).

4. (A4.2.4*) Clear Floor or Ground Space for Wheelchairs.

5. (A4.2.4.1) Size and Approach. The minimum clear floor or ground space required to accommodate a single stationary wheelchair and occupant is 30 inches by 48 inches (760mm by 1220mm) (see Fig. 4(a)). The minimum clear floor or ground space for wheelchairs may be positioned for forward or parallel approach to an object (see Fig. 4(b) and (c)). Clear floor or ground space for wheelchairs may be part of the knee space required under some objects.

6. (A4.2.4.2) Relationship of Maneuvering Clearances to Wheelchair Spaces. One full unobstructed side of the clear floor or ground space for a wheelchair shall adjoin or overlap an accessible route or adjoin another wheelchair clear floor space. If a clear floor space is
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located in an alcove or otherwise confined on all or part of 3 sides, additional maneuvering clearances shall be provided as shown in Fig. 4(d) and (e).

7. **(A4.2.4.3) Surfaces of Wheelchair Spaces.** Clear floor or ground spaces for wheelchairs shall comply with subsection (e) below.

8. **(A4.2.5) High Forward Reach.** If the clear floor space only allows forward approach to an object, the maximum high forward reach allowed shall be 48 inches (1220mm) (see Fig. 5(a)). If the high forward reach is over an obstruction, reach and clearances shall be as shown in Fig. 5(b).

9. **(A4.2.6) Side Reach.** If the clear floor space allows parallel approach by a person in a wheelchair, the maximum high side reach allowed shall be 54 inches (1370mm) and the low side reach shall be no less than 9 inches (230mm) above the floor (Fig. 6(a) and (b)). If the side reach is over an obstruction, the reach and clearances shall be as shown in Fig. 6(c).

(c) **(A4.3) Accessible Route.**

1. **(A4.3.1*) General.** All walks, halls, corridors, aisles and other spaces that are part of an accessible route shall comply with this subsection (c).

2. **(A4.3.2) Location.**
   a. Reserved.
   b. Reserved.
   c. Accessible routes shall connect accessible building or facility entrances with all accessible spaces and elements and with all accessible dwelling units within the building or facility.
   d. An accessible route shall connect at least one accessible entrance of each accessible dwelling unit with those exterior and interior spaces and facilities that serve the accessible dwelling unit.

3. **(A4.3.3) Width.** The minimum clear width of an accessible route shall be 36 inches (915mm) except at doors (see subsection (m)5 and 6). If a person in a wheelchair must make a turn around an obstruction, the minimum clear width of the accessible route shall be as shown in Fig. 7.

4. **(A4.3.4) Passing Space.** If an accessible route has less than 60 inches (1525mm) clear width, then passing spaces at least 60 inches by 60 inches (1525mm by 1525mm) shall be located at reasonable intervals not to
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exceed 200 feet (61m). A T-intersection of 2 corridors or walks is an acceptable passing place.

5. (A4.3.5) Head Room. Accessible routes shall comply with subsection (d)2 below.

6. (A4.3.6) Surface Texture. The surface of an accessible route shall comply with subsection (e) below.

7. (A4.3.7) Slope. An accessible route with a running slope greater than 1:20 is a ramp and shall comply with subsection (h) below. Nowhere shall the cross slope of an accessible route exceed 1:50.

8. (A4.3.8) Changes in Level. Changes in level along an accessible route shall comply with subsection (e)2 below. If an accessible route has changes in level greater than 1/2 inch (13mm), then a curb ramp, ramp elevator or elevator or platform lift approved by the Department shall be provided that complies with subsections (g), (h), (j) or (k), respectively. Stairs shall not be part of an accessible route.

9. (A4.3.9) Doors. Doors along an accessible route shall comply with subsection (m) below.

10. (A4.3.10) Egress. Where more than one exit is required by Section 3302, at least 2 accessible routes shall serve as a means of egress for emergencies or connect to an accessible place of refuge, with the exception of Group R-2 Occupancies. Such accessible routes and places of refuge shall comply with the requirements of this code. In buildings providing refuge areas in elevator lobbies or stairwells in compliance with Chapters 18 and 33, those areas may be considered as the means of egress for handicapped persons.

11. Refuge Areas.
   a. Shall be on accessible routes.
   b. All doors used in refuge areas shall have panic hardware or will comply with Section 6403(m)9.
   c. Dimensions of wheelchair refuge areas in stairwells shall comply with Fig. 4.
   d. Enclosed stairwells within parking garages shall have wheelchair refuge areas above and below grade.

(d) (A4.4) Protruding Objects.

1. (A4.4.1*) General. Objects projecting from walls with their leading edges between 27 inches and 80 inches (685mm and 2030mm) above the finished floor shall protrude no more than 4 inches (100mm) into walks, halls, corridors, passageways or aisles (see Fig. 8(a)).
Objects mounted with their leading edges at or below 27 inches (685mm) above the finished floor may protrude any amount (see Fig. 8(a) and (b)). Free-standing objects mounted on posts or pylons may overhang 12 inches (305mm) maximum from 27 inches to 80 inches (685mm to 2030mm) above the ground or finished floor (see Fig. 8(c) and (d)). Protruding objects shall not reduce the clear width of an accessible route or maneuvering space (see Fig. 8(e)).

2. (A4.4.2) Head Room. Walks, halls, corridors, passageways, aisles or other circulation spaces shall have 80 inches (2030mm) minimum clear head room (see Fig. 8(a)).

(e) (A4.5) Ground and Floor Surfaces.

1. (A4.5.1*) General. Ground and floor surfaces along accessible routes and in accessible rooms and spaces, including floors, walks, ramps, stairs and curb ramps, shall be stable, firm and relatively nonslip under all weather conditions and shall comply with this subsection (e).

2. (A4.5.2) Changes in Level. Changes in level up to ¼ inch (6mm) may be vertical and without edge treatment. Changes in level between ¼ and ½ inches (6mm and 13mm) shall be leveled with a slope no greater than 1:2. Changes in level greater than ½ inch (13mm) shall be accomplished by means of a ramp that complies with (h).

3. (A4.5.3*) Carpet. If carpet or carpet tile is used on a ground or floor surface, it shall be securely attached, have a firm cushion, pad or backing or no cushion or pad, and have a level loop, textured loop, level cut pile or level cut/uncut pile texture. The maximum pile height shall be ½ inch (13mm). Exposed edges of carpet should be fastened to floor surfaces and have trim along the entire length of the exposed edge. Carpet edge trim shall comply with subsection (e)2.

4. (A4.5.4) Gratings. If gratings are located in walking surfaces, they shall have spaces no greater than ½ inch (13mm) wide in one direction. If gratings have elongated openings, they shall be placed so that the long dimension is perpendicular to the dominant direction of travel.

(f) (A4.6) Reserved.

(g) (A4.7) Reserved.

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(h) (A4.8) Ramps.

1. (A4.8.1*) General. Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp and shall comply with this subsection (h).

2. (A4.8.2*) Slope and Rise. The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any ramp run shall be 30 inches (760mm). Curb ramps and ramps to be constructed on existing sites or in existing buildings or facilities may have slopes and rises as shown in Table No. 64-C(2) if space limitations prohibit the use of a 1:12 slope or less.

3. (A4.8.3) Clear Width. The minimum clear width of a ramp shall be 36 inches (915mm).

4. (A4.8.4) Landings. Ramps shall have level landings at the bottom and top of each run. Landings shall have the following features:
   a. The landing shall be at least as wide as the widest ramp run leading to it.
   b. The landing shall be a minimum of 60 inches (1525mm) clear.
   c. If ramps change in direction at landing, a minimum level run from each ramp of 60 inches (1525mm) shall be provided not less than the width of the ramp.
   d. If a doorway is located at a landing, then the area in front of the doorway shall comply with subsection (m)6 below.

5. (A4.8.5*) Handrails. If a ramp has a rise greater than 6 inches (250mm) or a horizontal projection greater than 72 inches (1830mm), it shall have handrails on both sides; if less than a 6-inch rise, one handrail is required per Section 3306(e). Handrails are not required on curb ramps. Handrails shall comply with subsection (2)2 below and shall have the following features:
   a. Handrails shall be provided along both sides of ramp segments. The inside handrail on switchback or dogleg ramps shall always be continuous.
   b. If handrails are not continuous, they shall extend at least 12 inches (305mm) beyond the top and bottom of the ramp segment and shall be parallel with the floor or ground surface.
   c. The clear space between the handrail and the wall shall be 1½ inches (38mm).
d. Gripping surfaces shall be uninterrupted by other construction elements or obstructions.

e. Handrail heights shall comply with Chapter 33.

6. **(A4.8.6) Cross Slope and Surfaces.** The cross slope of ramp surfaces shall be no greater than 1:50. Ramp surfaces shall comply with subsection (e) above.

7. **(A4.8.7) Edge Protection.** Ramps and landings with drop-offs shall have curbs, walls, railings or projecting surfaces that prevent people from slipping off the ramp. Curbs shall be a minimum of 2 inches (50mm) high (see Fig. 9).

8. **(A4.8.8) Outdoor Conditions.** Outdoor ramps and their approaches shall be designed so that water will not accumulate on walking surfaces.

(i) **(A4.9) Stairs.**

1. **(A4.9.1) Minimum Number.** Stairs connecting levels not connected by an elevator shall comply with this subsection (i). These specifications are not mandatory for stairs within dwelling units.

2. **(A4.9.2) Reserved.**

3. **(A4.9.3) Nosings.** The undersides of nosings shall not be abrupt. The radius of curvature at the leading edge of the tread shall be no greater than 1/2 inch (13mm). The riser shall be sloped or the underside of the nosing shall have an angle not less than 60° from the horizontal. Nosings shall project no more than 1½ inches (38mm) (see Fig. 10). Open risers shall not be used on stairs which are the only means of access to any level.

4. **(A4.9.4) Handrails.** Stairways shall have handrails at both sides of all stairs. Handrails shall comply with subsection (z) below and shall have the following features:

a. Handrails shall be continuous along both sides of stairs. The inside handrail on switchback of dogleg stairs shall always be continuous (see Fig. 11(a) and (b)).

b. If handrails are not continuous, they shall extend at least 12 inches (305mm) beyond the top riser and at least 12 inches (305mm) plus the width of one tread beyond the bottom riser. At the top, the extension shall be parallel with the floor or ground surface. At the bottom, the handrail shall continue to slope for a distance of the width of one tread from the bottom riser; the remainder of the extension shall be
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horizontal (see Fig 11(c) and (d). Handrail extensions shall comply with subsection (d) above.

c. The clear space between the handrail and the wall shall be 1½ inches (38mm).

d. Gripping surfaces shall be uninterrupted by other construction elements or obstructions.

5. (A4.9.5) Reserved.

6. (A4.9.6) Outdoor Conditions. Outdoor stairs and their approaches shall be designed so that water will not accumulate on walking surfaces.

(j) (A4.10) Elevators.

1. (A4.10.1) General. If elevators are provided, all passenger elevators on an accessible route and/or those used for evacuation purpose shall comply with this subsection (j) and with the American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks, ANSI A17.1. See Chapter 51.

2. (A4.10.2) Automatic Operations. Elevator operation shall be automatic. Each car shall be equipped with a self-leveling feature that will automatically bring the car to floor landings within a tolerance of ⅛ inch (13mm) under rated loading to zero loading conditions. This self-leveling feature shall be automatic and independent of the operating device and shall correct for overtravel and undertravel.

3. (A4.10.3) Hall Call Buttons. Call buttons in elevator lobbies and halls shall be centered at 42 inches (1065mm) above the floor. Such call buttons shall have visual signals to indicate when each call is registered and when each call is answered. Call buttons shall be a minimum of ¾ inches (19mm) in the smallest dimensions. The button designating the up direction shall be on top (see Fig. 12).

4. (A4.10.4) Hall Lanterns. A visible and audible signal shall be provided at each hoistway entrance to indicate which car is answering a call. Audible signals shall sound once for the up direction and twice for the down direction, or shall have verbal annunciators that say "up" or "down". Visible signals shall have the following features:

a. Hall lantern fixtures shall be mounted so that their centerline is at least 72 inches (1830mm) above the lobby floor.

b. Visual elements shall be at least 2½ inches (64mm) in the smallest dimension.
c. Signals shall be visible from the vicinity of the hall call button.
In-car lanterns located in cars, visible from the vicinity of hall call buttons and conforming to the above requirements, shall be acceptable. (see Fig. 12).

5. (A4.10.5) Raised or Indented Characters on Hoistway Entrances. All elevator hoistway entrances shall have raised or indented floor designations provided on both jambs. The centerline of the characters shall be 60 inches (1525mm) from the floor. Such characters shall be 2 inches (50mm) high and shall comply with subsection (dd) below. Permanently applied plates are acceptable if they are permanently fixed to the jambs. (see Fig. 12).

6. (A4.10.6) Door Protective and Reopening Device. Elevator doors shall open and close automatically. They shall be provided with a reopening device that will stop and reopen a car door and hoistway door automatically if the door becomes obstructed by an object or person. The device shall be capable of completing these operations without requiring contact for an obstruction passing through the opening at heights of 5 inches and 29 inches (125mm and 735mm) from the floor (see Fig. 12). Door reopening devices shall remain effective for at least 20 seconds. After such an interval, doors may close in accordance with the requirements of ANSI A17.1. See Chapter 51.

7. (A4.10.7*) Door and Signal Timing for Hall Calls. The minimum acceptable time from notifications that a car is answering a call until the doors of that car start to close shall be calculated from the following equation: where \[ T = \text{total time in seconds and } D = \text{distance (in feet or millimeters) from a point in the lobby or corridor 60 inches (1525mm) directly in front of the farthest call button controlling that car to the centerline of its hoistway door} \] (see Fig. 13). For cars with in-car lanterns, \( T \) begins when the lantern is visible from the vicinity of hall call buttons and an audible signal is sounded.

8. (A4.10.8) Door Delay for Car Calls. The minimum time for elevator doors to remain fully open in response to a car call shall be 3 seconds.

9. (A4.10.9) Floor Plan of Elevator Cars. The floor area of elevator cars shall provide space for wheelchair users to enter the car, maneuver within reach of controls, and exit from the car. Acceptable door opening and inside
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dimensions shall be as shown in Fig. 14. The clearance between the car platform sill and the edge of any hoistway landing shall be no greater than 1¼ inches (32mm).

10. (A4.10.10) Floor Surfaces. Floor coverings shall comply with subsection (e) above.

11. (A4.10.11) Illumination Levels. The level of illumination at the car controls, platform and car threshold and landing sill shall be at least 5 footcandles (53.8 lux).

12. (A4.10.12*) Car Controls. Elevator control panels shall have the following features:

a. Buttons. All control buttons shall be at least ¾ inch (19mm) in their smallest dimension. They may be raised, flush or receded.

b. Tactile and Visual Control Indicators. All control buttons shall be designated by raised or indented standard alphabet characters for letters, Arabic characters for numerals or standard symbols as shown in Fig. 15(a) and as required in ANSI A17.1. See Chapter 55. Raised and indented characters and symbols shall comply with subsection (dd) below. The call button for the main entry floor shall be designated by a raised or indented star at the left of the floor designation (see Fig. 15(a)). All raised or indented designations for control buttons shall be placed immediately to the left of the button to which they apply. Applied plates, permanently attached, are an acceptable means to provide raised or indented control designations. Floor buttons shall be provided with visual indicators to show when each call is registered. The visual indicators shall be extinguished when each call is answered.

c. Height. All floor buttons shall be no higher than 54 inches (1370mm) above the floor. Emergency controls, including the emergency alarm and emergency stop, shall be grouped at the bottom of the panel and shall have their centerlines no less than 35 inches (890mm) above the floor (see Fig. 15(a) and (b)).

d. Location. Controls shall be located on a front wall if cars have center opening doors, and at the side wall or at the front wall next to the door if cars have side opening doors (see Fig. 15(c) and (d)).
13. **(A4.10.13*) Car Position Indicators.** In elevator cars, a visual car position indicator shall be provided above the car control panel or over the door to show the position of the elevator in the hoistway. As the car passes or stops at a floor served by the elevators, the corresponding numeral shall illuminate and an audible signal shall sound. Numerals shall be a minimum of ½ inch (13mm) high. The audible signal shall be no less than 20 decibels with a frequency no higher than 1500 Hz. An automatic verbal announcement of the floor number at which a car stops or which a car passes may be substituted for an audible signal.

14. **(A4.10.14*) Emergency Communications.** If provided, emergency 2-way communication systems between the elevator and a point outside the hoistway shall comply with ANSI A17.1. See Chapter 55. The highest operable part of a 2-way communication system shall be a maximum of 54 inches (1370mm) from the floor of the car. It shall be identified by raised or recessed symbol and lettering complying with subsection (dd) below and located adjacent to the device. If the system uses a handset, then the length of the cord from the panel to the handset shall be at least 20 inches (735mm).

15. **Evacuation Plans.** All elevators will have an emergency evacuation plan posted at the elevator call buttons indicating the location of handicapped refuge areas. Stairwells which have wheelchair refuge areas shall have signage to indicate the refuge area.

(k) **(A4.11) Reserved.**

(l) **(A4.12) Reserved.**

(m) **(A4.13) Doors.**

1. **(A4.13.1) General.** All doors to accessible spaces and elements and along accessible routes shall comply with the requirements of this subsection (m).

2. **(A4.13.2) Revolving Doors and Turnstiles.** Revolving doors or turnstiles shall not be the only means of passage at an accessible entrance or along an accessible route.

3. **(A4.13.3) Gates.** Gates, including ticket gates, shall meet all applicable specifications of this subsection (m).

4. **(A4.13.4) Double-Leaf Doorways.** If doorways have two door leaves, then at least one leaf shall meet the specifications in subsections (m)5 and (m)6. That leaf shall be an active leaf.
5. (A4.13.5) **Clear Width.** Doorways shall have a minimum clear opening of 32 inches (315mm) with the door open 90° measured between the face of the door and the stop (see Fig. 16(a), (b), (c) and (d)), except that 32 inches (815mm) nominal doors with offset hinges may be installed in dwelling units. Openings more than 24 inches (610mm) in depth shall comply with subsections (b)1 and (c)3 above (see Fig. 16(e)).

6. (A4.13.6) **Maneuvering Clearances at Doors.** Except in dwelling units, minimum maneuvering clearances for doors that are not automatic shall be as shown in Fig. 17. The floor or ground area within the required clearances shall be level and clear. Entry doors to acute care hospital bedrooms for inpatients shall be exempt from the requirement for space at the latch side of the door (see dimension "x" in Fig. 17) if the door is at least 44 inches (1120mm) wide.

7. (A4.13.7) **Two Doors in Series.** The minimum space between two hinged or pivot doors in series shall be 48 inches (1220mm) plus the width of any door swinging into the space. Doors in series shall swing either in the same direction or away from the space between the doors (see Fig. 18). This requirement may be reduced to 60 inches (1525mm) between the doors when there is a 24-inch (610mm) offset on the latch side of the door.

8. (A4.13.8*) **Thresholds at Doorways.** Thresholds at doorways shall not exceed ¾ inch (19mm) in height for exterior sliding doors or ½ inch (13mm) for other types of doors. Raised thresholds and floor level changes at accessible doorways shall be leveled with a slope no greater than 1:2 (see subsection (e)2).

9. (A4.13.9*) **Door Hardware.** Handles, pulls, latches, locks and other operating devices on accessible doors in corridors and public areas shall have a shape that is easy to grasp with one hand and does not require tight grasping, tight pinching or twisting of the wrist to operate. Lever-type mechanisms, push-type mechanisms and U-shaped handles are acceptable designs. When sliding doors are fully open, operating hardware shall be exposed and usable from both sides. In dwelling units, only doors at accessible entrances to the unit itself will be made adaptable for the handicapped. Doors to hazardous areas shall have hardware complying with subsection (cc)3 below.
10. (A4.13.10*) Door Closers. If a door has a closer, then the sweep period of the closer shall be adjusted so that from an open position of 70° the door will take at least 3 seconds to move to a point 3 inches (75mm) from the latch, measured to the leading edge of the door.

11. (A4.13.11*) Door Opening Force. The maximum force for pushing or pulling open a door shall be as follows:
   a. Fire doors shall not exceed the maximum opening force allowable by Chapter 18 of this Code.
   b. Other doors:
      (1) exterior hinged doors: 8.5 lbf (37.8N)
      (2) interior hinged doors: 5 lbf (22.2N)
      (3) sliding or folding doors: 5 lbf (22.2N)
   These forces do not apply to the force required to retract latch bolts or disengage other devices that may hold the door in a closed position or to doors leading to pressurized stair enclosures and/or refuge areas.

12. (A4.13.12*) Automatic Doors and Power-Assisted Doors. If an automatic door is used, then it shall comply with American National Standard for Power Operated Doors, ANSI A156.10-1979. Slowly opening, low-powered, automatic doors shall be considered a type of custom design installation as described in paragraph 1.1.1 of ANSI A156.10-1979. Such doors shall not open to back check faster than 3 seconds and shall require no more than 15 lbf (66.6N) to stop door movement. If a power-assisted door is used, its door-opening force shall comply with subsection (m)11 above and its closing shall conform to the requirements in Section 10 of ANSI A156.10-1979.

(n) (A4.14) Entrances.
1. (A4.14.1) Minimum Number. The principal entrance to a building or facility shall be part of an accessible route and shall comply with subsection (c) above. Such entrances shall be connected by an accessible route to public transportation stops, to accessible parking and passenger loading zones, and to public streets or sidewalks if available (see ANSI A117.1-1980 and Denver Zoning Ordinance). They shall also be connected by an accessible route to all accessible spaces or elements within the building or facility.

2. (A4.14.2) Service Entrances. A service entrance shall not be the sole accessible entrance unless it is the only
entrance to a building or facility (for example, in a factory or garage).

(o) (A4.15) Drinking Fountains and Water Coolers.
   1. (A4.15.1) Minimum Number. Minimum accessible plumbing facilities to be provided may vary with occupant load and use, but in no case shall be less than the number specified in Table No. 64-A.
   2. (A4.15.2) Spout Height. In new construction spouts shall be no higher than 36 inches (915mm), measured from the floor or ground surfaces to the spout outlet (see Fig. 19(a)). In renovation construction, drinking cups may be provided when spout height adjustment is not practicable.
   3. (A4.15.3) Spout Location. The spouts of drinking fountains and water coolers shall direct the water flow in a trajectory that is parallel or nearly parallel to the front of the unit. The spout shall provide a flow of water at least 4 inches (100mm) high so as to allow the insertion of a cup or glass under the flow of water.
   4. (A4.15.4) Controls. Controls shall comply with subsection (aa)4 below.
   5. (A4.15.5) Clearances.
      a. Wall and post mounted cantilevered units shall have a clear knee space between the bottom of the apron and the floor ground at least 27 inches (685mm) high, 30 inches (760mm) wide and 17 inches to 19 inches (430mm to 485mm) deep (see Fig. 19(a) and (b)). Such units shall also have a minimum clear floor space 30 inches by 48 inches (760mm by 1220mm) to allow a person in a wheelchair to approach the unit facing forward.
      b. Free-standing or built-in units not having a clear space under them shall have a clear floor space at least 30 inches by 48 inches (760mm by 1220mm) that allows a person in a wheelchair to make a parallel approach to the unit (see Fig 19(c) and (d)). This clear floor space shall comply with subsection (b)4 above.

(p) (A4.16) Water Closets.
   1. (A4.16.1) General. Accessible water closets shall comply with (p). For water closets in adaptable dwelling units, see subsection (hh)7 below.
2. **(A4.16.2) Clear Floor Space.** Clear floor space for water closets not in stalls shall comply with Fig. 20. Clear floor space may be arranged to allow either a left-handed or right-handed approach.

3. **(A4.16.3*) Height.** The height of water closets shall be 17 inches to 19 inches (430mm to 485mm) measured to the top of the toilet seat (see Fig. 21).

4. **(A4.16.4*) Grab Bars.** Grab bars for water closets not located in stalls shall comply with Fig. 21 and with subsection (z) below.

5. **(A4.16.5*) Flush Controls.** Flush controls shall be hand operated and shall comply with subsection (aa)4 below. Controls for flush valves shall be mounted on the wide side of toilet areas no more than 44 inches (1120mm) above the floor.

6. **(A4.16.6) Dispensers.** Toilet paper dispensers shall be installed within reach, as shown in Fig. 21(b).

(q) **(A4.17) Toilet Stalls.**

1. **(A4.17.1) Location.** Accessible toilet stalls shall be on an accessible route and shall meet the requirements of this subsection (q). Clearance for entry into the stall shall conform to Fig. 17.

2. **(A4.17.2) Water Closets.** Water closets in stalls shall comply with subsection (p) above.

3. **(A4.17.3) Size and Arrangement.** The size and arrangement of toilet stalls shall comply with Fig. 22(a) in new construction. The size and arrangement of toilet stalls shall comply with either Fig. 22(a) or (b) in renovation or remodel construction. The width dimension of the toilet stall shown in Fig 22(b) shall be the absolute dimension of 36 inches (915mm). Toilet stalls with a minimum depth of 56 inches (1420mm) (See Fig. 22(a)) or 66 inches (1675mm) (see Fig. 22(b)) shall have wall-mounted water closets. If the depth of toilet stalls is increased at least 3 inches (75mm), a floor-mounted water closet may be used. Arrangements shown for stalls may be reversed to allow either a left- or right-hand approach.

4. **(A4.17.4) Toe Clearances.** In standard stalls, the front partition and at least one side partition shall provide a toe clearance of at least 9 inches (230mm) above the floor. If the depth of the stall is greater than 60 inches (1525mm), then the toe clearance is not required.
5. (A4.17.5*) Doors. Toilet stall doors shall comply with subsection (m) above.

6. (A4.17.6) Grab Bars. Grab bars complying with the length and positioning shown in Fig 22(a), (b), (c) and (d) shall be provided. Grab bars may be mounted by any desired method as long as they have a gripping surface at the locations shown and do not obstruct the required floor area. Grab bars shall comply with subsection (z) below.

(i) (A4.18) Urinals.

1. (A4.18.1) General. Accessible urinals shall comply with this subsection (i). When only one urinal is provided, the urinal does not have to meet the provisions of subsection (i) when an accessible water closet is located in the same room.

2. (A4.18.2) Height. Urinals shall have an elongated rim of at least 14 inches and mounted at a maximum of 17 inches (430mm) above the floor.

3. (A4.18.3) Clear Floor Space. A clear floor space 30 inches by 48 inches (760mm by 1220mm) shall be provided in front of urinals to allow forward approach. This clear space shall adjoin or overlap an accessible route and shall comply with subsection (b)4 above.

4. (A4.18.4) Flush Controls. Flush controls shall be hand-operated, shall comply with subsection (aa)4 below and shall be mounted no more than 44 inches (1120mm) above the floor.

(s) (A4.19) Lavatories and Mirrors.

1. (A4.19.1) General. The requirements of this subsection (s) shall apply to lavatory fixtures, vanities and built-in lavatories.

2. (A4.19.2) Height and Clearances. Lavatories shall be mounted with a clearance of at least 29 inches (735mm) from the floor to the bottom of the apron. Knee and toe clearance shall comply with Fig. 23.

3. (A4.19.3) Clear Floor Space. A clear floor space 30 inches by 48 inches (760mm by 1220mm) complying with subsection (b)4 above shall be provided in front of a lavatory to allow a forward approach. Such clear floor space shall adjoin or overlap an accessible route and shall extend a maximum of 19 inches (485mm) underneath the lavatory (see Fig. 24).
4. **(A4.19.4) Exposed Pipes and Surfaces.** Hot water and drain pipes under lavatories shall be insulated or otherwise covered. There shall be no sharp or abrasive surfaces under lavatories.

5. **(A4.19.5) Faucets.** Faucets shall comply with subsection (aa)4 below. Lever-operated, push-type and electronically controlled mechanisms are examples of acceptable designs. Self-closing valves are allowed if the faucet remains open for at least 10 seconds.

6. **(A4.19.6*) Mirrors.** Mirrors shall be mounted with the bottom edge no higher than 40 inches (1015mm) from the floor (see Fig. 23).

(t) **(A4.20) Bathtubs.**

1. **(A4.20.1) General.** Accessible bathtubs shall comply with this subsection (t). For bathtubs in adaptable dwelling units, see subsection (hh)9 below.

2. **(A4.20.2) Floor Space.** Clear floor space in front of bathtubs shall be as shown in Fig. 25.

3. **(A4.20.3) Seat.** An in-tub seat or a seat at the head end of the tub shall be provided as shown in Fig. 25 and 26. The structural strength of seats and their attachments shall comply with subsection (z)3 below. Seats shall be mounted securely and shall not slip during use.

4. **(A4.20.4) Grab Bars.** Grab bars complying with subsection (z) below shall be provided as shown in Fig. 25 and 26.

5. **(A4.20.5) Controls.** Faucets and other controls complying with (aa)4 shall be located as shown in Fig. 26.

6. **(A4.20.6) Shower Unit.** A shower spray unit with a hose at least 60 inches (1525mm) long that can be used as a fixed shower head or as a hand-held shower shall be provided.

7. **(A4.20.7) Bathtub Enclosures.** If provided, enclosures for bathtubs shall not obstruct controls or transfer from wheelchairs onto bathtub seats or into tubs. Enclosures on bathtubs shall not have tracks mounted on their runs.

(u) **(A4.21) Shower Stalls.**

1. **(A4.21.1*) General.** Accessible shower stalls shall comply with (u). For shower stalls in adaptable dwelling units, see subsection (hh)10 below.

2. **(A4.21.2) Size and Clearances.** Shower stall size and clear floor space shall comply with Fig. 27(a) or (b). The shower stall in Fig. 27(a) shall be 36 inches by 36 inches.
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(915mm). The shower stall in Fig 27(b) shall fit into the space required for a bathtub.

3. (A4.21.3) Seat. A seat shall be provided in a shower stall 36 inches by 36 inches (915mm by 915mm) and shall be as shown in Fig. 28. The seat shall be mounted 17 inches to 19 inches (430mm to 485mm) from the bathroom floor and shall extend the full depth of the stall. The seat shall be on the wall opposite the controls. The structural strength of seats and their attachments shall comply with subsection (z)3 below.

4. (A4.21.4) Grab Bars. Grab bars complying with subsection (z) below shall be provided as shown in Fig. 29.

5. (A4.21.5) Controls. Faucets and other controls complying with subsection (aa)4 below shall be located as shown in Fig. 29. In shower stalls 36 inches by 36 inches (915mm by 915mm), all controls, faucets and the shower unit shall be mounted on the side wall opposite the seat.

6. (A4.21.6) Shower Unit. A shower spray unit with a hose at least 60 inches (1525mm) long that can be used as a fixed shower head or as a hand-held shower shall be provided.

7. (A4.21.7) Curbs. If provided, curbs in shower stalls 36 inches by 36 inches (915mm by 915mm) shall be no higher than 4 inches (100mm). Shower stalls that are 30 inches by 60 inches (760mm by 1525mm) shall not have curbs.

8. (A4.21.8) Shower Enclosures. If provided, enclosures for shower stalls shall not obstruct controls or obstruct transfer from wheelchairs onto shower seats.

(v) (A4.22) Toilet Rooms.

1. (A4.22.1) Minimum Number. Minimum accessible plumbing facilities to be provided may vary with occupant load and use, but in no case shall be less than the number specified in Table No. 64-A.

2. (A4.22.2) Doors. All doors to accessible toilet rooms shall comply with subsection (m) above. Doors shall not swing into the clear floor space required for any fixture.

3. (A4.22.3) Clear Floor Space. The accessible fixtures and controls required in subsections (v)4, (v)5, (v)6 and (v)7 shall be on an accessible route. An unobstructed turning space complying with subsection (b)3 shall be provided within an accessible toilet room. The clear floor spaces at
fixtures and controls, the accessible route and the turning space may overlap.

4. (A4.22.4) Water Closets. If toilet stalls are provided, then a reasonable number, but always at least one, shall comply with subsection (q) above, and its water closet shall comply with subsection (p) above. If water closets are not in stalls, then a reasonable number, but always at least one, of water closets shall comply with subsection (p) above.

5. (A4.22.5) Urinals. If urinals are provided, a reasonable number, but always at least one, shall comply with subsection (r) above.

6. (A4.22.6) Lavatories and Mirrors. If lavatories and mirrors are provided, a reasonable number, but always at least one of each, shall comply with subsection (s) above.

7. (A4.22.7) Controls and Dispensers. If controls, dispensers, receptacles or other equipment is provided, at least one of each shall be on an accessible route and shall comply with subsection (aa) below.

(w) (A4.23) Bathrooms, Bathing Facilities and Shower Rooms.

1. (A4.23.1) Minimum Number. Minimum accessible plumbing facilities to be provided may vary with occupant load and use, but in no case shall be less than the number specified in Table No. 64-A.

2. (A4.23.2) Doors. Doors to accessible bathrooms shall comply with subsection (m) above. Doors shall not swing into the floor space required for any fixture.

3. (A4.23.3) Clear Floor Space. The accessible fixtures and controls required in subsections (w)4, (w)5, (w)6, (w)7, (w)8 and (w)9 shall be on an accessible route. An unobstructed turning space complying with subsection (b)3 above shall be provided within an accessible bathroom. The clear floor spaces at fixtures and controls, the accessible route and the turning space may overlap.

4. (A4.23.4) Water Closets. If toilet stalls are provided, then a reasonable number, but always at least one, shall comply with subsection (q) above, and its water closet shall comply with subsection (p) above. If water closets are not in stalls, then a reasonable number, but always at least one, shall comply with subsection (p) above.

5. (A4.23.5) Urinals. If urinals are provided, then a reasonable number, but always at least one, shall comply with subsection (r) above.
6. **(A4.23.6) Lavatories and Mirrors.** If lavatories and mirrors are provided, then a reasonable number, but always at least one of each, shall comply with subsection (s) above.

7. **(A4.23.7) Controls and Dispensers.** If controls, dispensers, receptacles or other equipment is provided, at least one of each shall be on an accessible route and shall comply with subsection (aa) below.

8. **(A4.23.8) Bathing and Shower Facilities.** If tubs or showers are provided, then at least one accessible tub that complies with subsection (t) above or at least one accessible shower that complies with subsection (u) above shall be provided.

9. **(A4.23.9*) Medicine Cabinets.** If medicine cabinets are provided, at least one shall be located with a usable shelf no higher than 44 inches (1120mm) above the floor space. The floor space shall comply with subsection (b) above.

(x) **(A4.24) Sinks.**

1. **(A4.24.1) General.** If accessible sinks are provided, they shall comply with this subsection (x). Sinks in kitchens of accessible dwelling units shall comply with subsection (hh) below.

2. **(A4.24.2) Height.** Sinks shall be mounted with the center or rim no higher than 34 inches (865mm) from the floor.

3. **(A4.24.3) Knee Clearance.** Knee clearance that is 27 inches (685mm) high, 30 inches (760mm) wide and 19 inches (485mm) deep shall be provided underneath sinks.

4. **(A4.24.4) Depth.** Each sink shall be a maximum of 6½ inches (165mm) deep.

5. **(A4.24.5) Clear Floor Space.** A clear floor space at least 30 inches by 48 inches (760mm by 1220mm) complying with subsection (b) above shall be provided in front of a sink to allow forward approach. The clear floor space shall be on an accessible route and shall extend a maximum of 19 inches (485mm) underneath the sink (see Fig. 24).

6. **(A4.24.6) Exposed Pipes and Surfaces.** Hot water and drain pipes under sinks shall be insulated or otherwise covered. There shall be no sharp or abrasive surfaces under sinks.
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7. (A4.24.7) Faucets. Faucets shall comply with subsection (aa)4 below. Lever-operated, push-type, touch-type, or electronically controlled mechanisms are acceptable designs.

(y) (A4.25) Storage.
1. (A4.25.1) General. If provided, accessible storage facilities such as cabinets, shelves, closets and drawers shall comply with this subsection (y).

2. (A4.25.2) Clear Floor Space. A clear floor space at least 30 inches by 48 inches (760mm by 1220mm) complying with subsection (b)4 above that allows either a forward or parallel approach by a person using a wheelchair shall be provided at accessible storage facilities.

3. (A4.25.3) Height. Accessible storage spaces shall be within at least one of the reach ranges specified in subsection (b)5 above and subsection (b)6 above. Clothes rods shall be a maximum of 54 inches (1370mm) from the floor (see Fig. 30).

4. (A4.25.4) Hardware. Hardware for accessible storage facilities shall comply with subsection (aa)4 below. Touch latches and U-shaped pulls are acceptable.

(z) (A4.26) Handrails, Grab Bars and Tub and Shower Seats.
1. (A4.26.1*) General. All handrails, grab bars and tub and shower seats shall comply with this subsection (z).

2. (A4.26.2*) Size and Spacing of Grab Bars and Handrails. The diameter or width of the gripping surface of a handrail or grab bar shall be 1¼ to 1½ inches (32mm to 38mm) or the shape shall provide an equivalent gripping surface. If handrails or grab bars are mounted adjacent to a wall, the space between the wall and the handrail or grab bar shall be 1½ inches (38mm) (see Fig. 31(a), (b) and (c)). Handrails may be located in a recess if the recess is a maximum of 3 inches (75mm) deep and extends at least 18 inches (455mm) above the top of the rail (See Fig. 31(d)).

3. (A4.26.3) Structural Strength. The structural strength of grab bars, tub and shower seats, fasteners and mounting devices shall meet the following specifications:
   a. Bending stress in a grab bar or seat induced by the maximum bending moment from the application of 250 lbf (1112N) shall be less than the allowable stress for the material of the grab bar or seat.
b. Shear stress induced in a grab bar or seat by the application of 250 lbf (1112N) shall be less than the allowable shear stress for the material of the grab bars or seat. If the connection between the grab bar or seat and its mounting bracket or other support is considered to be fully restrained, then direct and torsional shear stresses shall be totaled for the combined shear stress, which shall not exceed the allowable shear stress.

c. Shear force induced in a fastener or mounting device from the application of 250 lbf (1112N) shall be less than the allowable lateral load of either the fastener or mounting device or the supporting structure, whichever is the smaller allowable load.

d. Tensile force induced in a fastener by a direct tension force of 250 lbf (1112N) plus the maximum moment from the application of 250 lbf (1112N) shall be less than the allowable withdrawal load between the fastener and the supporting structure.

e. Grab bars shall not rotate within their fittings.

4. (A4.26.4) Eliminating Hazards. A handrail or grab bar and any wall or other surface adjacent to it shall be free of any sharp or abrasive elements. Edges shall have a minimum radius of 1/8 inch (3.2mm).

(aa) (A4.27) Controls and Operating Mechanisms.

1. (A4.27.1) General. Controls and operating mechanisms in accessible spaces, along accessible routes, or as part of accessible elements (for example, light switches, dispenser controls) shall comply with this subsection (aa).

2. (A4.27.2) Clear Floor Space. Clear floor space complying with subsection (b)4 above that allows a forward or a parallel approach by a person using a wheelchair shall be provided at controls, dispensers, receptacles and other operable equipment.

3. (A4.27.3) Height. The highest operable part of all controls, dispensers, receptacles and other operable equipment shall be placed within at least one of the reach ranges specified in subsections (b)5 and (b)6 above. Except where the use of special equipment dictates otherwise, electrical and communications system receptacles on walls shall be mounted no less than 15 inches (380mm) above the floor.
4. (A4.27.4) Operation. Controls and operating mechanisms, except in Group H-3 occupancies, shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2N).

(bb) (A4.28) Alarms.
1. (A4.28.1) General. If emergency warning systems are provided, they shall include both audible alarms complying with this subsection (bb)2 and visual alarms complying with this subsection (bb)3. In facilities with sleeping accommodations, the sleeping accommodations shall have an auxiliary visual alarm system complying with this subsection (bb)4.

2. (A4.28.2) Audible Alarms. Audible alarms shall comply with the requirements of Chapter 38.

3. (A4.28.3) Visual Alarms. Visual alarms shall be provided in all areas required to be accessible. Visual alarms shall conform to the requirements of Chapter 38.

4. (A4.28.4) Auxiliary Alarms. Accessible sleeping accommodations shall have a visual alarm connected to the building fire alarm system conforming to the requirements of Chapter 38.

(cc) (A4.29) Tactile Warnings.
1. (A4.29.1) Reserved.
2. (A4.29.2) Reserved.
3. (A4.29.3*) Tactile Warnings on Doors to Hazardous Areas. Doors that lead to areas that might prove dangerous to a blind person (for example, doors to loading platforms, boiler rooms, stages and the like) shall be made identifiable to the touch by a textured surface on the door handle, knob, pull or other operating hardware. This textured surface may be made by knurling or roughening or by a material applied to the contact surface. Such textured surfaces shall not be provided for emergency exit doors or any doors other than those to hazardous areas.

4. (A4.29.4) Reserved.
5. (A4.29.5) Reserved.
6. (A4.29.6) Reserved.
7. (A4.29.7) Reserved.
(dd) (A4.30) Signage.

1. (A4.30.1*) General. All signage that provides emergency information or general circulation directions shall comply with subsections (dd)2, (dd)3 and (dd)5. Tactile signage shall also comply with subsection (dd)4.

2. (A4.30.2) Character Proportion. Letters and numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10.

3. (A4.30.3*) Color Contrast. Characters and symbols shall contrast with their background - either light characters on a dark background or dark characters on a light background.

4. (A4.30.4*) Raised or Indented Characters or Symbols. Letters and numbers on signs shall be raised or incised 1/32 inch (0.8mm) minimum and shall be sans serif characters. Raised characters or symbols shall be at least 5/8 inch (16mm) high, but no higher than 2 inches (50mm). Indented characters or symbols shall have a stroke width of at least ¼ inch (6mm). Symbols or pictographs on signs shall be raised or indented 1/32 inch (0.8mm) minimum.

5. (A4.30.5) Symbols or Accessibility. When accessible facilities are identified, then the international symbol of accessibility shall be used. The symbol shall be displayed as shown in Fig. 32.

(ee) (A4.31) Reserved.

(ff) (A4.32) Seating, Tables and Work Surfaces.

1. (A4.32.1) Minimum Number. If fixed or built-in seating, tables or work surfaces are provided in accessible spaces, a reasonable number, but always at least one, of seating spaces, tables or work surfaces shall comply with this subsection (ff).

2. (A4.32.2) Seating. If seating spaces for people in wheelchairs are provided at tables, counters or work surfaces, clear floor spaces complying with subsection (b)4 above shall be provided. Such clear floor space shall not overlap knee space by more than 19 inches (485mm) (see Fig. 33).

3. (A4.32.3) Knee Clearances. If seating for people in wheelchairs is provided at tables, counters and work surfaces, knee spaces at least 27 inches (685mm) high, 30 inches (760mm) wide and 19 inches (485mm) deep shall be provided (see Fig. 33).
4. **(A4.32.4*) Height of Work Surfaces.** The tops of tables and work surfaces shall be from 28 inches to 34 inches (710mm to 865mm) from the floor or ground.

**(gg) (A4.33) Assembly Areas.**

1. **(A4.33.1) Minimum Number.** If assembly areas are provided, accessible viewing positions shall comply with this subsection (gg) and the following table:

<table>
<thead>
<tr>
<th>Capacity of Assembly(3)</th>
<th>Number of Viewing Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 25</td>
<td>1</td>
</tr>
<tr>
<td>26 to 50</td>
<td>2</td>
</tr>
<tr>
<td>51 to 75</td>
<td>3</td>
</tr>
<tr>
<td>76 to 100</td>
<td>4</td>
</tr>
<tr>
<td>101 to 150</td>
<td>5</td>
</tr>
<tr>
<td>151 to 200</td>
<td>6</td>
</tr>
<tr>
<td>201 to 300</td>
<td>7</td>
</tr>
<tr>
<td>301 to 400</td>
<td>8</td>
</tr>
<tr>
<td>401 to 500</td>
<td>9</td>
</tr>
<tr>
<td>501 to 1000</td>
<td>(1)</td>
</tr>
<tr>
<td>Over 1000</td>
<td>(2)</td>
</tr>
</tbody>
</table>

(1) 2 percent of total
(2) 20 plus 1 for each 100 over 1000.
Assembly areas with audio-amplification systems shall have a listening system complying with subsections (gg)6 and (gg)7 to assist a reasonable number of people, but no fewer than two, with severe hearing loss in the appreciation of audio presentations.

(3) When there are multiple assembly areas in one facility (e.g. multiple theaters), accessible seating shall be provided in every assembly area proportional to the capacity of assembly.

2. **(A4.33.2*) Size of Wheelchair Locations.** Each wheelchair location shall provide minimum clear ground or floor spaces as shown in Fig. 34 and shall accommodate 2 people in wheelchairs.

3. **(A4.33.3*) Placement of Wheelchair Locations.** Wheelchair areas shall be an integral part of any fixed seating plan and shall be dispersed throughout the seating area. They shall adjoin an accessible route that also serves as a means of egress in case of emergency.

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and shall be located to provide lines of sight comparable to those for all viewing areas.

4. **(A4.33.4) Surfaces.** The ground or floor at wheelchair locations shall be level and comply with subsection (e) above.

5. **(A4.33.5) Access to Performing Areas.** An accessible route shall connect wheelchair seating locations with performing areas, including stages, arena floors, dressing rooms, locker rooms and other spaces used by performers.

6. **(A4.33.6*) Placement of Listening Systems.** If the listening system provided serves individual fixed seats, then such seats shall be located within a 50-foot (15m) viewing distance of the stage or playing area and shall have a complete view of the stage or playing area.

7. **(A4.33.7*) Types of Listening Systems.** Audio loops and radio frequency systems are 2 acceptable types of listening systems.

(hh) **(A4.34) Dwelling Units.**

1. **(A4.34.1) General.** In Group R Division 1 and 2, Occupancies consisting of 8 or more units, one unit of the first 8 units and one unit for each 7 units thereafter shall comply with the requirements of Section 6402(hh) for accessible housing.

   **EXCEPTION:** Group R-2 Occupancies where all sleeping facilities are on the second floor.

2. **(A4.34.2*) Minimum Requirements.** An accessible dwelling unit shall be on an accessible route. An accessible dwelling unit shall have the following accessible elements and spaces as a minimum:
   a. Common spaces and facilities serving individual accessible dwelling units (for example, entry walks, trash disposal facilities and mail boxes) shall comply with subsections (b) through (gg).
   b. Accessible spaces shall have maneuvering space complying with subsections (b)2 and (b)3 and surfaces complying with subsection (e).
   c. At least one accessible route complying with subsection (c) shall connect the accessible entrances with all accessible spaces and elements within dwelling units.
   d. Reserved.
   e. Reserved.
f. Doors to and in accessible spaces that are intended for passage shall comply with subsection (m).

g. A reasonable number, but always at least one, of accessible entrances to the dwelling unit shall comply with subsection (n).

h. Storage in accessible spaces in dwelling units, including cabinets, shelves, closets and drawers shall comply with subsection (y).

i. All controls in accessible spaces except in R-2 occupancies shall comply with subsection (aa). Those portions of heating, ventilating and air-conditioning equipment requiring regular, periodic maintenance and adjustment by the resident of a dwelling shall be accessible to people in wheelchairs. If air distribution registers must be placed in or close to ceilings for proper air circulation, this specification shall not apply to the registers.

j. If emergency alarms are provided, a reasonable number, but always at least one, of alarm connections complying with subsection (bb)4 shall be provided in the dwelling unit.

k. Reserved.

l. A reasonable number, but always at least one, of full bathrooms shall comply with (hh)5. A full bathroom shall include a water closet, a lavatory and a bathtub or a shower.

m. The kitchen shall comply with subsection (hh)23.

n. If laundry facilities are provided, they shall comply with subsection (hh)24.

o. The following spaces shall be accessible and shall be on an accessible route:
   (1) The living area, including kitchen.
   (2) The dining area.
   (3) The sleeping area, or the bedroom in one-bedroom dwelling units, or one bedroom in dwelling units with 2 or more bedrooms.
   (4) Balconies, carports and garages, if provided with the dwelling unit. Grade level entry while not required is preferred and can be achieved with wood earth separation in conformance with Chapter 25 of this Code through construction of a foundation wall with a reverse ledge designed to provide bearing for wood framing with
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concrete at least 3 inches (78mm) in thickness
separating the wood from the earth.

3. (A4.34.3) Adaptability. Consumer information required
by subsection (hh)4 shall be provided with each filing for
a building permit for apartment and townhouse buildings.
The specifications of subsections (hh)5 and (hh)13 as
modified by this Chapter are based on the concept of
adaptability.

4. (A4.34.4) Consumer Information. To ensure that the
existence of adaptable features will be known to the
owner or occupant of a dwelling, the following consumer
information shall be provided in each accessible dwelling
unit for rent or sale:
   a. Reserved.
   b. Reserved.
   c. Reserved.
   d. Reserved.
   e. Notification that the dwelling unit has been designed
      in accordance with American National Standard
      Specifications for Making Buildings and Facilities
      Accessible to and Usable by Physically Handicapped
      In addition, the renters and buyers of accessible
dwelling units shall be provided with the following
information:
         (1) Reserved.
         (2) Reserved.
         (3) Reserved.
         (4) Reserved.
         (5) Reserved.

5. (A4.34.5*) Adaptable Bathrooms. Adaptable bathrooms
shall be on an accessible route and shall comply with the
requirements of subsections (hh)5 - 12.

6. (A4.34.5.1) Doors. Doors may swing into the clear floor
space required for any fixture, but shall not encroach into
the required clear space when opened 90° or more.

7. (A4.34.5.2) Water Closets.
   a. Clear floor space at the water closet shall be as
      shown in Fig. 35(a). The water closet may be located
      with the clear area at either the right or left side of the
      toilet.
   b. The height of the water closet shall be at least 15
      inches (380mm) measured to the top of the toilet
      seat.
c. Structural reinforcement or other provisions that will allow installation of grab bars shall be provided in the locations shown in Fig. 35(b). If provided, grab bars shall be installed as shown in Fig. 21 and shall comply with subsection (z).

d. The toilet paper dispenser shall be installed within reach as shown in Fig. 35(b).

8. (A4.34.5.3) Lavatory, Mirrors and Medicine Cabinets.
   a. The lavatory and mirrors shall comply with subsection (s).
   b. If a cabinet is provided under the lavatory, then it shall be removable to provide the clearances specified in subsection (s)2.
   c. If a medicine cabinet is provided above the lavatory, then the bottom of the medicine cabinet shall be located with a usable shelf no higher than 44 inches (1120mm) above the floor.

9. (A4.34.5.4) Bathtubs. If a bathtub is provided, then it shall have the following features:
   a. Floor Space. Clear floor space at bathtubs shall be as shown in Fig. 25.
   b. Reserved.
   c. Grab Bars. Structural reinforcement or other provisions that will allow installation of grab bars shall be provided in the locations shown in Fig. 36. If provided, grab bars shall be installed as shown in Fig. 26 and shall comply with subsection (z).
   d. Controls. Faucets and other controls shall be located as shown in Fig. 26 and shall comply with subsection (aa)4.
   e. Shower Unit. A shower spray unit with a hose at least 60 inches (1525mm) long that can be used as a fixed shower head or as a hand-held shower shall be provided. In Group R-1 and R-2 Occupancies if only a tub is provided, it must comply with this requirement; if both a tub and a shower are provided, one must comply with this requirement.

10. (A4.34.5.5) Showers. If a shower is provided, it shall have the following features:
    a. Size and Clearances. Shower stall size and clear floor space shall comply with either Fig. 27(a) or (b). The shower stall in Fig. 27(a) shall be 36 inches by 36 inches (915mm by 915mm). The shower stall in Fig.
27(b) will fit into the same space as a standard 60 inches (1525mm) long bathtub.

b. Seat. A seat shall be provided in the shower stall in Fig. 27(a) as shown in Fig. 28. The seat shall be 17 inches to 19 inches (430mm to 485mm) high measured from the bathroom floor and shall extend the full depth of the stall. The seat shall be on the wall opposite the controls. The structural strength of seats and their attachments shall comply with (z)3. Seats shall be mounted securely and shall not slip during use.

c. Grab Bars. Structural reinforcement or other provisions that will allow installation of grab bars shall be provided in the locations shown in Fig. 37. If provided, grab bars shall be installed as shown in Fig. 29 and shall comply with subsection (z).

d. Controls. Faucets and other controls shall be located as shown in Fig. 29 and shall comply with subsection (aa)4. In the shower stall in Fig. 27(a), all controls, faucets and the shower unit shall be mounted on the side wall opposite the seat.

e. Shower Unit. A shower spray unit with a hose at least 60 inches (1525mm) long that can be used as a fixed shower head or as a hand-held shower shall be provided. In Group R-1 and R-2 Occupancies if only a shower is provided, it must comply with this requirement; if both a tub and a shower are provided, one must comply with this requirement.

11. (A4.34.5.6) Bathtub and Shower Enclosures. Enclosures for bathtubs or shower stalls shall not obstruct controls or transfer from wheelchairs onto shower or bathtub seats. Enclosures on bathtubs shall not have tracks mounted on their rims.

12. (A4.34.5.7) Clear Floor Space. Clear floor space at fixtures may overlap.

13. (A4.34.6) Adaptable Kitchens. Kitchens and their components shall be on an accessible route and shall comply with the requirements of subsections (hh)13 - 22.

14. (A4.34.6.1*) Clearance. Clearances between all opposing base cabinets, counter tops, appliances or walls shall be 40 inches (1015mm) minimum, except in U-shaped kitchens, where such clearance shall be 60 inches (1525mm) minimum.
15. **(A4.34.6.2) Clear Floor Space.** A clear floor space at least 30 inches by 48 inches (760mm by 1220mm) complying with subsection (b)5 that allows either a forward or a parallel approach by a person in a wheelchair shall be provided at all appliances in the kitchen, including the range or cooktop, oven refrigerator/freezer, dishwasher and trash compactor. Laundry equipment located in the kitchen shall comply with subsection (hh)24.

16. **(A4.34.6.3) Controls.** All controls in kitchen shall comply with subsection (aa).

17. **(A4.34.6.4) Work Surfaces.** At least one 30-inch (760mm) section of counter shall provide a work surface that complies with the following: (See Fig. 38)
   a. The counter shall be adjustable or replaceable as a unit.
   b. Base cabinets, if provided, shall be removable under the full 30 inches (760mm) minimum frontage of the counter. The finished floor shall extend under the counter to the wall.
   c. Counter thickness and supporting structure shall be 2 inches (50mm) maximum over the required clear area.
   d. A clear floor space 30 inches by 48 inches (760mm by 1220mm) shall allow a forward approach to the counter. Nineteen inches (485mm) maximum of the clear floor space may extend underneath the counter. The knee space shall have a minimum clear width of 30 inches (760mm) and a minimum clear depth of 19 inches (485mm). This may be accomplished by the use of a removable front panel.
   e. There shall be no sharp or abrasive surfaces under such counters.

18. **(A4.34.6.5*) Sink.** The sink and surrounding counter shall comply with the following requirements (see Fig. 39):
   a. The total width of the sink and counter area shall be 30 inches (760mm) minimum. Initial installation may include standard base-cabinetry and a 36-inch (915mm) high countertop.
   b. Rough-in plumbing shall be located to accept connections of supply and drain pipes for sinks mounted at the height of 28 inches (710mm).
c. The depth of a sink bowl shall be no greater than 6\(\frac{1}{2}\) inches (165mm).
d. Faucets shall comply with subsection (aa)4. Lever-operated or push-type mechanisms are 2 acceptable designs.
e. Base cabinets, if provided, shall be removable under the full 30 inches (760mm) minimum frontage of the sink and surrounding counter. The finished flooring shall extend under the counter to the wall.
f. Upon adaptation, counter thickness and supporting structure shall be 2 inches (50mm) maximum over the required clear space.
g. A clear floor space 30 inches by 48 inches (760mm by 1220mm) shall allow forward approach to the sink. Nineteen inches (485mm) maximum of the clear floor space may extend underneath the sink. The knee space shall have a minimum clear width of 30 inches (760mm) and a clear depth of 19 inches (485mm).
h. There shall be no sharp or abrasive surfaces under sinks. Hot water and drain pipes under sinks shall be insulated or otherwise covered.
i. If garbage disposal units are provided, at least one sink bowl shall be accessible per paragraph (3).

19. (A4.34.6.6*) Ranges and Cooktops. Ranges and cooktops shall comply with subsections (hh)15 and (hh)16. If ovens or cooktops have knee spaces underneath, then they shall be insulated or otherwise protected on the exposed contact surfaces to prevent burns, abrasions or electrical shock. The clear floor space may overlap the knee space, if provided, by 19 inches (485mm) maximum. The location of controls for ranges and cooktops shall not require reaching across burners.

20. (A4.34.6.7*) Ovens. Ovens shall be of the self-cleaning type and be located adjacent to an adjustable height counter with knee space below (see Fig. 40). For side-opening ovens, the door latch side shall be next to the open counter space, and there shall be a pull-out shelf under the oven extending the full width of the oven and pulling out not less than 20 inches (255mm) when fully extended. Ovens shall have controls on front panels. They may be located on either side of the door.
Appendix 6403

21. (A4.34.6.8*) Refrigerators/Freezers. Refrigerator/freezers shall comply with this subsection (hh)21. Refrigerators shall be:
   a. Of the vertical side-by-side refrigerator/freezer type;
   or
   b. Of the over-and-under type and meet the following requirements:
      (1) Have at least 50% of the freezer space below 54 inches (1370mm) above the floor.
      (2) Have 100% of the refrigerator space and controls below 54 inches (1370mm). Freezers with less than 100% of the storage volume within the limits specified in subsections (b)5 or (b)6 shall be the self-defrosting type.

22. (A4.34.6.9) Dishwashers. Dishwashers shall comply with subsections (hh)15 and (hh)16. Dishwashers shall have all rack space accessible from the front of the machine for loading and unloading dishes.

23. (A4.34.6.10*) Kitchen Storage. Cabinets, drawers and shelf storage areas shall be adaptable to comply with subsection (y) and shall have the following features:
   a. Maximum height shall be 48 inches (1220mm) for at least one shelf of one cabinet or storage shelf (see Fig. 38).
   b. Door pulls or handles for wall cabinets shall be mounted as close to the top of cabinet doors as possible.

24. (A4.34.7) Laundry Facilities. If laundry equipment is provided within individual accessible dwelling units, or if separate laundry facilities serve one or more accessible dwelling units, then they shall meet the requirements of subsections (hh)25 through (hh)27.

25. (A4.34.7.1) Location. Laundry facilities and laundry equipment shall be on an accessible route.

26. (A4.34.7.2) Washing Machines and Clothes Dryers. Washing machines and clothes dryers in common use laundry rooms shall be front loading.

27. (A4.34.7.3) Controls. Laundry equipment shall comply with subsection (aa).
Appendix 6404

SECTION 6404. STANDARDS. Unless provided for in other Sections of this Building Code, the following Standards shall apply.

<table>
<thead>
<tr>
<th>ORGANIZATION</th>
<th>TITLE OF PUBLICATION</th>
</tr>
</thead>
</table>

LEGEND

| ORGANIZATION | American National Standards Institute, Inc. 1430 Broadway New York, NY 10018 |

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### TABLE 64-A
**FIXTURES REQUIRED TO BE ACCESSIBLE TO THE HANDICAPPED (a)**

<table>
<thead>
<tr>
<th>TABLE NO.</th>
<th>USE</th>
<th>WATER CLOSETS</th>
<th>URINALS</th>
<th>LAVATORIES</th>
<th>DRINKING FOUNTAINS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MALE</td>
<td>FEMALE</td>
<td>MALE</td>
<td>FEMALE</td>
</tr>
<tr>
<td>5-E-1</td>
<td>Places of Assembly</td>
<td>1 per 2000</td>
<td>1 per 800</td>
<td>1 per 2000</td>
<td>1 per 1800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 for each</td>
<td>1 for each</td>
<td>1 for each</td>
<td>1 for each</td>
</tr>
<tr>
<td></td>
<td></td>
<td>addl. 1000</td>
<td>addl. 400</td>
<td>addl. 400</td>
<td>addl. 300</td>
</tr>
<tr>
<td>5-E-2</td>
<td>Industrial, office, retail, &amp; Public Buildings</td>
<td>1 per 150</td>
<td>1 per 100</td>
<td>1 per 250</td>
<td>1 per 200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 for each</td>
<td>1 for each</td>
<td>1 for each</td>
<td>1 for each</td>
</tr>
<tr>
<td></td>
<td></td>
<td>addl. 150</td>
<td>addl. 100</td>
<td>addl. 250</td>
<td>addl. 200</td>
</tr>
<tr>
<td>5-E-3</td>
<td>Taverns and Lounges</td>
<td>1 per 300</td>
<td>1 per 150</td>
<td>1 per 150</td>
<td>1 per 300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 for each</td>
<td>1 for each</td>
<td>1 for each</td>
<td>1 for each</td>
</tr>
<tr>
<td></td>
<td></td>
<td>addl. 300</td>
<td>addl. 150</td>
<td>addl. 300</td>
<td>addl. 300</td>
</tr>
<tr>
<td>5-E-4</td>
<td>Schools Elem. &amp; Jr. High</td>
<td>1 per 500</td>
<td>1 per 225</td>
<td>1 per 150</td>
<td>1 per ea. 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 for each</td>
<td>1 per each</td>
<td>1 per each</td>
<td>water clos.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>addl. 300</td>
<td>addl. 150</td>
<td>addl. 300</td>
<td>and/or urin.</td>
</tr>
<tr>
<td>5-E-4</td>
<td>All Others</td>
<td>1 per 500</td>
<td>1 per 225</td>
<td>1 per 150</td>
<td>1 per ea. 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 for each</td>
<td>1 per each</td>
<td>1 per each</td>
<td>water clos.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>addl. 300</td>
<td>addl. 150</td>
<td>addl. 300</td>
<td>and/or urin.</td>
</tr>
<tr>
<td>5-E-5</td>
<td>Dormitories</td>
<td>1 per 50</td>
<td>1 per 40</td>
<td>1 per 60</td>
<td>1 per 60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50% of those provided, but at least one per flr.</td>
</tr>
</tbody>
</table>

(a) The plumbing facilities shown are for the number of persons shown or any fraction thereof. In regard to bathing facilities and shower rooms ANSI A117.1 (1980) Section (4.23) shall apply and separate handicap accessible facilities shall be provided for each sex for whom such facilities are provided. See Table 5-E.
SECTION 6405. TABLES AND ILLUSTRATIONS.

TABLE 64-B
GRAPHIC CONVENTIONS

<table>
<thead>
<tr>
<th>Graphic Conventions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical dimension line showing U.S. customary units (in inches) above the line and SI units (in millimeters) below</td>
<td></td>
</tr>
<tr>
<td>Dimensions for short distances indicated on extended line</td>
<td></td>
</tr>
<tr>
<td>Dimension line showing alternate dimensions required</td>
<td></td>
</tr>
<tr>
<td>Direction of approach</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td></td>
</tr>
<tr>
<td>Boundary of clear floor area</td>
<td></td>
</tr>
<tr>
<td>Centerline</td>
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</tbody>
</table>

TABLE 64-C
ALLOWABLE RAMP DIMENSIONS

Allowable Ramp Dimensions for Construction in Existing Sites, Buildings, and Facilities

<table>
<thead>
<tr>
<th>Slope*</th>
<th>Maximum Rise</th>
<th>Maximum Run</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in</td>
<td>mm</td>
</tr>
<tr>
<td>Steeper than 1:10 but no steeper than 1:8</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>Steeper than 1:12 but no steeper than 1:10</td>
<td>6</td>
<td>150</td>
</tr>
</tbody>
</table>

*A slope steeper than 1:8 not allowed.
TABLE 64-D
FIGURES
(Note: All numbers in parentheses refer to the ANSI A117.1-1980 Standard.)

Fig. 1
Minimum Clear Width for Single Wheelchair

(a)
60-in (1525-mm) Diameter Space

Fig. (3)
Wheelchair Turning Space

(b)
T-Shaped Space for 180° Turns

Fig. 2
Minimum Clear Width for Two Wheelchairs
TABLE 64-D (Continued)

Fig. (4)

Minimum Clear Floor Space for Wheelchairs

(a)
Clear Floor Space

NOTE: \( x \leq 24 \text{ in} \) (610 mm).

(d)
Clear Floor Space in Alcoves

NOTE: \( x \leq 15 \text{ in} \) (380 mm).

(b) Forward Approach

(c) Parallel Approach

NOTE: If \( x > 24 \text{ in} \) (610 mm), then an additional maneuvering clearance of 6 in (150 mm) shall be provided as shown.

NOTE: If \( x > 15 \text{ in} \) (380 mm), then an additional maneuvering clearance of 12 in (305 mm) shall be provided as shown.

(e)
Additional Maneuvering Clearances for Alcoves
TABLE 64-D (Continued)

(a)
High Forward Reach Limit

(b)
Maximum Forward Reach over an Obstruction

NOTE: \( x \) shall be < 25 in (635 mm); \( y \) shall be \( \geq x \). When \( x \) < 20 in (510 mm), then \( y \) shall be 48 in (1220 mm) maximum. When \( x \) is 20 to 25 in (510 to 635 mm), then \( y \) shall be 44 in (1120 mm) maximum.

Fig. (5)
Forward Reach
TABLE 64-D (Continued)

(a) Clear Floor Space
Parall\(\text{e}\)ar Approach

(b) High and Low
Side Reach Limits

(c) Maximum Side Reach
\(\text{ov}r\) Obstruction

Fig. (6)
Side Reach

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TABLE 64-D (Continued)

(a)  
90° Turn

(b)  
Turns around an Obstruction

Fig. (7)  
Width of Accessible Route

NOTE: Dimensions shown apply when x < 48 in (1220 mm).
TABLE 64-D (Continued)

(a) Walking Parallel to a Wall

(b) Walking Perpendicular to a Wall

Fig. (8)
Protruding Objects
TABLE 64-D (Continued)

(c) Free-Standing Overhanging Objects

(d) Objects Mounted on Posts or Pylons

(e) Example of Protection around Wall-Mounted Objects and Measurements of Clear Widths

Fig. (8)
Protruding Objects (Continued)
Table 64-D (Continued)

Elevation                     Section

Curb

Wall

Vertical guard rail

Railing with extended platform

Fig. 9 (17)
Examples of Edge Protection and Handrail Extensions

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TABLE 64-D (Continued)

(a) Flush Riser
(b) Angled Nosing
(c) Rounded Nosing

Fig. 10 (18)
Usable Tread Width and Examples of Acceptable Nosings

(a) Plan

(b) Elevation of Center Handrail

Fig. 11 (19)
Stair Handrails

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Table 64-D (Continued)

(c) Extension at Bottom of Run

(d) Extension at Top of Run

Fig. 11 (19)
Stair Handrails (continued)

NOTE: The automatic door reopening device is activated if an object passes through either line A or line B. Line A and line B represent the vertical locations of the door reopening device not requiring contact.

Fig. 12 (20)
Hoistway and Elevator Entrances
TABLE 64-D (Continued)

![Graph of Timing Equation]

Fig. 13 (21)
Graph of Timing Equation

NOTE: Elevator cars with a minimum width less than that above but no less than 54 in (1370 mm) are allowed for elevators with capacities of less than 2000 lb. A center opening door application may necessitate increasing the 68-in (1730-mm) dimension.

Fig. 14 (22)
Minimum Dimensions of Elevator Cars
Appendix 6405

TABLE 64-D (Continued)

Panel Detail

Control Height

Alternate Locations of Panel with Center Opening Door

Alternate Locations of Panel with Side Opening Door

Fig. 15 (23)
Car Controls

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TABLE 64-D (Continued)

(a) Front Approaches — Swinging Doors

NOTE: x = 12 in (305 mm) if door has both a closer and latch.

(b) Hinge Side Approaches — Swinging Doors

NOTE: x = 36 in (915 mm) minimum if y = 60 in (1525 mm); x = 42 in (1065 mm) minimum if y = 54 in (1370 mm).

NOTE: y = 48 in (1220 mm) minimum if door has both a latch and closer.

(c) Latch Side Approaches — Swinging Doors

NOTE: y = 54 in (1370 mm) minimum if door has closer.

NOTE: y = 48 in (1220 mm) minimum if door has closer.

NOTE: All doors in alcoves shall comply with the clearances for front approaches.

Fig. 17 (25)

Maneuvering Clearances at Doors
TABLE 64-D (Continued)

(d) Front Approach – Sliding Doors

(e) Slide Side Approach – Sliding Doors

(f) Latch Side Approach – Sliding Doors

NOTE: All doors in alcoves shall comply with the clearances for front approaches.

Fig. 17 (25)
Maneuvering Clearances at Doors (Continued)

Fig. 18 (26)
Two Hinged Doors in Series
TABLE 64-D (Continued)

(a) Spout Height and Knee Clearance

(b) Clear Floor Space

(c) Free-Standing Fountain or Cooler

(d) Built-In Fountain or Cooler

Fig. 19 (27)
Drinking Fountains and Water Coolers
TABLE 64-D (Continued)

Fig. 20 (28)
Clear Floor Space at Water Closets

(a) Back Wall

(b) Side Wall

Fig. 21 (29)
Grab Bars at Water Closets
TABLE 64-D (Continued)

(a) Standard Stall

(b) Alternative Stall

Fig. 22 (30)
Toilet Stalls

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TABLE 64-D (Continued)

(a) With Seat in Tub

(b) With Seat at Head of Tub

Fig. 25 (33)
Clear Floor Space at Bathtubs

SYMBOL KEY:
- Shower controls
- Shower head
- Drain
Appendix 6405

TABLE 64-D (Continued)

(a)  With Seat in Tub

(b)  With Seat at Head of Tub

Fig. 26 (34)
Grab Bars at Bathtubs
TABLE 64-D (Continued)

(a) 36-in by 36-in (915-mm by 915-mm) Stall

(b) 30-in by 60-in (760-mm by 1525-mm) Stall

Fig. 27 (35)
Shower Size and Clearances

Fig. 28 (36)
Shower Seat Design

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TABLE 64-D (Continued)

(a)
36-in by 36-in (915-mm by 915-mm) Stall

(b)
30-in by 60-in (760-mm by 1525-mm) Stall

Fig. 29 (37)
Grab Bars at Shower Stalls
TABLE 64-D (Continued)

Fig. 30 (38)
Storage Shelves and Closets

Fig. 31 (39)
Size and Spacing of Handrails and Grab Bars

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Size and Spacing of Handrails and Grab Bars (Continued)
TABLE 64-D (Continued)

(a)
Proportions

(b)
Display Conditions

Fig. 32 (43)
International Symbol of Accessibility
TABLE 64-D (Continued)

(a)  
Forward or Rear Access

(b)  
Side Access

Fig. 34 (46)  
Space Requirements for Wheelchair  
Seating Spaces in Series

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TABLE 64-D (Continued)

### Clear Floor Space for Adaptable Bathrooms

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Min</th>
<th>Max</th>
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</thead>
<tbody>
<tr>
<td>42 min</td>
<td>1065</td>
<td>1500</td>
</tr>
<tr>
<td>18 min</td>
<td>435</td>
<td>700</td>
</tr>
<tr>
<td>36 min</td>
<td>915</td>
<td>1130</td>
</tr>
<tr>
<td>18 min</td>
<td>455</td>
<td>925</td>
</tr>
<tr>
<td>48 min</td>
<td>1220</td>
<td>1500</td>
</tr>
</tbody>
</table>

NOTE: The hatched areas are reinforced to receive grab bars.

### Reinforced Areas for Installation of Grab Bars

**Fig. 35 (47)**

Water Closets in Adaptable Bathrooms
TABLE 64-D (Continued)

NOTE: The hatched areas are reinforced to receive grab bars.

Fig. 36 (48)
Location of Grab Bars and Controls of Adaptable Bathtubs

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### TABLE 64-D (Continued)

#### (a)
36-in by 36-in (915-mm by 915-mm) Stall

#### (b)
30-in by 60-in (750-mm by 1525-mm) Stall

**NOTE:** The hatched areas are reinforced to receive grab bars.

**Fig. 37 (49)**
Location of Grab Bars and Controls of Adaptable Showers
TABLE 64-D (Continued)

(a) Before Removal of Cabinets and Base

(b) Cabinets and Base Removed and Height Alternatives

Fig. 38 (50)
Counter Work Surface
TABLE 64-D (Continued)

(a) Before Removal of Cabinets and Base

Fig. 39 (51)
Kitchen Sink

(b) Cabinets and Base Removed and Height Alternatives

(a) Side-Hinged Door

(b) Bottom-Hinged Door

SYMBOL KEY:
1. Countertop or wall-mounted oven.
2. Pull-out board preferred with side-opening door.
3. Clear open space.
4. Bottom-hinged door.

Fig. 40 (52)
Ovens without Self-Cleaning Feature
Appendix Chapter 66 is added:

CHAPTER 66

SOUND INSULATION STANDARDS FOR BUILDINGS EXPOSED TO AIRCRAFT NOISE

SECTION 6600. SCOPE.
(a) General. Chapter 66 sets forth requirements for construction of specified occupancy classes in designated noise impact zones adjacent to Stapleton International Airport. A map depicting the current noise zones around the Airport is on file in the City Clerk’s Office. This map was adopted by reference on December 10, 1984, in City Council Resolution No. 59, City Clerk Filing No. 84-541. This map shall be amended as often as required to reflect the most current annual noise exposure of the Airport which exceeds 65 LDN (Day-Night Sound Level).

(b) Provisions. The provision(s) of Chapter 66 shall apply to Group A, B, E, I and R Occupancies. The provisions of this Chapter shall not apply to Group H, B2 warehouse and M Occupancies or Occupancies included in the Stapleton Noise Insulation Program.

SECTION 6601. DEFINITIONS
(a) For the purposes of this Chapter, the following definitions shall apply:
A-Weighted Decibels (dBA) - ten times the logarithm (to the base 10) of a power or intensity ration with a weighting which correlates with the human response to the loudness of sounds.

Day-Night Sound Level (LDN) - the yearly average of the A-weighted sound level integrated over a 24-hour period with a 10-dB step function weighting on aircraft events between 10:00 PM and 6:59 AM.

Exterior Wall Noise Reduction (EWN) - the calculated noise level reduction provided by the exterior construction of a building.

Heating/Ventilation/Air Conditioning (HVAC) - the mechanical system which provides heating, ventilation and air conditioning to buildings constructed or modified under this Chapter.

Level Reduction (LR) - in a specified frequency band - the decrease in sound pressure level, measured at the location of
the receiver, when a barrier or other sound-reducing element is placed between the source and the receiver.

Noise Level Reduction (NLR) - a reduction in A-weighted sound levels.

Outside to Inside Transmission Loss (OITL) - of a building facade, in a specified frequency band - ten times the common logarithm of the ratio of the airborne sound power incident on the exterior of the facade to the sound power transmitted by the facade and radiated to the interior. The quantity so obtained is expressed in decibels.

SECTION 6602. INTENT AND COMPLIANCE.

(a) Design Requirements. The requirements of this Chapter shall ensure that building envelopes in the designated noise impact zones provide adequate sound insulation. In addition the mechanical systems will supply the requisite amount of heating, cooling and ventilation for the building without compromising the sound insulation properties of the building envelope.

(b) Design Paths. It is intended that these provisions provide flexibility to permit the use of innovative approaches and techniques to achieve effective sound insulation. These provisions are structured to permit compliance with the intent of this Chapter by either of the following 2 design paths:

Design Path I. Achieving a calculated EWNR utilizing the EWNRCalculation Form provided by the Department in conjunction with the standards set forth in Section 6603.

Design Path II. Achieving an actual NLR (to be verified by acoustical testing of the building shell) by utilizing materials and/or methods differing from those described in Design Path I.

(c) Additions to Existing Buildings. An addition may be made to an existing building without requiring the existing building to comply with all of the requirements of this Chapter, provided that the addition conforms to the requirements of this Chapter and the Code. For alterations or repairs, see Section 106.

(d) Change in Occupancy. Any change in occupancy or use of an existing building within a designated noise impact zone shall not be permitted, unless the building is made to conform to all of the requirements of this Chapter and this Code. See Chapter 5.

(e) HVAC Requirements. Regardless of which Design Path is chosen, the HVAC requirements in Section 6606 shall be met.
SECTION 6603. DESIGN PATH I - SYSTEMS ANALYSIS APPROACH AND SOUND INSULATION CALCULATION STANDARDS.

(a) General. This approach requires that construction documents comply with the design specifications and construction techniques described in this Chapter. An acceptable calculated EWNR will be required prior to the approval of the plans by the Department. The construction materials available for use are listed in Section 6608. Any deviation from Design Path I will require that the NLR standards in Section 6604 be met.

(b) Noise Level Reduction (NLR) Requirements. All nonexempt occupancies referenced in Section 6600 of this Chapter shall be designed and constructed so that the exterior shell (windows closed) provides a calculated Exterior Wall Noise Level Reduction (EWNR) equal to or greater than the following values:

<table>
<thead>
<tr>
<th>Equal to or Greater Than</th>
<th>But Less Than</th>
<th>Or Greater Than</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 dbA</td>
<td>70 dbA</td>
<td>30 dbA</td>
</tr>
<tr>
<td>70 dbA</td>
<td>75 dbA</td>
<td>35 dbA</td>
</tr>
<tr>
<td>75 dbA</td>
<td>Construction is Prohibited</td>
<td></td>
</tr>
</tbody>
</table>

No exterior shell noise level reduction is required for levels less than 65 dbA.

(c) EWNR Calculations. EWNR calculations must be submitted on a form furnished by the Department. When required by Chapter 3, EWNR calculations must be submitted by an engineer or architect. The EWNR calculations for Group R Occupancies shall be prepared for the 2 rooms with the greatest area (in square feet) of exterior walls, roof (ceilings) and exposed floor. For all other occupancy groups, EWNR calculations shall be based on the most intensively occupied area; which is the room or rooms in which the primary service of the occupancy type is provided.
(d) **Construction Techniques.** All exterior walls, roofs and exposed floors shall be constructed airtight. All nonlap joints shall be grouted or caulked airtight with a nonhardening, nonshrinking sealant installed in strict accordance with the sealant manufacturer's specifications. Any penetrations of exterior walls by pipes, ducts or conduits shall be sealed airtight as required for joints above. Door and window openings in exterior walls shall be flashed all around with an approved vapor barrier and sealed to prevent air infiltration. Sill sealant shall be used to prevent air infiltration at all base plates of exterior walls. Attic and crawl space vents shall be constructed as detailed in Figure 66-5. See Section 6606 for Building Mechanical System requirements.

**SECTION 6604. DESIGN PATH II - PERFORMANCE TESTING APPROACH.**

(a) **General.** This approach allows the building to be constructed using design and construction methods which vary from Design Path I. The NLR requirements must be verified through actual sound level measurements.

(b) **Restrictions.** The construction shall meet the NLR requirements listed below, the requirements of Sections 6605 and 6606, and all other applicable portions of the Code.

(c) **Noise Level Reduction (NLR) Requirements.** All nonexempt occupancies referenced in Section 6600 shall be designed and constructed so that the exterior shell (windows closed) provides a measured NLR equal to or greater than the values listed below.

<table>
<thead>
<tr>
<th>Equal to or Greater Than</th>
<th>But Less Than Or Greater Than</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 dBa</td>
<td>70 dBa</td>
</tr>
<tr>
<td>70 dBa</td>
<td>75 dBa</td>
</tr>
<tr>
<td>75 dBa</td>
<td>Construction is Prohibited</td>
</tr>
</tbody>
</table>

Then the Measured EWNR Provided by the Exterior Shell Must be Equal to

There are no exterior shell noise level reduction requirements for projects where outdoor LDN levels are less than 65 dBa.
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(c) **Building Testing.** Acoustical measurements shall be conducted in accordance with ASTM Standard E966-84, Field Measurement of Airborne Sound Insulation of Building Facades and Facade Elements, and shall be certified by an engineer and submitted to the Department. The NLR between A-weighted levels shall be calculated using the following equation:

\[
\text{NLR} = \frac{\left( \frac{10}{10} \right) \left( \frac{\text{LA1} - 10 \log f - 10 \log [S/A] - 6, \text{ dB}}{[\text{OITL}(f) + a(f)]/10} \right)}
\]

Where:

- \( \text{LA1} \) = A-weighted exterior noise level
- \( \text{L1}(f) \) = 1/3-octave band exterior noise level at frequency \( f \)
- \( a(f) \) = A-weighted at frequency \( f \)
- \( \text{OITL}(f) \) = 1/3-octave band transmission loss of complete assembly at frequency \( f \)

**SECTION 6605. PLANS AND SPECIFICATIONS.**

(a) **General.** With each application for a building permit, plans, specifications and EWNR calculations in compliance with this Chapter shall be submitted. A form with the calculation of EWNR values shall be supplied by the Department. If Design Path II is chosen, a statement of intent to comply with this Chapter shall be submitted.

(b) **Details.** The plans, specifications and calculations shall show in sufficient detail all pertinent data and features of the building and the sound insulation techniques as herein required, but not limited to, design criteria, exterior envelope component materials, EWR values of the envelope elements, construction techniques and other pertinent data to indicate conformance with the requirements of this Chapter.

**SECTION 6606. BUILDING MEchanical SYSTEMS.**

(a) **Forced-Air System.** All buildings constructed under this Code shall be provided with a forced-air HVAC system with the following features:
1. Gas-fired appliances, including gas-fired water heaters, shall be enclosed in a room or rooms separated from habitable space. Such rooms shall be equipped with a tight fitting, self-closing door. Combustion air shall be supplied to the room directly from the outside as prescribed in Section 5112.

EXCEPTION 1: Sealed combustion units or any similar type of appliance that have a closed combustion chamber and combustion air drawn directly from the outside.

EXCEPTION 2: Gas-fired appliances in commercial kitchens and commercial laundry rooms.

2. A ducted connection shall be installed between the return air system and the outside to provide a continuous supply of outside air into the building equal to at least 10% of the CFM rating of the HVAC system.

3. Equipment for refrigerated cooling of the ventilation air shall be included as a part of the system.

4. Controls shall be arranged to permit "fan-only" operation without activation of the heating or cooling system.

EXCEPTION: A new forced air system complying with this subsection will not be required for additions to existing buildings if the heating system in the existing building, regardless of type, has sufficient capacity to provide heat to the addition.

(b) Exhaust to the Outside. Provision shall be made to mechanically exhaust kitchen areas, bathroom areas and janitor/service areas so that opening of windows will not be necessary. All exhaust ducts handling clean air shall contain at least a 10-foot length of internal sound-absorbing lining (1 inch minimum fiberglass). Each duct shall be provided with at least one bend such that there is no direct line of sight from inside the building to the outside. Kitchen exhaust ducts, not being compatible with sound absorbing linings, shall have at least one bend to eliminate line-of-sight sound transmission and shall contain a solid baffle plate across the exterior termination which will still allow adequate area for proper ventilation.

(c) Fireplaces. If a fireplace is included in the building, compliance with this Code shall follow Design Path II as described in Section 6604. The acoustical measurements shall be performed with the fireplace damper open.
Appendix 6606

(d) Prohibitions. Due to the extremely tight construction mandated by this Chapter, the installation of solid-fuel stoves, gas-fired kitchen ranges and gas-fired clothes dryers in Group H2, H3 and I Occupancies are prohibited.

SECTION 6607. STANDARDS. The following standards shall apply to this Chapter:


ASTM FIELD MEASUREMENT OF AIRBORNE INSULATION OF BUILDING FACADES AND FACADE ELEMENTS, E966-84

SECTION 6608. SUPPLEMENTS. Calculation forms and sample calculations may be adopted by Rule and Regulations per Section 105 and will be available at the Department.
### Exterior Wall Rating (EWR) in dB for Standard Exterior Construction

<table>
<thead>
<tr>
<th>Exterior Finish</th>
<th>Wall Section</th>
<th>No.</th>
<th>Interior Finish</th>
<th>EWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Siding over 1/2&quot; Wood Sheathing</td>
<td>W1-1</td>
<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W1-2</td>
<td>3/8&quot; Gypsumboard</td>
<td>39</td>
<td></td>
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<tr>
<td></td>
<td>W1-3</td>
<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W1-4</td>
<td>2 Layers 5/8&quot; Gypsumboard</td>
<td>44</td>
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</tr>
<tr>
<td></td>
<td>W1-5</td>
<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
<td>41</td>
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<tr>
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<td>W1-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
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<tr>
<td></td>
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<td>43</td>
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<tr>
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<td>W1-8</td>
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<td>46</td>
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<tr>
<td></td>
<td>W1-9</td>
<td>1/2&quot; Gypsbld / 1/4&quot; plywood Paneling</td>
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<tr>
<td></td>
<td>W1-10</td>
<td>1/2&quot; Plywood Paneling</td>
<td>37</td>
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<tr>
<td></td>
<td>W1-11</td>
<td>1/2&quot; Gypsbld / 1/4&quot; Hardboard Paneling</td>
<td>43</td>
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<tr>
<td>7/8&quot; Stucco over Paper</td>
<td>W2-1</td>
<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>48</td>
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<tr>
<td></td>
<td>W2-3</td>
<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>49</td>
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<td></td>
<td>W2-4</td>
<td>2 Layers 5/8&quot; Gypsumboard</td>
<td>48</td>
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<td>W2-5</td>
<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
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<td>W2-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
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<td>W2-8</td>
<td>7/8&quot; Plaster</td>
<td>41</td>
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<td></td>
<td>W2-9</td>
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<tr>
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<tr>
<td>7/8&quot; Stucco over 1/2&quot; Sheathing</td>
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<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
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<tr>
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<td>3/8&quot; Gypsumboard</td>
<td>49</td>
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</tr>
<tr>
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<td>W3-3</td>
<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>49</td>
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<tr>
<td></td>
<td>W3-4</td>
<td>2 Layers 5/8&quot; Gypsumboard</td>
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<tr>
<td></td>
<td>W3-5</td>
<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
<td>50</td>
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<tr>
<td></td>
<td>W3-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
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<tr>
<td></td>
<td>W3-7</td>
<td>1/2&quot; Plaster</td>
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<td></td>
<td>W3-8</td>
<td>7/8&quot; Plaster</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W3-9</td>
<td>1/2&quot; Gypsbld / 1/4&quot; plywood Paneling</td>
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<tr>
<td></td>
<td>W3-10</td>
<td>1/2&quot; Plywood Paneling</td>
<td>46</td>
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<tr>
<td></td>
<td>W3-11</td>
<td>1/2&quot; Gypsbld / 1/4&quot; Hardboard Paneling</td>
<td>51</td>
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<tr>
<td>1/2&quot; - 3/4&quot; Wood Sheathing</td>
<td>W4-1</td>
<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>37</td>
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<td>Construction: Stud Wall with R11 Fiberglass in Stud Wall</td>
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<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>42</td>
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</tr>
<tr>
<td></td>
<td>W4-4</td>
<td>2 Layers 5/8&quot; Gypsumboard</td>
<td>44</td>
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<tr>
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<tr>
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<td>W4-7</td>
<td>1/2&quot; Plaster</td>
<td>43</td>
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<td>W4-8</td>
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<td></td>
<td>W4-10</td>
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<td>W4-11</td>
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<td>43</td>
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</tbody>
</table>
### Appendix 6609

#### Figure 66-1 (cont.)

**Exterior Wall Rating (EWR) in dB for Standard Exterior Construction**

<table>
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<tr>
<th>Exterior Finish</th>
<th>Wall Section</th>
<th>No.</th>
<th>Interior Finish</th>
<th>EWR</th>
</tr>
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<tbody>
<tr>
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<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
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<tr>
<td></td>
<td>W5-2</td>
<td>3/8&quot; Gypsumboard</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-3</td>
<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-4</td>
<td>2 Layers 5/8&quot; Gypsumboard</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-5</td>
<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-7</td>
<td>1/2&quot; Plaster</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-8</td>
<td>7/8&quot; Plaster</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-9</td>
<td>1/2&quot; Gypsum / 1/4&quot; Plywood Paneling</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W5-10</td>
<td>1/2&quot; Plywood Paneling</td>
<td>38</td>
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</tr>
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<td></td>
<td>W5-11</td>
<td>1/2&quot; Gypsum / 1/4&quot; Hardboard Paneling</td>
<td>41</td>
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<tr>
<td><strong>4 1/2&quot; Brick Veneer</strong></td>
<td>W6-1</td>
<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>57</td>
<td></td>
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<tr>
<td></td>
<td>W6-2</td>
<td>3/8&quot; Gypsumboard</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W6-3</td>
<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>56</td>
<td></td>
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<tr>
<td></td>
<td>W6-4</td>
<td>2 Layers 5/8&quot; Gypsumboard</td>
<td>56</td>
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<tr>
<td></td>
<td>W6-5</td>
<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W6-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
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<tr>
<td></td>
<td>W6-7</td>
<td>1/2&quot; Plaster</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W6-8</td>
<td>7/8&quot; Plaster</td>
<td>50</td>
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<tr>
<td></td>
<td>W6-9</td>
<td>1/2&quot; Gypsum / 1/4&quot; Plywood Paneling</td>
<td>57</td>
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<td></td>
<td>W6-10</td>
<td>1/2&quot; Plywood Paneling</td>
<td>54</td>
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<tr>
<td></td>
<td>W6-11</td>
<td>1/2&quot; Gypsum / 1/4&quot; Hardboard Paneling</td>
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<td></td>
<td>W6-13</td>
<td>4&quot; Brick with 2&quot; Air Cavity, Metal Ties</td>
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<tr>
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<td></td>
<td>W6-16</td>
<td>2 Wythes 4&quot; Brick Mortared Together</td>
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<td>W6-17</td>
<td>4&quot; CMU Mortared to Exterior</td>
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<td><strong>9&quot; Brick Veneer</strong></td>
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<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>60</td>
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<tr>
<td></td>
<td>W7-2</td>
<td>3/8&quot; Gypsumboard</td>
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<td>W7-5</td>
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<td>W7-9</td>
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<td>W7-10</td>
<td>1/2&quot; Plywood Paneling</td>
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<td>W7-11</td>
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### Exterior Wall Rating (EWR) in dB for Standard Exterior Construction

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<th>Exterior Finish</th>
<th>Wall Section</th>
<th>No.</th>
<th>Interior Finish</th>
<th>EWR</th>
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<td>W8-7</td>
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<tr>
<td>Construction:</td>
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<td>7/8&quot; Plaster</td>
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<td>Mounted on Furring Strips (16&quot; o.c.)</td>
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<td>W9-5</td>
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<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
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<tr>
<td></td>
<td>W9-7</td>
<td>1/2&quot; Plaster</td>
<td>50</td>
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<tr>
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<td>W9-8</td>
<td>7/8&quot; Plaster</td>
<td>51</td>
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<tr>
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<td>1/2&quot; Gypbd / 1/4&quot; Plywood Paneling</td>
<td>50</td>
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<tr>
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<td>50</td>
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<tr>
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<td>W9-11</td>
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<td><strong>8&quot; Concrete</strong></td>
<td>W10-1</td>
<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>62</td>
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<td>64</td>
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<tr>
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<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>Mounted on Furring Strips (16&quot; o.c.)</td>
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<td>2 Layers 5/8&quot; Gypsumboard</td>
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<tr>
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<td>65</td>
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</tr>
<tr>
<td></td>
<td>W10-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W10-7</td>
<td>1/2&quot; Plaster</td>
<td>54</td>
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<tr>
<td>Construction:</td>
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<td>55</td>
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<td>54</td>
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<td>1/2&quot; Plywood Paneling</td>
<td>54</td>
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<td></td>
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<td>1/2&quot; Gypbd / 1/4&quot; Hardboard Paneling</td>
<td>54</td>
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<tr>
<td><strong>6&quot; Hollow Concrete Block</strong></td>
<td>W11-1</td>
<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>52</td>
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<td>53</td>
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<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>55</td>
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<tr>
<td>Mounted on Furring Strips (16&quot; o.c.)</td>
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<td>2 Layers 5/8&quot; Gypsumboard</td>
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</tr>
<tr>
<td></td>
<td>W11-5</td>
<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W11-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W11-7</td>
<td>1/2&quot; Plaster</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Construction:</td>
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<td>7/8&quot; Plaster</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Interior Finish:</td>
<td>W11-9</td>
<td>1/2&quot; Gypbd / 1/4&quot; Plywood Paneling</td>
<td>41</td>
<td></td>
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<tr>
<td>Mounted Directly to the Solid Wall</td>
<td>W11-10</td>
<td>1/2&quot; Plywood Paneling</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W11-11</td>
<td>1/2&quot; Gypbd / 1/4&quot; Hardboard Paneling</td>
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Figure 66-1 (cont.)

Extterior Wall Rating (EWR) in dB for Standard Exterior Construction

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<th>EWR</th>
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<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
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</tr>
<tr>
<td>Construction:</td>
<td>W12-2</td>
<td>3/8&quot; Gypsumboard</td>
<td>55</td>
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</tr>
<tr>
<td>Interior Finish:</td>
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<td>2 Layers 1/2&quot; Gypsumboard</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Mounted on Furring Strips (16&quot; o.c.)</td>
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<td>2 Layers 5/8&quot; Gypsumboard</td>
<td>57</td>
<td></td>
</tr>
<tr>
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<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W12-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction:</td>
<td>W12-7</td>
<td>1/2&quot; Plaster</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Interior Finish:</td>
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<td>3/8&quot; Plaster</td>
<td>45</td>
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</tr>
<tr>
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<td>1/2&quot; Gypsum / 1/4&quot; Plywood Paneling</td>
<td>43</td>
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</tr>
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<td>1/2&quot; Plywood Paneling</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W12-11</td>
<td>1/2&quot; Gypsum / 1/4&quot; Hardboard Paneling</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot; Block with 1/2&quot; Stucco</td>
<td>W13-1</td>
<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Construction:</td>
<td>W13-2</td>
<td>3/8&quot; Gypsumboard</td>
<td>54</td>
<td></td>
</tr>
<tr>
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<td>2 Layers 1/2&quot; Gypsumboard</td>
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<td>2 Layers 5/8&quot; Gypsumboard</td>
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<tr>
<td>W13-5</td>
<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W13-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
<td>56</td>
<td></td>
<td></td>
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<tr>
<td>Construction:</td>
<td>W13-7</td>
<td>1/2&quot; Plaster</td>
<td>43</td>
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<tr>
<td>Interior Finish:</td>
<td>W13-8</td>
<td>3/8&quot; Plaster</td>
<td>44</td>
<td></td>
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<td>Mounted Directly to the Solid Wall</td>
<td>W13-9</td>
<td>1/2&quot; Gypsum / 1/4&quot; Plywood Paneling</td>
<td>42</td>
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<td>W13-10</td>
<td>1/2&quot; Plywood Paneling</td>
<td>42</td>
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</tr>
<tr>
<td>W13-11</td>
<td>1/2&quot; Gypsum / 1/4&quot; Hardboard Paneling</td>
<td>42</td>
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<tr>
<td>8&quot; Block with 1/2&quot; Stucco</td>
<td>W14-1</td>
<td>1/2&quot; or 5/8&quot; Gypsumboard</td>
<td>54</td>
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<tr>
<td>Construction:</td>
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<td>3/8&quot; Gypsumboard</td>
<td>56</td>
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<tr>
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<td>2 Layers 1/2&quot; Gypsumboard</td>
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<tr>
<td>Mounted on Furring Strips (16&quot; o.c.)</td>
<td>W14-4</td>
<td>2 Layers 5/8&quot; Gypsumboard</td>
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</tr>
<tr>
<td>W14-5</td>
<td>1/2&quot; Soundboard / 1/2&quot; Gypsumboard</td>
<td>57</td>
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</tr>
<tr>
<td>W14-6</td>
<td>1/2&quot; Soundboard / 3/8&quot; Gypsumboard</td>
<td>58</td>
<td></td>
<td></td>
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<td>Construction:</td>
<td>W14-7</td>
<td>1/2&quot; Plaster</td>
<td>43</td>
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</tr>
<tr>
<td>Interior Finish:</td>
<td>W14-8</td>
<td>3/8&quot; Plaster</td>
<td>46</td>
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<tr>
<td>Mounted Directly to the Solid Wall</td>
<td>W14-9</td>
<td>1/2&quot; Gypsum / 1/4&quot; Plywood Paneling</td>
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<tr>
<td>W14-10</td>
<td>1/2&quot; Plywood Paneling</td>
<td>44</td>
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</tr>
<tr>
<td>W14-11</td>
<td>1/2&quot; Gypsum / 1/4&quot; Hardboard Paneling</td>
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### Exterior Wall Rating (EWR) in dB for Basic Roof-Ceiling Construction

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<th>Section</th>
<th>No.</th>
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<th>EWR</th>
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<tr>
<td>Wood Shingles</td>
<td>C1-1</td>
<td></td>
<td>3/8&quot; Gypsum Lath/ 1/8&quot; Plaster</td>
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<tr>
<td>Construction:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Single Joist with</td>
<td>C1-2</td>
<td></td>
<td>1/2&quot; or 5/8&quot; Gypsum Board</td>
<td>41</td>
</tr>
<tr>
<td>Fiberglass Insulation</td>
<td>C1-3</td>
<td></td>
<td>Exposed Framing</td>
<td>29</td>
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<tr>
<td>Composition Shingles</td>
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<td>C2-3</td>
<td></td>
<td>Exposed Framing</td>
<td>35</td>
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<tr>
<td>Clay or Concrete Tiles</td>
<td>C3-1</td>
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<td>3/8&quot; Gypsum Lath/ 1/8&quot; Plaster</td>
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<td>Construction:</td>
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<td>Exposed Framing</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Single Joist with</td>
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<td>44</td>
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<tr>
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<td>C4-3</td>
<td></td>
<td>Exposed Framing</td>
<td>32</td>
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<tr>
<td>1/2&quot; Wood and Sheet Metal</td>
<td>C5-1</td>
<td></td>
<td>3/8&quot; Gypsum Lath/ 1/8&quot; Plaster</td>
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<td>Construction:</td>
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<td>Single Joist with</td>
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<td>1/2&quot; or 5/8&quot; Gypsum Board</td>
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<td>Exposed Framing</td>
<td>31</td>
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Appendix 6609

Figure 66-2 continued

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<th>Ceiling Construction</th>
<th>EWR</th>
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<td>C6-1</td>
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<tr>
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<td>1/2&quot; or 5/8&quot; Gypsum Board</td>
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<td></td>
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</tr>
<tr>
<td>Clay or Concrete Tiles</td>
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<td>3/8&quot; Gypsum Lath/ 1/8&quot; Plaster</td>
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</tr>
<tr>
<td>Built-Up Roofing</td>
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<td>3/8&quot; Gypsum Lath/ 1/8&quot; Plaster</td>
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<td>Construction: Attic Space</td>
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<td>1/2&quot; or 5/8&quot; Gypsum Board</td>
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<td>with Fiberglass Insulation</td>
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<tr>
<td>1/2&quot; Wood and Sheet Metal</td>
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<td>3/8&quot; Gypsum Lath/ 1/8&quot; Plaster</td>
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<tr>
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## Figure 66-3

### Single Glazed Units

#### Fixed Units

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<td>Specified</td>
<td>3/32&quot; Glass with Divided Lights</td>
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<td>Specified</td>
<td>1/8&quot; Glass</td>
<td>31</td>
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<td>Specified</td>
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<td>Specified</td>
<td>1/8&quot; Acrylite Storm Sheet</td>
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<td>3/16&quot; Lexan Solar Sheet</td>
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<td>G1-18</td>
<td>Wood</td>
<td>5/8&quot; Glass</td>
<td>36</td>
</tr>
<tr>
<td>G1-19</td>
<td>Specified</td>
<td>5/8&quot; Laminated Glass</td>
<td>40</td>
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<tr>
<td>G1-20</td>
<td>Specified</td>
<td>3/4&quot; Laminated Glass</td>
<td>41</td>
</tr>
<tr>
<td>G1-21</td>
<td>Specified</td>
<td>13/16&quot; Laminated Glass</td>
<td>42</td>
</tr>
<tr>
<td>G1-22</td>
<td>Wood</td>
<td>1&quot; Glass</td>
<td>36</td>
</tr>
<tr>
<td>G1-23</td>
<td>Specified</td>
<td>1&quot; Laminated Glass</td>
<td>42</td>
</tr>
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</table>

#### Double Hung Units

<table>
<thead>
<tr>
<th>No.</th>
<th>Frame</th>
<th>Description</th>
<th>EWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1-24</td>
<td>Wood</td>
<td>3/32&quot; Old Glass Unit</td>
<td>24</td>
</tr>
<tr>
<td>G1-25</td>
<td>Wood</td>
<td>3/32&quot; Glass (sealed)</td>
<td>30</td>
</tr>
<tr>
<td>G1-26</td>
<td>Wood</td>
<td>3/32&quot; Glass, Divided Lights (sealed)</td>
<td>30</td>
</tr>
<tr>
<td>G1-27</td>
<td>Wood</td>
<td>3/32&quot; Glass (locked)</td>
<td>28</td>
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<tr>
<td>G1-28</td>
<td>Wood</td>
<td>1/8&quot; Glass</td>
<td>31</td>
</tr>
<tr>
<td>G1-29</td>
<td>Wood</td>
<td>1/8&quot; Glass, Divided Lights (sealed)</td>
<td>32</td>
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</table>
# Appendix 6609

## Figure 66-3 (cont.)

### SINGLE GLAZED UNITS

#### Casement Units

<table>
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<tbody>
<tr>
<td>G1-30</td>
<td>Steel</td>
<td>3/32&quot; Glass</td>
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</tr>
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<td>G1-31</td>
<td>Aluminum</td>
<td>1/8&quot; Glass</td>
<td>23</td>
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<tr>
<td>G1-32</td>
<td>Wood</td>
<td>1/8&quot; Glass (locked)</td>
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#### Sliding Units

<table>
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<tbody>
<tr>
<td>G1-33</td>
<td>Aluminum</td>
<td>3/32&quot; Glass (locked)</td>
<td>26</td>
</tr>
<tr>
<td>G1-34</td>
<td></td>
<td>1/8&quot; Glass</td>
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<tr>
<td>G1-35</td>
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<td>1/4&quot; Glass</td>
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#### Awning Units

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<tbody>
<tr>
<td>G1-36</td>
<td>Wood</td>
<td>1/8&quot; Glass (sealed)</td>
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</tbody>
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#### Jalousie Units

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<tr>
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<td>Unspecified</td>
<td>1/4&quot; Glass, 4-1/2&quot; Louvres, 1/2&quot; Overlap</td>
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</table>
### Double Glazed Units

#### Fixed Units

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<td>G2-1</td>
<td>8&quot; x 8&quot; x 3-3/8&quot; Deep Glass Block</td>
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<td>41</td>
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<tr>
<td>G2-2</td>
<td>3/32&quot; Glass, 3-3/4&quot; Air Space, 1/8&quot; Storm</td>
<td></td>
<td>37</td>
</tr>
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<td>G2-3</td>
<td>1/8&quot; Glass, 1/4&quot; Air Space, 1/8&quot; Glass (sealed)</td>
<td></td>
<td>29</td>
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<tr>
<td>G2-4</td>
<td>1/8&quot; Glass, 3/8&quot; Air Space, 1/8&quot; Glass (sealed)</td>
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<tr>
<td>G2-5</td>
<td>1/8&quot; Glass, 2-1/4&quot; Air Space, 1/8&quot; Glass</td>
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<tr>
<td>G2-6</td>
<td>1/8&quot; Glass, 2-1/4&quot; Air Space, 1/4&quot; Glass</td>
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<tr>
<td>G2-7</td>
<td>3/16&quot; Glass, 1&quot; Air Space, 3/16&quot; Glass (sealed)</td>
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<tr>
<td>G2-9</td>
<td>1/4&quot; Glass, 1&quot; Air Space, 1/4&quot; Glass</td>
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<tr>
<td>G2-10</td>
<td>1/4&quot; Glass, 3&quot; Air Space, 3/16&quot; Glass</td>
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<tr>
<td>G2-11</td>
<td>1/4&quot; Glass, 4&quot; Air Space, 3/16&quot; Glass</td>
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<tr>
<td>G2-12</td>
<td>1/4&quot; Glass, 2&quot; Air Space, 1/2&quot; Glass</td>
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<tr>
<td>G2-13</td>
<td>1/4&quot; Lam. Glass, 3/8&quot; Air Space, 3/16&quot; Glass</td>
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<tr>
<td>G2-14</td>
<td>1/4&quot; Lam. Glass, 1/2&quot; Air Space, 1/4&quot; Glass</td>
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<tr>
<td>G2-15</td>
<td>1/4&quot; Lam. Glass, 1/2&quot; Air Space, 1/4&quot; Lam. Glass</td>
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<tr>
<td>G2-16</td>
<td>1/4&quot; Lam. Glass, 1&quot; Air Space, 3/16&quot; Glass (unsealed)</td>
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<tr>
<td>G2-17</td>
<td>1/4&quot; Lam. Glass, 2&quot; Air Space, 3/16&quot; Glass (unsealed)</td>
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</tr>
<tr>
<td>G2-18</td>
<td>1/4&quot; Lam. Glass, 4&quot; Air Space, 3/16&quot; Glass (unsealed)</td>
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<tr>
<td>G2-19</td>
<td>3/8&quot; Lam. Glass, 1/2&quot; Air Space, 1/4&quot; Glass (sealed)</td>
<td></td>
<td>37</td>
</tr>
<tr>
<td>G2-20</td>
<td>1/2&quot; Lam. Glass, 1&quot; Air Space, 1/4&quot; Lam. Glass (unsealed)</td>
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<tr>
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<td>1/2&quot; Lam. Glass, 2&quot; Air Space, 3/16&quot; Glass (unsealed)</td>
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<tr>
<td>G2-22</td>
<td>1/2&quot; Lam. Glass, 2&quot; Air Space, 3/8&quot; Glass (unsealed)</td>
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<tr>
<td>G2-23</td>
<td>1/2&quot; Lam. Glass, 4&quot; Air Space, 3/16&quot; Glass (unsealed)</td>
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<tr>
<td>G2-24</td>
<td>1/2&quot; Lam. Glass, 4&quot; Air Space, 3/8&quot; Glass (unsealed)</td>
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<tr>
<td>G2-25</td>
<td>1/2&quot; Lam. Glass, 4&quot; Air Space, 1/2&quot; Lam. Glass (unsealed)</td>
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<tr>
<td>G2-26</td>
<td>1/2&quot; Lam. Glass, 4&quot; Air Space, 1/4&quot; Lam. Glass (unsealed)</td>
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<td>52</td>
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<tr>
<td>G2-27</td>
<td>1/2&quot; Lam. Glass, 5&quot; Air Space, 1/4&quot; Glass</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>G2-28</td>
<td>1/2&quot; Lam. Glass, 8-1/2&quot; Air Space, 3/8&quot; Glass</td>
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<td>56</td>
</tr>
<tr>
<td>G2-29</td>
<td>3/4&quot; Lam. Glass, 4&quot; Air Space, 1/8&quot; Glass (unsealed)</td>
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<tr>
<td>G2-30</td>
<td>3/4&quot; Lam. Glass, 4&quot; Air Space, 1/2&quot; Lam. Glass (unsealed)</td>
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</table>
### Double Glazed Units

#### Fixed Units

<table>
<thead>
<tr>
<th>No.</th>
<th>Frame</th>
<th>Description</th>
<th>EWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>G2-31</td>
<td>Aluminum</td>
<td>3/16&quot; Glass, 2-1/2&quot; Air Space, 1/4&quot; Glass</td>
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</tr>
<tr>
<td>G2-32</td>
<td>Aluminum</td>
<td>3/16&quot; Glass, 4-3/4&quot; Air Space, 1/4&quot; Glass</td>
<td>47</td>
</tr>
<tr>
<td>G2-33</td>
<td>Aluminum</td>
<td>1/4&quot; Glass, 1/2&quot; Air Space, 1/4&quot; Glass</td>
<td>33</td>
</tr>
<tr>
<td>G2-34</td>
<td>Aluminum</td>
<td>1/4&quot; Glass, 4&quot; Air Space, 3/16&quot; Glass</td>
<td>47</td>
</tr>
<tr>
<td>G2-35</td>
<td>Aluminum</td>
<td>1/4&quot; Lam. Glass, 3/4&quot; Air Space, 1/4&quot; Glass</td>
<td>38</td>
</tr>
<tr>
<td>G2-36</td>
<td>Aluminum</td>
<td>3/8&quot; Glass, 2&quot; Air Space, 1/4&quot; Glass</td>
<td>47</td>
</tr>
<tr>
<td>G2-37</td>
<td>Aluminum</td>
<td>3/8&quot; Lam. Glass, 1/2&quot; Air Space, 3/16&quot; Lam. Glass</td>
<td>40</td>
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<tr>
<td>G2-38</td>
<td>Aluminum</td>
<td>3/8&quot; Lam. Glass, 5/8&quot; Air Space, 1/4&quot; Glass</td>
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#### Double Hung Units

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<tr>
<td>G2-41</td>
<td>Aluminum</td>
<td>7/32&quot; Glass, 1/4&quot; Air Space, 1/8&quot; Glass</td>
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<tr>
<td>G2-42</td>
<td>Aluminum</td>
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<td>44</td>
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<tr>
<td>G2-43</td>
<td>Aluminum</td>
<td>1/4&quot; Glass, 4-1/4&quot; Air Space, 3/16&quot; Glass</td>
<td>47</td>
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<tr>
<td>G2-45</td>
<td>Wood</td>
<td>3/32&quot; Glass, 2-1/8&quot; Air Space, 3/32&quot; Glass</td>
<td>34</td>
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<tr>
<td>G2-46</td>
<td>Wood</td>
<td>3/32&quot; Glass, 2-1/8&quot; Air Space, 1/8&quot; Glass</td>
<td>37</td>
</tr>
<tr>
<td>G2-47</td>
<td>Wood</td>
<td>1/8&quot; Glass, 3/16&quot; Air Space, 1/8&quot; Glass (locked)</td>
<td>27</td>
</tr>
<tr>
<td>G2-48</td>
<td>Wood</td>
<td>1/8&quot; Glass, 3/16&quot; Air Space, 1/8&quot; Glass (locked)</td>
<td>26</td>
</tr>
<tr>
<td>G2-49</td>
<td>Wood</td>
<td>1/8&quot; Glass, 5/8&quot; Air Space, 1/8&quot; Glass</td>
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#### Casement Units

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<tbody>
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<td>Vinyl</td>
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## DOUBLE GLAZED UNITS

### Sliding Units

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<td>39</td>
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<tr>
<td>G2-54</td>
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<tr>
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<tr>
<td>G2-59</td>
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<td>1/4&quot; Glass, 4-1/4&quot; Air Space, 3/8&quot; Glass</td>
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<td>1/4&quot; Glass, 5-1/4&quot; Air Space, 3/8&quot; Glass</td>
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<tr>
<td>G2-64</td>
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<td>1/4&quot; Lam. Glass, 2-1/4&quot; Air Space, 1/4&quot; Glass</td>
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</tr>
<tr>
<td>G2-65</td>
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<td>1/4&quot; Lam. Glass, 4-1/4&quot; Air Space, 1/4&quot; Glass</td>
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<tr>
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<tr>
<td>G2-67</td>
<td></td>
<td>1/4&quot; Lam. Glass, 4-1/4&quot; Air Space, 1/4&quot; Lam. Glass</td>
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<tr>
<td>G2-68</td>
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<tr>
<td>G2-69</td>
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<td>G2-70</td>
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<tr>
<td>G2-71</td>
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<td>1/4&quot; Plexiglass, 4-1/4&quot; Air Space, 1/4&quot; Glass</td>
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### Awning Units

<table>
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### Tilt/Turn Units

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## TRIPLE GLAZED UNITS

### Fixed Units

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<tr>
<td>G3-3</td>
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<td>5/16&quot; Glass, 3/8&quot; Gas*, 5/32&quot; Glass, 1/4&quot; Gas*, 5/32&quot; Glass</td>
<td>33</td>
</tr>
<tr>
<td>G3-5</td>
<td></td>
<td>5/16&quot; Glass, 1/2&quot; Gas*, 5/32&quot; Glass, 1/4&quot; Gas*, 5/32&quot; Glass</td>
<td>39</td>
</tr>
<tr>
<td>G3-6</td>
<td></td>
<td>5/16&quot; Glass, 1/2&quot; Gas*, 5/32&quot; Glass, 1/2&quot; Gas*, 5/32&quot; Glass</td>
<td>39</td>
</tr>
<tr>
<td>G3-7</td>
<td></td>
<td>5/16&quot; Glass, 25/32&quot; Gas*, 5/32&quot; Glass, 1/4&quot; Gas*, 5/32&quot; Glass</td>
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### Operable Units

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<th>Description</th>
<th>EWR</th>
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<td>5/16&quot; Glass, 1/4&quot; Gas*, 5/32&quot; Glass, 1/4&quot; Gas*, 5/32&quot; Glass</td>
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* gas filling (SF₆)
## TRIPLE GLAZED UNITS

### Single Hung Units

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<th>Frame</th>
<th>Description</th>
<th>EWR</th>
</tr>
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<tbody>
<tr>
<td>G3-16</td>
<td>Aluminum</td>
<td>7/8&quot; Glass, 1/2&quot; Air, 7/8&quot; Glass, 2&quot; Air, 1/4&quot; Lam. Glass</td>
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### Double Hung Units

<table>
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<tr>
<th>No.</th>
<th>Frame</th>
<th>Description</th>
<th>EWR</th>
</tr>
</thead>
</table>

### Tilt/Turn Units

<table>
<thead>
<tr>
<th>No.</th>
<th>Frame</th>
<th>Description</th>
<th>EWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3-18</td>
<td>Vinyl</td>
<td>1/8&quot; Glass, 1/4&quot; Air, 1/8&quot; Glass, 1/4&quot; Air, 1/8&quot; Glass</td>
<td>33</td>
</tr>
</tbody>
</table>
# Appendix 6609

## Figure 66-4

<table>
<thead>
<tr>
<th>No.</th>
<th>Door Description</th>
<th>Door Seal</th>
<th>Storm Door</th>
<th>Comments</th>
<th>EWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>1-3/4&quot; Hollow-Core Flush Wood</td>
<td>No</td>
<td>1/16&quot; Undercut</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td>1-3/4&quot; Hollow-Core Flush Wood</td>
<td>Weatherstripped</td>
<td>No</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>D3</td>
<td>1-3/4&quot; Solid-Core Flush Wood</td>
<td>No</td>
<td>1/16&quot; Undercut</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>D4</td>
<td>1-3/4&quot; Solid-Core Flush Wood</td>
<td>Weatherstripped</td>
<td>No</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>D5</td>
<td>1-3/4&quot; Steel</td>
<td>Mechanical Drop Closer, 6.1 psf</td>
<td>No</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>D6</td>
<td>2-1/2&quot; Steel</td>
<td>Mechanical Drop Closer, 8.6 psf</td>
<td>No</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>D7</td>
<td>Hollow-Core Wood in Frame</td>
<td>Brass Weatherstrip, 3.91 psf</td>
<td>No</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>D8</td>
<td>Solid-Core Wood in Frame</td>
<td>Brass Weatherstrip, 1.23 psf</td>
<td>No</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>D9</td>
<td>Solid-Core Wood</td>
<td>Spring Brass, 3 Sides with Plastic Halfround Threshold Strip</td>
<td>No</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>D10</td>
<td>Solid-Core Wood</td>
<td>Extruded Plastic Weatherstrip</td>
<td>No</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>D11</td>
<td>Solid-Core Wood</td>
<td>Extruded Plastic Weatherstrip</td>
<td>Yes</td>
<td>Storm: Al, Glazed Single Strength</td>
<td>35</td>
</tr>
<tr>
<td>D12</td>
<td>Hollow Steel</td>
<td>Magnet Weatherstriped, 3.22 psf</td>
<td>No</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>D13</td>
<td>Sliding Glass, Glazed 3/16&quot; Safety Glass</td>
<td>No</td>
<td>Locked</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

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Baffle to be constructed of sheet metal (minimum 20 ga.) or 1/2-inch thick plywood

X + 2"

2-1/2 x X

Line baffle with 1-inch thick, 3 pound per cubic foot semi-rigid fiberglass panel

Figure 66-5 Crawl Space Baffle Vent
<table>
<thead>
<tr>
<th>Description</th>
<th>EWR Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double (half) glass thickness</td>
<td>+(-)3 dB</td>
</tr>
<tr>
<td>Double interlayer thickness</td>
<td></td>
</tr>
<tr>
<td>0.030&quot; to 0.060&quot; Saflex*</td>
<td></td>
</tr>
<tr>
<td>total glass thickness less than 3/8&quot;</td>
<td>0 dB</td>
</tr>
<tr>
<td>total glass thickness 3/8&quot; or greater</td>
<td>+1 dB</td>
</tr>
</tbody>
</table>

### Air Spaced

<table>
<thead>
<tr>
<th>Description</th>
<th>EWR Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double (half) air space</td>
<td>+(-)3 dB</td>
</tr>
<tr>
<td>Double (half) total glass weight</td>
<td>+(-)1 dB</td>
</tr>
<tr>
<td>Change from unsealed to sealed insulating glass</td>
<td>+1 dB</td>
</tr>
<tr>
<td>Sound absorptive periphery*</td>
<td>+6 dB</td>
</tr>
</tbody>
</table>

### Laminated Insulating

<table>
<thead>
<tr>
<th>Description</th>
<th>EWR Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double (half) air space</td>
<td>+(-)3 dB</td>
</tr>
<tr>
<td>Double (half) glass weight</td>
<td></td>
</tr>
<tr>
<td>air space thickness less than 1&quot;</td>
<td>+(-)3 dB</td>
</tr>
<tr>
<td>air space thickness greater than 1&quot;</td>
<td>+(-)1 dB</td>
</tr>
<tr>
<td>Change from air spaced to laminated insulating</td>
<td>+4 dB</td>
</tr>
<tr>
<td>(equal weight, equal air space)</td>
<td></td>
</tr>
<tr>
<td>Sound absorptive periphery*</td>
<td>+6 dB</td>
</tr>
</tbody>
</table>

### Double Laminated Insulating

<table>
<thead>
<tr>
<th>Description</th>
<th>EWR Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double (half) air space</td>
<td>+(-)3 dB</td>
</tr>
<tr>
<td>Double (half) glass weight</td>
<td>+(-)1 dB</td>
</tr>
<tr>
<td>Laminated insulating to double laminated insulating</td>
<td>+3 dB</td>
</tr>
<tr>
<td>Sound absorptive periphery*</td>
<td>+6 dB</td>
</tr>
</tbody>
</table>

* For airspaces 3" thick or greater
### Table 66-1 (cont.)

**INCREASE OF EWR VALUES DUE TO EXTERIOR WALL MODIFICATIONS**

<table>
<thead>
<tr>
<th>Modification</th>
<th>Increase in EWR, dB&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resilient Mounting of Interior Surface Skin</td>
<td>6</td>
</tr>
<tr>
<td>Resilient Damping Board Layer Under Interior Surface Skin</td>
<td>5</td>
</tr>
<tr>
<td>Double Interior Surface Skin</td>
<td>3</td>
</tr>
<tr>
<td>Staggered Studs</td>
<td>10</td>
</tr>
<tr>
<td>Sand-fill Concrete Blocks</td>
<td>3</td>
</tr>
<tr>
<td>1/2-inch plaster on Brick or Block</td>
<td>2</td>
</tr>
<tr>
<td>1/2-inch Gyp Board on Furring Added to Concrete Block</td>
<td>5</td>
</tr>
<tr>
<td>Resiliently Mounted Skin on Concrete Block</td>
<td>8</td>
</tr>
<tr>
<td>Insulation in Concrete Block Cavities</td>
<td>3</td>
</tr>
</tbody>
</table>

<sup>1</sup> If two modifications are employed, use larger benefits plus one-half of smaller benefit.

Table 66-2
Effects of Venting Attics on EWR Values with and without Absorption

<table>
<thead>
<tr>
<th>Hard Ceiling Skins</th>
<th>Unvented Attic EWR, dB</th>
<th>Vented Attic EWR, dB</th>
<th>Vented Attic EWR, dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>with batt or blow-in</td>
<td>no batt or blow-in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>insulation 3-inch</td>
<td>insulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>minimum</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>-5</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>-6</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>-7</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>-8</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>-8</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>-9</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>-10</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>-10</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>-11</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>-12</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>-12</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>-13</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>-14</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mineral Board Ceiling Skins</th>
<th>Vented Attic EWR, dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td>+2</td>
</tr>
<tr>
<td>45</td>
<td>+1</td>
</tr>
<tr>
<td>46</td>
<td>0</td>
</tr>
<tr>
<td>47</td>
<td>-1</td>
</tr>
<tr>
<td>48</td>
<td>-2</td>
</tr>
<tr>
<td>49</td>
<td>-3</td>
</tr>
<tr>
<td>50</td>
<td>-4</td>
</tr>
<tr>
<td>51</td>
<td>-5</td>
</tr>
<tr>
<td>52</td>
<td>-6</td>
</tr>
<tr>
<td>53</td>
<td>-7</td>
</tr>
<tr>
<td>54</td>
<td>-8</td>
</tr>
<tr>
<td>55</td>
<td>-9</td>
</tr>
<tr>
<td>56</td>
<td>-10</td>
</tr>
</tbody>
</table>


2 When all the attic vents are baffled, calculate using EWR values for vented attic.
Appendix 6609

Chart 66-1
Chart for Calculation of Composite EWR for Two Wall Elements

Difference of the EWR's of Two Components


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Appendix 6609

Chart 66-2

\[ \overline{A} = 2.2 \times SF_f^{0.89} \]

\( \overline{A} \) = Floor Area (in square feet)

UBC APPX 66 - 27
Appendix 6609

Chart 66-3

-10 log SF_t

SF_t = Total Square Foot Area of the Exposed Exterior Surfaces
DIVISION 2

AMENDMENTS

TO THE

1988 EDITION OF THE UNIFORM MECHANICAL CODE

AND

APPENDIX
DENVER AMENDMENTS TO THE UNIFORM MECHANICAL CODE
BY PARTS, CHAPTERS AND SECTIONS

The following Chapters and Sections have been amended by the Denver Amendments to the UMC.

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Chapter 2. Organization and Enforcement ...................................... 1

Chapter 3. Permits and Inspections ............................................. 1

**Part III - Heating, Ventilation and Cooling**

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505. Access ................................................................. 1
506. Automatic Control Devices ........................................... 2
508. Location ............................................................... 2

Chapter 6. Combustion Air
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607. Area of Combustion Air Openings ...................................... 3

Chapter 7. Warm-Air Heating Systems
SEC. 706. Return and Outside Air ............................................. 4
710. Furnaces Installed on Roofs or Exterior Walls of Buildings .......... 4

Chapter 8. Vented Decorative Appliances, Floor Furnaces,
Vented Wall Furnaces, Unit Heaters and Room Heaters
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804. Floor Furnaces ........................................................... 8
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1004. Installation of Ducts .................................................. 9
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Chapter 15. Mechanical Refrigerating Equipment
SEC. 1503. Classification of Refrigerants................................. 10
1504. General........................................................................... 11
1506. Group 2 and Group 3 Refrigerants.............................. 11

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Appendix B Chapter 63. Steam and Hot Water Boilers and Piping
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2110. Pressure Regulators....................................................... 4
2113. Automatic Boilers.......................................................... 4
2116. Mounting................................................................. 4
2123. Inspection and Tests...................................................... 5
2125. Maintenance Inspection.................................................. 5
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Sec. 503

Part I - Administrative, which includes Chapters 1, 2 and 3 of the Uniform Mechanical Code (UMC), is deleted. The administrative provisions of UBC, Chapters 1, 2 and 3 as amended by Denver, shall govern.

Section 503(c) is amended:

(c) Gas-Burning Appliances. Appliances designed to burn gas shall be rigidly connected to the gas-supply outlet in an approved manner and with approved materials.

EXCEPTION: An approved listed semirigid or flexible metal connector may be used to connect commercial and domestic cooking appliances, gas clothes dryers, gas appliances subject to expansive soil conditions when approved by the Department, and other specialized appliances as approved by the Department, provided that:

1. The connector shall not exceed 3 feet in length, except range connectors, which may not exceed 6 feet.
2. An approved shutoff valve is used between the gas-supply outlet and such connector.
3. Connectors shall not be concealed within or run through any wall, floor or partition.
4. Connectors shall have a nominal diameter not less than that of the inlet connection to the appliance as provided by the manufacturer of the appliance and shall be of such size as to provide the total demand of the connected appliance load based on Table No. 5-D-1 or 5-D-2.

Section 505 is amended by adding the following paragraph.

SECTION 505. ACCESS. Boiler and furnace rooms shall be separated from refrigeration equipment machinery rooms and from air handling equipment rooms by a fire separation wall of at least one-hour fire-resistive construction. There shall be no access doors to a boiler or furnace room from a refrigeration equipment machinery room or from an air handling equipment room.
Sec. 506

Section 506 Exception is amended:

EXCEPTION: The listed shut off devices shall not be required on range or cooking tops, gas lights, open-burner manually operated appliances permitted by this Code or the Department, listed appliances not requiring such devices, or specific industrial appliances as approved by the Department.

Section 508 is amended:

SECTION 508. LOCATION. Appliances installed in garages, warehouses, or other areas where they may be subjected to mechanical damage shall be suitably guarded against such damage by being installed behind protective barriers or by being elevated or located out of the normal path of vehicles.

Open flame appliances or devices which are located in a garage shall be installed with the pilots and burners at least 8 feet above the floor.

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

Heating equipment located in rooms where cellulose nitrate plastic is stored or processed shall comply with the Fire Code.

Fuel-fired appliances or equipment shall not be installed or used in a bedroom, bathroom, toilet room, janitor closet, garages, in any enclosed space with access only through a room mentioned above, or under a stairway unless specifically allowed by this Code.

Section 603(c) is amended:

(c) Prohibited Sources. Openings and ducts shall not connect appliance enclosures with space in which the operation of a fan may adversely affect the flow of combustion air. Combustion air shall not be obtained from a hazardous location or from any area in which objectionable quantities of flammable vapor, lint or dust
are released. Combustion air shall not be taken from a refrigeration machinery room. Combustion air intakes shall be separated from any forced fresh air intake by at least 10 feet.

Section 607 is amended:

SECTION 607. AREA OF COMBUSTION AIR OPENINGS.

(a) General. For combustion air, the provisions of this Section shall apply above other provisions of this Chapter, except as noted. All combustion air shall be taken from the outside or from spaces connecting with the outside, such as crawl spaces and attics, unless otherwise permitted by the Building Official.

(b) Appliances Located in Unconfined Spaces. Combustion air openings having a total free area of at least 1 square inch per 5,000 Btu/h of total input rating of all appliances shall be provided. Ducts admitting outdoor air may be connected to the cool air return of the heating system and shall comply with Section 604.

EXCEPTION: For Group R-3 Occupancies and for individual units of Group R-1 Occupancies, combustion air opening(s) of at least 1 square inch per 10,000 Btu/h of total input rating shall be provided.

(c) Appliances Located in Confined Spaces. Provide 2 openings as required in Section 602. Each opening shall have a free area of at least 1 square inch per 4000 Btu/h of the total input rating of all appliances in the enclosure. If horizontal ducts are used, each opening shall have a free area of at least 1 square inch per 2000 Btu/h of total input rating of all appliances in the enclosure.

EXCEPTION: In R-3 Occupancies and in individual living units of R-1 Occupancies, each opening shall have a free area of at least 1 square inch per 5000 Btu/h of total input rating.

(d) Designed Installations. With prior approval of the building official, compliance with the requirements of subsections (b) and (c) above will not be required for an installation that has been professionally designed to ensure an adequate supply of combustion and ventilation air.
Sec. 706

Section 706(a) is amended:

(a) **Source.** A warm air furnace shall be provided with return air, outside air or both. Heating systems regulated by this Code shall be arranged to mechanically introduce a continuous supply of outside air into the building to comply with ASHRAE 62-1981.

**EXCEPTION:** In R-2 and R-3 Occupancies and in individual living units of R-1 Occupancies, the use of operable windows to provide required ventilation shall be allowed.

Section 710(h) is amended:

(h) **Access.** Every furnace and air handling unit that is installed on an exterior wall or on the roof of a building shall be readily accessible. In buildings having an eave height of 20 feet or more or 2 or more stories in height where appliances are located on the roof, there shall be permanent inside means of access.

At least 6 feet clearance shall be maintained between the appliance and the edge of a roof. Otherwise, rigidly fixed guard rails at least 3 feet in height or a 3-foot-high parapet shall be provided at the edge of the roof.

**EXCEPTIONS:**

1. Permanent exterior ladders providing roof access for buildings not requiring interior access need not extend closer than 12 feet to the finish grade.

2. A portable ladder may be used for access to equipment on the single story portion of a Group M or R Occupancies.

Section 802 is amended:

**SECTION 802. GENERAL.** Every vented decorative appliance, vented wall furnace, unit heater and room heater shall be of a type listed for vented use and shall be connected to a vent complying with Chapter 9, except as provided for in Section 807.

Every vented decorative appliance, vented wall furnace, unit heater and room heater shall be provided with combustion air complying with Chapter 6.
Sec. 802

A vented decorative appliance, vented wall furnace, unit heater or room heater shall not be located in any of the following places:

(a) Surgical operating room.
(b) Hazardous location.
(c) Group H, Division 1, 2 or 3 Occupancies.
(d) Any room or space where an open flame is prohibited.
(e) In Group H, Division 4 Occupancies, devices generating a spark or glow capable of igniting gasoline vapors shall not be installed or used within 8 feet of the floor.
(f) In any Group H, Division 5 Occupancies, and Group B, Division 3 Occupancies, unless the appliance is located at least 8 feet above the floor.

Overhead heaters installed in aircraft storage or servicing areas of Group B, Division 3 Occupancies shall be at least 10 feet above the upper surface of wings or engine enclosures of the tallest aircraft housed in the hangar. Overhead heaters shall be at least 8 feet above the floor of shops, offices and other sections of hangars communicating with aircraft storage or working areas.

Vented decorative appliances, vented wall furnaces, unit heaters and room heaters shall be installed so as to minimize the probability of damage from an external source.

Section 803 is amended:

SECTION 803. VENTED DECORATIVE APPLIANCES AND GAS LOGS.

(a) General. In addition to the general requirements specified in Section 802, every vented decorative appliance shall comply with the requirements specified for heating equipment and heating appliances of this Code.

(b) Gas Log. A gas-fired decorative log set may be installed in a fireplace suitable for burning solid fuel subject to the following limitations. Installation shall comply with the manufacturer's listing and instructions.

1. Construction shall be in accordance with Los Angeles Standard RGA 2-72 or ANSI Standard Z21.60, and equipment shall be listed.
Sec. 803

2. Input rating shall not exceed 90,000 Btu/h nor be less than 11,000 Btu/h. Orifices shall be fixed and sized for Denver altitude.

3. A safety pilot is required. The safety pilot shall be protected from mechanical damage and shall not be covered by sand or granules.

4. Thermostatic control valve is not permitted.

5. The use of a flexible gas connector is not permitted.

6. Masonry fireplaces shall comply with Chapter 37. Factory-built fireplaces shall be approved for installation of gas logs and provided with a means for installing the gas piping.

7. The chimney serving a masonry fireplace shall comply with Chapter 37 or for existing chimneys, as approved by the Department. Factory built fireplaces shall be equipped with a listed chimney. Chimney size shall comply with Table 8-A.

8. The chimney damper shall either be removed or an opening or openings shall be cut in the damper; or a permanent, nonremovable clamp with a breakaway bolt fastener shall be installed on the damper; all to provide the minimum amount of opening prescribed in Table 8A or the manufacturer’s instructions, whichever is more stringent.

9. Permanent combustion air openings, communicating directly with outside air, shall be provided in the firebox or in an area directly communicating with the room in which the fireplace is located. Openings shall be sized in accordance with Chapter 6.

10. Glass doors and a fireplace screen shall be required on the fireplace when a gas log appliance is installed.

11. The gas log appliance shall be provided with a permanent label with lettering ¼ inches in height stating "NO SOLID FUEL SHALL BE USED IN THIS FIREPLACE." This label must be visible after installation.

12. Manufacturer’s instructions: Complete instructions shall be packaged with each set.
TABLE 8-A is added:

### TABLE 8-A

**CHIMNEY SIZING FOR GAS LOGS**

Minimum free area required within the chimney and at the damper opening.

<table>
<thead>
<tr>
<th>Chimney Height, Foot</th>
<th>Appliance Input Rating, Btu Per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>14,000</td>
</tr>
<tr>
<td>8</td>
<td>15,200</td>
</tr>
<tr>
<td>10</td>
<td>16,800</td>
</tr>
<tr>
<td>15</td>
<td>18,200</td>
</tr>
<tr>
<td>20</td>
<td>20,200</td>
</tr>
<tr>
<td>30</td>
<td>21,600</td>
</tr>
</tbody>
</table>
Sec. 804

Section 804 is amended:

SECTION 804. FLOOR FURNACES. Floor furnaces shall not be installed, repaired, replaced or used.

Section 806(a) is amended:

(a) Suspended-Type Unit Heaters.
1. Approved unit heaters may be installed in garages, enclosed loading docks and other similar occupancies. When heaters are installed in public repair or storage garages, they shall be suspended from the roof or ceiling so that there is at least 8 feet from the floor to the bottom of the unit. In spaces where vehicular equipment in excess of 6 feet in height is present, a minimum of 2 feet clearance shall be provided between the bottom of the unit heater and the top of the vehicle.

2. Unit heaters installed in private garages shall be installed with a clearance of at least 66 inches measured from the floor to the bottom of the unit.

3. Unit heaters shall be installed with clearances from combustible material of not less than 18 inches at the sides, 12 inches at the bottom, 6 inches above the top, and 18 inches beyond the front and rear of the heater except as provided in subsections (c) and (d) below.

4. When heaters are installed in public repair or storage garages, they shall be suspended from the roof or ceiling so that there is at least 8 feet from the floor to the bottom of the unit. In spaces where vehicular equipment in excess of 6 feet in height is present, a minimum of 2 feet clearance shall be provided between the bottom of the unit heater and the top of the vehicle.

5. Unit heaters installed in private garages shall be installed with a clearance of at least 66 inches measured from the floor to the bottom of the unit.
Sec. 806

Section 806(b) is added:

3. Floor-mounted-type unit heaters shall not be installed in repair garages, storage garages or any other areas where Class I flammable liquids are used or stored.

Section 1002(a) is amended by adding the following paragraph:

Gypsum board products shall not be used as a duct, except that a fire-rated shaft extending through a multi-level building and constructed of an approved fire-rated gypsum board assembly may be used as a central return air duct.

Section 1004(b) is amended:

(b) Factory-Made Air Ducts. Approved Class 0 and Class 1 factory-made air ducts may be installed in any occupancy covered by this Code. Factory-made flexible air ducts shall be used only to connect diffusers and grills to a main duct and shall be limited to 16 inches in diameter and 10 feet in length.

Section 1004(e) is added:

(e) Installation References. In addition to the specific requirements outlined in this Section, duct installation shall comply with American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) and Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards.

Section 1006(d) Exception 3 is added:

EXCEPTIONS:

3. Fire dampers and combination fire/smoke dampers located in a smoke exhaust path shall be equipped with links having a high temperature classification.
Section 1503 is amended:

**GROUP 1**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Chemical Formula</th>
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<tbody>
<tr>
<td>Carbon Dioxide (R 744)</td>
<td>CO₂</td>
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<tr>
<td>Dichlorodifluoromethane (R 12)</td>
<td>CCl₂F₂</td>
</tr>
<tr>
<td>Dichlorodifluoromethane, 73.8 degrees</td>
<td>CCl₂F₂</td>
</tr>
<tr>
<td>and Ethylidene Fluoride, 26.2%</td>
<td>CH₃CHF₂</td>
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<tr>
<td>Dichloromethane (R 30) (Methylene Chloride)</td>
<td>CH₂Cl₂</td>
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<tr>
<td>Dichloromonofluoromethane (R 21)</td>
<td>CHCl₂F</td>
</tr>
<tr>
<td>Dichlorotetrafluoroethane (R 114)</td>
<td>C₂Cl₂F₂</td>
</tr>
<tr>
<td>Monochlorodifluoromethane (R 22)</td>
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<td>Trichlorotetrafluoroethane (R 113)</td>
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**GROUP 2 (TOXIC)**

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<tr>
<td>Ammonia</td>
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**GROUP 3 (FLAMMABLES)**

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<tr>
<td>Propane</td>
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</table>
Sec. 1504

Section 1504(a) is amended:

(a) **Supports.** Supports for compressors and condensing units shall be designed to safely carry the equipment. Supports from buildings or parts of buildings that are of noncombustible construction shall be noncombustible.

A compressor or portion of a condensing unit supported from the ground shall rest on a concrete or other approved base extending not less than 3 inches above the adjoining ground level and shall not be located closer than 5 feet to any property line.

Section 1504(b) is amended:

(b) **Access.** An unobstructed access opening and passageway not less than 24 inches in the least dimension shall be provided and maintained to the compressor, unless otherwise specified by this Code.

Roof-mounted mechanical refrigeration equipment shall not be placed closer than 6 feet to the edge of a roof unless protected with a guard rail or parapet wall at least 3 feet high. Access to refrigeration rooms shall not be through a boiler or furnace room.

Section 1504(g) is added:

(g) **Domestic Water.** Domestic water used for cooling purposes shall be consumed or recycled and shall not be wasted to storm sewer, sanitary sewer, above-ground drainage or below-ground drainage unless specifically approved by the Department.

Section 1506 is amended:

**SECTION 1506. GROUP 2 AND GROUP 3 REFRIGERANTS.**

(a) **General.** The use of any Group 2 (toxic) or Group 3 (flammable) refrigerants, other than ammonia as specified herein, is prohibited.
Sec. 1506

(b) Prohibitions.

1. Ammonia is prohibited for use in an air conditioning system or ice skating rink and shall be permitted only in a building used exclusively for ice making, cold storage or the manufacturing or processing of food or drink, provided that the occupant load does not exceed one person per 100 square feet of floor area served by the system. See Chapter 33.

2. Parts of an ammonia refrigeration system shall not be located in any exit less than 20 feet from any door, window or air inlets when located on the exterior of a building.

(c) Emergency Switch. An accessible single emergency control switch to shut off an ammonia refrigeration machine shall be located outside of but within 10 feet of the entrance to the space containing the equipment and shall be properly labeled.

Section 2002(d) is amended:

(d) Duct Enclosure. A grease duct serving a Type I hood shall be installed in an enclosure from the point where the duct first penetrates a fire-rated wall, floor or ceiling assembly. Enclosure shall be continuous until the duct exits the building. A duct may only penetrate exterior walls at locations where unprotected openings are permitted by the Code.

Duct enclosures shall be constructed in accordance with the Code procedures for shaft enclosures. Duct enclosures shall be of at least one-hour fire-resistive construction in all buildings and shall be of 2-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 enclosure shall be separated from the duct by at least 3 and not more than 12 inches and shall serve a single grease exhaust duct system.
Sec. 2003

Section 2003(b) last paragraph is added:

Joints and seams shall be made with a continuous liquid-tight weld or braze.

EXCEPTION: Hoods of listed grease extractors or listed automatic damper and hood assemblies evaluated under the same conditions of fire severity as the hood of listed grease extractors shall be considered as complying with this requirement.
Appendix B Section 2105 is amended:

SECTION 2105. PERMIT REQUIRED. It shall be unlawful to install, alter or repair any boiler or pressure vessel without first obtaining a permit to do so from the Building Official. All repairs or alterations shall be completed in accordance with the latest revision of the National Board Inspection Code (NBIC). All repairs or alterations of a welded nature to ASME Coded boilers or pressure vessels must be performed by a company in possession of a National Board "R" Symbol Stamp or an ASME Code Symbol Stamp. Repairs or alterations shall be performed in accordance with procedures outlined in the National Board Inspection Code. In addition, the scope of the work must be within the capability of the company as outlined in the company's quality control manual. Assembly of code boilers requiring field welding must be performed by an organization in possession of a valid and appropriate ASME Code Symbol Stamp.

Appendix B Section 2106(f) is added:

(f) Prohibitions. The following prohibitions shall apply to installation and location of equipment:

1. In addition to equipment location prohibitions in Chapter 22, gas, oil or solid fuel-fired equipment or appliances, including but not limited to steam generators, boilers or water heaters, shall not be installed or maintained in any garage, wash rack, auto wash or building where gasoline or L.P. gas equipment can be operated. Boilers of any type shall not be located in elevator equipment rooms.

   EXCEPTION: Steam generators, water heaters or other open-flame devices may be located in auto washes or commercial garages if installed at least 5 feet 6 inches above the floor on a noncombustible stand that is structurally sufficient to support the equipment.

2. In addition to access requirements covered in Chapter 22, access to rooms containing gas, liquid or solid fuel-fired steam generators, boilers or water heaters shall not be through any garage, wash rack, auto wash or any area where flammable vapors may be present.
3. Boilers or water heaters shall not be installed in dry cleaning plants except as permitted in Chapter 9 of the Uniform Building Code.

4. The installation of compressors or the storage of materials of any kind shall not be permitted in boiler rooms.

5. The installation or use of gaseous chlorinators or chlorine piping in boiler rooms or rooms where fuel-fired equipment is located is prohibited.

6. The installation of any device that will create a pressure less than atmospheric in the boiler room containing gas, oil or solid fuel-fired equipment is prohibited. 

**EXCEPTION:** Equipment designed, listed and approved with power burners or induced draft fans.

7. The installation of piping shall not be permitted in the shaft, pit or penthouse of elevators.

**EXCEPTION:** Piping necessary for the installation of heating equipment for penthouses shall be permitted in the penthouses.

8. The use of internal float-type low-water cutoff as a primary control is prohibited.

9. Refrigeration equipment, forced air or gravity furnaces, or air handlers shall not be located in or access made through boiler rooms.

**EXCEPTION:** Group R-3 Occupancies and individual living units of R-1 Occupancies.

10. Fuel-fired equipment with atmospheric burners shall not be installed in the same room with equipment having power burners or induced draft fans.

**EXCEPTION:** Engineered systems specifically approved by the Department.

11. Cast-iron boilers and cast-iron radiation shall not be permitted on steam systems operating at pressures in excess of 15 psig for steam or 30 psig for water, unless such boilers or radiation are designed and tested for higher working pressures and so certified by the manufacturer or listing agency and approved for use by the Department.

12. Potable water shall not be circulated through any piping system, appurtenances or equipment utilized for space heating unless all components, piping, fittings and joints are new and approved by this code for potable use.
Appendix 2106

13. Single wall exchangers are prohibited where process water and potable water are interfaced. See the Plumbing Code.
14. Incinerators or access to incinerators shall not be located in boiler rooms.
15. Boilers shall not be located in crawl spaces or attics.
16. The use of sealants introduced into boilers and piping systems is prohibited.
17. The plugging of boiler tubes is prohibited.
18. The use of nonmetallic materials in piping of heating or process systems.
   EXCEPTION: Nonmetallic piping as permitted in other sections of this Code or special applications when approved by the Department.
19. Water heaters shall not be used for space heater purposes unless those water heaters meet ANSI Z21.10.1 or ANSI Z21.10.3 for water heaters used in dual purpose applications.
20. Galvanized pipe shall not be used on steam, space heating or process piping systems.

Appendix B Section 2108 is amended:

SECTION 2108. SAFETY OR RELIEF VALVE DISCHARGE.
The discharge from relief valves shall be piped to within 18 inches of the floor or to an open receptacle, and when the operating temperature is in excess of 212°F., shall be equipped with a splash shield or centrifugal separator. When the discharge from safety valves would result in a hazardous discharge of steam inside the boiler room, such discharge shall be extended outside the boiler room. No valve of any description shall be placed between the safety or relief valve and the boiler, nor on the discharge pipe between the safety valve and the atmosphere. The cross-sectional area of the discharge pipe shall be not less than the full area of the valve outlet, or of the total of the areas of the valve outlets, discharging thereto. It shall be as short and straight as possible and arranged as to avoid undue stresses on the valve or valves.
Appendix B Section 2110 is amended:

SECTION 2110. GAS PRESSURE REGULATORS. An approved gas-pressure regulator shall be installed on gas-fired boilers where the gas supply pressure is higher than that at which the main burner is designed to operate. A separate approved gas-pressure regulator shall be installed to regulate the gas pressure to the pilot or pilots. The vent for these regulators should be vented to: (1) a standing pilot; (2) the outside atmosphere; or (3) an approved vent limiting device. A separate regulator shall not be required for the pilot or pilots on manufacturer-assembled boiler-burner units which have been approved by the Building Official and on gas-fired boilers in Group R Occupancies of less than 6 units and in Group M Occupancies.

Appendix B Section 2113 is amended:

SECTION 2113. AUTOMATIC BOILERS AND PRESSURE VESSELS. Automatic boilers shall be equipped with controls and limit devices as set forth in Table No. 21-C. Automatic boilers shall also be equipped with the following gauges, when applicable: oil temperature, oil suction pressure, high and low gas pressure, stack temperature and windbox pressure.

Unless otherwise approved by the Department in special circumstances, automatic boilers and pressure vessels shall conform to the standards of the ASME Boiler and Pressure Vessel Code.

The Building Official may approve solid fuel-fired boilers that meet the safety requirements for automatic gas- or oil-fired boilers.

Appendix B Section 2116 is amended:

SECTION 2116. MOUNTING. A boiler or water heater supported from the ground shall rest on a concrete or other approved base extending not less than 3 inches above the adjoining ground level and shall not be located closer than 5 feet to any property line.
Appendix 2123

Appendix B Section 2123 is amended:

SECTION 2123. INSPECTION AND TESTING.
(a) Testing and Inspection Responsibility. The testing of boilers and pressure vessels shall be performed by the permit holder. In addition to the inspections required in Chapter 3 of the Building Code, the inspection of boilers and pressure vessels shall be performed by the Department.

(b) Owners to Provide Facilities. Every person owning or having possession or control of any such equipment subject to inspection shall provide, at his own expense, proper arrangements and facilities for attaching the instruments of inspection. Immediately before the time set for such inspection, every such person shall remove all scale, dirt, soot and sediment in, beneath and around the equipment. When directed by the Department, a hydrostatic test shall be performed by a licensed steam and hot water heat contractor or boiler maker contractor in accordance with the provisions of the National Board Inspection Code (NBIC), and witnessed by the Department. The hydrostatic test pressure need be no greater than the set pressure of the safety valve having the lowest setting and shall not exceed 1½ times the maximum allowable working pressure of the boiler. When hydrostatic pressure test is deemed necessary by the Department, an internal examination shall be performed prior to the hydrostatic pressure test.

(c) Equipment Tests. When leaks occur that prevent a successful test, the Department shall make a second test upon receiving notice that all leaks have been repaired. If, upon making a second test, such equipment is still defective, the owner or user thereof shall pay an additional inspection fee as provided in Chapter 3 of the Building Code for each subsequent test. The Department shall not issue a certificate until fully satisfied that the equipment is safe.

(d) Piping Systems. Piping systems shall be pressure tested to a minimum of 1½ times working pressure or 100 psig whichever is greater.

(e) Inspection Fees. See Chapter 3 of the Building Code.

> Appendix B Section 2125. Maintenance Inspection is deleted. <
Appendix B Section 2127 is amended:

1. Those portions of piping systems in which the pressure exceeds 160 psig or the temperature exceeds 250°F shall comply with the ASME Boiler and Pressure Vessel Code, ASME/ANSI B31.1 Power Piping, and with the requirements of paragraph 2 below.

Appendix B Section 2128 is added:

SECTION 2128. USED EQUIPMENT.
(a) General. This Section shall not be construed to prevent the use or reinstallation of a boiler or pressure vessel, provided that it conforms to the requirements of this Chapter governing new or existing installations.
(b) Working Pressure. The maximum allowable working pressure of a boiler or pressure vessel carrying the ASME Code symbol shall be determined by the applicable sections of the ASME Code under which it was constructed and stamped.
(c) Non-Standard Working Pressure. The maximum allowable working pressure of a boiler or pressure vessel which does not carry the ASME Code symbol shall be computed in accordance with the Inspection Code of the National Board of Boiler and Pressure Vessel Inspectors.
(d) Used Equipment. Before a used boiler or pressure vessel may be installed, an inspection shall be made by a Denver licensed steam and hot water heating or boilermaker contractor.
   EXCEPTION: For equipment to be installed in one- and two-unit dwellings, the boiler may be inspected by a hot water heating contractor.
(e) Used boilers and pressure vessels shall be hydrostatically tested in accordance with requirements outlined in the National Board Inspection Code (NBIC). The hydrostatic test shall be witnessed by a member of the Department. Test results and written certification of the boiler condition shall be submitted by the licensed contractor to the Department and approved prior to installation.
Appendix 2128

(f) Reinstallation. Where a stationary boiler or pressure vessel is moved and reinstalled, the fittings and appurtenances shall comply with the requirements for new installations.

Appendix B Section 2129 is added:

SECTION 2129. CENTRAL UTILITY STEAM.

(a) General. Steam piping from any central utility heating system entering into an individual building shall be provided with a steam shutoff valve of the same size as the supply pipe to the building and shall be installed near the entrance of the pipe and the building. Connections to the steam supply of building piping shall be made on the building or load side of the valve.

(b) Reducing Valve Required.

1. Where the steam pressure supplied from such systems is of greater pressure than the design pressure of the heating equipment or other equipment used in the building, an approved reducing valve shall be installed to regulate the steam pressure to this equipment.

2. A bypass line installed around the pressure reducing valve shall be at least ½ the size of the reducing valve and shall be controlled by a globe-type stop valve.

3. On the downstream side or low pressure side of the reducing valve, a steam gauge and low pressure relief or safety valve shall be installed and set at maximum pressure at which the low pressure heating system is designed to be operated.

(c) Return Condensate. The return condensate from a building heated by a central steam supply may be discharged either into a return condensate system or wasted into a sewer drain connection or approved leaching well. Condensate discharging into a sanitary sewer system shall be sufficiently cooled so that the temperature of the discharge water is not in excess of 180°F. The discharge cannot be directly connected to any sanitary sewer system. The discharge shall be to an open floor drain, special drain connection or approved receptor. If the floor drain or drain connection to the sewer is above the level of the return piping so that it cannot flow by gravity, an automatic sump pump shall be
Appendix B Section 2130 is added:

**SECTION 2130. STANDARDS.** Unless otherwise provided for in the Building Code, the following Standards shall apply:

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<thead>
<tr>
<th>ORGANIZATION</th>
<th>TITLE OF PUBLICATION</th>
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<tr>
<td>AISI</td>
<td>American Iron and Steel Institute C-140 Flow Chart and Sizing Tables.</td>
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| ANSI         | Pipe Threads (Except Dryseal), 82.1-1968.  
|             | Petroleum Refinery Piping, B31.3-1980  
|             | Refrigeration Piping, B31.5-1983  
|             | Heating Boilers, Section IV, 1989.  
|             | Recommended Rules for Care and Operation of Heating Boilers, Section VI, 1989.  
|             | Recommended Rules for Care of Power Boilers, Section VII, 1989.  
|             | Pressure Vessels, Section VIII, 1989.  
|             | Welding and Brazing Qualifications - Section IX 1989 |
| ASTM         | Surface Burning Characteristics of Building Materials, E84-77.  
<table>
<thead>
<tr>
<th>ORGANIZATION</th>
<th>LEGEND</th>
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| AISI | American Iron and Steel Institute  
1000 16th Street N.W.  
Washington, D.C. 20036 |
| ANSI | American National Standards Institute  
1430 Broadway  
New York, NY 10018 |
| API | American Petroleum Institute  
1801 K Street N.W.  
Washington, D.C. 20006 |
| ASHRAE | American Society of Heating, Refrigeration and Air Conditioning Engineers  
1791 Tullie Cir. N.E.  
Atlanta, GA 30329 |
| ASME | American Society of Mechanical Engineers  
345 East 47th Street  
New York, NY 10017 |
| ASTM | American Society for Testing and Materials  
1916 Race Street  
Philadelphia, PA 19103 |
| NBBI | National Board of Boiler and Pressure Vessel Inspectors  
1055 Crupper Avenue  
Columbus, OH 43229 |
Appendix B Section 2206(c)2 is amended:

2. Final Piping Inspection. This inspection shall include an air, CO or nitrogen pressure test, at which time the gas piping shall stand a pressure of not less than 10 psig or, at the discretion of the Building Official, the piping and valves may be tested at a pressure of at least 6 inches of mercury. Test pressures shall be held for a length of time satisfactory to the Building Official, but not less than 15 minutes, with no perceptible drop in pressure. For welded piping and for piping carrying gas at pressures in excess of 14 inches water column pressure, the test pressure shall be 1½ times the maximum fuel pressure for which the piping system is designed, but not less than 60 psig, and shall be continued for a length of time satisfactory to the Building Official, but not less than 30 minutes. These tests shall be made using air, CO or nitrogen pressure only and shall be made in the presence of the Building Official. Necessary apparatus for conducting tests shall be furnished by the permit holder.

Appendix B Section 2211(d) is amended:

(d) Inlet Location. The gas piping inlet shall be located adjacent to the approved meter location. Gas pipe entry into the building shall be above grade.

Appendix B Section 2212 first paragraph is amended:

SECTION 2212. MATERIAL FOR GAS PIPING. Pipe used for the installation, extension, alteration or repair of gas piping shall be malleable black iron pipe or, when special circumstances dictate, internally tinned copper pipe or tubing. Polyethylene pipe meeting the standards of ASTM D2513-86A may be used in exterior buried piping systems. The use of PVC or cast iron for any gas piping is prohibited.

Appendix B Section 2213(b) is amended:

(b) Location. Gas piping shall not be installed in or on the ground under any building or structure, and exposed gas piping shall be kept at least 6 inches above grade or
Appendix 2213

> structure. Gas piping shall not be installed under any concrete or asphalt slab that buts up against a building unless the pipe is sleeved and the sleeve is vented to the atmosphere to dissipate any gas leaks. Welded or threaded gas piping may be installed in concealed spaces provided that bushings, unions, valves, plugged or capped openings are not concealed, gas piping is not imbedded in concrete or masonry, and access is provided to all threaded joints.

Appendix B Section 2214 is amended:

SECTION 2214. APPLIANCE CONNECTORS. Appliance connections shall be installed in accordance with Section 503(c) of the Uniform Mechanical Code.

Appendix B Section 2219(a) is amended:

(a) General. Where the maximum demand does not exceed 250 cubic feet per hour and the maximum length of piping between the meter and the most distant outlet is not over 250 feet, the size of each section and each outlet of any system of gas piping shall be determined by means of Table No. 22-D. Other systems within the range of Table No. 22-D may be sized from that table or by the methods set forth in subsection (b) below. Table No. 22-J, representing Denver’s condition of altitude and .67 specific gravity gas, may be used to size gas piping systems.

Appendix B Section 2220(a) is amended:

(a) General. Approval by the Building Official and verification from the serving gas supplier of the availability of the desired pressure shall be obtained before any medium- or high-pressure gas piping system is installed. A gas piping system at a pressure over 8-inch water column shall not be installed in any Group R Occupancies. EXCEPTION: System pressure over 8-inch water column may be used in any Group R-1 Occupancies for a gas piping system that only serves a central boiler/furnace facility.
Appendix C

Appendix C Reference Standards is amended to include the following Standards.

- NFPA 90A - Installation of Air Conditioning and Ventilating Systems - 1985
- NFPA 33 - Spray Application Using Flammable & Combustible Liquids - 1985
- NFPA 37 - Stationary Combustion Engines & Gas Turbines - 1984
- NFPA 99C - Nonflammable Medical Gas Systems - 1987
- NFPA 664 - Wood Processing and Woodworking Facilities - 1987
- NFPA 82 - Incinerators, Waste and Liner Handling Systems & Equipment - 1983
- NFPA 86 - Ovens and Furnaces - 1985
- NFPA 91 - Blower and Exhaust Systems - 1983
Appendix B Table No. 22-J is added:

**TABLE 22-J**

**FUEL LINE SIZING TABLE**

**CAPACITIES FOR 6.0 INCHES W.C. FUEL LINE SYSTEMS**

**STEEL PIPE 0.5 INCHES W.C. PRESSURE DROP**

**PIPING CAPACITY TABLE FOR 0.67 SPECIFIC GRAVITY GAS**

**MAXIMUM CAPACITY OF STEEL PIPE IN CFH**

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DIVISION 3

AMENDMENTS

TO THE

1988 EDITION OF THE UNIFORM PLUMBING CODE

AND

APPENDIX
DENVER AMENDMENTS TO THE UNIFORM PLUMBING CODE BY
PARTS, CHAPTERS AND SECTIONS

The following Chapters and Sections have been amended by the Denver Amendments to the UPC.

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Part I Administration, including Chapters 1, 2 and 3, of the Uniform Plumbing Code ("UPC") is deleted. The administrative provisions of UBC Chapters 1, 2 and 3 as amended by Denver shall govern.

Part II Installation Requirements.

Section 102 (h) is added:

(h) Area Drain - A drain installed to collect surface or rainwater from an open area.

Section 103 (c) is amended:

(c) Backflow Preventer - A device or means to prevent backflow into the potable water system as approved by the Department including:
1. Atmospheric type (vacuum breaker - atmospheric). A vacuum breaker not designed to be subject to static line pressure.
2. Pressure type (vacuum breaker - pressure). A vacuum breaker designed to operate under conditions of static line pressure.
3. Reduced pressure type. An assembly of differential valves and check valves including an automatically opened spillage port to the atmosphere.

Section 103(q) is added:

(q) Branch Interval - A length of waste stack not less than 8 feet in length or height, within which horizontal branches are connected to the stack.

Section 104(a) Cesspool is deleted.

Section 104(e) is amended:

(e) Combination Waste and Vent System - A specially designed system of waste piping embodying the horizontal wet venting of one or more sinks, lavatories, drinking fountains or floor drains by means of a common waste and vent pipe, adequately sized to provide free movement of air above the flow line of the drain.
Section 104(l) and (m) are added:

(l) **Control Valves** - the valves controlling distribution of water from the sprinkler supply line to sprinkler distribution pipes. The valves may be installed singly or in manifold.

(m) **CPVC** - Chlorinated Polyvinyl Chloride.

Section 105(h), (i), (j) and (k) are added:

(h) **Dead End** - A branch leading from a waste, vent, building drain or building sewer which is terminated at a developed length of 2 feet or more by means of a cap, plug or other closed fitting.

(i) **Downspout** - A water conductor that does not connect to a disposal system. (Also see Leader.)

(j) **Dwelling** - Any building or portion thereof which contains not more than 2 dwelling units.

(k) **Dwelling Unit** - Any building or portion thereof which contains living facilities, including provisions for sleeping, eating, cooking and sanitation for not more than one family.

Section 107(k) and (l) are added:

(k) **Floor Drain** - An opening in the floor used to drain water from floors into the plumbing system.

(l) **Floor Sink** - A receptor in the floor used for the waste discharged from indirect drain piping.

Section 108(b) is amended:

> (b) **Grease Interceptor** - See Interceptor.

> Section 108(c) **Grease Trap** is deleted.

Section 110(a) is amended:

(a) **Indirect Waste Pipe** - A pipe that does not connect directly with the drainage system but conveys liquid wastes by discharging, through an air break or air gap, into a plumbing fixture or receptacle that is directly connected to the drainage system.
Section 110(f) is added:

(f) Irrigation Control Valves - The valves controlling distribution of water from the sprinkler supply line to sprinkler distribution pipes. The valves may be installed singly or in a manifold.

Section 113(g) is added:

(g) Leader - A water conductor from the roof to the building storm drain.

Section 114(f) is added:

(f) Municipal Water System - The system by which water is supplied to the City and its inhabitants.

Section 117(p) is added:

(p) Pressure Lines - A water line designed or intended to contain water under continuous pressure.

Section 119(g) is added:

(g) Roof Drain - A drain or receptacle installed to receive water collecting on the surface of a roof and to discharge it to a leader or downspout.

Section 120(q), (r), (s), (t), (u) and (v) are added:

(q) Sanitary Sewer - A pipe that carries sewage exclusive of storm, surface and groundwater.
(r) Service Line - Pipes conveying water from the water main to the building.
(s) Sewage Ejector - A nonclogging type pump designed for conducting sewage collected from sanitary plumbing fixtures in the building.
(t) Sprinkler Distribution Pipe - A water line not under continuous pressure conveying water from the control valves to the sprinkler heads.
(u) Subsoil Drain - A drain or pipe that receives only subsurface water and conveys it to a place of disposal.
(v) Sump Pump - A pump that handles only clear waste or storm water.
Section 124(j) and (k) are added:

(j) **Water Storage Facility** - A reservoir, cistern, storage tank, water supply tank or similar facility utilized to store water in a water supply system.

(k) **Weir** - The level at which water leaves the outlet of a trap.

Section 203(a) is amended:

(a) **Underground Drainage.** Copper tube for underground drainage and vent piping shall have a weight of not less than that of type L copper drainage tube.

Section 203(d) is amended:

(d) **Water Piping.** Copper tube for water piping shall have a weight of not less than type L.

**Exception:** Type M copper tubing may be used for water piping when piping is above ground in or on a building.

Section 204 is amended:

**SECTION 204: LEAD.** See Table A. Plumbing Materials Standards. Sheet lead shall be not less than the following:

(a) **Safe pans.** Safe pans shall not be less than 4 pounds per square foot or 1.6 mm thick.

(b) **Terminals.** Flashing or vent terminals shall not be less than 3 pounds per square foot or 1.2 mm thick.

(c) **Lead Bends and Traps.** Lead bends and lead traps shall not be less than 1/8 inch (3.2 mm) wall thickness. The use of lead solder, flux and pipe is prohibited in new installations or in the repair of existing plumbing systems. This includes the use of lead in drain waste and vents.

**EXCEPTION:** Lead as a related material may be used for caulked joints on nonpressure systems, lead pans and lead flashings.

Caulked joints for cast iron bell and spigot pipe shall be firmly packed with oakum and filled with 1-inch-deep molten lead. Lead shall be caulked.

Section 207(c) is amended:

(c) **Cleanout.** Cleanouts shall be designed to be gas and water tight.
Sec. 208

Section 208(a) is amended:

(a) **Screwed fittings.** Screwed fittings shall be ABS, cast iron, copper, copper alloy, malleable iron, PVC, CPVC, polypropylene steel or other approved materials. Threads shall be tapped out of solid metal or molded in solid ABS, PVC, CPVC or polypropylene.

Section 303(c) is amended:

(c) **Wastewater Management Division.** Uniform Plumbing Code provisions for wastewater quality control facilities, inside and/or outside of any structure, shall be administered and enforced by the Wastewater Management Division (WMD). These facilities include and are not limited to pretreatment devices such as grease, sand and oil interceptors, acid neutralization tanks, silver recovery units; swimming pool discharge; area drains; control manholes; flow equalization facilities; flow meters; and inspection chambers. Construction of all storm and sanitary sewers, facilities and service connections from a point 2 feet outside the structure to the point of connection at the public sewer system is within the purview of the WMD and thus must be approved by the WMD and meet all applicable WMD standards.

References:

1. Rules and Regulations Governing Sewage Charges and Fees and Management of Wastewater, Wastewater Management Division.
4. Directives, Procedures and Standards, Wastewater Management Division.

Section 306 is amended:

**SECTION 306. PLANS REQUIRED.**

(a) **Plans.** The Department shall require the submission of plans, specifications, drawings and such other information as may be deemed necessary prior to the
commencement of and at any time during the progress of any work regulated by this Code.

(b) Issuance of Permit. The issuance of a permit upon plans and specifications shall not prevent the Department from thereafter requiring the correction of errors in said plans and specifications or from preventing construction operations being carried on thereunder when there is a violation of this Code or of any other pertinent ordinance or from revoking any certificate of approval when issued in error.

Section 310(h) is added:

(h) Dead Ends. In the installation or removal of any part of a drainage system, dead ends shall be avoided except where necessary to make a cleanout accessible.

Section 315(b) is amended:

(b) Installation. All piping in connection with a plumbing system shall be installed so that piping or connections are not subject to undue strains or stresses. Provisions shall be made for expansion, contraction and structural settlement. No piping shall be directly embedded in concrete or masonry walls or footings. No structural member shall be seriously weakened or impaired by cutting, notching or otherwise unless approved by the Department.

Section 322 is amended:

SECTION 322. VALIDITY.

(a) Severability. If any provision of this Code or the application thereof is held invalid, the remainder of the Code, or the application of such provision to other persons or circumstances, shall not be affected thereby.

(b) Appendices. Wherever reference is made to an appendix, the provisions in the appendix shall not apply unless specifically stated as a requirement.
Sec. 401

Section 401(a)(4) is added:

(4) No clay, ABS, PVC or other types of plastic piping shall be installed under or within 2 feet of any building or structure.

Section 508 is added:

SECTION 508. SUDS, WASTE, AND VENTING.

(a) Where Required. Laundry trays, laundry washing machines and similar fixtures in which sudsy detergents are normally used shall be wasted and vented in accordance with Section 508(b). This requirement shall not apply to single family dwellings.

(b) Method. In buildings of less than 6 branch intervals, a separate waste pipe for the lowest floor fixtures shall be provided. The connection to the lowest horizontal drain shall not be within 5 feet of the stack. In buildings of 6 or more branch intervals, separate waste and vent stacks for the lower 2 branch intervals shall be provided.

Section 609 is amended:

SECTION 609. COOLING WATER. Domestic water used for cooling purposes shall be consumed or recycled and shall not be wasted to storm sewer, sanitary sewer, above-ground drainage or below-ground drainage unless specifically approved by the Department.

Section 610 is amended:

SECTION 610. DRINKING FOUNTAINS. Drinking fountains shall not be installed with indirect wastes.

Section 612(h) is amended:

(h) Minor Installations. The provisions in this Section, relative to materials and methods of construction, may not apply to minor installations such as small photographic or X-ray dark rooms or small research or control laboratories where minor amounts of adequately diluted chemicals are discharged as approved by Wastewater Management Division.
Section 713 is amended:

SECTION 713. FOOD WASTE DISPOSAL PROHIBITED.
> Unless specifically approved and permitted by the Wastewater Management Division, no food waste disposal unit shall be connected to or discharged into any grease interceptor or grease trap.

Section 802(h) Asbestos Cement Sewer Pipe Joints is deleted.

Section 804(g) is added:

(g) Expansion and Contraction. For plastic sanitary drainage and vent systems, restraint and expansion fittings shall be used at each branch interval or each vertical 25 feet, whichever is less, to accommodate movement due to contraction and expansion.

Section 901 is amended:

SECTION 901. MATERIALS - CONSERVATION - GENERAL REPLACEMENTS.

(a) Quality of Fixtures. Plumbing fixtures shall be constructed of dense, durable, nonabsorbent materials and shall have smooth, impervious surfaces, free from unnecessary concealed fouling surfaces. Except as permitted elsewhere in this Code, all fixtures shall conform in quality and design to nationally recognized applicable standards or to other approved standards acceptable to the Department. All porcelain enamel surfaces on plumbing fixtures shall be acid resistant. Water closet bowls for public use shall be elongated bowls equipped with open-front seats. Water closet seats shall be of smooth nonabsorbent material and shall be properly sized for the water closet bowl type. (For the convenience of users of this Denver Code, a list of generally accepted plumbing fixture standards is included in Table A at the end of Chapter 2 of this Code.)

(b) Conservation. All plumbing fixtures in new construction shall meet the following requirements for water use:

1. Tank type water closets shall not use more than 3.5 gallons per flush.
2. Flushometer Valves.
   a. Flushometer valves for water closets shall not use more than 3.0 gallons per flush.
   b. Flushometer valves for urinals shall not use more that 1.5 gallons per flush.
3. Shower heads for the purpose of bathing and washing shall have a maximum flow rate of 3.0 gallons per minute.
4. Lavatory, kitchen, and service faucets shall have a maximum flow of 2.5 gallons per minute.

Section 910 is amended:

SECTION 910. PLUMBING FIXTURES REQUIRED. Each building shall be provided with the minimum sanitary facilities for various occupancies as listed in Appendix C of this Code. Each plumbing fixture shall be equipped with hot and cold running water as necessary for its normal operation.

(a) Location of Toilet Facilities. Facilities shall be installed in a location convenient to occupied areas served by them and not more than 300 feet and one floor removed from any portion of the occupied area.

(b) Restroom. Separate toilet room facilities shall be provided for males and females, unless otherwise allowed in this Code. Toilet room facilities shall be completely enclosed or screened to ensure privacy. A toilet room utilized by both sexes shall be identified as a "Restroom".

(c) Access. There shall be no access through a toilet room to any portion of a building. Access to toilet rooms shall not be through food preparation areas, except for toilet room facilities provided exclusively for the use of employees in the food preparation area.

(d) Toilet Room Accessories. A minimum of one hand-drying facility shall be provided in each toilet room where lavatories are provided.

(e) Location of Service Sinks. Except for Group R Occupancies, service sinks are required on each floor where toilet facilities are required. Service sinks shall not be installed in toilet rooms.

(f) Urinals for Women. Women's urinals may be installed only under the following conditions:
Sec. 910

1. Urinals may be installed as auxiliary fixtures and shall not be considered as substitutes for required water closets. The required minimum number of water closets shall be provided in all cases.

2. Urinals shall be in enclosed compartments with doors for privacy.

(g) **Coin-Operated Toilets.** Toilet facilities for public use and provided with coin-operated or other external locking devices shall be provided only in addition to the toilet room facilities required by this Code.

(h) **Occupancy/Ratio of Sexes.** To determine the number of occupants in a building or portion thereof, see Table No. 33-A of the Uniform Building Code. In buildings occupied by both sexes, the ratio of male to female facilities shall be established on the basis of 50% male and 50% female occupants, except when the building or portions thereof are designed and intended for an imbalanced division of the sexes. For imbalanced situations, the number of fixtures for each sex shall be installed on the basis of the actual or intended ratio of male to female occupants of the building or portion thereof.

Section 913 is added:

**SECTION 913. SINKS.**

(a) **Waste Outlets.** Sinks shall be provided with waste lines at least 1½ inches in diameter. Waste outlets shall have open strainers or stoppers.

(b) **Commercial Sinks.**

1. All commercial sinks, such as bar sinks and dishwashing sinks, used in food preparation areas shall be installed so that any drainage backup is relieved through a floor drain placed next to the fixture.

2. Sinks used in the direct preparation of foods, such as salad sinks and frozen food sinks where food is prepared, stored or thawed, shall be connected indirectly to a floor sink located as near as possible to the food preparation sink.

(c) **Waste Lines.** All kitchen-type sinks with a garbage disposal and dishwasher installed in residential or commercial lunch rooms shall have a minimum of a 2-inch waste line.
Section 1003(h) is amended:

(h) **Lawn Sprinkling Systems.**

1. In addition to the other requirements of the Uniform Plumbing Code, this Section shall govern the design, construction and installation of lawn sprinkler systems connected to the potable water supply.

2. Lawn Sprinkler Systems shall include apparatus and equipment affixed permanently to the property in the lawn, ground, flower beds or fence, connected to the potable water supply, and normally used for the purpose of irrigation. Connection to the water supply includes connections to the hose bibs and permanent connections to the water supply line.

3. Design and installation of sprinkler systems shall, under calm wind conditions, prevent spray of water onto sidewalks, streets or other public ways.

4. Pipes shall be sloped to drain. Drain valves shall drain into a sump or gravel pocket.

5. Cross connections shall not be made between the potable water supply and any other source of water.

6. Connection to the potable water supply may be made either at the service line or at the water distribution line. In either case, the connection shall be made at least 5 feet downstream from the water meter. Provisions shall be made to protect the sprinkler supply line from freezing.

7. An approved back-flow preventer shall be installed in all lawn sprinkler systems. The back-flow preventer, unless of the reduced pressure type, shall be installed at least 6 inches above the highest sprinkler head.

8. In addition to meeting the requirements specified in Appendix A, tubing under pressure to the irrigation control valves shall be capable of with standing a minimum of 125 psi.

9. All pipe and fittings downstream of the irrigation control valves and backflow devices shall be capable of withstanding a continuous working pressure of 80 psi.

10. Each pipe fitting, sprinkler head, valve or device used in a lawn sprinkler system shall have the manufacturer's name and type or classification indelibly marked on it. Each length of pipe shall be so marked continuously along its length.
Sec. 1003

11. The following standards shall apply:

Organization:

American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

Title of Publication:

Poly (Vinyl Chloride) Plastic Pipe Schedules, D-1785, 1974
Poly (Vinyl Chloride) Plastic Pipe, Specs. for, D-2241, 1974
Polyethylene Plastic Pipe, Specs. for, D-2239-1974
Polyethylene Plastic Tubing, Specs. for, D-2737-1974

Section 1004(a) is amended:

(a) Water Pipe. Water pipe and fittings shall be of brass, copper, cast iron, galvanized malleable iron, galvanized wrought iron, galvanized steel or other approved materials. CPVC, PE or PVC water pipe manufactured to recognized standards may be used for cold water distribution systems outside a building. CPVC and water pipe and tubing may be used for hot and cold water distribution systems within a building. All materials used in the water supply system, except valves and similar devices, shall be of a like material, except where otherwise approved by the Department.

Section 1101(d) is amended:

(d) Public Sewer. The public sewer shall not be considered available when it is more than 300 feet from the nearest point of the property line or the building to be served is more than 1000 feet from such public sewer.

Section 1105 is amended:

SECTION 1105. SIZE OF BUILDING SEWERS. The minimum size of any building sewer shall be determined on the basis of the total number of fixture units drained by such sewer, in
Sec. 1105

accordance with Table 11-2. In no case shall the building sewer size be less than 4 inches inside diameter.

Section 1108 is amended:

SECTION 1108. SEwers AND WATER PIPES. Building sewers shall not be run or laid in the same trench as the water pipes unless approved by the Department in writing.

Section 1307 is amended:

SECTION 1307. ENClosures AND COMBustion AIR. All fuel-fired water heaters shall be provided with combustion air in accordance with Chapter 6 of the Uniform Mechanical Code.
APPENDIX C
MINIMUM PLUMBING FACILITIES

Each building shall be provided with sanitary facilities, for use by both the public and employees, including provisions for the physically handicapped (See Section 910, Plumbing Fixtures Required). For Handicapped requirements the design, installation and materials used in all structures shall comply with this Plumbing Code and Appendix Chapter 64 of the amendments.

<table>
<thead>
<tr>
<th>Type of Building Occupancy</th>
<th>Water Closets</th>
<th>Male&lt;sup&gt;10&lt;/sup&gt; Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking&lt;sup&gt;3,13&lt;/sup&gt; Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly Places - Theatres, Auditoriums, Convention Halls, Arenas, Field Houses, Assembly Halls, Stadiums, and similar occupancies - for permanent employee use.</td>
<td>Male 1:1-15 Female 2:16-35 3:36-55</td>
<td>0:1-10 Male 1 per 40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Appendix C is amended.
### APPENDIX C (Continued)

#### MINIMUM PLUMBING FACILITIES

<table>
<thead>
<tr>
<th>Type of Building Occupancy</th>
<th>Water Closets</th>
<th>Male Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly Places - Theatres, Auditoriums, Convention Halls, Arenas, Field Houses, Assembly Halls, Stadiums, and similar occupancies - for permanent public use.</td>
<td>Male 1:1-100 Female 3:1-100</td>
<td>1:1-100 Male 1:1-200 Female 1:1-200</td>
<td>1:1-200 Male 2:201-400 Female 2:201-400</td>
<td>1:1-200 Male 3:401-750 Female 3:401-750</td>
<td>1 per 75&lt;sup&gt;12&lt;/sup&gt; Min. 1 per floor</td>
</tr>
<tr>
<td>Dormitories - School or Labor</td>
<td>Male 1 per 10 Female 1 per 8</td>
<td>1 per 25 Male 1 per 12 Female 1 per 12</td>
<td>1 per 25 Male 1 per 50 Female 1 per 15</td>
<td>1 per 8 Female, add 1 additional bathtub per 30. Over 150 occupants, add 1 fixture per 20</td>
<td>1 per 75&lt;sup&gt;12&lt;/sup&gt; Min. 1 per floor</td>
</tr>
</tbody>
</table>
## APPENDIX C (Continued)

### MINIMUM PLUMBING FACILITIES

#### FIXTURES PER NUMBER OF OCCUPANTS

<table>
<thead>
<tr>
<th>Type of Building or Occupancy</th>
<th>Water Closets</th>
<th>Male Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dormitories&lt;sup&gt;2&lt;/sup&gt; - for staff use</td>
<td>Male 1:1-15 Female 1:1-15</td>
<td>0:1-10</td>
<td>Male 1 per 40 Female 1 per 40</td>
<td>For additional Males 1:11-50 For additional Males 1 per 50</td>
<td></td>
</tr>
<tr>
<td>For additional Occupants 1 per 40 1 per 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dwellings&lt;sup&gt;4&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Dwelling 1 per dwelling unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple Dwelling or Apartment House 1 per dwelling unit or apartment unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> For additional males, 1 per 50

<sup>2</sup> For additional females, 1 per 50

<sup>3</sup> For additional males, 1 per 50

<sup>4</sup> For additional females, 1 per 50

<sup>5</sup> For additional males, 1 per 50

<sup>6</sup> For additional females, 1 per 50

<sup>7</sup> For additional males, 1 per 50

<sup>8</sup> For additional females, 1 per 50

<sup>9</sup> For additional males, 1 per 50

<sup>10</sup> For additional females, 1 per 50

<sup>11</sup> For additional males, 1 per 50

<sup>12</sup> For additional females, 1 per 50

<sup>13</sup> For additional males, 1 per 50

<sup>14</sup> For additional females, 1 per 50
# APPENDIX C (Continued)

## MINIMUM PLUMBING FACILITIES

<table>
<thead>
<tr>
<th>Type of Building or Occupancy</th>
<th>Water Closets</th>
<th>Male Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals Waiting Room</td>
<td>1 per room for each sex</td>
<td>0:1-10</td>
<td>1 per room for each sex</td>
<td>1 per room</td>
<td>1 per 75&lt;sup&gt;12&lt;/sup&gt; Min. 1 per floor</td>
</tr>
<tr>
<td>For employee use</td>
<td>Male 1:1-15 Female 1:1-15</td>
<td>1:11-50</td>
<td>Male 1 per 40 Female 1 per 40</td>
<td>For additional Males 1 per 50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2:16-35 Male 2:16-35 Female 3:36-55 Male 3:36-55</td>
<td>For additional Males 1 per 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:36-55 Male 3:36-55 Female 1 per 40 Female 1 per 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitals Individual Room</td>
<td>1 per room</td>
<td>1 per 10 patients</td>
<td>1 per room</td>
<td>1 per 75&lt;sup&gt;12&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Ward Room</td>
<td>1 per 4 beds&lt;sup&gt;17&lt;/sup&gt;</td>
<td>1 per 10 patients</td>
<td>1 per room</td>
<td>1 per 10 patients</td>
<td>1 per 10 patients</td>
</tr>
</tbody>
</table>
## APPENDIX C (Continued)

### MINIMUM PLUMBING FACILITIES

**FIXTURES PER NUMBER OF OCCUPANTS**

<table>
<thead>
<tr>
<th>Type of Building or Occupancy</th>
<th>Water Closets</th>
<th>Male Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>Male 1:1-10</td>
<td>1:1-10</td>
<td>1:1-10</td>
<td>1 per 10 up to 100 occupants</td>
<td>1 per 75&lt;sup&gt;12&lt;/sup&gt; Min. 1 per floor</td>
</tr>
<tr>
<td>Warehouses, Workshops, Foundries, Parking Structures with attendants and similar occupancies</td>
<td>Female 1:1-30</td>
<td>1:1-30</td>
<td>2:11-25</td>
<td>2:11-60</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3:61-80</td>
<td>3:26-50</td>
<td>3:61-120</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4:91-120</td>
<td>4:51-75</td>
<td>4:121-180</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5:121-150</td>
<td>5:76-100</td>
<td>5:181-240</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>For additional Males 1 per 60</td>
<td>For additional Males 1 per 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 per 60</td>
<td>1 per 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional other than Hospitals or Penal Institutions (on each occupied floor)</td>
<td>Male 1 per 10</td>
<td>Female 1 per 10</td>
<td>0:1-10</td>
<td>Male 1 per 10</td>
<td>Female 1 per 10</td>
</tr>
<tr>
<td>Type of Building or Occupancy</td>
<td>Water Closets</td>
<td>Male Urinals</td>
<td>Lavatories</td>
<td>Bathtubs or Showers</td>
<td>Drinking Fountains</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------</td>
<td>--------------</td>
<td>------------</td>
<td>---------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Motels or Hotels</td>
<td>1 per Unit</td>
<td></td>
<td>1 per unit</td>
<td></td>
<td>1 per unit</td>
</tr>
</tbody>
</table>
## APPENDIX C (Continued)
### MINIMUM PLUMBING FACILITIES

<table>
<thead>
<tr>
<th>Type of Building or Occupancy</th>
<th>Water Closets</th>
<th>Male Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penal Institutions For Employee Use</td>
<td>Male 1:1-15, Female 1:1-15</td>
<td>0:1-10</td>
<td>Male 1 per 40, Female 1 per 40</td>
<td></td>
<td>1 per 75</td>
</tr>
<tr>
<td>For additional Occupants 1 per 40</td>
<td></td>
<td>1 per 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penal Institutions For Prisoner Use Cell</td>
<td>1 per cell</td>
<td></td>
<td>1 per cell</td>
<td>1 per cell block floor</td>
<td></td>
</tr>
<tr>
<td>Exercise Room</td>
<td>1 per exercise room</td>
<td>1 per exercise room</td>
<td>1 per exercise room</td>
<td>1 per cell block floor</td>
<td>1 per exercise room</td>
</tr>
</tbody>
</table>
# APPENDIX C (Continued)

## MINIMUM PLUMBING FACILITIES

### FIXTURES PER NUMBER OF OCCUPANTS

<table>
<thead>
<tr>
<th>Type of Building or Occupancy</th>
<th>Water Closets</th>
<th>Male Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restaurants, &amp; establishments which serve alcoholic beverages¹¹</td>
<td>Male 1:1-50 Female 1:1-20</td>
<td>1:1-75</td>
<td>Male 1:1-50</td>
<td>Male 1:1-50</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td></td>
<td>2:51-150 Female 2:21-45</td>
<td>2:76-165</td>
<td>Female 2:51-120</td>
<td>Female 2:51-120</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:151-300 Male 3:46-75</td>
<td>3:166-300</td>
<td>3:121-220</td>
<td>3:201-400</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td></td>
<td>4:76-115 Male 4:301-450</td>
<td>4:301-450</td>
<td>4:221-350</td>
<td>3:201-400</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td></td>
<td>5:116-165 Male For additional Males 1 per 60</td>
<td>For additional Males 1 per 150</td>
<td>For additional occupants 1 per 200</td>
<td>3:201-400</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td>Restaurants &amp; establishments which serve no alcoholic beverages¹¹</td>
<td>Male 1:1-50 Female 1:1-40</td>
<td>1:1-150</td>
<td>Male 1:1-50</td>
<td>Male 1:1-50</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td></td>
<td>2:51-150 Female 2:41-90</td>
<td>2:51-120</td>
<td>Female 2:51-120</td>
<td>Female 2:51-120</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td></td>
<td>3:151-300 Male 3:91-150</td>
<td>3:166-300</td>
<td>3:121-220</td>
<td>3:201-400</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td></td>
<td>4:151-230 Male</td>
<td>4:301-450</td>
<td>4:221-350</td>
<td>3:201-400</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td></td>
<td>For additional Occupants 1 per 200</td>
<td>For additional Occupants 1 per 150</td>
<td>For additional occupants 1 per 400</td>
<td>3:201-400</td>
<td>1 per 75¹² Min. 1 per Floor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 per 150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Building or Occupancy</td>
<td>Water Closets</td>
<td>Male 10 Urinals</td>
<td>Lavatories</td>
<td>Bathtubs or Showers</td>
<td>Drinking Fountains</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------</td>
<td>-----------------</td>
<td>------------</td>
<td>---------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Retail Stores - for public use (Use same table for employees)</td>
<td>Male 1:1-200 Female 1:1-75</td>
<td>0:1-100 1:101-500</td>
<td>Male 1:1-150 Female 1:1-150</td>
<td>Male 1:1-150 Female 1:1-150</td>
<td>1 per 375 Min. 1 per Floor</td>
</tr>
<tr>
<td>2:201-500 2:76-250</td>
<td>3:501-900 3:251-550</td>
<td>For additional Males 1 per 500</td>
<td>2:151-350 2:151-350</td>
<td>3:351-600 3:351-600</td>
<td>For additional Occupants 1 per 400 1 per 400</td>
</tr>
</tbody>
</table>
### APPENDIX C (Continued)

#### MINIMUM PLUMBING FACILITIES

#### FIXTURES PER NUMBER OF OCCUPANTS

<table>
<thead>
<tr>
<th>Type of Building or Occupancy</th>
<th>Water Closets</th>
<th>Male Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schools - for student use</strong></td>
<td><strong>Male</strong></td>
<td><strong>Female</strong></td>
<td><strong>Male</strong></td>
<td>1:1-25</td>
<td>1:1-25</td>
</tr>
<tr>
<td><strong>For additional Occupants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 per 50</td>
<td>1 per 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 per 15</td>
<td>1 per 15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Child Care Ctr.</strong></td>
<td>Male</td>
<td>Female</td>
<td>1 per 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Elementary</strong></td>
<td>1 per 30</td>
<td>1 per 25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>1 per 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary</strong></td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 per 40</td>
<td>1 per 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Others (Colleges, universities, adult centers, etc.)</strong></td>
<td>Male</td>
<td>Female</td>
<td>1 per 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 per 40</td>
<td>1 per 30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Includes garages and recreational buildings.

<sup>2</sup> Includes all types of schools, nursery schools, and private schools, but not nurseries, day care centers, or kindergartens.

<sup>3</sup> Includes all types of schools, nursery schools, and private schools, but not nurseries, day care centers, or kindergartens.

<sup>10</sup> Includes all types of schools, nursery schools, and private schools, but not nurseries, day care centers, or kindergartens.

<sup>12</sup> Includes all types of schools, nursery schools, and private schools, but not nurseries, day care centers, or kindergartens.

<sup>13</sup> Includes all types of schools, nursery schools, and private schools, but not nurseries, day care centers, or kindergartens.
## APPENDIX C (Continued)

### MINIMUM PLUMBING FACILITIES

#### FIXTURES PER NUMBER OF OCCUPANTS

<table>
<thead>
<tr>
<th>Type of Building or Occupancy 1</th>
<th>Water Closets</th>
<th>Male 10 Urinals</th>
<th>Lavatories</th>
<th>Bathtubs or Showers</th>
<th>Drinking Fountains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools - for staff use (All schools)</td>
<td>Male: 1:1-15, Female: 1:1-15</td>
<td>0:1-10</td>
<td>Male 1 per 40, Female 1 per 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2:16-35</td>
<td>1:11-50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:36-55</td>
<td>For additional Males 1 per 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For additional Occupants 1 per 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worship Places - Educational and activities unit</td>
<td>Male: 1 per 250, Female: 1 per 125</td>
<td>1 per 250</td>
<td>1 per toilet room</td>
<td></td>
<td>1 per 75, Min. 1 per floor</td>
</tr>
<tr>
<td>Worship Places - Principal Assembly Place</td>
<td>Male: 1 per 300, Female: 1 per 150</td>
<td>1 per 300</td>
<td>1 per toilet room</td>
<td></td>
<td>1 per 75, Min. 1 per floor</td>
</tr>
</tbody>
</table>
APPENDIX C (Continued)

MINIMUM PLUMBING FACILITIES

Whenever additional urinals are provided, one (1) water closet less than the number specified may be provided for each additional urinal installed, except the number of water closets in such cases shall not be reduced to less than two-thirds (2/3) of the minimum specified.

1. The figures shown are based upon one (1) fixture being the minimum required for the number of persons indicated or any fraction thereof.
2. Building categories not shown on this table shall be considered separately by the Administrative Authority.
3. Drinking Fountains or service sinks shall not be installed in toilet rooms.
4. Laundry and kitchen. For each dwelling unit, in buildings with one or two dwelling units, one (1) capped automatic washer standpipe in a space large enough to accept laundry equipment. For each dwelling or apartment unit, in buildings with three (3) or more dwelling or apartment units, one (1) laundry tray and one (1) automatic washer for the first ten units; in excess of ten units, one (1) automatic washer for each additional 15 dwelling or apartment units; this equipment shall be accessible to all units. Kitchen sinks with garbage disposals; one (1) for each dwelling or apartment unit.
APPENDIX C

MINIMUM PLUMBING FACILITIES

5. Deleted
7. Where there is exposure to skin contamination with poisonous, infectious, or irritating materials, provide one (1) lavatory for each five (5) persons.
8. Twenty-four (24) lineal inches (609.67 mm) of wash sink or eighteen (18) inches (457.2 mm) of a circular basin, when provided with water outlets for such space, shall be considered equivalent to one (1) lavatory.
9. Laundry trays. One (1) for each fifty (50) persons. Slop sinks, one (1) for each hundred (100) persons.
APPENDIX C (Continued)

MINIMUM PLUMBING FACILITIES

10. General. In applying this schedule of facilities, consideration must be given to the accessibility of the fixtures. Conformity purely on a numerical basis may not result in an installation suited to the need of the individual establishment. For example, schools should be provided with toilet facilities on each floor having classrooms. Temporary working men facilities. One (1) water closet and one (1) urinal for each thirty (30) workmen. Fixtures may be conventional water closets and urinals or of the chemical storage type.
   a. Surrounding materials. Wall and floor space to a point two (2) feet (0.6 m) in front of urinal tip and four (4) feet (1.2 m) above the floor, and at least two (2) feet (0.6 m) to each side of the urinal shall be lined with non-absorbent material.
   b. Trough urinals are prohibited.

11. A restaurant is defined as a business which sells food to be consumed on the premises.
   a. The number of occupants for a drive-in restaurant or drive-in theatre shall be considered as equal to twice the number of parking stalls.
APPENDIX C (Continued)

MINIMUM PLUMBING FACILITIES

b. Employee toilet facilities are not to be included in the above restaurant requirements. Hand washing facilities must be available in the kitchen for employees.

c. Walk-up restaurants with no access inside of building by customers.
   (1) If less than 17 outside seats, one toilet room is required, for employees only.
   (2) If more than 16 outside seats, both male and female toilet rooms are required, for public and employees per Appendix C.

d. Restaurants with less that 225 sq. ft. inside customer area and less than 17 outside seats.
   (1) A minimum of one toilet room shall be provided for public and employees.

e. Restaurants with less that 225 sq. ft. inside customer area and more than 16 outside seats.
   (1) Both male and female toilet rooms are required, for public and employees per Appendix C.
APPENDIX C (Continued)

MINIMUM PLUMBING FACILITIES

f. Restaurants with more than 225 sq. ft. inside customer area and which may include outside seating of less than 50% of inside occupant load. Occupancy load may be based on inside customer area only.

   (1) Both male and female toilet rooms are required for public and employees per Appendix C.

g. Restaurants with more than 225 sq. ft. inside customer area and with outside seating greater than 50% of inside occupant load. Occupant load must include entire inside and outside occupant loads.

   (1) Both male and female toilet rooms are required for public and employees per Appendix C.

12. Where food is consumed indoors, water stations may be substituted for drinking fountains. Offices, or similar public buildings for use by more
APPENDIX C (Continued)

MINIMUM PLUMBING FACILITIES

than six (6) persons shall have one (1) drinking fountain for the first seventy-five (75) persons and one (1) additional fountain for each one hundred and fifty (150) persons thereafter.

13. There shall be a minimum of one (1) drinking fountain per occupied floor in schools, theatres, auditoriums, dormitories, offices or public buildings.

14. Provide one shower for each 5 students of a gym or swimming class.

15. A single restroom may be provided for both sexes, and both service sinks and drinking fountains may be eliminated for the following:
   (1) Retail occupancies of 3,000 sq. ft. or less.
   (2) Offices, medical and dental clinics of 1000 sq. ft. or less.

16. Separate toilet facilities for each sex shall be located adjacent to all swimming pools used by the public, except Group R Occupancies of 3 stories or less.

17. Toilet with bed pan flushing equipment.
Appendix D

APPENDIX D, Part C, Paragraph D3.1 is amended:

D3.1 Sizing of Rainwater Piping. Vertical rainwater piping shall be sized in accordance with Table D-1. Table D-1 is based upon maximum inches (mm) of rainfall per hour falling upon a given roof area in square feet (m). Three inches per hour is the selected rate for Denver.

APPENDIX D, Part C, Paragraph D3.6 is added:

D3.6 Controlled Flow Storm Water System.
(a) The roof drainage system may be sized on the equivalent or adjusted maximum projected roof areas which result from controlled flow and storage of storm water on the roof, provided that approved flow control devices are incorporated into a finished roof.
(b) A control device shall be installed to limit the rate of discharge of water in gallons per minute not to exceed the rate permitted in Tables D-1 through D-3.
(c) See Uniform Building Code for roof construction.
(d) Control of runoff from flat roofs may be controlled by devices. Height of stones or other granular material above waterproofed surface shall be discounted, and in no case shall the surface in the vicinity of the drain be recessed to create a reservoir. Control devices shall be protected by secured metallic strainers.
(e) At least 2 drains shall be installed in roof areas 10,000 square feet or less and at least 4 drains in roof areas over 10,000 square feet.

Appendix H is amended:

APPENDIX H. Recommend Procedures to Sizing Commercial Kitchen Grease Interceptors. All requirements pertaining to sizing and construction of grease interceptors shall be administered and enforced by the Wastewater Management Division.
DIVISION 4

AMENDMENTS

TO THE

1988 EDITION OF THE UNIFORM BUILDING CODE STANDARDS
DENVER AMENDMENTS TO THE

UNIFORM BUILDING CODE STANDARDS

The following have been amended by the Denver Amendments to the 1988 Uniform Building Code Standards.

Uniform Building Standard No. 70-1

Section 7010 Appendix

7016 Alternate Standard
Sec. 70.106

Section 70.106 is added to Uniform Building Code Standard No. 70-1:

SECTION 70.106. ALTERNATE STANDARD. ASTM D-698-78 (Standard Proctor) may be used as an alternate to the standards listed.
DIVISION 5

AMENDMENTS

TO THE

1990 EDITION NATIONAL ELECTRICAL CODE
DENVER AMENDMENTS TO THE NATIONAL ELECTRICAL CODE
BY PARTS, ARTICLES AND SECTIONS

The following Articles have been added by the Denver Amendments to the National Electrical Code.

Chapter 10. AMENDMENTS TO ELECTRICAL DESIGN, INSTALLATION AND MATERIALS.
ART. 1001. General Requirements ..................................... NEC 1
       1002. Service .................................................. 2
       1003. Grounding ................................................. 2
       1004. Temporary Installations ................................. 3
       1005. Types of Wiring .......................................... 4
       1006. Wiring Methods .......................................... 4
       1007. Appliance .................................................. 5
       1008. Mechanical Equipment ................................. 5
       1009. Emergency Systems ...................................... 6
       1010. Signs and Outline Lighting ............................ 8
       1011. Standards .................................................. 9
Chapter 10 is added:

CHAPTER 10. AMENDMENTS TO ELECTRICAL DESIGN, INSTALLATION AND MATERIALS.

ARTICLE 1001. GENERAL REQUIREMENTS.
(a) Scope. In addition to the other requirements of this Code, the provisions of this Chapter shall apply to all electrical installations, electrical systems and their component parts.
(b) Design, Installation and Materials. Design, installation and materials shall conform to the requirements of this Chapter, NFPA 70-1990, the National Electrical Code. (See Standards). The abbreviation NEC shall mean NFPA 70-1990, the National Electrical Code.
EXCEPTION: Where a conflict exists between this Chapter and the Standards indicated herein, the requirements of this Chapter shall govern.
(c) Approval. All electrical materials and equipment required or permitted by this Chapter shall be accepted only if tested and listed by a testing agency recognized by the Department.
(d) Weather Protection. Electrical equipment, raceways and/or conductors susceptible to weather damage shall not be installed inside of any building, structure or utility until adequate protection for the equipment and/or conductors has been provided.
(e) Release. The public utility company shall not provide electrical service to a building, structure or utility until electrical inspection has been completed and the building, structure or utility has been released for electrical service by the Department.
EXCEPTION: Electrical meters for temporary heat and construction purposes may be released by the Department.
This Section covers meters set at permanent site for one- and two-unit dwellings only. Construction heat meters will be released under the following conditions:
1. Electrical rough-in inspection shall be completed.
2. Not more than two 120-volt receptacles provided with ground fault circuit interrupter protection shall be connected.
3. Furnace or boiler circuit, including electric furnaces or boilers, shall be completed.
4. Inspection shall be required. If inspection can be completed at the same time as rough-in inspection, no
fee will be required. Additional inspection shall require a reinspection fee.

5. No occupancy of the building shall be permitted until all final inspections are completed.

(f) Testing. Electrical systems shall be energized for final inspection or inspection for occupancy.

ARTICLE 1002. SERVICE.

(a) General. See Article 230 NEC.

(b) Service Drop. The method of attachment of electrical service to any building, structure or utility shall be designated by the public utility company and shall comply with the requirements of Article 230-24 (a) and (b) NEC. If the roof is accessible by a permanent ladder, stairs or doorway, a minimum 8-foot clearance over the roof shall be maintained.

(c) Service Masts. Where a mast is required to maintain the required height, the mast shall be at least 2-inch galvanized rigid conduit or intermediate metal conduit. All masts over 48 inches in height shall be guyed.

EXCEPTION: For remodeling work only and where it is physically impractical to use 2-inch rigid steel conduit for a service mast, 1¼-inch rigid steel conduit may be permitted, provided that the mast is properly guyed at the point of attachment of the service wires.

(d) Disconnecting Means. Service entrance switches or any service distribution equipment, including branch circuit panelboards, shall not be installed within a bathroom, toilet room, clothes closet, storage closet, bedroom, furnace room, boiler room, mechanical room or over or under stairways.

EXCEPTIONS:
1. Branch circuit panelboards or control centers serving a furnace, boiler or associated mechanical equipment may be installed in furnace, boiler and mechanical rooms.
2. Furnace or boiler rooms in a townhouse or one- and two-unit dwellings.

ARTICLE 1003. GROUNDING.

(a) Grounding Electrode. See Article 250 NEC.

EXCEPTIONS:
1. Gas piping systems shall not be permitted as a grounding electrode.
2. Rod electrodes of iron or steel shall be protected by a conductive coating other than galvanizing or painting.
3. Pipe or conduit electrodes shall not be permitted.
Sec. 1003

4. Water lines serving exclusively as fire protection piping shall not be permitted as a grounding electrode.

(b) Grounding Connections. Grounding conductors shall not be secured to any plumbing fixture or fitting.

(c) Temporary Service Grounding. A driven ground rod at the service equipment will be acceptable. When building steel is in place, the temporary service ground shall have an additional connection to this steel even if the temporary service was installed prior to the steel being erected.

EXCEPTION: Group R-2 and R-3 Occupancies.

(d) Transformer Case Grounding. The transformer neutral and case must be grounded. The size of the grounding conductors and point of grounding must be specified.

(e) The Emergency Disconnecting. The emergency disconnecting means shall be grounded by a separate equipment grounding conductor sized per NEC Table 250-95.

ARTICLE 1004. TEMPORARY INSTALLATIONS.

(a) Electrical Service. Electrical service and wiring installed for temporary purposes shall comply with all applicable requirements of this Chapter and NEC Articles 250 and 305. Location and construction of the temporary service drop/lateral support for both overhead and underground supply shall comply with the above and public utility company requirements.

(b) One- and Two-Unit Dwellings. One temporary service shall serve not more than 3 consecutive sites for construction purposes.

(c) Location. Temporary construction meters shall be located on the same side of the alley, street or driveway as the construction for which the meter is required.

(d) Outside Wiring. Outside temporary electrical wiring, other than extension cords, shall be installed at a minimum height of 8 feet above ground level. Extension cords rated for hard usage as listed in NEC may be laid upon the ground provided that the cords are removed at the end of each working day.

(e) Underground. Temporary conductors installed underground shall be of a type approved for the purpose and use, such as UF and USE. Minimum burial depth shall be 12 inches. Routes of buried conductors shall be plainly marked with flags or stakes to prevent accidental excavation.
ARTICLE 1005. TYPES OF WIRING. Nonmetallic Sheathed Cable as defined in Article 336 NEC and Service Entrance Cable as defined in Article 338 NEC shall not be permitted to be installed. 
EXCEPTION: Nonmetallic Sheathed Cable and Service Entrance Cable may be installed in the following occupancies and uses:
(a) Apartment buildings of 3 stories or less. See Section 1009(c) for emergency systems.
(b) Townhouse buildings.
(c) One- and two-unit dwellings.
(d) Temporary buildings.
(e) Trailers and mobile units.
(f) Portable buildings.
(g) Temporary wiring.

ARTICLE 1006. WIRING METHODS.
(a) Connection of Cable Assemblies. Cable assemblies connected to panelboards, junction boxes, outlet boxes and other enclosures shall enter the enclosure through a separate opening for each cable and shall be secured to the enclosure by means of an approved fitting, clamp or connector.
EXCEPTION: Exterior panelboard. Cables shall enter an exterior panelboard through a nipple extending completely through the outer wall structure into the hollow space within the wall. The nipple shall be secured to the panelboard by locknut or connector, and insulated bushings shall be provided at each end of the nipple into the panelboard.
(b) Box Supports. Outlet boxes shall not be supported by nails alone unless boxes are specifically designed and approved for the purpose.
(c) Raceway.
1. Raceway installed directly in or on the earth, or in concrete which is placed in or on the earth, shall be one of the following types:
   a. Rigid nonmetallic conduit.
   b. Rigid steel or intermediate metal conduit covered with:
      (1) An approved factory-applied polyvinyl chloride (PVC) or bituminous-base tape. Field-applied tape is not acceptable.
      (2) An approved bonded PVC coating.
      (3) An approved coat of bituminous-base paint. An approved "Special" coating. (E.g., double galvanizing, etc.)
2. Raceway installed in concrete not in contact with the earth may be electrical metallic tubing in addition to the types listed above.

3. Aluminum conduit shall not be installed in or on the earth or embedded in concrete.

4. ENT may be installed in concrete in addition to the types listed above and shall comply with Article 331, NEC.

(d) Roof Penetrations. Conduits penetrating a roof shall be installed in roof jacks to preserve the integrity of the roof.

(e) Conduits on Roofs. When conduits are installed on roofs, they shall be a minimum of 12 inches above the finished roof and shall be supported on metal stands installed in pitch pans with no more than 10 feet between stands.

(f) Conductors in Ducts and Plenums. See Mechanical Code and Article 300 NEC.

(g) Duct Attachment or Support. Support or attachment of conduit or fixtures from ducts is prohibited.

(h) Clearances. See the Mechanical Code for clearances from bonnets, ducts and plenums.

(i) Townhouse Buildings. Electrical, telephone and signalling wiring and equipment shall not be permitted in 2-hour fire-resistant walls between dwelling units. Electrical installations shall conform to the requirements for one- and two-unit dwellings. See Chapter 12.

(j) Type AC Cable. An approved tool shall be used to cut the armor on type AC cable. Metal cutting saws or pliers are not permitted.

ARTICLE 1007. APPLIANCES.

(a) Electric Cooking Units. Each wall-mounted oven or counter-mounted cooking unit not grouped to form a single appliance shall be connected to a separate individual circuit.

(b) Electric Fences. Electric fences are prohibited. See the Building Code.

(c) Electric Water Heaters. Electric water heaters shall not be installed in unheated crawl spaces or attic areas. See the Mechanical Code.

ARTICLE 1008. MECHANICAL EQUIPMENT.

(a) General. See the Uniform Mechanical Code for refrigeration equipment.
Sec. 1008

(b) Furnaces, Unit Heaters and Boilers. All motors for furnaces, heaters and boilers, either new installations or replacements, shall have a separate overcurrent device that shall open the circuit when the motor current exceeds 125% of the full load rated amperage. A thermal protector integral with the motor is not acceptable as the overcurrent device for motors on furnaces, unit heaters and boilers. Each motor shall be provided with a disconnecting means located on or adjacent to the unit. All motors for furnaces and boilers, either new installations or replacements, shall be on a separate circuit.

EXCEPTION: In townhouses and one- and two-unit dwellings, lighting fixtures and receptacles required by Article 1008(c)1 may be installed on the furnace or boiler circuit.

(c) General Lighting and Power Requirements. In all rooms containing mechanical equipment, adequate lighting and receptacle outlets shall be provided for servicing the equipment. In addition, when equipment is installed in attics, crawl spaces or on roofs, the following shall be required:

1. Attics and crawl spaces. A lighting fixture shall be installed at the access opening and a lighting fixture and receptacle shall be installed on the service side of the equipment. Fixtures shall be switched at the access opening.

2. Roofs. A duplex receptacle shall be installed within a 50-foot radius of the equipment.

ARTICLE 1009. EMERGENCY SYSTEMS.

(a) Scope. Emergency systems shall comply with Article 700 NEC and shall include all required electrical wiring and equipment that is essential to life safety.

1. Exit illumination and exit signs shall be provided as required in Chapter 33 of the Building Code.

2. Fire alarm and detection systems.
   a. Systems shall be installed as required by Chapter 38 of the Building Code.
   b. Wiring for fire alarm and fire detection shall be separate and distinct from all other wiring and raceway systems.
   c. All systems shall be electrically supervised in accordance with NFPA 72A and Chapter 38 of the Building Code.
Sec. 1009

3. Sprinkler alarm systems shall be installed on fire sprinkler systems as required by Chapter 38 of the Building Code. Fire sprinkler systems with a Central Station connection must be powered from the building emergency power source.


5. Elevators.
   a. When required by Chapter 51 of the Building Code, elevators shall be powered from the emergency power source of the building. See Chapter 18 of the Building Code.
   b. The ventilation fan and the lighting in each elevator cab shall be energized by a separate circuit connected to the emergency power source of the building.


7. Communication systems. The voice alarm and/or communication system for Fire Department use shall conform to the requirements of Chapters 18 and 38 of the Building Code.

(b) Emergency Power Source. All emergency circuits shall be energized from one or more of the following emergency power sources of the building. See Chapters 18, 33 and 38 of the Building Code.

1. Generator driven by a diesel powered prime mover.

2. There shall be a normal source of power plus an emergency source of power for emergency loads in accordance with Article 700-12 NEC. Emergency sources may be any of the options indicated in paragraphs (a) through (e) of 700-12. Unit equipment for emergency lighting may be utilized in accordance with paragraph 700-12(f). When installed as required emergency lighting the additional requirements of Sections 3313 and 3314 shall apply. See Chapter 33 of the Building Code.

(c) Wiring Methods. Wiring for emergency systems shall be installed in approved metal raceways, type MI Cable or type MC Cable.

   EXCEPTION: Approved cables may be installed for listed fire protective signalling circuits provided that they comply with Article 760 NEC and the following requirements: