

CHAPTER 1 ADMINISTRATION

SECTION 101 GENERAL

Comm 62.0001 Standards. The design, construction, and maintenance of public buildings and places of employment shall comply with section Comm 61.05, except as provided in chapters Comm 61 to 65 and chapter Comm 14.

101.1 - 101.4.7 Deleted.

SECTION 102 APPLICABILITY

102.1 - 102.3 Deleted.

102.4 Referenced codes and standards. The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

102.5 - 102.6 Deleted.

SECTIONS 103-114 Deleted

SECTION 115 UNSAFE STRUCTURES AND EQUIPMENT

Comm 62.0115. The requirements in IBC section 115 apply to all public buildings and structures and places of employment, that exist before, on, or after the effective date of this code.

115.1 Conditions. Structures or existing equipment that are or hereafter become unsafe, unsanitary or deficient because of inadequate means of egress facilities, inadequate light and ventilation, or which constitute a fire hazard, or are otherwise dangerous to human life or the public welfare, or which involve illegal or improper occupancy or inadequate maintenance, shall be deemed an unsafe condition. Unsafe structures shall be taken down and removed or made safe, as the building official deems necessary and as provided for in this section. A vacant structure that is not secured against entry shall be deemed unsafe.

115.2 Record. The building official shall cause a report to be filed on an unsafe condition. The report shall state the occupancy of the structure and the nature of the unsafe condition.

115.3 Notice. If an unsafe condition is found, the building official shall serve on the owner, agent or person in control of the structure, a written notice that describes the condition deemed unsafe and specifies the required repairs or improvements to be made to abate the unsafe condition, or that requires the unsafe structure to be demolished within a stipulated time. Such notice shall require the person thus notified to declare immediately to

the building official acceptance or rejection of the terms of the order.

115.4 Method of service. Such notice shall be deemed properly served if a copy thereof is (a) delivered to the owner personally; (b) sent by certified or registered mail addressed to the owner at the last known address with the return receipt requested; or (c) delivered in any other manner as prescribed by local law. If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner upon the owner's agent or upon the person responsible for the structure shall constitute service of notice upon the owner.

115.5 Restoration. The structure or equipment determined to be unsafe by the building official is permitted to be restored to a safe condition. To the extent that repairs, alterations or additions are made or a change of occupancy occurs during the restoration of the structure, such repairs, alterations, additions or change of occupancy shall comply with the requirements of Section 105.2.2 and Chapter 34.

CHAPTER 2

DEFINITIONS

SECTION 201 GENERAL

201.1 Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the *International Plumbing Code*, *International Mechanical Code*, *International Fuel Gas Code*, or *International Fire Code*, such terms shall have the meanings ascribed to them as in those codes.

201.4 Terms not defined. Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.

SECTION 202 DEFINITIONS

ACCESSIBLE. See Section 1102.1.

ACCESSIBLE MEANS OF EGRESS. See Section 1002.1.

ACCESSIBLE ROUTE. See Section 1102.1.

ACCREDITATION BODY. See Section 2302.1.

ACTIVE FAULT/ACTIVE FAULT TRACE. See Section 1613.1.

ADDITION. An extension or increase in floor area or height of a building or structure.

ADHERED MASONRY VENEER. See Section 1402.1.

ADMIXTURE. See Section 1902.1.

ADOBE CONSTRUCTION. See Section 2102.1.

Stabilized adobe. See Section 2102.1.

Unstabilized adobe. See Section 2102.1.

[F] AEROSOL. See Section 307.2.

Level 1 aerosol products. See Section 307.2.

Level 2 aerosol products. See Section 307.2.

Level 3 aerosol products. See Section 307.2.

[F] AEROSOL CONTAINER. See Section 307.2.

AGGREGATE. See Section 1902.1.

AGGREGATE, LIGHTWEIGHT. See Section 1902.1.

AGRICULTURAL, BUILDING. A structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products. This structure shall not be a place of human habitation or a place of employment where agricultural products are processed, treated or packaged, nor shall it be a place used by the public.

AIR BARRIER. A material or combination of materials collectively having a maximum air leakage rate of 0.06 cfm/ft.² at 0.30 in. H₂O, when tested in accordance with ASTM E 783, installed to resist air leakage into the exterior envelope. [Comm 62.0202 (1) (a)]

AIR-INFLATED STRUCTURE. See Section 3102.2.

AIR-SUPPORTED STRUCTURE. See Section 3102.2.

Double skin. See Section 3102.2.

Single skin. See Section 3102.2.

AISLE ACCESSWAY. See Section 1002.1.

[F] ALARM NOTIFICATION APPLIANCE. See Section 902.1.

[F] ALARM SIGNAL. See Section 902.1.

[F] ALARM VERIFICATION FEATURE. See Section 902.1.

ALLEY. See "Public Way."

ALLOWABLE STRESS DESIGN. See Section 1602.1.

ALTERATION. Any construction or renovation to an existing structure other than repair or addition.

ALTERNATING TREAD DEVICE. See Section 1002.1.

ALUMINUM COMPOSITE MATERIAL (ACM). See Section 1402.1.

ALUMINUM COMPOSITE MATERIAL (ACM) SYSTEM. See Section 1402.1.

ANCHOR. See Sections 1913.2.2 and 2102.1.

ANCHOR BUILDING. See Section 402.2.

ANCHOR GROUP. See Section 1913.2.2.

ANCHOR PULLOUT STRENGTH. See Section 1913.2.2.

ANCHORED MASONRY VENEER. See Section 1402.1.

ANNULAR SPACE. See Section 702.1.

[F] ANNUNCIATOR. See Section 902.1.

APPROVED. Acceptable to the department. [Comm 62.0202 (2) (a)]

APPROVED AGENCY. See Section 1702.1.

APPROVED FABRICATOR. See Section 1702.1.

ARCHITECTURAL TERRA COTTA. See Section 2102.1.

AREA. See Section 2102.1.

Bedded. See Section 2102.1.

Gross cross-sectional. See Section 2102.1.

Net cross-sectional. See Section 2102.1.

AREA, BUILDING. See Section 502.1.

AREA OF REFUGE. See Section 1002.1.

AREAWAY. A subsurface space adjacent to a building open at the top or protected at the top by a grating or guard.

ATRIUM. See Section 404.1.1.

ATTACHMENT. See Section 1913.2.2.

ATTACHMENTS, SEISMIC. See Section 1613.1.

ATTIC. The space between the ceiling beams of the top story and the roof rafters.

[F] AUDIBLE ALARM NOTIFICATION APPLIANCE. See Section 902.1.

[F] AUTOMATIC. See Section 902.1.

[F] AUTOMATIC FIRE-EXTINGUISHING SYSTEM. See Section 902.1.

[F] AUTOMATIC SPRINKLER SYSTEM. See Section 902.1.

[F] AVERAGE AMBIENT SOUND LEVEL. See Section 902.1

AWNING. An architectural projection that provides weather protection, identity or decoration and is wholly supported by the building to which it is attached. An awning is comprised of a lightweight, rigid skeleton structure over which a covering is attached.

BACKING. See Section 1402.1.

BALCONY, EXTERIOR. See Section 1602.1.

[F] BARRICADE. See Section 307.2.

Artificial barricade. See Section 307.2.

Natural barricade. See Section 307.2.

BASE. See Section 1613.1.

BASE FLOOD. See Section 1612.2.

BASE FLOOD ELEVATION. See Section 1612.2.

BASE SHEAR. See Section 1602.1.

BASEMENT. That portion of a building that is partly or completely below grade (see “Story Above Grade Plane” and Sections 502.1 and 1612.2).

BED JOINT. See Section 2102.1.

BLEACHERS. See Section 1002.1.

BOARDING HOUSE. See Section 310.2.

[F] BOILING POINT. See Section 307.2.

BOND BEAM. See Section 2102.1.

BOND REINFORCING. See Section 2102.1.

BOUNDARY ELEMENTS. See Sections 1613.1 and 2302.1.

BOUNDARY MEMBERS. See Section 1602.1.

BRACED WALL LINE. See Section 2302.1.

BRACED WALL PANEL. See Section 2302.1.

BRICK. See Section 2102.1.

Calcium silicate (sand lime brick). See Section 2102.1.

Clay or shale. See Section 2102.1.

Concrete. See Section 2102.1.

BRITTLE. See Section 1613.1.

BRITTLE STEEL ELEMENT. See Section 1913.2.2.

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy.

BUILDING, ENCLOSED. See Section 1609.2.

BUILDING LINE. The line established by law, beyond which a building shall not extend, except as specifically provided by law.

BUILDING, LOW-RISE. See Section 1609.2.

BUILDING OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

BUILDING, OPEN. See Section 1609.2.

BUILDING, PARTIALLY ENCLOSED. See Section 1609.2.

BUILDING, SIMPLE DIAPHRAGM. See Section 1609.2.

BUILT-UP ROOF COVERING. See Section 1502.1.

BUTTRESS. See Section 2102.1.

CABLE-RESTRAINED, AIR SUPPORTED STRUCTURE. See Section 3102.2.

CANOPY. An architectural projection that provides weather protection, identity or decoration and is supported by the building to which it is attached and at the outer end by not less than one stanchion. A canopy is comprised of a rigid structure over which a covering is attached.

CANTILEVERED COLUMN SYSTEM. See Section 1602.1.

[F] CARBON DIOXIDE EXTINGUISHING SYSTEMS. See Section 902.1.

CAST STONE. See Section 2102.1.

[F] CEILING LIMIT. See Section 902.1.

CEILING RADIATION DAMPER. See Section 702.1.

CELL. See Section 2102.1.

CEMENT PLASTER. See Section 2502.1.

CEMENTITIOUS MATERIALS. See Section 1902.1.

CERAMIC FIBER BLANKET. See Section 720.1.1.

CERTIFICATE OF COMPLIANCE. See Section 1702.1.

CHIMNEY. See Section 2102.1.

CHIMNEY TYPES. See Section 2102.1.

High-heat appliance type. See Section 2102.1.

Low-heat appliance type. See Section 2102.1.

Masonry type. See Section 2102.1.

Medium-heat appliance type. See Section 2102.1.

CIRCULATION PATH. See Section 1102.1.

CLADDING. See “Components and Cladding.”

[F] CLEAN AGENT. See Section 902.1.

CLEANOUT. See Section 2102.1.

[F] CLOSED SYSTEM. See Section 307.2.

COLLAR JOINT. See Section 2102.1.

COLLECTOR. See Sections 1613.1 and 2302.1.

COLLECTOR ELEMENTS. See Section 1602.1.

COLUMN. See Section 1902.1.

COLUMN, MASONRY. See Section 2102.1.

COMBINATION FIRE/SMOKE DAMPER. See Section 702.1.

[F] COMBUSTIBLE DUST. See Section 307.2.

[F] COMBUSTIBLE FIBERS. See Section 307.2.

[F] COMBUSTIBLE LIQUID. See Section 307.2.

Class II. See Section 307.2.

Class IIIA. See Section 307.2.

Class IIIB. See Section 307.2.

COMMON PATH OF EGRESS TRAVEL. See Section 1002.1.

COMPONENT. See Section 1613.1.

Component equipment. See Section 1613.1.

Component, flexible. See Section 1613.1.

Component, rigid. See Section 1613.1.

COMPONENTS AND CLADDING. See Section 1609.2.

COMPOSITE MASONRY. See Section 2102.1.

[F] COMPRESSED GAS. See Section 307.2.

COMPRESSIVE STRENGTH OF MASONRY. See Section 2102.1.

CONCRETE. See Section 1902.1.

CONCRETE BREAKOUT STRENGTH. See Section 1913.2.2.

CONCRETE CARBONATE AGGREGATE. See Sections 702.1 and 720.1.1.

CONCRETE, CELLULAR. See Section 720.1.1.

CONCRETE, LIGHTWEIGHT AGGREGATE. See Sections 702.1 and 720.1.1.

CONCRETE, PERLITE. See Section 720.1.1.

CONCRETE PRYOUT STRENGTH. See Section 1913.2.2.

CONCRETE, SAND-LIGHTWEIGHT. See Sections 702.1 and 720.1.1.

CONCRETE, SILICEOUS AGGREGATE. See Sections 702.1 and 720.1.1.

CONCRETE (F'_c), SPECIFIED COMPRESSIVE STRENGTH OF. See Section 1902.1.

CONCRETE, VERMICULITE. See Section 720.1.1.

CONFINED REGION. See Section 1602.1.

CONNECTOR. See Section 2102.1.

[F] CONSTANTLY ATTENDED LOCATION. See Section 902.1.

CONSTRUCTION DOCUMENTS. Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit.

CONSTRUCTION TYPES. See Section 602.

Type I. See Section 602.2.

Type II. See Section 602.2.

Type III. See Section 602.3.

Type IV. See Section 602.4.

Type V. See Section 602.5.

[F] CONTINUOUS GAS DETECTION SYSTEM. See Section 415.2.

CONTRACTION JOINT. See Section 1902.1.

[F] CONTROL AREA. See Section 307.2.

CONVENTIONAL LIGHT-FRAME WOOD CONSTRUCTION. See Section 2302.1.

CORRIDOR. See Section 1002.1.

CORROSION RESISTANT. See Section 1502.1.

[F] CORROSIVE. See Section 307.2.

COUPLING BEAM. See Section 1602.1.

COURT. An open, uncovered space, unobstructed to the sky, bounded on three or more sides by exterior building walls or other enclosing devices.

COVER. See Section 2102.1.

COVERED MALL BUILDING. See Section 402.2.

CRIPPLE WALL. See Section 2302.1.

CRYOGENIC FLUID. See Section 307.2.

DALLE GLASS. See Section 2402.1.

DAMPER. See Section 702.1.

DEAD LOADS. See Section 1602.1.

DECK. See Section 1602.1.

DECORATIVE GLASS. See Section 2402.1.

[F] DEFLAGRATION. See Section 307.2.

DEFORMABILITY. See Section 1602.1.

High deformability element. See Section 1602.1.

Limited deformability element. See Section 1602.1.

Low deformability element. See Section 1602.1.

DEFORMATION. See Section 1602.1.

Limited deformation. See Section 1602.1.

Ultimate deformation. See Section 1602.1.

DEFORMED REINFORCEMENT. See Section 1902.1.

[F] DELUGE SYSTEM. See Section 902.1.

DESIGN EARTHQUAKE. See Section 1613.1.

DESIGN FLOOD. See Section 1612.2.

DESIGN FLOOD ELEVATION. See Section 1612.2.

DESIGN STRENGTH. See Section 1602.1.

DESIGNATED SEISMIC SYSTEM. See Section 1613.1.

[F] DETACHED STORAGE BUILDING. See Section 307.2.

DETECTABLE WARNING. See Section 1102.1.

[F] DETECTOR, HEAT. See Section 902.1.

[F] DETONATION. See Section 307.2.

DIAPHRAGM. See Sections 2102.1 and 2302.1.

DIAPHRAGM, BLOCKED. See Section 2302.1.

DIAPHRAGM, BOUNDARY. See Section 2302.1.

DIAPHRAGM, CHORD. See Section 2302.1.

DIAPHRAGM, FLEXIBLE. See Section 1602.1.

DIAPHRAGM, RIGID. See Sections 1602.1 and 2302.1.

DIAPHRAGM, UNBLOCKED. See Section 2302.1.

DIMENSIONS. See Section 2102.1.

Actual. See Section 2102.1.

Nominal. See Section 2102.1.

Specified. See Section 2102.1.

DISPENSING. See Section 307.2.

DISPLACEMENT. See Section 1613.1

Design displacement. See Section 1613.1.

Total design displacement. See Section 1613.1

Total maximum displacement. See Section 1613.1.

DISPLACEMENT RESTRAINT SYSTEM. See Section 1613.1

DOOR, BALANCED. See Section 1002.1.

DORMITORY. See Section 310.2.

DRAFT STOP. See Section 702.1.

DRAG STRUT. See Section 2302.1.

[F] DRY-CHEMICAL EXTINGUISHING AGENT. See Section 902.1.

DRY FLOODPROOFING. See Section 1612.2.

DUCTILE STEEL ELEMENT. See Section 1913.2.2.

DURATION OF LOAD. See Section 1602.1.

DWELLING. A building that contains one or two dwelling units used, intended, or designed to be used, rented, leased, let or hired out to be occupied for living purposes.

DWELLING UNIT. See Section 101.61 (1), Wisconsin Stats.

Note: Section 101.61 (1), Stats., reads in part: " 'Dwelling unit' means a structure or that part of a structure which is used or intended to be used as a home, residence or sleeping place by one person or by 2 or more persons maintaining a common household, to the exclusion of all others." [Comm 62.0202 (2) (b)]

Dwelling unit, ground floor. See Section 1102.1.

Dwelling unit, multistory. See Section 1102.1.

Dwelling unit, Type A. See Section 1102.1.

Dwelling unit, Type B. See Section 1102.1.

EDGE DISTANCE. See Section 1913.2.2.

EFFECTIVE DAMPING. See Section 1613.1.

EFFECTIVE DEPTH OF SECTION (*d*). See Section 1902.1.

EFFECTIVE EMBEDMENT DEPTH. See Section 1913.2.2.

EFFECTIVE HEIGHT. See Section 2102.1.

EFFECTIVE PERIOD. See Section 2102.1.

EFFECTIVE STIFFNESS. See Section 1613.1.

EFFECTIVE WIND AREA. See Section 1609.2.

EGRESS COURT. See Section 1002.1.

ELEMENT. See Section 1602.1.

Ductile element. See Section 1602.1.

Limited ductile element. See Section 1602.1.

Nonductile element. See Section 1602.1.

[F] EMERGENCY ALARM SYSTEM. See Section 902.1.

[F] EMERGENCY CONTROL STATION. See Section 415.2.

EMERGENCY ESCAPE AND RESCUE OPENING. See Section 1002.1.

[F] EMERGENCY VOICE/ALARM COMMUNICATIONS. See Section 902.1.

EQUIPMENT SUPPORT. See Section 1602.1.

ESSENTIAL FACILITIES. See Section 1602.1.

[F] EXHAUSTED ENCLOSURE. See Section 415.2.

EXISTING CONSTRUCTION. See Section 1612.2.

EXISTING STRUCTURE. A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.

EXIT. See Section 1002.1.

EXIT ACCESS. See Section 1002.1.

EXIT DISCHARGE. See Section 1002.1.

EXIT DISCHARGE, LEVEL OF. See Section 1002.1.

EXIT ENCLOSURE. See Section 1002.1.

EXIT PASSAGEWAY. See Section 1002.1.

EXPANDED VINYL WALL COVERING. See Section 802.1.

[F] EXPLOSION. See Section 902.1.

[F] EXPLOSIVE. See Section 307.2.

High explosive. See Section 307.2.

Low explosive. See Section 307.2.

UN/DOtn Class 1 Explosives. See Section 307.2.

Division 1.1. See Section 307.2.

Division 1.2. See Section 307.2.

Division 1.3. See Section 307.2.

Division 1.4. See Section 307.2.

Division 1.5. See Section 307.2.

Division 1.6. See Section 307.2.

EXTERIOR SURFACES. See Section 2502.1.

EXTERIOR WALL. See Section 1402.1.

EXTERIOR WALL COVERING. See Section 1402.1.

EXTERIOR WALL ENVELOPE. See Section 1402.1.

F RATING. See Section 702.1.

FABRICATED ITEM. See Section 1702.1.

[F] FABRICATION AREA. See Section 415.2.

FACILITY. See Section 1102.1.

FACTORED LOAD. See Section 1602.1.

FIBERBOARD. See Section 2302.1.

[F] FIRE ALARM CONTROL UNIT. See Section 902.1.

[F] FIRE ALARM SIGNAL. See Section 902.1.

- [F] FIRE ALARM SYSTEM.** See Section 902.1.
- FIRE AREA.** See Section 702.1.
- FIRE BARRIER.** See Section 702.1.
- [F] FIRE COMMAND CENTER.** See Section 902.1.
- FIRE DAMPER.** See Section 702.1.
- [F] FIRE DETECTOR, AUTOMATIC.** See Section 902.1.
- FIRE DOOR.** See Section 702.1.
- FIRE DOOR ASSEMBLY.** See Section 702.1.
- FIRE EXIT HARDWARE.** See Section 1002.1.
- FIRE PARTITION.** See Section 702.1.
- FIRE PROTECTION RATING.** See Section 702.1.
- [F] FIRE PROTECTION SYSTEM.** See Section 902.1.
- FIRE RESISTANCE.** See Section 702.1.
- FIRE-RESISTANCE RATING.** See Section 702.1.
- FIRE-RESISTANT JOINT SYSTEM.** See Section 702.1.
- [F] FIRE SAFETY FUNCTIONS.** See Section 902.1.
- FIRE SEPARATION DISTANCE.** See Section 702.1.
- FIRE WALL.** See Section 702.1.
- FIRE WINDOW ASSEMBLY.** See Section 702.1.
- FIREBLOCKING.** See Section 702.1.
- FIREPLACE.** See Section 2102.1.
- FIREPLACE THROAT.** See Section 2102.1.
- FIREWORKS.** See Section 307.2.
- FIREWORKS, 1.3G.** See Section 307.2.
- FIREWORKS, 1.4G.** See Section 307.2.
- 5-PERCENT FRACTILE.** See Section 1913.2.2.
- FLAME RESISTANCE.** See Section 802.1.
- FLAME SPREAD.** See Section 802.1.
- FLAME SPREAD INDEX.** See Section 802.1.
- [F] FLAMMABLE GAS.** See Section 307.2.
- [F] FLAMMABLE LIQUEFIED GAS.** See Section 307.2.
- [F] FLAMMABLE LIQUID.** See Section 307.2.
- Class IA.** See Section 307.2.
- Class IB.** See Section 307.2.
- Class IC.** See Section 307.2.
- [F] FLAMMABLE MATERIAL.** See Section 307.2.
- [F] FLAMMABLE SOLID.** See Section 307.2.
- [F] FLAMMABLE VAPORS OR FUMES.** See Section 415.2.
- [F] FLASH POINT.** See Section 307.2.
- FLEXIBLE BUILDINGS AND OTHER STRUCTURES.** See Section 1609.2.
- FLEXIBLE EQUIPMENT CONNECTIONS.** See Section 1602.1.
- FLOOD OR FLOODING.** See Section 1612.2.
- FLOOD DAMAGE-RESISTANT MATERIALS.** See Section 1612.2.
- FLOOD HAZARD AREA.** See Section 1612.2.
- FLOOD HAZARD AREA SUBJECT TO HIGH VELOCITY WAVE ACTION.** See Section 1612.2.
- FLOOD INSURANCE RATE MAP (FIRM).** See Section 1612.2.
- FLOOD INSURANCE STUDY.** See Section 1612.2.
- FLOODWAY.** See Section 1612.2.
- FLOOR AREA, GROSS.** See Section 1002.1.
- FLOOR AREA, NET.** See Section 1002.1.
- FLOOR FIRE DOOR ASSEMBLY.** See Section 702.1.
- [F] FOAM-EXTINGUISHING SYSTEMS.** See Section 902.1.
- FOAM PLASTIC INSULATION.** See Section 2602.1.
- FOLDING AND TELESCOPIC SEATING.** See Section 1002.1.
- FOOD COURT.** See Section 402.2.
- FOOTBOARDS.** See Section 1002.1.
- FLY GALLERY.** See Section 410.2.
- FRAME.** See Section 1602.1.
- Braced frame.** See Section 1602.1.
- Concentrically braced frame (CBF).** See Section 1602.1.
- Eccentrically braced frame (EBF).** See Section 1602.1.
- Ordinary concentrically braced frame (OCBF).** See Section 1602.1.
- Special concentrically braced frame (SCBF).** See Section 1602.1.
- FRAME, MOMENT.** See Section 1602.1.
- Intermediate moment frame (IMF).** See Section 1602.1.
- Ordinary moment frame (OMF).** See Section 1602.1.
- Special moment frame (SMF).** See Section 1602.1.
- FRAME SYSTEM.** See Section 1602.1.
- Building frame system.** See Section 1602.1.
- Dual frame system.** See Section 1602.1.
- Space frame system.** See Section 1602.1.
- [F] GAS CABINET.** See Section 415.2.
- [F] GAS ROOM.** See Section 415.2.
- GLASS FIBER BOARD.** See Section 720.1.1.
- GLUED BUILT-UP MEMBER.** See Section 2302.1.
- GRADE FLOOR OPENING.** A window or other opening located such that the sill height of the opening is not more than 44 inches (1118 mm) above or below the finished ground level adjacent to the opening.
- GRADE (LUMBER).** See Section 2302.1.
- GRADE PLANE.** See Section 502.1.
- GRANDSTAND.** See Section 1002.1.

GRAVITY LOAD. See Section 1613.1.

GRIDIRON. See Section 410.2.

GROSS LEASABLE AREA. See Section 402.2.

GROUTED MASONRY. See Section 2102.1.

Grouted hollow-unit masonry. See Section 2102.1.

Grouted multiwythe masonry. See Section 2102.1.

GUARD. See Section 1002.1.

GYPSUM BOARD. See Section 2502.1.

GYPSUM PLASTER. See Section 2502.1.

GYPSUM VENEER PLASTER. See Section 2502.1.

HABITABLE SPACE. A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

[F] HALOGENATED EXTINGUISHING SYSTEMS. See Section 902.1.

[F] HANDLING. See Section 307.2.

HANDRAIL. See Section 1002.1.

HARDBOARD. See Section 2302.1.

HAZARDOUS CONTENTS. See Section 1613.1.

[F] HAZARDOUS MATERIALS. See Section 307.2.

[F] HAZARDOUS PRODUCTION MATERIAL (HPM). See Section 415.2.

HEAD JOINT. See Section 2102.1.

HEADER (Bonder). See Section 2102.1.

[F] HEALTH HAZARD. See Section 307.2.

HEIGHT, BUILDING. See Section 502.1.

HEIGHT, STORY. See Section 502.1.

HEIGHT, WALLS. See Section 2102.1.

HELIPORT. See Section 412.5.2.

HELISTOP. See Section 412.5.2.

[F] HIGHLY TOXIC. See Section 307.2.

HISTORIC BUILDING. A “qualified historic building” as defined in s. Comm 70.17 (15).

Note: Section Comm 70.17 (15) reads as follows: “ ‘Qualified historic building’ means a building which is: (a) Listed on, or nominated by the state historical society for listing on, the national register of historic places in Wisconsin; (b) Included in a district which is listed on, or has been nominated by the state historical society for listing on, the national register of historic places in Wisconsin, and has been determined by the state historical society to contribute to the historic significance of the district; (c) Listed on a certified municipal register of historic property; or (d) Included in a district which is listed on a certified municipal register of historic property, and has been determined by the municipality to contribute to the historic significance of the district.” [Comm 62.0202 (2) (c)]

HISTORIC BUILDINGS. Buildings that are listed in or eligible for listing in the National Register of Historic Places, or designated as historic under an appropriate state or local law. See Section 3406.

HOOKE D BOLT. See Section 1913.2.2.

HORIZONTAL EXIT. See Section 1002.1.

[F] HPM FLAMMABLE LIQUID. See Section 415.2.

[F] HPM ROOM. See Section 415.2.

HURRICANE-PRONE REGIONS. See Section 1609.2.

IBC and INTERNATIONAL BUILDING CODE. The 2000 edition of the *International Building Code*®, as adopted and modified in chs. Comm 61 to 65. [Comm 62.0202 (1) (b)]

ICC ELECTRICAL CODE. Chapter Comm 16. [Comm 62.0202 (1) (c)]

IECC and INTERNATIONAL ENERGY CONSERVATION CODE. The 2000 edition of the *International Energy Conservation Code*®, as adopted and modified in chs. Comm 61 to 65. [Comm 62.0202 (1) (d)]

IFC and INTERNATIONAL FIRE CODE. The 2000 edition of the *International Fire Code*®. [Comm 62.0202 (1) (e)]

IFGC and INTERNATIONAL FUEL GAS CODE. The 2000 edition of the *International Fuel Gas Code*®, as adopted and modified in chs. Comm 61 to 65. [Comm 62.0202 (1) (f)]

IMC and INTERNATIONAL MECHANICAL CODE. The 2000 edition of the *International Mechanical Code*®, as adopted and modified in chs. Comm 61 to 65. [Comm 62.0202 (1) (g)]

IPC and INTERNATIONAL PLUMBING CODE. Chapters Comm 81 to 87. [Comm 62.0202 (1) (h)]

IPSDC and INTERNATIONAL PRIVATE SEWAGE DISPOSAL CODE. Chapters Comm 81 to 87. [Comm 62.0202 (1) (i)]

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH). See Section 415.2.

IMPACT LOAD. See Section 1602.1.

IMPORTANCE FACTOR, *I*. See Section 1609.2.

INCOMPATIBLE MATERIALS. See Section 307.2.

INDUSTRIAL EQUIPMENT PLATFORM. See Section 502.1.

[F] INITIATING DEVICE. See Section 902.1.

INSPECTION CERTIFICATE. See Section 1702.1.

INTERIOR FINISH. See Section 802.1.

INTERIOR FLOOR FINISH. See Section 802.1.

INTERIOR SURFACES. See Section 2502.1.

INTERIOR WALL AND CEILING FINISH. See Section 802.1.

INTERLAYMENT. See Section 1502.1.

INVERTED PENDULUM-TYPE STRUCTURES. See Section 1613.1.

ISOLATION INTERFACE. See Section 1613.1.

ISOLATION JOINT. See Section 1902.1.

ISOLATION SYSTEM. See Section 1613.1.

ISOLATOR UNIT. See Section 1613.1.

JOINT. See Sections 702.1 and 1602.1.

JURISDICTION. The governmental unit that has adopted this code under due legislative authority.

LABEL. See Section 1702.1.

LIGHT-DIFFUSING SYSTEM. See Section 2602.1.

LIGHT-FRAME CONSTRUCTION. A type of construction whose vertical and horizontal structural elements are primarily formed by a system of repetitive wood or light gauge steel framing members.

LIGHT-TRANSMITTING PLASTIC ROOF PANELS. See Section 2602.1.

LIGHT-TRANSMITTING PLASTIC WALL PANELS. See Section 2602.1.

LIMIT STATE. See Section 1602.1.

[F] LIQUID. See Section 415.2.

[F] LIQUID STORAGE ROOM. See Section 415.2.

[F] LIQUID USE, DISPENSING AND MIXING ROOMS. See Section 415.2.

LISTED. See Section 902.1.

LIVE LOADS. See Section 1602.1.

LIVE LOADS (ROOF). See Section 1602.1.

LOAD AND RESISTANCE FACTOR DESIGN (LRFD). See Section 1602.1.

LOAD FACTOR. See Section 1602.1.

LOADS. See Section 1602.1.

LOADS EFFECTS. See Section 1602.1.

LOT. A portion or parcel of land considered as a unit.

LOT LINE. A line dividing one lot from another, or from a street or any public place.

[F] LOWER FLAMMABLE LIMIT (LFL). See Section 415.2.

LOWEST FLOOR. See Section 1612.2.

MAIN WINDFORCE-RESISTING SYSTEM. See Section 1609.2.

MALL. See Section 402.2.

[F] MANUAL FIRE ALARM BOX. See Section 902.1.

MANUFACTURER'S DESIGNATION. See Section 1702.1.

MARK. See Section 1702.1.

MARQUEE. A permanent roofed structure attached to and supported by the building and that projects into the public right of way.

MASONRY. See Section 2102.1.

Ashlar masonry. See Section 2102.1.

Coursed ashlar. See Section 2102.1.

Glass unit masonry. See Section 2102.1.

Plain masonry. See Section 2102.1.

Random ashlar. See Section 2102.1.

Reinforced masonry. See Section 2102.1.

Solid masonry. See Section 2102.1.

MASONRY UNIT. See Section 2102.1.

Clay. See Section 2102.1.

Concrete. See Section 2102.1.

Hollow. See Section 2102.1.

Solid. See Section 2102.1.

MAXIMUM CONSIDERED EARTHQUAKE. See Section 1613.1.

MEAN DAILY TEMPERATURE. See Section 2102.1.

MEAN ROOF HEIGHT. See Section 1609.2.

MEANS OF EGRESS. See Section 1002.1.

MECHANICAL-ACCESS OPEN PARKING GARAGES. See Section 406.3.2.

MECHANICAL EQUIPMENT SCREEN. See Section 1502.1.

MEMBRANE-COVERED CABLE STRUCTURE. See Section 3102.2.

MEMBRANE-COVERED FRAME STRUCTURE. See Section 3102.2.

MEMBRANE PENETRATION. See Section 702.1.

MEMBRANE-PENETRATION FIRESTOP. See Section 702.1.

METAL ROOF PANEL. See Section 1502.1.

METAL ROOF SHINGLE. See Section 1502.1.

MEZZANINE. See Section 502.1.

MINERAL BOARD. See Section 720.1.1.

MODIFIED BITUMEN ROOF COVERING. See Section 1502.1.

MORTAR. See Section 2102.1.

MORTAR, SURFACE-BONDING. See Section 2102.1.

MULTIFAMILY DWELLING. See Section 101.971 (2), Wisconsin Stats.

Note: Section 101.971 (2), Stats., reads as follows: " 'Multifamily dwelling' means an apartment building, rowhouse, town house, condominium or manufactured building, as defined in s. 101.71 (6), that does not exceed 60 feet in height or 6 stories and that consists of 3 or more attached dwelling units the initial construction of which is begun on or after January 1, 1993. 'Multifamily dwelling' does not include a facility licensed under ch. 50." [Comm 62.0202 (1) (j)]

[F] MULTIPLE-STATION ALARM DEVICE. See Section 902.1.

[F] MULTIPLE-STATION SMOKE ALARM. See Section 902.1.

NAILING, BOUNDARY. See Section 2302.1.

NAILING, EDGE. See Section 2302.1.

NAILING, FIELD. See Section 2302.1.

NATURALLY DURABLE WOOD. See Section 2302.1.

Decay resistant. See Section 2302.1.

Termite resistant. See Section 2302.1.

NEUTRAL PLANE. See Section 1807.1. [Comm 62.1807 (1)]

NOMINAL LOADS. See Section 1602.1.

NOMINAL SIZE (LUMBER). See Section 2302.1.

NONBUILDING STRUCTURE. See Section 1613.1.

NONCOMBUSTIBLE MEMBRANE STRUCTURE. See Section 3102.2.

[F] NORMAL TEMPERATURE AND PRESSURE (NTP). See Section 415.2.

NOSING. See Section 1002.1.

[F] NUISANCE ALARM. See Section 902.1.

OCCUPANCY IMPORTANCE FACTOR. See Section 1613.1.

OCCUPANT LOAD. See Section 1002.1.

OCCUPIABLE SPACE. A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.

OPEN-AIR SEATING GRANDSTANDS AND BLEACHERS. See Section 1002.1.

OPEN PARKING GARAGE. See Section 406.3.2.

[F] OPEN SYSTEM. See Section 307.2.

[F] ORGANIC PEROXIDE. See Section 307.2.

Class I. See Section 307.2.

Class II. See Section 307.2.

Class III. See Section 307.2.

Class IV. See Section 307.2.

Class V. See Section 307.2.

Unclassified detonable. See Section 307.2.

ORIENTED STRAND BOARD (OSB). See Section 2302.1.

OTHER STRUCTURES. See Section 1602.1.

OWNER. Any person, agent, firm or corporation having a legal or equitable interest in the property.

[F] OXIDIZER. See Section 307.2.

Class 4. See Section 307.2.

Class 3. See Section 307.2.

Class 2. See Section 307.2.

Class 1. See Section 307.2.

[F] OXIDIZING GAS. See Section 307.2.

P-DELTA EFFECT. See Section 1602.1.

PANEL (PART OF A STRUCTURE). See Section 1602.1.

PANIC HARDWARE. See Section 1002.1.

PARTICLEBOARD. See Section 2302.1.

PEDESTAL. See Section 1902.1.

PENETRATION FIRESTOP. See Section 702.1.

PENTHOUSE. See Section 1502.1.

PERMIT. An official document or certificate issued by the authority having jurisdiction which authorizes performance of a specified activity.

PERSON. An individual, heirs, executors, administrators or assigns, and also includes a firm, partnership or corporation, its or their successors or assigns, or the agent of any of the aforesaid.

PERSONAL CARE SERVICE. See Section 310.2.

[F] PHYSICAL HAZARD. See Section 307.2.

PIER FOUNDATIONS. See Section 1807.1.

Belled piers. See Section 1807.1.

PILE FOUNDATIONS. See Section 1807.1.

Augered uncased piles. See Section 1807.1.

Caisson piles. See Section 1807.1.

Concrete-filled steel pipe and tube piles. See Section 1807.1.

Driven uncased piles. See Section 1807.1.

Enlarged base piles. See Section 1807.1.

PINRAIL. See Section 410.2.

PLAIN CONCRETE. See Section 1902.1.

PLAIN REINFORCEMENT. See Section 1902.1.

PLASTIC, APPROVED. See Section 2602.1.

PLASTIC GLAZING. See Section 2602.1.

PLASTIC HINGE. See Section 2102.1.

PLATFORM. See Section 410.2.

PLYWOOD. See Section 2302.1

POSITIVE ROOF DRAINAGE. See Section 1502.1.

PRECAST CONCRETE. See Section 1902.1.

PRESERVATIVE-TREATED WOOD. See Section 2302.1.

PRESTRESSED CONCRETE. See Section 1902.1.

PRISM. See Section 2102.1.

PROJECTED AREA. See Section 1913.2.2.

PROSCENIUM WALL. See Section 410.2.

PUBLIC ENTRANCE. See Section 1102.1.

PUBLIC-USE AREAS. See Section 1102.1.

PUBLIC WAY. See Section 1002.1.

[F] PYROPHORIC. See Section 307.2.

[F] PYROTECHNIC COMPOSITION. See Section 307.2.

QUALITY ASSURANCE PLAN. A written procedure complying with the requirements of Section 1705.

RAMP. See Section 1002.1.

RAMP-ACCESS OPEN PARKING GARAGES. See Section 406.3.2.

[F] RECORD DRAWINGS. See Section 902.1.

REFERENCE RESISTANCE (D). See Section 2302.1.

REGISTERED DESIGN PROFESSIONAL. An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

REINFORCED CONCRETE. See Section 1902.1.

REINFORCED PLASTIC, GLASS FIBER. See Section 2602.1.

REINFORCEMENT. See Section 1902.1.

REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance.

REQUIRED STRENGTH. See Sections 1602.1 and 2102.1.

REROOFING. See Section 1502.1.

RESHORES. See Section 1902.1.

RESIDENTIAL AIRCRAFT HANGAR. See Section 412.3.1.

RESIDENTIAL CARE/ASSISTED LIVING FACILITIES. See Section 310.2.

RESISTANCE FACTOR. See Section 1602.1.

REVIEWING STANDS. See Section 1002.1.

ROOF ASSEMBLY. See Section 1502.1.

ROOF COVERING. See Section 1502.1.

ROOF COVERING SYSTEM. See Section 1502.1.

ROOF DECK. See Section 1502.1.

ROOF RECOVER. See Section 1502.1.

ROOF REPAIR. See Section 1502.1.

ROOF REPLACEMENT. See Section 1502.1.

ROOF VENTILATION. See Section 1502.1.

ROOFTOP STRUCTURE. See Section 1502.1.

RUBBLE MASONRY. See Section 2102.1.

Coursed rubble. See Section 2102.1.

Random rubble. See Section 2102.1.

Rough or ordinary rubble. See Section 2102.1.

RUNNING BOND. See Section 2102.1.

SCUPPER. See Section 1502.1.

SEISMIC DESIGN CATEGORY. See Section 1613.1.

SEISMIC-FORCE-RESISTING SYSTEM. See Section 1613.1

SEISMIC FORCES. See Section 1613.1.

SEISMIC RESPONSE COEFFICIENT. See Section 1613.1.

SEISMIC USE GROUP. See Section 1613.1.

SELF-CLOSING. See Section 702.1.

SELF-SERVICE STORAGE FACILITY. See Section 1102.1.

[F] SERVICE CORRIDOR. See Section 415.2.

SERVICE ENTRANCE. See Section 1102.1.

SHAFT. See Section 702.1.

SHAFT ENCLOSURE. See Section 702.1.

SHALLOW ANCHORS. See Section 1602.1.

SHEAR PANEL. See Section 1602.1.

SHEAR WALL. See Sections 1602.1, 1613.1, 2102.1 and 2302.1.

Detailed plain masonry shear wall. See Section 2102.1.

Intermediate reinforced masonry shear wall. See Section 2102.1.

Ordinary plain masonry shear wall. See Section 2102.1.

Ordinary reinforced masonry shear wall. See Section 2102.1.

Special reinforced masonry shear wall. See Section 2102.1.

SHEAR WALL-FRAME INTERACTIVE SYSTEM. See Section 1613.1.

SHELL. See Section 2102.1.

SHORES. See Section 1902.1.

SHOTCRETE. See Section 1914.1.

SIDE-FACE BLOWOUT STRENGTH. See Section 1913.2.2.

SINGLE-PLY MEMBRANE. See Section 1502.1.

[F] SINGLE-STATION SMOKE ALARM. See Section 902.1.

SITE. See Section 1102.1.

SITE CLASS. See Section 1613.1.

SITE COEFFICIENTS. See Section 1613.1.

SKYLIGHTS AND SLOPED GLAZING. Glass or other transparent or translucent glazing material installed at a slope of 15 degrees (0.26 rad) or more from vertical. Glazing material in sky-lights, solariums, sun spaces, roofs and sloped walls are included in this definition.

SLEEPING ACCOMMODATIONS. See Section 1102.1.

[F] SMOKE ALARM. See Section 902.1.

SMOKE BARRIER. See Section 702.1.

SMOKE COMPARTMENT. See Section 702.1.

SMOKE DAMPER. See Section 702.1.

[F] SMOKE DETECTOR. See Section 902.1.

SMOKE-DEVELOPED INDEX. See Section 802.1.

SMOKE-PROTECTED ASSEMBLY SEATING. See Section 1002.1.

SMOKEPROOF ENCLOSURE. See Section 902.1.

[F] SOLID. See Section 415.2.

SPECIAL AMUSEMENT BUILDING. See Section 411.2.

SPECIAL INSPECTION. See Section 1702.1.

Special continuous inspection. See Section 1702.1.

Special periodic inspection. See Section 1702.1.

SPECIAL FLOOD HAZARD AREA. See Section 1612.2.

SPECIAL TRANSVERSE REINFORCEMENT. See Section 1602.1.

SPECIFIED. See Section 2102.1.

SPECIFIED COMPRESSIVE STRENGTH OF MASONRY (f'_m). See Section 2102.1.

SPIRAL REINFORCEMENT. See Section 1902.1.

SPLICE. See Section 702.1.

SPRAYED FIRE-RESISTANT MATERIALS. See Section 1702.1.

STACK BOND. See Section 2102.1.

STAGE. See Section 410.2.

STAIR. See Section 1002.1.

STAIRWAY. See Section 1002.1.

STAIRWAY, EXTERIOR. See Section 1002.1.

STAIRWAY, INTERIOR. See Section 1002.1.

STAIRWAY, SPIRAL. See Section 1002.1.

[F] STANDPIPE SYSTEM, CLASSES OF. See Section 902.1.

Class I system. See Section 902.1.

Class II system. See Section 902.1.

Class III system. See Section 902.1.

[F] STANDPIPE, TYPES OF. See Section 902.1.

Automatic dry. See Section 902.1.

Automatic wet. See Section 902.1.

Manual dry. See Section 902.1.

Manual wet. See Section 902.1.

Semiautomatic dry. See Section 902.1.

START OF CONSTRUCTION. See Section 1612.2.

STEEL CONSTRUCTION, COLD-FORMED. See Section 2202.1.

STEEL JOIST. See Section 2202.1.

STEEL MEMBER, STRUCTURAL. See Section 2202.1.

STEEP SLOPE. A roof slope greater than two units vertical in 12 units horizontal (17-percent slope).

STIRRUP. See Section 2102.1.

STONE MASONRY. See Section 2102.1.

Ashlar stone masonry. See Section 2102.1.

Rubble stone masonry. See Section 2102.1.

[F] STORAGE, HAZARDOUS MATERIALS. See Section 415.2.

STORY. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above (also see "Basement," "Mezzanine" and Section 502.1). It is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

STORY ABOVE GRADE PLANE. Any story having its finished floor surface entirely above grade plane, except that a basement shall be considered as a story above grade plane where the finished surface of the floor above the basement is:

1. More than 6 feet (1829 mm) above grade plane;

2. More than 6 feet (1829 mm) above the finished ground level for more than 50 percent of the total building perimeter; or

3. More than 12 feet (3658 mm) above the finished ground level at any point.

STORY DRIFT RATIO. See Section 1613.1.

STRENGTH. See Section 2102.1.

Design strength. See Section 2102.1.

Nominal strength. See Sections 1602.1 and 2102.1.

STRENGTH DESIGN. See Section 1602.1.

STRUCTURAL CONCRETE. See Section 1902.1.

STRUCTURAL GLUED-LAMINATED TIMBER. See Section 2302.1.

STRUCTURAL OBSERVATION. See Section 1702.1.

STRUCTURE. That which is built or constructed.

SUBDIAPHRAGM. See Section 2302.1.

SUBSTANTIAL DAMAGE. See Section 1612.2.

SUBSTANTIAL IMPROVEMENT. See Section 1612.2.

[F] SUPERVISING STATION. See Section 902.1.

[F] SUPERVISORY SERVICE. See Section 902.1.

[F] SUPERVISORY SIGNAL. See Section 902.1.

[F] SUPERVISORY SIGNAL-INITIATING DEVICE. See Section 902.1.

SWIMMING POOLS. See Section 3109.2.

T RATING. See Section 702.1.

TECHNICALLY INFEASIBLE. See s. Comm 62.3408 (7).

TENDON. See Section 1902.1.

TENT. Any structure, enclosure or shelter which is constructed of canvas or pliable material supported in any manner except by air or the contents it protects.

THERMOPLASTIC MATERIAL. See Section 2602.1.

THERMOSETTING MATERIAL. See Section 2602.1.

THROUGH PENETRATION. See Section 702.1.

THROUGH-PENETRATION FIRESTOP SYSTEM. See Section 702.1.

TIE, LATERAL. See Section 2102.1.

TIE, WALL. See Section 2102.1.

TIE-DOWN (HOLD-DOWN). See Section 2302.1.

TILE. See Section 2102.1.

TILE, STRUCTURAL CLAY. See Section 2102.1.

[F] TIRES, BULK STORAGE OF. See Section 902.1.

TORSIONAL FORCE DISTRIBUTION. See Section 1613.1.

TOUGHNESS. See Section 1613.1.

[F] TOXIC. See Section 307.2.

TREATED WOOD. See Section 2302.1.

TRIM. See Section 802.1.

DEFINITIONS

UNDERLAYMENT. See Section 1502.1.

[F] UNSTABLE (REACTIVE) MATERIAL. See Section 307.2.

Class 4. See Section 307.2.

Class 3. See Section 307.2.

Class 2. See Section 307.2.

Class 1. See Section 307.2.

[F] USE (MATERIAL). See Section 415.2.

VAPOR RETARDER. A material having a permeance rating of 1.0 perm or less, when tested in accordance with ASTM E 96, such as foil, plastic sheeting, or insulation facing, installed to resist the transmission of water vapor through the exterior envelope.

veneer. See Section 1402.1.

VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

[F] VISIBLE ALARM NOTIFICATION APPLIANCE. See Section 902.1.

WALKWAY, PEDESTRIAN. A walkway used exclusively as a pedestrian trafficway.

WALL. See Section 2102.1.

Cavity wall. See Section 2102.1.

Composite wall. See Section 2102.1.

Dry-stacked, surface-bonded wall. See Section 2102.1.

Masonry-bonded hollow wall. See Section 2102.1.

Parapet wall. See Section 2102.1.

WALL FRAME. See Section 2102.1.

WALL, LOAD BEARING. See Section 1602.1.

WALL, NONLOAD BEARING. See Section 1602.1.

[F] WATER-REACTIVE MATERIAL. See Section 307.2.

Class 3. See Section 307.2.

Class 2. See Section 307.2.

Class 1. See Section 307.2.

WEATHER-EXPOSED SURFACES. See Section 2502.1.

WEB. See Section 2102.1.

[F] WET-CHEMICAL EXTINGUISHING SYSTEM. See Section 902.1.

WHEELCHAIR SPACE. See Section 1102.1.

WHEELCHAIR SPACE CLUSTER. See Section 1102.1.

WIND-BORNE DEBRIS REGION. See Section 1609.2.

WIND-RESTRAINT SEISMIC SYSTEM. See Section 1613.

WIRE BACKING. See Section 2502.1.

[F] WIRELESS PROTECTION SYSTEM. See Section 902.1.

WOOD SHEAR PANEL. See Section 2302.1.

WOOD STRUCTURAL PANEL. See Section 2302.1.

[F] WORKSTATION. See Section 415.2.

WYTHE. See Section 2102.1.

YARD. An open space, other than a court, unobstructed from the ground to the sky, except where specifically provided by this code, on the lot on which a building is situated.

[F] ZONE. See Section 902.1.

CHAPTER 3

USE AND OCCUPANCY CLASSIFICATION

SECTION 301 GENERAL

301.1 Scope. The provisions of this chapter shall control the classification of all buildings and structures as to use and occupancy.

SECTION 302 CLASSIFICATION

302.1 General. Structures or portions of structures shall be classified with respect to occupancy in one or more of the groups listed below. Structures with multiple uses shall be classified according to Section 302.3. Where a structure is proposed for a purpose which is not specifically provided for in this code, such structure shall be classified in the group which the occupancy most nearly resembles, according to the fire safety and relative hazard involved.

1. Assembly (see Section 303): Groups A-1, A-2, A-3, A-4 and A-5
2. Business (see Section 304): Group B
3. Educational (see Section 305): Group E
4. Factory and Industrial (see Section 306): Groups F-1 and F-2
5. High Hazard (see Section 307): Groups H-1, H-2, H-3, H-4 and H-5
6. Institutional (see Section 308): Groups I-1, I-2, I-3 and I-4
7. Mercantile (see Section 309): Group M
8. Residential (see Section 310): Groups R-1, R-2, R-3 as applicable in Section 101.2, and R-4
9. Storage (see Section 311): Groups S-1 and S-2
10. Utility and Miscellaneous (see Section 312): Group U

302.1.1 Incidental use areas. Areas that are incidental to the main occupancy shall be separated and protected in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use area is located.

Exception: Incidental use areas within and serving a dwelling unit are not required to comply with this section.

302.1.1.1 Separation. Where Table 302.1.1 requires a fire-resistance-rated separation, the incidental use area shall be separated from the remainder of the building with a fire barrier. Where Table 302.1.1 permits an automatic fire-extinguishing system without a fire barrier, the incidental use area shall be separated by construction capable of resisting the passage of smoke. The partitions shall extend from the floor to the underside of the fire-resistance-rated floor/ceiling assembly or fire-resistance-rated roof/ceiling assembly or to the underside of the floor or roof deck above. Doors shall be self-closing or

automatic-closing upon detection of smoke. Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with NFPA 80.

**TABLE 302.1.1
INCIDENTAL USE AREAS**

ROOM OR AREA	SEPARATION ^a
Furnace room where largest piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic fire-extinguishing system
Boilers over 15 psi and 10 horsepower	1 hour or provide automatic fire-extinguishing system
Refrigerant machinery rooms	1 hour or provide automatic fire-extinguishing system
Automotive parking garage in other than Group R-3	2 hours
Incinerator rooms	2 hours and automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic fire-extinguishing systems
Laboratories and vocational shops, not classified as Group H, located in Group E and I-2 occupancies	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 square feet	1 hour
Storage rooms over 100 square feet	1 hour
Group I-3 padded cells	1 hour
Waste and linen collection rooms over 100 square feet	1 hour
Stationary lead-acid battery systems having a liquid capacity of more than 100 gallons used for facility standby power, emergency power or uninterrupted power supplies	1-hour fire barriers and floor-ceiling assemblies in Group B, F, H, M, S and U occupancies. 2-hour fire barriers and floor-ceiling assemblies in Group A, E, I and R occupancies

For SI: 1 square foot = 0.0929 m², 1 pound per square inch = 6.9 kPa, 1 British thermal unit = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

a. Where an automatic fire-extinguishing system is provided, it need only be provided in the incidental use room or area.

302.2 Accessory use area. Except for accessory use areas of Group H in accordance with Section 302.3.1, or when required for incidental use areas as indicated in Section 302.1.1, a fire barrier shall not be required for a use not occupying more than 10 percent of the area of any floor of a building, nor more than the tabular values for either height or area for such use.

302.3 Mixed occupancies.

302.3.1 Two or more uses. Where the building is occupied for two or more uses not included in the same occupancy, the

building or portion thereof shall comply with Section 302.3.2 or 302.3.3 or combinations of these sections, except that areas of Group H shall be separated from other occupancies in accordance with Section 302.3.3. Areas of Group H-1 shall be in a separate and detached building and structure. Also, see Section 508 for special provisions for buildings containing mixed uses.

302.3.2 Nonseparated uses. Each portion of the building shall be individually classified as to use. The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building. The other requirements shall apply to each portion of the building based on the use of that space except that the most restrictive applicable provisions of the high rise building provisions and fire-protection system requirements shall apply to these nonseparated uses. Fire separations are not required between uses, except as required by other provisions.

302.3.3 Separated uses. Each portion of the building shall be individually classified as to use and shall be completely separated from adjacent areas by fire barrier walls or horizontal assemblies or both having a fire-resistance rating determined in accordance with Table 302.3.3 for the uses being separated. Each fire area shall comply with the code based on the use of that space. Each fire area shall comply with the height limitations based on the use of that space and the type of construction classification. In each story, the building area shall be such that the sum of the ratios of the floor area of each use divided by the allowable area for each use shall not exceed 1.

Exceptions:

1. Except for Group H and I-2 areas, where the building is equipped throughout with an automatic sprinkler system, the fire-resistance ratings in Table 302.3.3 shall be reduced by 1 hour but to not less than 1 hour and to not less than that required for floor construction according to the type of construction.
 2. The private garage shall be separated from the residence and its attic area by means of minimum $\frac{1}{2}$ -inch (12.7 mm) gypsum board applied to the garage side. Door openings between the garage and the residence shall be equipped with either solid wood doors not less than $1\frac{3}{8}$ inches (35 mm) thick, solid or honeycomb core steel doors not less than $1\frac{3}{8}$ inches (35 mm) thick or doors in compliance with Section 714.2.3. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted.
 3. Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel and shall have no openings into the garage.
4. A separation is not required between a Group R-3 and Group U carport provided the carport is entirely open on two or more sides and there are no enclosed uses above.

SECTION 303 ASSEMBLY GROUP A

303.1 Assembly Group A. Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering together of persons for purposes such as civic, social or religious functions, recreation, food or drink consumption or awaiting transportation. A room or space used for assembly purposes by fewer than 50 persons and accessory to another occupancy shall be included as a part of that occupancy. Assembly occupancies shall include the following:

- A-1** Assembly uses, usually with fixed seating, intended for the production and viewing of the performing arts or motion pictures including, but not limited to:
 - Motion picture theaters
 - Television and radio studios admitting an audience
 - Theaters
- A-2** Assembly uses intended for food and/or drink consumption including, but not limited to:
 - Banquet halls
 - Night clubs
 - Restaurants
 - Taverns and bars
- A-3** Assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A, including, but not limited to:
 - Amusement arcades
 - Art galleries
 - Auditoriums
 - Bowling alleys
 - Churches
 - Community halls
 - Courtrooms
 - Dance halls
 - Exhibition halls
 - Funeral parlors
 - Gymnasiums
 - Indoor swimming pools
 - Indoor tennis courts
 - Lecture halls
 - Libraries
 - Museums
 - Passenger stations (waiting area)
 - Pool and billiard parlors
- A-4** Assembly uses intended for viewing of indoor sporting events and activities with spectator seating, including, but not limited to:
 - Arenas
 - Skating rinks
 - Swimming pools
 - Tennis courts

TABLE 302.3.3
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)^a

USE	A-1	A-2	A-3	A-4	A-5	B ^b	E ^b	F-1	F-2	H-1	H-2	H-3	H-4	H-5	I-1	I-2	I-3	I-4	M ^b	R-1	R-2	R-3, R-4	S-1	S-2 ^c	U
A-1	2	2	2	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
A-2 ^h	—	2	2	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
A-3 ^{d,f}	—	—	2	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
A-4	—	—	—	2	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
A-5	—	—	—	—	2	2	2	3	2	NP	4	3	2	4	2	2	2	2	2	2	2	2	3	2	1
B ^b	—	—	—	—	—	2	2	3	2	NP	2	1	1	1	2	2	2	2	2	2	2	2	3	2	1
E	—	—	—	—	—	2	2	3	2	NP	4	3	2	3	2	2	2	2	2	2	2	2	3	2	1
F-1	—	—	—	—	—	—	—	3	3	NP	2	1	1	1	3	3	3	3	3	3	3	3	3	3	3
F-2	—	—	—	—	—	—	—	—	2	NP	2	1	1	1	2	2	2	2	2	2	2	2	3	2	1
H-1	—	—	—	—	—	—	—	—	—	4	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
H-2	—	—	—	—	—	—	—	—	—	—	4	1	2	2	4	4	4	4	2	4	4	4	2	2	1
H-3	—	—	—	—	—	—	—	—	—	—	—	3	1	1	4	3	3	3	1	3	3	3	1	1	1
H-4	—	—	—	—	—	—	—	—	—	—	—	—	2	1	4	4	4	4	1	4	4	4	1	1	1
H-5	—	—	—	—	—	—	—	—	—	—	—	—	—	2	4	4	4	3	1	4	4	4	1	1	3
I-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	2	2	2	2	4	3	2
I-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	2	2	2	3	2	1
I-3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	2	2	3	2	1
I-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	2	3	2	1
M ^b	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2	3	2	1
R-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	3	2	1
R-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2	3	2	1
R-3, R-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3	2 ^g	1 ^g
S-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	3
S-2 ^c	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1
U	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1

For SI: 1 square foot = 0.0929 m².

NP = Not permitted.

a. See Exception 1 to Section 302.3.3 for reductions permitted.

b. Occupancy separation need not be provided for incidental storage areas within Groups B and M if the:

1. Area is less than 10 percent of the floor area;
2. Area is provided with an automatic fire-extinguishing system and is less than 3,000 square feet; or
3. Area is less than 1,000 square feet.

c. Areas used only for private or pleasure vehicles may reduce separation by 1 hour.

d. Accessory assembly areas are not considered separate occupancies if the floor area is 750 square feet or less.

e. Assembly uses accessory to Group E are not considered separate occupancies.

f. Accessory religious educational rooms and religious auditoriums with occupant loads of less than 100 are not considered separate occupancies.

g. See exception to Section 302.3.3.

h. Commercial kitchens need not be separated from the restaurant seating areas that they serve.

A-5 Assembly uses intended for participation in or viewing outdoor activities including, but not limited to:

- Amusement park structures
- Bleachers
- Grandstands
- Stadiums

SECTION 304 BUSINESS GROUP B

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

- Airport traffic control towers
- Animal hospitals, kennels and pounds
- Banks
- Barber and beauty shops
- Car wash
- Civic administration
- Clinic—outpatient
- Dry cleaning and laundries; pick-up and delivery stations and self-service
- Educational occupancies above the 12th grade
- Electronic data processing
- Fire and police stations
- Laboratories; testing and research
- Motor vehicle showrooms
- Post offices
- Print shops
- Professional services (architects, attorneys, dentists, physicians, engineers, etc.)
- Radio and television stations
- Telephone exchanges

SECTION 305 EDUCATIONAL GROUP E

305.1 Educational Group E. Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade.

305.2 Day care. The use of a building or structure, or portion thereof, for educational, supervision or personal care services for more than five children older than 2½ years of age, shall be classified as a Group E occupancy.

SECTION 306 FACTORY GROUP F

306.1 Factory Industrial Group F. Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous occupancy.

306.2 Factory Industrial F-1 Moderate-Hazard Occupancy. Factory Industrial uses which are not classified as Fac-

tory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

- Aircraft
- Appliances
- Athletic equipment
- Automobiles and other motor vehicles
- Bakeries
- Beverages (alcoholic)
- Bicycles
- Boats; building
- Brooms or brushes
- Business machines
- Cameras and photo equipment
- Canvas or similar fabric
- Carpets and rugs (includes cleaning)
- Clothing
- Construction and agricultural machinery
- Disinfectants
- Dry cleaning and dyeing
- Electric light plants and power houses
- Electronics
- Engines (including rebuilding)
- Food processing
- Furniture
- Hemp products
- Jute products
- Laundries
- Leather products
- Machinery
- Metals
- Millwork (sash & door)
- Motion pictures and television filming
- Musical instruments
- Optical goods
- Paper mills or products
- Photographic film
- Plastic products
- Printing or publishing
- Recreational vehicles
- Refuse incineration
- Shoes
- Soaps and detergents
- Textiles
- Tobacco
- Trailers
- Upholstering
- Wood; distillation
- Woodworking (cabinet)

306.3 Factory Industrial F-2 Low-Hazard Occupancy. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials which during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

- Beverages (nonalcoholic)
- Brick and masonry
- Ceramic products
- Foundries

Glass products
Gypsum
Ice
Metal products (fabrication and assembly)

[F] SECTION 307 HIGH-HAZARD GROUP H

307.1 Hazardous Group H. Hazardous Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those found in Tables 307.7(1) and 307.7(2). (See also definition of "Control Area".)

307.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

AEROSOL. A product that is dispensed from an aerosol container by a propellant.

Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.

Level 1 aerosol products. Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

Level 2 aerosol products. Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

Level 3 aerosol products. Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).

AEROSOL CONTAINER. A metal can or a glass or plastic bottle designed to dispense an aerosol. Metal cans shall be limited to a maximum size of 33.8 fluid ounces (1000 ml). Glass or plastic bottles shall be limited to a maximum size of 4 fluid ounces (118 ml).

BARRICADE. A structure that consists of a combination of walls, floor and roof, which is designed to withstand the rapid release of energy in an explosion and which is fully confined, partially vented or fully vented; or other effective method of shielding from explosive materials by a natural or artificial barrier.

Artificial barricade. An artificial mound or revetment a minimum thickness of 3 feet (914 mm).

Natural barricade. Natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures that require protection cannot be seen from the magazine or building containing explosives when the trees are bare of leaves.

BOILING POINT. The temperature at which the vapor pressure of a liquid equals the atmospheric pressure of 14.7 pounds per square inch (psia) (101 kPa) or 760 mm of mercury. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for the purposes of this classification, the 20-percent evaporated point of a distillation performed in accordance with ASTM D 86 shall be used as the boiling point of the liquid.

CLOSED SYSTEM. The use of a solid or liquid hazardous material involving a closed vessel or system that remains closed during normal operations where vapors emitted by the product are not liberated outside of the vessel or system and the product is not exposed to the atmosphere during normal operations; and all uses of compressed gases. Examples of closed systems for solids and liquids include product conveyed through a piping system into a closed vessel, system or piece of equipment.

COMBUSTIBLE DUST. Finely divided solid material that is 420 microns or less in diameter and which, when dispersed in air in the proper proportions, could be ignited by a flame, spark or other source of ignition. Combustible dust will pass through a U.S. No. 40 standard sieve.

COMBUSTIBLE FIBERS. Readily ignitable and free-burning fibers, such as cocoa fiber, cloth, cotton, excelsior, hay, hemp, henequen, istle, jute, kapok, oakum, rags, sisal, Spanish moss, straw, tow, wastepaper or other like materials.

COMBUSTIBLE LIQUID. A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:

Class II. Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).

Class IIIA. Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).

Class IIIB. Liquids having a closed cup flash point at or above 200°F (93°C).

The category of combustible liquids does not include compressed gases or cryogenic fluids.

COMPRESSED GAS. A material, or mixture of materials which:

1. Is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure; and
2. Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C).

The states of a compressed gas are categorized as follows:

1. Nonliquefied compressed gases are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).
2. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C).
3. Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.
4. Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.

CONTROL AREA. Spaces within a building that are enclosed and bounded by exterior walls, fire walls, fire barriers

and roofs, or a combination thereof, where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used or handled.

CORROSIVE. A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR, Part 173, such a chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.

CRYOGENIC FLUID. A liquid having a boiling point lower than -150°F (-101°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101 kPa).

DEFLAGRATION. An exothermic reaction, such as the extremely rapid oxidation of a flammable dust or vapor in air, in which the reaction progresses through the unburned material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

DETACHED STORAGE BUILDING. A separate single-story building, without a basement or crawl space, used for the storage of hazardous materials and located an approved distance from all structures.

DETONATION. An exothermic reaction characterized by the presence of a shock wave in the material which establishes and maintains the reaction. The reaction zone progresses through the material at a rate greater than the velocity of sound. The principal heating mechanism is one of shock compression. Detonations have an explosive effect.

DISPENSING. The pouring or transferring of any material from a container, tank or similar vessel, whereby vapors, dusts, fumes, mists or gases are liberated to the atmosphere.

EXPLOSIVE. Any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord, igniters and display fireworks, 1.3G (Class B, Special).

The term "explosive" includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G (Class C, Common) by the hazardous materials regulations of DOTn 49 CFR.

High explosive. Explosive material, such as dynamite, which can be caused to detonate by means of a No. 8 test blasting cap when unconfined.

Low explosive. Explosive material that will burn or deflagrate when ignited. It is characterized by a rate of reaction that is less than the speed of sound. Examples of low explosives include, but are not limited to, black powder; safety fuse; igniters; igniter cord; fuse lighters; fireworks, 1.3G (Class B special) and propellants, 1.3C.

UN/DOTn Class 1 explosives. The former classification system used by DOTn included the terms "high" and "low" explosives as defined herein. The following terms further define explosives under the current system applied by

DOTn for all explosive materials defined as hazard Class 1 materials. Compatibility group letters are used in concert with the division to specify further limitations on each division noted (i.e., the letter G identifies the material as a pyrotechnic substance or article containing a pyrotechnic substance and similar materials).

Division 1.1. Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

Division 1.2. Explosives that have a projection hazard but not a mass explosion hazard.

Division 1.3. Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Division 1.4. Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5. Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard, but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Division 1.6. Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

FIREWORKS. Any composition or device for the purpose of producing a visible or an audible effect for entertainment purposes by combustion, deflagration or detonation that meets the definition of 1.4G fireworks or 1.3G fireworks as set forth herein.

FIREWORKS, 1.3G. (Formerly Class B, Special Fireworks.) Large fireworks devices, which are explosive materials, intended for use in fireworks displays and designed to produce audible or visible effects by combustion, deflagration or detonation. Such 1.3G fireworks include, but are not limited to, firecrackers containing more than 130 milligrams (2 grains) of explosive composition, aerial shells containing more than 40 grams of pyrotechnic composition, and other display pieces which exceed the limits for classification as 1.4G fireworks. Such 1.3G fireworks are also described as fireworks, 49 CFR (172) by the DOTn.

FIREWORKS, 1.4G. (Formerly known as Class C, Common Fireworks.) Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion. Such 1.4G fireworks which comply with the construction, chemical composition and labeling regulations of the DOTn for fireworks, 49 CFR (172), and the U.S. Consumer Product Safety Commission (CPSC) as set forth in CPSC 16 CFR: Parts 1500 and 1507, are not explosive materials for the purpose of this code.

FLAMMABLE GAS. A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101

kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] which:

1. Is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air; or
2. Has a flammable range at 14.7 psia (101 kPa) with air of at least 12 percent, regardless of the lower limit.

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E 681.

FLAMMABLE LIQUEFIED GAS. A liquefied compressed gas which, under a charged pressure, is partially liquid at a temperature of 68°F (20°C) and which is flammable.

FLAMMABLE LIQUID. A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

Class IA. Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).

Class IB. Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).

Class IC. Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).

The category of flammable liquids does not include compressed gases or cryogenic fluids.

FLAMMABLE MATERIAL. A material capable of being readily ignited from common sources of heat or at a temperature of 600°F (316°C) or less.

FLAMMABLE SOLID. A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption or moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid as determined in accordance with the test method of CPSC 16 CFR, Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.1 inch (2.5 mm) per second along its major axis.

FLASH POINT. The minimum temperature in degrees Fahrenheit at which a liquid will give off sufficient vapors to form an ignitable mixture with air near the surface or in the container, but will not sustain combustion. The flash point of a liquid shall be determined by appropriate test procedure and apparatus as specified in ASTM D 56, ASTM D 93 or ASTM D 3278.

HANDLING. The deliberate transport by any means to a point of storage or use.

HAZARDOUS MATERIALS. Those chemicals or substances that are physical hazards or health hazards as defined and classified in this section and the *International Fire Code*, whether the materials are in usable or waste condition.

HEALTH HAZARD. A classification of a chemical for which there is statistically significant evidence that acute or chronic health effects are capable of occurring in exposed persons. The term "health hazard" includes chemicals that are toxic or highly toxic, and corrosive.

HIGHLY TOXIC. A material which produces a lethal dose or lethal concentration that falls within any of the following categories:

1. A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3. A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as highly toxic. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

INCOMPATIBLE MATERIALS. Materials that, when mixed, have the potential to react in a manner that generates heat, fumes, gases or byproducts which are hazardous to life or property.

OPEN SYSTEM. The use of a solid or liquid hazardous material involving a vessel or system that is continuously open to the atmosphere during normal operations and where vapors are liberated, or the product is exposed to the atmosphere during normal operations. Examples of open systems for solids and liquids include dispensing from or into open beakers or containers, dip tank and plating tank operations.

ORGANIC PEROXIDE. An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. Organic peroxides can pose an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.

Class I. Those formulations that are capable of deflagration but not detonation.

Class II. Those formulations that burn very rapidly and that pose a moderate reactivity hazard.

Class III. Those formulations that burn rapidly and that pose a moderate reactivity hazard.

Class IV. Those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.

Class V. Those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.

Unclassified detonable. Organic peroxides that are capable of detonation. These peroxides pose an extremely high explosion hazard through rapid explosive decomposition.

OXIDIZER. A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials. Examples of other oxidizing gases include bromine, chlorine and fluorine.

Class 4. An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock. In addition, the oxidizer will enhance the burning rate and can cause spontaneous ignition of combustibles.

Class 3. An oxidizer that will cause a severe increase in the burning rate of combustible materials with which it comes in contact or that will undergo vigorous self-sustained decomposition due to contamination or exposure to heat.

Class 2. An oxidizer that will cause a moderate increase in the burning rate or that causes spontaneous ignition of combustible materials with which it comes in contact.

Class 1. An oxidizer whose primary hazard is that it slightly increases the burning rate but which does not cause spontaneous ignition when it comes in contact with combustible materials.

OXIDIZING GAS. A gas that can support and accelerate combustion of other materials.

PHYSICAL HAZARD. A chemical for which there is evidence that it is a combustible liquid, compressed gas, cryogenic, explosive, flammable gas, flammable liquid, flammable solid, organic peroxide, oxidizer, pyrophoric or unstable (reactive) or water-reactive material.

PYROPHORIC. A chemical with an autoignition temperature in air, at or below a temperature of 13°F (-11°C).

PYROTECHNIC COMPOSITION. A chemical mixture that produces visible light displays or sounds through a self-propagating, heat-releasing chemical reaction which is initiated by ignition.

TOXIC. A chemical falling within any of the following categories:

1. A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3. A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

UNSTABLE (REACTIVE) MATERIAL. A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants, or in contact with incompatible materials. Unstable (reactive) materials are subdivided as follows:

Class 4. Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.

Class 3. Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures.

Class 2. Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures.

Class 1. Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressure.

WATER-REACTIVE MATERIAL. A material that explodes; violently reacts; produces flammable, toxic or other hazardous gases; or evolves enough heat to cause self-ignition or ignition of nearby combustibles upon exposure to water or moisture. Water-reactive materials are subdivided as follows:

Class 3. Materials that react explosively with water without requiring heat or confinement.

Class 2. Materials that may form potentially explosive mixtures with water.

Class 1. Materials that may react with water with some release of energy, but not violently.

307.3 Group H-1 structures. Buildings and structures that contain materials that pose a detonation hazard, shall be classified as Group H-1. Such materials shall include, but not be limited to:

Explosives
Organic peroxides, unclassified detonable
Oxidizers, Class 4
Unstable (reactive) materials, Class 3 detonable and Class 4
Detonable pyrophoric materials

307.4 Group H-2 structures. Buildings and structures which contain materials that pose a deflagration hazard or a hazard from accelerated burning, shall be classified as Group H-2. Such materials shall include, but not be limited to:

Class I, or II or IIIA flammable or combustible liquids that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103 kPa).

Combustible dusts
 Cryogenic liquids, flammable
 Flammable gases
 Organic peroxides, Class I
 Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103 kPa).
 Pyrophoric liquids, solids and gases, nondetonable
 Unstable (reactive) materials, Class 3, nondetonable
 Water-reactive materials, Class 3

307.5 Group H-3 structures. Buildings and structures which contain materials that readily support combustion or pose a physical hazard, shall be classified as Group H-3. Such materials shall include but not be limited to:

Class I, II or IIIA flammable or combustible liquids that are used or stored in normally closed containers or systems pressurized at less than 15 pounds per square inch gauge (103 kPa).
 Combustible fibers
 Consumer fireworks, 1.4G (Class C, Common)
 Cryogenic liquids, oxidizing
 Flammable solids
 Organic peroxides, Class II and Class III
 Oxidizers, Class 1 and Class 2
 Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at less than 15 pounds per square inch gauge (103 kPa)
 Oxidizing gases
 Unstable (reactive) materials, Class 2
 Water-reactive materials, Class 2

307.6 Group H-4 structures. Buildings and structures which contain materials that are health hazards shall be classified as Group H-4. Such materials shall include, but not be limited to:

Corrosives
 Highly toxic materials
 Toxic materials

307.7 Group H-5 structures. Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials is in excess of those listed in Tables 307.7(1) and 307.7(2). Such facilities and areas shall be designed and constructed in accordance with Section 415.9.

307.8 Multiple hazards. Buildings and structures containing a material or materials representing hazards that are classified in one or more of Groups H-1, H-2, H-3 and H-4 shall conform to the code requirements for each of the occupancies so classified.

307.9 Exceptions: The following shall not be classified in Group H, but shall be classified in the occupancy which they most nearly resemble. Hazardous materials in any quantity shall conform to the requirements of this code, including Section 414, and the *International Fire Code*.

1. Buildings and structures that contain not more than the maximum allowable quantities per control area of haz-

ardous materials as shown in Tables 307.7(1) and 307.7(2) provided that such buildings are maintained in accordance with the *International Fire Code*.

2. Buildings utilizing control areas in accordance with Section 414.2 that contain not more than the maximum allowable quantities per control area of hazardous materials as shown in Tables 307.7(1) and 307.7(2).
3. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Section 416 and NFPA 33, NFPA 34 and the *International Fire Code*.
4. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to NFPA 30 and the *International Fire Code*.
5. Closed systems housing flammable or combustible liquids or gases utilized for the operation of machinery or equipment.
6. Cleaning establishments that utilize combustible liquid solvents having a flash point of 140°F (60°C) or higher in closed systems employing equipment listed by an approved testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour fire-resistance-rated fire barrier walls or horizontal assemblies or both.
7. Cleaning establishments which utilize a liquid solvent having a flash point at or above 200°F (93°C).
8. Liquor stores and distributors without bulk storage.
9. Refrigeration systems.
10. The storage or utilization of materials for agricultural purposes on the premises.
11. Stationary batteries utilized for facility emergency power, uninterrupted power supply or telecommunication facilities provided that the batteries are provided with safety venting caps and ventilation is provided in accordance with the *International Mechanical Code*.
12. Corrosives shall not include personal or household products in their original packaging used in retail display or commonly used building materials.
13. Buildings and structures occupied for aerosol manufacturing or storage shall be classified as Group F-1 or S-1, provided that such buildings conform to the requirements of NFPA 30B and the *International Fire Code*.
14. Display and storage of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in quantities not exceeding the maximum allowable quantity per control area in Group M or S occupancies complying with Section 414.2.4.
15. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements prescribed in the *International Fire Code*.

[F] TABLE 307.7(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a, j}

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible liquid ^{c, i}	II IIA IIIB	H-2 or H-3 H-2 or H-3	N/A	120 ^{d, e} 330 ^{d, e} 13,200 ^{e, f}	N/A	N/A	120 ^d 330 ^d 13,200 ^{e, f}	N/A	N/A	30 ^d 80 ^d 3,300 ^f
Combustible fiber	Loose baled	H-3	(100) (1,000)	N/A	N/A	(100) (1,000)	N/A	N/A	(20) (200)	N/A
Consumer fireworks (Class C, Common)	1.4G	H-3	125 ^{d, e, l}	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cryogenics flammable		H-2	N/A	45 ^d	N/A	N/A	45 ^d	N/A	N/A	10 ^d
Cryogenics, oxidizing	N/A	H-3	N/A	45 ^d	N/A	N/A	45 ^d	N/A	N/A	10 ^d
Explosives		H-1	1 ^{e, g}	(1) ^{e, g}	N/A	0.25 ^g	(0.25) ^g	N/A	0.25 ^g	(0.25) ^g
Flammable gas	Gaseous liquefied	H-2	N/A	N/A 30 ^{d, e}	1,000 ^{d, e} N/A	N/A	N/A 30 ^{d, e}	1,000 ^{d, e} N/A	N/A	N/A
Flammable liquid ^c	1A 1B 1C	H-2 or H-3	N/A	30 ^{d, e} 60 ^{d, e} 90 ^{d, e}	N/A	N/A	30 ^d 60 ^d 90 ^d	N/A	N/A	10 ^d 15 ^d 20 ^d
Combination flammable liquid (1A, 1B, 1C)		H-2 or H-3	N/A	120 ^{d, e, h}	N/A	N/A	120 ^{d, h}	N/A	N/A	30 ^{d, h}
Flammable solid		H-3	125 ^{d, e}	N/A	N/A	125 ^d	N/A	N/A ^z	25 ^d	N/A
Organic peroxide	UD	H-1	1 ^{e, f}	(1) ^{e, g}	N/A	0.25 ^g	(0.25) ^g	N/A	0.25 ^g	(0.25) ^g
	I	H-2	5 ^{d, e}	(5) ^{d, e}	N/A	1 ^d	(1)	N/A	1 ^d	(1) ^d
	II	H-3	50 ^{d, e}	(50) ^{d, e}	N/A	50 ^d	(50) ^d	N/A	10 ^d	(10) ^d
	III	H-3	125 ^{d, e}	(125) ^{d, e}	N/A	125 ^d	(125) ^d	N/A	25 ^d	(25) ^d
	IV V		NL NL	NL NL	N/A N/A	N/A N/A	N/L N/L	N/A N/A	NL NL	NL NL
Oxidizer	4	H-1	1 ^{e, g}	(1) ^{e, g}	N/A	0.25 ^g	(0.25) ^g	N/A	0.25 ^g	(0.25) ^g
	3 ^k	H-2	10 ^{d, e}	(10) ^{d, e}	N/A	2 ^d	(2) ^d	N/A	2 ^d	(2) ^d
	2	H-3	250 ^{d, e}	(250) ^{d, e}	N/A	250 ^d	(250) ^d	N/A	50 ^d	(50) ^d
	1	H-3	4,000 ^{d, e}	(4,000) ^{d, e}	N/A	4,000 ^d	(4,000) ^d	N/A	1,000 ^d	(1,000) ^d
Oxidizing gas	Gaseous liquefied	H-3	N/A N/A	N/A 15 ^{d, e}	1,500 ^{d, e} N/A	N/A N/A	N/A 15 ^{d, e}	1,500 ^{d, e} N/A	N/A N/A	N/A N/A

(continued)

[F] TABLE 307.7(1)—continued
 MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a,i}

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Pyrophoric material		H-2	4 ^{e, g}	(4) ^{e, g}	50 ^{e, g}	1 ^g	(1) ^g	10 ^{e, g}	0	0
Unstable (reactive)	4	H-1	1 ^{e, g}	(1) ^{e, g}	10 ^{d, g}	0.25 ^g	(0.25) ^g	2 ^{e, g}	0.25 ^g	(0.25) ^g
	3	H-1 or H-2	5 ^{d, e}	(5) ^{d, e}	50 ^{d, e}	1 ^d	(1)	10 ^{d, e}	1 ^d	(1) ^d
	2	H-3	50 ^{d, e}	(50) ^{d, e}	250 ^{d, e}	50 ^d	(50) ^d	250 ^{d, e}	10 ^d	(10) ^d
	1		NL	NL	N/A	NL	N/L	NL	NL	NL
Water reactive	3	H-2	5 ^{d, e}	(5) ^{d, e}	N/A	5 ^d	(5) ^d	N/A	1 ^d	(1) ^d
	2	H-3	50 ^{d, e}	(50) ^{d, e}	N/A	50 ^d	(50) ^d	N/A	10 ^d	(10) ^d
	1		NL	NL	N/A	NL	NL	N/A	NL	NL

For SI: 1 cubic foot = 0.023 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; N/A = Not Applicable

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs, consumer or industrial products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Quantities shall be increased 100 percent when stored in approved cabinets, gas cabinets, exhausted enclosures, or safety cans as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. The permitted quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Permitted only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. Inside a building, the maximum capacity of a combustible liquid storage system that is connected to a fuel-oil piping system shall be 660 gallons provided such system conforms to the *International Fire Code*.

j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.

k. A maximum quantity of 200 pounds of solid or 20 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment. Storage containers and the manner of storage shall be approved.

l. Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

[F] TABLE 307.7(2)
 MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIAL POSING A HEALTH HAZARD^{a, b, c}

MATERIAL	STORAGE ^d			USE-CLOSED SYSTEMS ^d			USE-OPEN SYSTEMS ^d	
	Solid pounds ^{e, f}	Liquid gallons (pounds) ^{e, f}	Gas cubic feet ^e	Solid pounds ^e	Liquid gallons (pounds) ^e	Gas cubic feet ^e	Solid pounds ^e	Liquid gallons (pounds) ^e
Corrosive	5,000	500	810 ^g	5,000	500	810 ^g	1,000	100
Highly toxic	10	(10) ⁱ	20 ^h	10	(10) ⁱ	20 ^h	3	(3) ⁱ
Toxic	500	(500) ⁱ	810 ^f	500	(500) ⁱ	810 ^f	125	(125) ⁱ

For SI: 1 cubic foot = 0.028 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

- For use of control areas, see Section 414.2.
- In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs, consumer or industrial products, and cosmetics, containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.
- For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.4, see Table 414.2.4.
- The aggregate quantity in use and storage shall not exceed the quantity listed for storage.
- Quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note f also applies, the increase for both notes shall be applied accumulatively.
- Quantities shall be increased 100 percent when stored in approved storage cabinets, gas cabinets, or exhausted enclosures as specified in the *International Fire Code*. Where Note e also applies, the increase for both notes shall be applied accumulatively.
- A single cylinder containing 150 pounds or less of anhydrous ammonia in a single control area in a nonsprinklered building shall be considered a maximum allowable quantity. Two cylinders, each containing 150 pounds or less in a single control area shall be considered a maximum allowable quantity provided the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
- Allowed only when stored in approved exhausted gas cabinets or exhausted enclosures as specified in the *International Fire Code*.
- Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.

SECTION 308 INSTITUTIONAL GROUP I

308.1 Institutional Group I. Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which people having physical limitations because of health or age are harbored for medical treatment or other care or treatment, or in which people are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

308.2 Group I-1. This occupancy shall include a building or part thereof housing more than 16 persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff. This group shall include, but not be limited to, the following: residential board and care facilities, assisted living facilities, half-way houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug centers and convalescent facilities. A facility such as the above with five or fewer persons shall be classified as Group R-3. A facility such as above, housing at least six and not more than 16 persons shall be classified as Group R-4.

308.3 Group I-2. This occupancy shall include buildings and structures used for medical, surgical, psychiatric, nursing or custodial care on a 24-hour basis of more than five persons who are not capable of self-preservation. This group shall include, but not be limited to the following: hospitals, nursing homes (both intermediate care facilities and skilled nursing facilities), mental hospitals and detoxification facilities. A facility such as the above with five or fewer persons shall be classified as Group R-3.

308.3.1 Child care facility. A child care facility that provides care on a 24-hour basis to more than five children 2½ years of age or less shall be classified as Group I-2.

308.4 Group I-3. This occupancy shall include buildings and structures that are inhabited by more than five persons who are under restraint or security. An I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control. This group shall include, but not be limited to, the following: prisons, jails, reformatories, detention centers, correctional centers and pre-release centers. Buildings of Group I-3 shall be classified as one of the occupancy conditions indicated in Sections 308.4.1 through 308.4.5 (see Section 408.1).

308.4.1 Condition 1. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas, and other spaces where access or occupancy is permitted, to the exterior via means of egress without restraint. A Condition 1 facility is permitted to be constructed as Group R.

308.4.2 Condition 2. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments. Egress to the exterior is impeded by locked exits.

308.4.3 Condition 3. This occupancy condition shall include buildings in which free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping rooms and group activity spaces, where egress is impeded by remote-controlled release of means of egress from such a smoke compartment to another smoke compartment.

308.4.4 Condition 4. This occupancy condition shall include buildings in which free movement is restricted from

an occupied space. Remote-controlled release is provided to permit movement from sleeping rooms, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

308.4.5 Condition 5. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from sleeping rooms, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

308.5 Group I-4, day care facilities. This group shall include buildings and structures occupied by persons of any age who receive custodial care for less than 24 hours by individuals other than parents or guardians, relatives by blood, marriage, or adoption, and in a place other than the home of the person cared for. A facility such as the above with five or fewer persons shall be classified as a Group R-3. Places of worship during religious functions are not included.

308.5.1 Adult care facility. A facility that provides accommodations for less than 24 hours for more than five unrelated adults and provides supervision and personal care services.

308.5.2 Child care facility. A facility, that provides supervision and personal care on less than a 24-hour basis for more than five children 2½ years of age or less shall be classified as Group I-4.

Exception: A child day care facility that provides care for more than five but no more than 100 children 2½ years or less of age, when the rooms where such children are cared for are located on the level of exit discharge and each of these child care rooms has an exit door directly to the exterior, shall be classified as Group E.

SECTION 309 MERCANTILE GROUP M

309.1 Mercantile Group M. Mercantile Group M occupancy includes, among others, buildings and structures or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and accessible to the public. Mercantile occupancies shall include, but not be limited to, the following:

- Department stores
- Drug stores
- Markets
- Motor vehicle service stations
- Retail or wholesale stores
- Sales rooms

309.2 Quantity of hazardous materials. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single control area of a Group M occupancy shall not exceed the quantities in Table 414.2.4.

SECTION 310 RESIDENTIAL GROUP R

310.1 Residential Group R. Residential Group R occupancy includes, among others, the use of a building or structure, or a

portion thereof, for sleeping accommodations when not classed as an Institutional Group I. Residential occupancies shall include the following:

R-1 Residential occupancies where the occupants are primarily transient in nature (less than 30 days) including:

- Boarding houses (transient)
- Hotels (including motels)

R-2 Residential occupancies containing more than two dwelling units where the occupants are primarily permanent in nature, including:

- Apartment houses
- Boarding houses (not transient)
- Convents
- Dormitories
- Fraternities and sororities
- Monasteries

R-3 Residential occupancies where the occupants are primarily permanent in nature and not classified as R-1, R-2 or I and where buildings do not contain more than two dwelling units, or adult and child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.

R-4 Residential occupancies shall include buildings arranged for occupancy as Residential Care/Assisted Living Facilities including more than five but not more than 16 occupants, excluding staff.

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3 except for the height and area limitations provided in Section 503.

310.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

BOARDING HOUSE. A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

DORMITORY. A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

DWELLING UNIT. A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

PERSONAL CARE SERVICE. The care of residents who do not require chronic or convalescent medical or nursing care. Personal care involves responsibility for the safety of the resident while inside the building.

RESIDENTIAL CARE/ASSISTED LIVING FACILITIES. A building or part thereof housing a maximum of 16 persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment which provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff. This classification shall include, but not be limited to, the following: residential board and care facilities, assisted living facilities, halfway houses, group homes, congre-

gate care facilities, social rehabilitation facilities, alcohol and drug abuse centers and convalescent facilities. Residential care/assisted living facilities housing more than 16 persons shall be classified as a Group I-1.

Comm 62.0310 Note: See s. Comm 61.02 Notes for statutory definitions of adult family home and community-based residential facility. See s. Comm 62.0202 for definitions of dwelling unit and multifamily dwelling.

310.3 Required dwelling unit and guestroom separation. Walls and floors separating dwelling units in the same building, or guestrooms in Group R-1 hotel occupancies, shall be fire partitions or horizontal assemblies as required by Sections 708 and 710.

SECTION 311 STORAGE GROUP S

311.1 Storage Group S. Storage Group S occupancy includes among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

311.2 Moderate-hazard storage, Group S-1. Buildings occupied for storage uses which are not classified as Group S-2 including, but not limited, to storage of the following:

- Aerosols, Level 2 and Level 3
- Aircraft hangars
- Bags, cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting, canvas and leather
- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Furniture
- Furs
- Glues, mucilage, pastes and size
- Grains
- Horns and combs, other than celluloid
- Leather
- Linoleum
- Lumber
- Motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials listed in Table 307.7(1). (See Section 406.6.)
- Petroleum warehouses for storage of lubricating oils with a flash point of 200°F (93°C) or higher
- Photo engravings
- Resilient flooring
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

311.3 Low-hazard storage, Group S-2. Includes, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such

products may have a negligible amount of plastic trim such as knobs, handles or film wrapping. Storage uses include, but are only limited to, storage of the following:

- Asbestos
- Beer or wine up to 12-percent alcohol in metal, glass or ceramic containers
- Cement in bags
- Chalk and crayons
- Dairy products in nonwaxed coated paper containers
- Dry cell batteries
- Electrical coils
- Electrical motors
- Empty cans
- Food products
- Foods in noncombustible containers
- Fresh fruits and vegetables in nonplastic trays or containers
- Frozen foods
- Glass
- Glass bottles, empty or filled with noncombustible liquids
- Gypsum board
- Inert pigments
- Ivory
- Meats
- Metal cabinets
- Metal desks with plastic tops and trim
- Metal parts
- Metals
- Mirrors
- Oil-filled and other types of distribution transformers
- Parking garages, open or enclosed
- Porcelain and pottery
- Stoves
- Talc and soapstones
- Washers and dryers

SECTION 312 UTILITY AND MISCELLANEOUS GROUP U

312.1 General. Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

- Agricultural buildings
- Aircraft hangars, accessory to a one- or two-family residence (See Section 412.3)
- Barns
- Carports
- Fences more than 6 feet (1829 mm) high
- Grain silos, accessory to a residential occupancy
- Greenhouses
- Livestock shelters
- Private garages
- Retaining walls
- Sheds
- Stables
- Tanks
- Towers

CHAPTER 4

SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

SECTION 401 SCOPE

401.1 Detailed use and occupancy requirements. In addition to the occupancy and construction requirements in this code, the provisions of this chapter apply to the special uses and occupancies described herein.

Comm 62.0400 (1) Fireworks, black powder and explosive materials. Fireworks, black powder and explosive materials shall be stored and isolated in accordance with chs. Comm 7 and Comm 14.

(2) Recycling space. An owner of a building shall provide a separate room or designated space within or adjacent to the building for the separation, temporary storage and collection of recyclable materials that are likely to be generated by the building occupants, under any of the following conditions:

- (a) The construction of a new building.
- (b) An increase in the existing area of a building that increases the gross floor area of the structure by 50 percent or more.
- (c) An alteration of 50 percent or more of the existing area of a building that is 10,000 square feet (929 m²) or more in area.

Note: See Appendix B for guidelines for recommended designated areas.

Note: The collection and temporary storage of recyclable materials that are flammable or combustible is regulated by ch. Comm 14. Storage of liquids that are flammable or combustible is regulated by ch. Comm 10. Owners of buildings where these materials are stored should consult those chapters for isolation, removal and storage standards.

(3) Lunchrooms. A space for eating lunches shall be provided in all places of employment where there is exposure to injurious dusts, toxic material and industrial poisons. Such space shall be physically separate from any location where there is exposure to toxic materials. Toilet rooms shall not be permitted to serve as lunchrooms.

(4) Community-based residential facilities. A newly constructed building or portion thereof that is a community-based residential facility serving three to eight unrelated adults shall comply with chs. Comm 20 to 25 instead of all other requirements of this code.

Comm 62.0401 Note: See ch. Comm 10 for additional requirements for motor vehicle service stations and for storage, handling, processing and transporting of flammable and combustible liquids.

SECTION 402 COVERED MALL BUILDINGS

402.1 Scope. The provisions of this section shall apply to buildings or structures defined herein as covered mall buildings not

exceeding three floor levels at any point nor more than three stories above grade. Except as specifically required by this section, covered mall buildings shall meet applicable provisions of this code.

Exceptions:

1. Foyers and lobbies of Groups B, R-1 and R-2 are not required to comply with this section.
2. Buildings need not comply with the provisions of this section where they totally comply with other applicable provisions of this code.

402.2 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

ANCHOR BUILDING. An exterior perimeter building of a Group other than H having direct access to a covered mall building but having required means of egress independent of the mall.

COVERED MALL BUILDING. A single building enclosing a number of tenants and occupants such as retail stores, drinking and dining establishments, entertainment and amusement facilities, passenger transportation terminals, offices, and other similar uses wherein two or more tenants have a main entrance into one or more malls. For the purpose of this chapter, anchor buildings shall not be considered as a part of the covered mall building.

FOOD COURT. A public seating area located in the mall that serves adjacent food preparation tenant spaces.

GROSS LEASABLE AREA. The total floor area designed for tenant occupancy and exclusive use. The area of tenant occupancy is measured from the centerlines 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.

MALL. A roofed or covered common pedestrian area within a covered mall building that serves as access for two or more tenants and not to exceed three levels that are open to each other.

402.3 Deleted.

402.4 Means of egress. Each tenant space and the covered mall building shall be provided with means of egress as required by this section and this code. Where there is a conflict between the requirements of this code and the requirements of this section, the requirements of this section shall apply.

402.4.1 Determination of occupant load. The occupant load permitted in any individual tenant space in a covered mall building shall be determined as required by this code. Means of egress requirements for individual tenant spaces shall be based on the occupant load thus determined.

402.4.1.1 Occupant formula. In determining required means of egress of the mall, the number of occupants for whom means of egress are to be provided shall be based on gross leasable area of the covered mall building (excluding anchor buildings) and the occupant load factor as determined by the following equation.

$$OLF = (0.00007)(GLA) + 25 \quad (\text{Equation 4-1})$$

where:

OLF = The occupant load factor (square feet per person).

GLA = The gross leasable area (square feet).

402.4.1.2 OLF range. The occupant load factor (*OLF*) is not required to be less than 30 and shall not exceed 50.

402.4.1.3 Anchor buildings. The occupant load of anchor buildings opening into the mall shall not be included in computing the total number of occupants for the mall.

402.4.1.4 Food courts. The occupant load of a food court shall be determined in accordance with Section 1003. For the purposes of determining the means of egress requirements for the mall, the food court occupant load shall be added to the occupant load of the covered mall building as calculated above.

402.4.2 Number of means of egress. Wherever the distance of travel to the mall from any location within a tenant space used by persons other than employees exceeds 75 feet (22 860 mm) or the tenant space exceeds an occupant load of 50, not less than two means of egress shall be provided.

402.4.3 Arrangements of means of egress. Assembly occupancies with an occupant load of 500 or more shall be so located in the covered mall building that their entrance will be immediately adjacent to a principal entrance to the mall and shall have not less than one-half of their required means of egress opening directly to the exterior of the covered mall building.

402.4.3.1 Anchor building means of egress. Required means of egress for anchor buildings shall be provided independently from the mall means of egress system. The occupant load of anchor buildings opening into the mall shall not be included in determining means of egress requirements for the mall. The path of egress travel of malls shall not exit through anchor buildings. Malls terminating at an anchor building where no other means of egress has been provided shall be considered as a dead-end mall.

402.4.4 Distance to exits. Within each individual tenant space in a covered mall building, the maximum distance of travel from any point to an exit or entrance to the mall shall not exceed 200 feet (60 960 mm).

The maximum distance of travel from any point within a mall to an exit shall not exceed 200 feet (60 960 mm).

402.4.5 Access to exits. Where more than one exit is required, they shall be so arranged that it is possible to travel in either direction from any point in a mall to separate exits. The minimum width of an exit passageway or corridor from a mall shall be 66 inches (1 676 mm).

Exception: Dead ends not exceeding a length equal to twice the width of the mall measured at the narrowest location within the dead-end portion of the mall.

402.4.5.1 Exit passageway enclosures. Where exit passageway enclosures provide a secondary means of egress from a tenant space, doors to the exit passageway enclosures shall be 1-hour fire doors. Such doors shall be self-closing and be so maintained or shall be automatic-closing by smoke detection.

402.4.6 Service areas fronting on exit passageways, and corridors. Mechanical rooms, electrical rooms, building service areas and service elevators are permitted to open directly into exit passageways and corridors provided that the required fire-resistance rating of the exit passageway or corridor is maintained.

402.5 Mall width. For the purpose of providing required egress, malls may be considered as corridors but need not comply with the requirements of Section 1003.2.3 of this code where the width of the mall is as specified in this section.

402.5.1 Minimum width. The minimum width of the mall shall be 20 feet (6 096 mm). The mall width shall be sufficient to accommodate the occupant load served. There shall be a minimum of 10 feet (3 048 mm) clear exit width to a height of 8 feet (2 438 mm) between any projection of a tenant space bordering the mall and the nearest kiosk, vending machine, bench, display opening, food court or other obstruction to means of egress travel.

402.6 Types of construction. The area of any covered mall building, including anchor buildings of Types I, II, III and IV construction, shall not be limited provided the covered mall building and attached anchor buildings and parking structures are surrounded on all sides by a permanent open space of not less than 60 feet (18 288 mm).

402.7 Fire-resistance-rated separation. Fire-resistance-rated separation is not required between tenant spaces and the mall. Fire-resistance-rated separation is not required between a food court and adjacent tenant spaces or the mall.

402.7.1 Attached garage. An attached garage for the storage of passenger vehicles having a capacity of not more than nine persons and open parking garages shall be considered as separate buildings where they are separated from the covered mall building by a fire barrier having a fire-resistance rating of at least 2 hours.

Exception: Where an open parking garage is separated from the covered mall building a distance greater than 10 feet (3 048 mm), the provisions of Table 602 shall apply. Pedestrian walkways and tunnels that attach the open parking garage to the covered mall building shall be constructed in accordance with Section 3104.

402.7.2 Tenant separations. Each tenant space shall be separated from other tenant spaces by a fire partition complying with Section 708. A tenant separation wall is not required between any tenant space and the mall except for occupancy separations required elsewhere in this code.

402.7.2.1 Openings between anchor building and mall. Except for the separation between Group R-1 sleeping rooms and the mall, openings between anchor

buildings of Types IA, IB, IIA and IIB construction and the mall need not be protected.

[F] 402.8 Automatic sprinkler system. The covered mall building and buildings connected shall be provided throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, which shall comply with the following:

1. The automatic sprinkler system shall be complete and operative throughout occupied space in the covered mall building prior to occupancy of any of the tenant spaces. Unoccupied tenant spaces shall be similarly protected unless provided with approved alternate protection.
2. Sprinkler protection for the mall shall be independent from that provided for tenant spaces or anchors. Where tenant spaces are supplied by the same system, they shall be independently controlled.

Exception: An automatic sprinkler system shall not be required in spaces or areas of open parking garages constructed in accordance with Section 406.2.

[F] 402.8.1 Standpipe system. The covered mall building and other buildings connected shall be provided throughout with a standpipe system in accordance with Section 905.

402.9 Smoke control. A smoke control system shall be provided where required for atriums in Section 404.

402.10 Kiosks. Kiosks and similar structures (temporary or permanent) shall meet the following requirements:

1. Combustible kiosks or other structures shall not be located within the mall unless constructed of fire-retardant-treated wood.
2. Kiosks or similar structures located within the mall shall be provided with approved fire suppression and detection devices.
3. The minimum horizontal separation between kiosks and other structures within the mall shall be 20 feet (6096 mm).
4. Each kiosk or similar structure shall have a maximum area of 300 square feet (28 m²).

402.11 Security grilles and doors. Horizontal sliding or vertical security grilles or doors that are a part of a required means of egress shall conform to the following:

1. They shall remain 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 without the use of any special knowledge or effort where the space is occupied.
4. Where two or more exits are required, not more than one-half of the exits shall be permitted to include either a horizontal sliding or vertical rolling grille or doors.

402.12 Standby power. Covered mall buildings exceeding 50,000 square feet (4645 m²) shall be provided with standby power systems that are capable of operating the emergency voice/alarm communication system.

[F] 402.13 Emergency voice/alarm communication system. Covered mall buildings exceeding 50,000 square feet (4645 m²) in total floor area shall be provided with an emergency voice/alarm communication system. Emergency voice/alarm communication systems serving a mall, required or otherwise, shall be accessible to the fire department. The system shall be provided in accordance with Section 907.2.12.2.

402.14 Plastic signs. Within every store or level and from side wall to side wall of each tenant space facing the mall, plastic signs shall be limited as specified in Sections 402.14.1 through 402.14.5.

402.14.1 Area. Plastic signs shall not exceed 20 percent of the wall area facing the mall.

402.14.2 Height and width. Plastic signs shall not exceed a height of 36 inches (914 mm), except if the sign is vertical, the height shall not exceed 96 inches (2438 mm) and the width shall not exceed 36 inches (914 mm).

402.14.3 Location. Plastic signs shall be located a minimum distance of 18 inches (457 mm) from adjacent tenants.

402.14.4 Plastics other than foam plastics. Plastics other than foam plastics shall be light-transmitting plastics complying with Section 2606.4 or shall have a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D 1929, and a flame spread index not greater than 75 and smoke-developed index not greater than 450 when tested in the manner intended for use in accordance with ASTM E 84.

402.14.4.1 Encasement. Edges and backs of plastic signs in the mall shall be fully encased in metal.

402.14.5 Foam plastics. Foam plastics shall have a maximum heat-release rate of 150 kilowatts when tested in accordance with UL 1975 and shall have physical characteristics in accordance with Sections 402.14.5.1 and 402.14.5.2.

402.14.5.1 Density. The minimum density of foam plastic signs shall not be less than 20 pounds per cubic foot (320 kg/m³).

402.14.5.2 Thickness. The thickness of foam plastic signs shall not be greater than 1/2 inch (12.7 mm).

402.15 Fire department access to equipment. 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 403 HIGH-RISE BUILDINGS

403.1 Applicability. The provisions of this section shall apply to buildings having occupied floors located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

Exception: The provisions of this section shall not apply to the following buildings and structures:

1. Airport traffic control towers in accordance with Section 412.

2. Open parking garages in accordance with Section 406.3.
3. Buildings with an occupancy in Group A-5 in accordance with Section 303.1.
4. Low-hazard special industrial occupancies in accordance with Section 503.1.2.
5. Buildings with an occupancy in Group H-1, H-2 or H-3 in accordance with Section 415.

403.2 Automatic sprinkler system. Buildings and structures shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 903.3.5.2.

Exception: An automatic sprinkler system shall not be required in spaces or areas of:

1. Open parking garages in accordance with Section 406.3.
2. Telecommunications equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic fire detection system in accordance with Section 907.2 and are separated from the remainder of the building with fire barriers consisting of 1-hour fire-resistance-rated walls and 2-hour fire-resistance-rated floor/ceiling assemblies.

Comm 62.0403 (1) Note: Under s. 101.14 (4) (b) 1, Wisconsin Stats., an automatic sprinkler system must be installed throughout every building that is more than 60 feet (180288 mm) in height, except this requirement does not apply to open parking structures.

Note: Under s. 101.14 (4) (b) 3, Wisconsin Stats., an automatic sprinkler system must be installed by January 1, 2006, on each floor of all University of Wisconsin System residence halls and dormitories which are over 60 feet (180288 mm) tall and for which initial construction was begun prior to April 26, 2000.

403.3 Reduction in fire-resistance rating. The fire-resistance-rating reductions listed in Sections 403.3.1 and 403.3.2 shall be allowed in buildings that have sprinkler control valves equipped with supervisory initiating devices and water-flow initiating devices for each floor.

403.3.1 Type of construction. The following reductions in the minimum construction type allowed in Table 601 shall be allowed as provided in Section 403.3:

1. Type IA construction shall be allowed to be reduced to Type IB.
2. In other than Groups F-1, M and S-1, Type IB construction shall be allowed to be reduced to Type IIA.

403.3.2 Shaft enclosures. The required fire-resistance rating of the fire barrier walls enclosing vertical shafts, other than exit enclosures and elevator hoistway enclosures, shall be reduced to 1 hour where automatic sprinklers are installed within the shafts at the top and at alternate floor levels.

403.4 Emergency escape and rescue. Emergency escape and rescue openings required by Section 1009 are not required.

[F] 403.5 Automatic fire detection. Smoke detection shall be provided in accordance with Section 907.2.12.1.

[F] 403.6 Emergency voice/alarm communication systems. An emergency voice/alarm communication system shall be provided in accordance with Section 907.2.12.2.

[F] 403.7 Fire department communications system. A two-way fire department communications system shall be provided for fire department use in accordance with Section 907.2.12.3.

[F] 403.8 Fire command. A fire command center complying with Section 911 shall be provided in a location approved by the fire department.

403.9 Elevators. Elevator operation and installation shall be in accordance with Chapter 30.

403.10 Standby power, light and emergency systems. Standby power, light and emergency systems shall comply with the requirements of Sections 403.10.1 through 403.10.3.

403.10.1 Standby power. A standby power system conforming to the requirements of Section 2702 shall be provided. If the standby system is a generator set inside a building, the system shall be located in a separate room enclosed with 2-hour fire-resistance-rated fire barrier assemblies. System supervision with manual start and transfer features shall be provided at the fire command center.

403.10.1.1 [Comm 62.0403 (2)] Fuel supply. An on-premises fuel supply, sufficient for not less than 2-hour full-demand operation of the system, shall be provided.

Exception: Where the system is supplied with pipeline natural gas.

403.10.1.2 Capacity. The standby system shall have a capacity and rating that supplies equipment required to be operational at the same time. The generating capacity is not required to be sized to operate all of the connected electrical equipment simultaneously if automatic load-shedding is provided.

403.10.1.3 Connected facilities. Power and lighting facilities for the fire command center and elevators specified in Sections 403.8 and 403.9, as applicable, and electrically powered fire pumps required to maintain pressure, shall be automatically transferable to the standby source. Standby power shall be provided for at least one elevator to serve all floors and be transferable to any elevator.

403.10.2 Separate circuits and fixtures. Separate lighting circuits and fixtures shall be required to provide sufficient light with an intensity of not less than 1 foot-candle (10.76 lux) measured at floor level in means of egress corridors, stairways, smokeproof enclosures, elevator cars and lobbies, and other areas that are clearly a part of the escape route.

403.10.2.1 Other circuits. Circuits supplying lighting for the fire command center and mechanical equipment rooms shall be transferable to the standby source.

403.10.3 Emergency systems. Exit signs, exit illumination as required by Chapter 10, and elevator car lighting are classified as emergency systems and shall operate within 10 seconds of failure of the normal power supply and shall be capable of being transferred to the standby source.

Exception: Exit sign, exit and means of egress illumination are permitted to be powered by a standby source in buildings of Group F and S occupancies.

403.11 Stairway door operation. Stairway doors other than the exit discharge doors shall be permitted to be locked from stairway side. Stairway doors that are locked from the stairway side shall be capable of being unlocked simultaneously without unlatching upon a signal from the fire command center.

403.11.1 Stairway communications system. A telephone or other two-way communications system connected to an approved constantly attended station shall be provided at not less than every fifth floor in each required stairway where the doors to the stairway are locked.

403.12 Seismic considerations. For seismic considerations, see Chapter 16.

SECTION 404 ATRIUMS

404.1 General. Vertical openings meeting the requirements of this section are not required to be enclosed in other than Group H occupancies.

404.1.1 Definition. The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

ATRIUM. An opening through two or more floor levels other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Floor levels, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505.

404.2 Use. The floor of the atrium shall not be used for other than low fire hazard uses and only approved materials and decorations in accordance with the *International Fire Code* shall be used in the atrium space.

Exception: The atrium floor area is permitted to be used for any approved use where the individual space is provided with an automatic sprinkler system in accordance with Section 903.3.1.1.

404.3 Automatic sprinkler protection. An approved automatic sprinkler system shall be installed throughout the entire building.

Exceptions:

1. That area of a building adjacent to or above the atrium need not be sprinklered provided that portion of the building is separated from the atrium portion by a 2-hour fire barrier wall or horizontal assembly or both.
2. Where the ceiling of the atrium is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the atrium is not required.

404.4 Smoke control. A smoke control system shall be installed in accordance with Section 909.

Exceptions:

1. Smoke control is not required for a floor opening connecting only two floors meeting the requirements of Section 707.2, Exception 7.
2. Smoke control is not required for floor openings meeting the requirements of Section 707.2, Exception 2, 8 or 9.

404.5 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier wall.

Exceptions:

1. A glass wall forming a smoke partition where automatic sprinklers are spaced 6 feet (1829 mm) or less along both sides of the separation wall, or on the room side only if there is not a walkway on the atrium side, and between 4 and 12 inches (102 and 305 mm) away from the glass and so designed that the entire surface of the glass is wet upon activation of the sprinkler system. The glass shall be installed either:
 - 1.1. In a gasketed frame so installed that the framing system deflects without breaking (loading) the glass before the sprinkler system operates, or
 - 1.2. As a glass block wall assembly in accordance with Section 2110 and the listing for a $3\frac{1}{4}$ -hour fire-resistance rating.
2. The adjacent spaces of any three floors of the atrium shall not be required to be separated from the atrium where such spaces are included in computing the atrium volume for the design of the smoke control system.

[F] 404.6 Automatic fire detection system. Smoke detection shall be provided in accordance with Section 907.2.13.

404.7 Standby power. Equipment required to provide smoke control shall be connected to a standby power system in accordance with Section 909.11.

404.8 Interior finish. The interior finish of walls and ceilings of the atrium shall not be less than Class B with no reduction in class for sprinkler protection.

404.9 Travel distance. In other than the lowest level of the atrium, where the required means of egress is through the atrium space, the portion of exit access travel distance within the atrium space shall not exceed 150 feet (45 720 mm).

SECTION 405 UNDERGROUND BUILDINGS

405.1 General. The provisions of this section apply to building spaces having a floor level used for human occupancy more than 30 feet (9144 mm) below the lowest level of exit discharge.

Exceptions:

1. One- and two-family dwellings, sprinklered in accordance with Section 903.3.1.3.

2. Parking garages with automatic fire-suppression systems in compliance with Section 405.3.
3. Fixed guideway transit systems.
4. Grandstands, bleachers, stadiums, arenas and similar facilities.
5. Where the lowest story is the only story that would qualify the building as an underground building and has an area not exceeding 1,500 square feet (139 m²) and has an occupant load less than 10.

405.2 Construction requirements. The underground portion of the building shall be of Type I construction.

405.3 Automatic sprinkler system. The highest level of exit discharge serving the underground portions of the building and all levels below shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Water-flow switches and control valves shall be supervised in accordance with Section 903.4.

405.4 Compartmentation.

405.4.1 Number of compartments. A building having a floor level more than 60 feet (18 288 mm) below the lowest level of exit discharge shall be divided into a minimum of two compartments of approximately equal size. Such compartmentation shall extend through the highest level of exit discharge serving the underground portions of the building and all levels below.

Exception: The lowest story need not be compartmented where the area does not exceed 1,500 square feet (139 m²) and has an occupant load of less than 10.

405.4.2 Smoke barrier penetration. The separation between the two compartments shall be of minimum 1-hour fire barrier wall construction that shall extend from floor slab to floor deck above. Openings between the two compartments shall be limited to plumbing and electrical piping and conduit penetrations firestopped in accordance with Section 711. Doorways shall be protected by door assemblies that are automatic-closing by smoke detection in accordance with Section 714.2 and shall be provided with gasketing and a drop sill to minimize smoke leakage. Where provided, each compartment shall have an air supply and an exhaust system independent of the other compartments.

405.4.3 Elevators. Where elevators are provided, each compartment shall have direct access to an elevator. Where an elevator serves more than one compartment, an elevator lobby shall be provided and shall be separated from each compartment by a 1-hour fire barrier wall. Doors shall be gasketed, have a drop sill, and be automatic-closing by smoke detection installed in accordance with Section 907.10.

405.5 Smoke control system.

405.5.1 Control system. A smoke control system is required to control the migration of products of combustion in accordance with Section 909 and provisions of this section. Smoke control shall restrict movement of smoke to the general area of fire origin and maintain means of egress in a usable condition.

405.5.2 Smoke exhaust system. Where compartmentation is required, each compartment shall have an independent smoke control system. The system shall be automatically activated and capable of manual operation in accordance with Section 907.2.18.

[F] 405.6 Fire alarm systems. A fire alarm system shall be provided where required by Section 907.2.19.

[F] 405.7 Public address. A public address system shall be provided where required by Section 907.2.19.1.

405.8 Exits.

405.8.1 Number of exits. Each floor level shall be provided with a minimum of two exits. Where compartmentation is required by Section 405.4, each compartment shall have a minimum of one exit and shall also have an exit access doorway into the adjoining compartment.

405.8.2 Smokeproof enclosure. Every required stairway serving floor levels more than 30 feet (9144 mm) below its level of exit discharge shall comply with the requirements for a smokeproof enclosure.

[F] 405.9 Standby power. A standby power system shall be provided.

405.9.1 Automatic startup. The system shall be equipped with suitable means for automatically starting the generator set upon failure of the normal electrical service and for automatic transfer and operation of electrical functions.

405.9.2 Fuel supply. An on-premises fuel supply sufficient for not less than 2 hours full demand operation of the system shall be provided.

Exception: Where the system is supplied with pipeline natural gas and is approved.

405.9.3 Standby power loads. The following loads are classified as standby power loads. The standby power load shall be sized to supply the following:

1. Smoke management system.
2. Smokeproof enclosure.
3. Fire pumps.
4. One elevator to serve all floors with the capability of transferring power to any elevator.
5. Emergency power loads.

405.9.4 Pick-up time. The standby power system shall pick up its connected loads within 60 seconds of failure of the normal power supply.

[F] 405.10 Emergency power. An emergency power system shall be provided.

405.10.1 Load. The following loads are classified as emergency power loads:

1. Emergency voice/alarm communications system.
2. Fire alarm systems.
3. Automatic fire detection systems.
4. Elevator car lighting.
5. Egress lighting and exit sign illumination.

405.10.2 Pick-up time. The emergency power system shall pick up its connected loads within 10 seconds of failure of the normal power supply.

405.10.3 Power load transfer. Emergency power loads shall be capable of being transferred to the standby power system.

405.11 Standpipe system. The underground building shall be provided throughout with a standpipe system in accordance with Section 905.

SECTION 406 MOTOR-VEHICLE-RELATED OCCUPANCIES

406.1 Private garages and carports.

406.1.1 Classification. Buildings or parts of buildings classed as Group U occupancies because of the use or character of the occupancy shall not exceed 1,000 square feet (93 m²) in area or one story in height except as provided in Section 406.1.2. Any building or portion thereof that exceeds the limitations specified in this section shall be classed in the occupancy group other than Group U that it most nearly resembles.

406.1.2 Area increase. Group U occupancies used for the storage of private or pleasure-type motor vehicles where no repair work is done or fuel dispensed are permitted to be 3,000 square feet (279 m²), when the following provisions are met:

1. For a mixed-occupancy building, the exterior wall and opening protection for the Group U portion of the building shall be as required for the major occupancy of the building. For such mixed occupancy building, the allowable floor area of the building shall be as permitted for the major occupancy contained therein.
2. For a building containing only a Group U occupancy, the exterior wall and opening protection shall be as required for a Group R-1 or R-2 occupancy.

More than one 3,000-square-foot (279 m²) Group U occupancy shall be permitted to be in the same building, provided each 3,000-square-foot (279 m²) area is separated by fire walls complying with Section 705.

406.1.3 Garages and carports. Carports shall be open on at least two sides. Carport floor surfaces shall be of approved noncombustible material. Carports not open on at least two sides shall be considered a garage and shall comply with the provisions of this section for garages.

Exception: Asphalt surfaces shall be permitted at ground level in carports.

The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

406.2 Parking garages.

406.2.1 Classification. Parking garages shall be classified as either open, as defined in Section 406.3, or enclosed and

shall meet the appropriate criteria in Section 406.4. Also see Section 508 for special provisions for parking garages.

406.2.2 Clear height. The clear height of each floor level in vehicle and pedestrian traffic areas shall not be less than 7 feet (2134 mm). Vehicle and pedestrian areas accommodating van accessible parking required by Section 1106.4 shall conform to ICC A117.1.

406.2.3 Guards. Guards shall be provided in accordance with Section 1003.2.12 at exterior and interior vertical openings on floor and roof areas where vehicles are parked or moved and where the vertical distance to the ground or surface directly below exceeds 30 inches (762 mm).

406.2.4 Vehicle barriers. Parking areas shall be provided with exterior or interior walls or vehicle barriers, except at pedestrian or vehicular accesses, designed in accordance with Section 1607.7. Vehicle barriers not less than 2 feet (607 mm) high shall be placed at the ends of drive lanes, at the end of parking spaces where the difference in adjacent floor elevation is greater than 1 foot (305 mm).

406.2.5 Ramps. Vehicle ramps shall not be considered as providing required exit facilities. Enclosed ramps shall be in accordance with the exit requirements of Chapter 10.

406.2.6 Floor surface. Parking surfaces shall be of concrete or similar noncombustible and nonabsorbent materials.

Exception: Asphalt parking surfaces are permitted at ground level.

406.2.7 Mixed separation. Parking garages shall be separated from other occupancies in accordance with Section 302.3.1.

406.2.8 [Comm 62.0406] Special hazards.

- (1) Except as provided in subs. (2) and (3), fuel-fired appliances shall be located in a room that is separated from the parking garage by construction which will form a solid barrier between the room and the garage. Entrance to the room shall be from the outside, or by means of a vestibule creating a two-doorway separation, with both doors self-closing.
- (2) Unit heaters may be suspended in a parking garage in accordance with the IMC.
- (3) A single interior self-closing door shall be allowed provided the sources of ignition in the appliance are at least 18 inches (457 mm) above the floor.

406.2.9 Attached to rooms. Openings from a parking garage directly into a room used for sleeping purposes shall not be permitted.

406.3 Open parking garages.

406.3.1 Scope. Except where specific provisions are made in the following subsections, other requirements of this code shall apply.

406.3.2 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

MECHANICAL-ACCESS OPEN PARKING GARAGES. Open parking garages employing parking machines, lifts, elevators or other mechanical devices for vehicles moving from and to street level and in which public occupancy is prohibited above the street level.

OPEN PARKING GARAGE. A structure with the openings as described in Section 406.3.3.1 on two or more sides and that is used exclusively for the parking or storage of private motor vehicles as described in Section 406.3.4.

RAMP-ACCESS OPEN PARKING GARAGES. Open parking garages employing a series of continuously rising floors or a series of interconnecting ramps between floors permitting the movement of vehicles under their own power from and to the street level.

406.3.3 Construction. Open parking garages shall be of Type I, II or IV construction. Open parking garages shall meet the design requirements of Chapter 16. For vehicle barriers, see Section 406.2.4.

406.3.3.1 Openings. For natural ventilation purposes, the exterior side of the structure shall have uniformly distributed openings on two or more sides. The area of such openings in exterior walls on a tier must be at least 20 percent of the total perimeter wall area of each tier. The aggregate length of the openings considered to be providing natural ventilation shall constitute a minimum of 40 percent of the perimeter of the tier. Interior walls shall be at least 20 percent open with uniformly distributed openings.

Exception: Openings are not required to be distributed over 40 percent of the building perimeter where the required openings are uniformly distributed over two opposing sides of the building.

406.3.4 Uses. Except as allowed under the special provisions of Sections 508.3 and 508.8, open parking garages shall be used exclusively for the parking or storage of private motor vehicles.

Exception: The grade-level tier may contain an office, waiting and toilet rooms having a total combined area of

not more than 1,000 square feet (93 m²). Such area need not be separated from the open parking garage.

406.3.5 Area and height. Area and height of open parking garages shall be limited as set forth in Table 406.3.5, except for increases allowed by Section 406.3.6.

In open parking garages having a spiral or sloping floor, the horizontal projection of the structure at any cross section shall not exceed the allowable area per parking tier. In the case of an open parking garage having a continuous spiral floor, each 9 feet 6 inches (2896 mm) of height, or portion thereof, shall be considered a tier.

The clear height of a parking tier shall not be less than 7 feet (2134 mm), except that a lower clear height may be permitted in mechanical-access open parking garages where approved by the building official.

406.3.6 Area and height increases. The allowable area and height of open parking garages shall be increased in accordance with provisions of this section. Garages with sides open on three-fourths of the building perimeter may be increased by 25 percent in area and one tier in height. Garages with sides open around the entire building perimeter may be increased 50 percent in area and one tier in height. For a side to be considered open under the above provisions, the total area of openings along the side shall not be less than 50 percent of the interior area of the side at each tier, and such openings shall be equally distributed along the length of the tier.

Allowable tier areas in Table 406.3.5 shall be increased for open parking garages constructed to heights less than the table maximum. The gross tier area of the garage shall not exceed that permitted for the higher structure. At least three sides of each such larger tier shall have continuous horizontal openings not less than 30 inches (762 mm) in clear height extending for at least 80 percent of the length of the sides, and no part of such larger tier shall be more than 200 feet (60 960 mm) horizontally from such an opening. In addition, each such opening shall face a street or yard accessible to a street with a width of at least 30 feet (9144 mm) for the full length of the opening, and standpipes shall be provided in each such tier.

Open parking garages of Type IB and Type II construction, with all sides open, shall be unlimited in allowable area

**TABLE 406.3.5
OPEN PARKING GARAGES AREA AND HEIGHT**

TYPE OF CONSTRUCTION	AREA PER TIER (square feet)	HEIGHT (in tiers)		
		Ramp access	Mechanical access	
			Automatic sprinkler system	
			No	Yes
IA	Unlimited	Unlimited	Unlimited	Unlimited
IB	Unlimited	12 tiers	12 tiers	18 tiers
IIA	50,000	10 tiers	10 tiers	15 tiers
IIB	50,000	8 tiers	8 tiers	12 tiers
IV	50,000	4 tiers	4 tiers	4 tiers

For SI: 1 square foot = 0.0929 m².

where the height does not exceed 75 feet (22 860 mm). For a side to be considered open, the total area of openings along the side shall not be less than 50 percent of the interior area of the side at each tier, and such openings shall be equally distributed along the length of the tier. All portions of tiers shall be within 200 feet (60 960 mm) horizontally from such openings.

406.3.7 Location on property. Exterior walls and openings in exterior walls shall comply with Tables 601 and 602. The distance from an adjacent property line shall be determined in accordance with Table 602 and Section 704.

406.3.8 Stairs and exits. Where persons other than parking attendants are permitted, stairs and exits shall meet the requirements of Chapter 10. Where no persons other than parking attendants are permitted, there shall not be less than two 36-inch-wide (914 mm) stairs. Lifts shall be permitted to be installed for use of employees only, provided they are completely enclosed by noncombustible materials.

406.3.9 Standpipes. Standpipes shall be installed where required by the provisions of Chapter 9.

406.3.10 Sprinkler systems. Where required by other provisions or this code, automatic sprinkler systems and standpipes shall be installed in accordance with the provisions of Chapter 9.

406.3.11 Enclosure of vertical openings. Enclosure shall not be required for vertical openings except as specified in Section 406.3.8.

406.3.12 Ventilation. Ventilation, other than the percentage of openings specified in Section 406.3.3.1, shall not be required.

406.3.13 Prohibitions. The following uses and alterations are not permitted:

1. Vehicle repair work.
2. Parking of buses, trucks and similar vehicles.
3. Partial or complete closing of required openings in exterior walls by tarpaulins or any other means.
4. Dispensing of fuel.

406.4 Enclosed parking garages.

406.4.1 Heights and areas. Enclosed vehicle parking garages and portions thereof that do not meet the definition of open parking garages shall be limited to the allowable heights and areas specified in Table 503. Roof parking is permitted.

406.4.2 Ventilation. A mechanical ventilation system shall be provided in accordance with the *International Mechanical Code*.

406.5 Motor vehicle service station.

406.5.1 Construction. Motor vehicle service stations shall be constructed in accordance with the *International Fire Code* and this section.

406.5.2 Canopies. Canopies under which fuels are dispensed shall have a clear, unobstructed height of not less than 13 feet 6 inches (4115 mm) to the lowest projecting element in the vehicle drive through area. Canopies and their

supports over pumps shall be of noncombustible materials, fire-retardant-treated wood complying with Chapter 23, wood of Type IV sizes, or of construction providing 1-hour fire resistance. Combustible materials used in or on a canopy shall comply with one of the following:

1. Shielded from the pumps by a noncombustible element of the canopy, or wood of Type IV sizes; or
2. Plastics covered by aluminum facing having a minimum thickness of 0.020 inch (0.51 mm) or corrosion-resistant steel having a minimum base metal thickness of 0.016 inch (0.41 mm). The plastic shall have a flame spread index of 25 or less and a smoke-developed index of 450 or less when tested in the form intended for use in accordance with ASTM E 84 and a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D 1929; or
3. Panels constructed of light-transmitting plastic materials shall be permitted to be installed in canopies erected over motor-vehicle fuel-dispensing station fuel dispensers, provided the panels are located at least 10 feet (3048 mm) from any building on the same property, and face yards or streets not less than 40 feet (12 192 mm) in width on the other sides. The aggregate areas of plastics shall not exceed 1,000 square feet (93 m²). The maximum area of any individual panel shall not exceed 100 square feet (9.3 m²).

406.6 Repair garages.

406.6.1 General. A repair garage is any building or part thereof which is used for painting, body and fender work, engine overhauling or other major repair of motor vehicles. This occupancy shall not include motor vehicle service stations, as regulated in Section 406.5.

406.6.2 Mixed occupancy. A repair garage shall not be located within, or attached to, a building occupied for any other purpose, unless separated from the other occupancies as prescribed in Section 302.3.3. Such separation shall be continuous and unpierced, except for doors leading to salesrooms, or offices, operated in connection with such garages, and provided such openings are equipped with self-closing fire doors conforming to the requirements of Chapter 7.

406.6.3 Ventilation. Garages shall be mechanically ventilated in accordance with the *International Mechanical Code*. The ventilation system shall be controlled at the entrance to the garage.

406.6.4 Floor surface. Garage floors shall be of concrete or similar noncombustible and nonabsorbent materials.

406.6.5 Heating equipment. Heating equipment shall be placed in another room separated by a 2-hour fire barrier. Entrance shall be from the outside or by means of a vestibule providing a two-doorway separation.

Exceptions:

1. Unit heaters suspended at least 8 feet (2438 mm) above the garage floor.

2. A single interior door shall be allowed provided the sources of ignition in the appliance are at least 18 inches (457 mm) above the floor.

[F] 406.6.6 Gas detection system. Repair garages used for repair of vehicles fueled by nonodorized gases, such as hydrogen and nonodorized LNG, shall be provided with an approved flammable gas-detection system.

[F] 406.6.6.1 System design. The flammable gas-detection system shall be calibrated to the types of fuels or gases used by vehicles to be repaired. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower explosive limit. Gas detection shall also be provided in lubrication or chassis repair pits of repair garages used for repairing nonodorized LNG-fueled vehicles.

[F] 406.6.6.2 Operation. Activation of the gas detection system shall result in all of the following:

1. Initiation of distinct audible and visual alarm signals in the repair garage.
2. Deactivation of all heating systems located in the repair garage.
3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.

[F] 406.6.6.3 Failure of the gas detection system. Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical ventilation system, when the system is interlocked with gas detection and cause a trouble signal to sound in an approved location.

SECTION 407 GROUP I-2

407.1 General. Occupancies in Group I-2 shall comply with the provisions of this section and other applicable provisions of this code.

407.2 Corridors. Corridors in occupancies in Group I-2 shall be continuous to the exits and separated from other areas in accordance with Section 407.3 except spaces conforming to Sections 407.2.1 through 407.2.4.

407.2.1 Spaces of unlimited area. Waiting areas and similar spaces constructed as required for corridors shall not be open to a corridor, except where all of the following criteria are met:

1. The spaces are not occupied for patient sleeping rooms, treatment rooms, hazardous or incidental use areas as defined in Section 302.1.1.
2. The open space is protected by an automatic fire detection system installed in accordance with Section 907.
3. The corridors onto which the spaces open, in the same smoke compartment, are protected by an automatic fire detection system installed in accordance with Section 907, or the smoke compartment in which the spaces are located is equipped throughout with quick

response sprinklers in accordance with Section 903.3.2.

4. The space is arranged so as not to obstruct access to the required exits.

407.2.2 Nurses' stations. Spaces for doctors' and nurses' charting, communications and related clerical areas shall not be open to the corridor, except where such spaces are constructed as required for corridors.

407.2.3 Mental health treatment areas. Areas wherein mental health patients who are not capable of self-preservation are housed, or group meeting or multipurpose therapeutic spaces other than incidental use areas as defined in Section 302.1.1, under continuous supervision by facility staff, shall not be open to the corridor, except where the following criteria are met:

1. Each area does not exceed 1,500 square feet (140 m²).
2. The area is located to permit supervision by the facility staff.
3. The area is arranged so as not to obstruct any access to the required exits.
4. The area is equipped with an automatic fire detection system installed in accordance with Section 907.2.
5. Not more than one such space is permitted in any one smoke compartment.
6. The walls and ceilings of the space are constructed as required for corridors.

407.2.4 Gift shops. Gift shops shall not be open to the corridor except where such spaces are less than 500 square feet (46.5 m²) in area and both the gift shop and any storage rooms are protected in accordance with Section 302.1.1.

407.3 Corridor walls. Corridor walls shall form a barrier to limit the transfer of smoke. The walls shall extend from the floor to the underside of the floor or roof deck above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke. Corridor walls shall be constructed of materials consistent with the building type of construction and form a barrier to limit the transfer of smoke.

407.3.1 Corridor doors. Corridor doors, other than those in a wall required to be rated by Section 302.1.1 or for the enclosure of a vertical opening or an exit, shall not have a required fire protection rating and shall not be required to be equipped with self-closing or automatic-closing devices, but shall provide an effective barrier to limit the transfer of smoke and shall be equipped with positive latching. Roller latches are not permitted. Other doors shall conform to Section 714.2.

407.3.2 Locking devices. Locking devices that restrict access to the patient room from the corridor, and that are operable only by staff from the corridor side, shall not restrict the means of egress from the patient room except for patient rooms in mental health facilities.

407.4 Smoke barriers. Smoke barriers shall be provided to subdivide every story used by patients for sleeping or treatment and to divide other stories with an occupant load of 50 or more persons, into at least two smoke compartments. Such stories shall be divided into smoke compartments with an area of not

more than 22,500 square feet (2092 m²) and the travel distance from any point in a smoke compartment to a smoke barrier door shall not exceed 200 feet (60 960 mm). The smoke barrier shall be in accordance with Section 709.

407.4.1 Refuge area. At least 30 net square feet (2.8 m²) per patient shall be provided within the aggregate area of corridors, patient rooms, treatment rooms, lounge or dining areas and other low-hazard areas on each side of each smoke barrier. On floors not housing patients confined to a bed or litter, at least 6 net square feet (0.56 m²) per occupant shall be provided on each side of each smoke barrier for the total number of occupants in adjoining smoke compartments.

407.4.2 Independent egress. A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which means of egress originated.

407.5 Automatic sprinkler system. Smoke compartments containing patient sleeping rooms shall be equipped throughout with an automatic fire sprinkler system in accordance with Section 903.3.1.1. The smoke compartments shall be equipped with approved quick-response or residential sprinklers in accordance with Section 903.3.2.

407.6 Automatic fire detection. Corridors in nursing homes (both intermediate care and skilled nursing facilities), detoxification facilities and spaces permitted to be open to corridors by Section 407.2 shall be protected by an automatic fire detection system installed in accordance with Section 907.

Exceptions:

1. Corridor smoke detection is not required where patient sleeping rooms are provided with smoke detectors that comply with UL 268. Such detectors shall provide a visual display on the corridor side of each patient room and shall provide an audible and visual alarm at the nursing station attending each room.
2. Corridor smoke detection is not required where patient room doors are equipped with automatic door-closing devices with integral smoke detectors on the room sides installed in accordance with their listing, provided that the integral detectors perform the required alerting function.

SECTION 408 GROUP I-3

408.1 General. Occupancies in Group I-3 shall comply with the provisions of this section and other applicable provisions of this code (see Section 308.4).

408.2 Mixed occupancies. Portions of buildings with an occupancy in Group I-3 that are classified as a different occupancy shall meet the applicable requirements of this code for such occupancies. Where security operations necessitate the locking of required means of egress, provisions shall be made for the release of occupants at all times.

Means of egress from detention and correctional occupancies that traverse other use areas shall, as a minimum, conform to requirements for detention and correctional occupancies.

form to requirements for detention and correctional occupancies.

Exception: It is permissible to exit through a horizontal exit into other contiguous occupancies that do not conform to detention and correctional occupancy egress provisions but that do comply with requirements set forth in the appropriate occupancy, as long as the occupancy is not a high-hazard use.

408.3 Means of egress. Except as modified or as provided for in this section, the provisions of Chapter 10 shall apply.

408.3.1 Door width. Doors to resident sleeping rooms shall have a clear width of not less than 28 inches (711 mm).

408.3.2 Sliding doors. Where doors in a means of egress are of the horizontal-sliding type, the force to slide the door to its fully open position shall not exceed 50 pounds (220 N) with a perpendicular force against the door of 50 pounds (220 N).

408.3.3 Spiral stairs. Spiral stairs that conform to the requirements of Section 1003.3.3.9 are permitted for access to and between staff locations.

408.3.4 Exit discharge. Exits are permitted to discharge into a fenced or walled courtyard. Enclosed yards or courts shall be of a size to accommodate all occupants, a minimum of 50 feet (15 240 mm) from the building with a net area of 15 square feet (1.4 m²) per person.

408.3.5 Sallyports. A sallyport shall be permitted in a means of egress where there are provisions for continuous and unobstructed passage through the sallyport during an emergency egress condition.

408.3.6 Vertical exit enclosures. One of the required vertical exit enclosures in each building shall be permitted to have glazing installed in doors and interior walls at each landing level providing access to the enclosure, provided that the following conditions are met:

1. The vertical exit enclosure shall not serve more than four floor levels.
2. Vertical exit enclosure doors shall not be less than ¾-hour fire doors complying with Section 714.2.
3. The total area of glazing at each floor level shall not exceed 5,000 square inches (3.23 m²) and individual panels of glazing shall not exceed 1,296 square inches (0.84 m²).
4. The glazing shall be protected on both sides by an automatic fire sprinkler system. The sprinkler system shall be designed to wet completely the entire surface of any glazing affected by fire when actuated.
5. The glazing shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler system operates.
6. Obstructions, such as curtain rods, drapery traverse rods, curtains, drapes or similar materials shall not be installed between the automatic sprinklers and the glazing.

408.4 Locks. Egress doors are permitted to be locked in accordance with the applicable use condition. Doors from an area of refuge to the exterior are permitted to be locked with a key lock in lieu of locking methods described in Section 408.4.1. The keys to unlock the exterior doors shall be available at all times and the locks shall be operable from both sides of the door.

408.4.1 Remote release. Remote release of locks on doors in a means of egress shall be provided with reliable means of operation, remote from the resident living areas, to release locks on all required doors. In Occupancy Conditions 3 or 4, the arrangement, accessibility and security of the release mechanism(s) required for egress shall be such that with the minimum available staff at any time, the lock mechanisms are capable of being released within 2 minutes.

Exception: Provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required provided that not more than ten locks are necessary to be unlocked in order to move occupants from one smoke compartment to a refuge area within 3 minutes. The opening of necessary locks shall be accomplished with not more than two separate keys.

[F] 408.4.2 Power-operated doors and locks. Power-operated sliding doors or power-operated locks for swinging doors shall be operable by a manual release mechanism at the door, and either emergency power or a remote mechanical operating release shall be provided.

Exception: Emergency power is not required in facilities with ten locks or less complying with the exception to Section 408.4.1.

408.4.3 Redundant operation. Remote release, mechanically operated sliding doors or remote release, mechanically operated locks shall be provided with a mechanically operated release mechanism at each door, or shall be provided with a redundant remote release control.

408.4.4 Relock capability. Doors remotely unlocked under emergency conditions shall not automatically relock when closed unless specific action is taken at the remote location to enable doors to relock.

408.5 Vertical openings. Vertical openings shall be enclosed in accordance with Section 707.

Exception: A floor opening between floor levels of residential housing areas is permitted without enclosure protection between the levels, provided that both of the following conditions are met:

1. The entire normally occupied areas so interconnected are open and unobstructed so as to enable observation of the areas by supervisory personnel.
2. Means of egress capacity is sufficient to provide simultaneous egress for all occupants from all interconnected levels and areas.

The height difference between the highest and lowest finished floor levels shall not exceed 23 feet (7010 mm). Each story, considered separately, has at least one-half of its individual required means of egress capacity provided by exits leading directly out of that story without traversing another story within the interconnected area.

408.6 Smoke barrier. Occupancies in Group I-3 shall have smoke barriers complying with Section 709 to divide every story occupied by residents for sleeping, or any other story having an occupant load of 50 or more persons, into at least two smoke compartments.

Exception: Spaces having direct exit to one of the following, provided that the locking arrangement of the doors involved complies with the requirements for doors at the compartment barrier for the use condition involved:

1. A public way.
2. A building separated from the resident housing area by a 2-hour fire-resistance-rated assembly or 50 feet (15 240 mm) of open space.
3. A secured yard or court having a holding space 50 feet (15 240 mm) from the housing area that provides 6 square feet (0.56 m²) or more of refuge area per occupant including residents, staff and visitors.

408.6.1 Smoke compartments. The maximum number of residents in any smoke compartment shall be 200. The travel distance to a door in a smoke barrier from any room door required as exit access shall not exceed 150 feet (45 720 mm). The travel distance to a door in a smoke barrier from any point in a room shall not exceed 200 feet (60 960 mm).

408.6.2 Refuge area. At least 6 net square feet (0.56 m²) per occupant shall be provided on each side of each smoke barrier for the total number of occupants in adjoining smoke compartments. This space shall be readily available whenever the occupants are moved across the smoke barrier in a fire emergency.

408.6.3 Independent egress. A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which means of egress originates.

408.7 Subdivision of resident housing areas. Sleeping areas and any contiguous day room, group activity space or other common spaces where residents are housed shall be separated from other spaces in accordance with Sections 408.7.1 through 408.7.4.

408.7.1 Occupancy Conditions 3 and 4. Each sleeping area in Occupancy Conditions 3 and 4 shall be separated from the adjacent common spaces by a smoke-tight partition where the travel distance from the sleeping area through the common space to the exit access corridor exceeds 50 feet (15 240 mm).

408.7.2 Occupancy Condition 5. Each sleeping area in Occupancy Condition 5 shall be separated from adjacent sleeping areas, corridors and common spaces by a smoke-tight partition. Additionally, common spaces shall be separated from the exit access corridor by a smoke-tight partition.

408.7.3 Openings in room face. The aggregate area of openings in a solid sleeping room face in Occupancy Conditions 2, 3, 4 and 5 shall not exceed 120 square inches (77 419 mm²). The aggregate area shall include all openings including door undercuts, food passes and grilles. Openings shall be not more than 36 inches (914 mm) above the floor. In Occupancy Condition 5, the openings shall be closable from the room side.

408.7.4 Smoke-tight doors. Doors in openings in partitions required to be smoke tight by Section 408.7 shall be substantial doors, of construction that will resist the passage of smoke. Latches and door closures are not required on cell doors.

408.8 Windowless buildings. For the purposes of this section, a windowless building or portion of a building is one with nonopenable windows, windows not readily breakable or without windows. Windowless buildings shall be provided with an engineered smoke control system to provide ventilation (mechanical or natural) in accordance with Section 909 for each windowless smoke compartment.

SECTION 409 MOTION PICTURE PROJECTION ROOMS

409.1 General. The provisions of this section shall apply to rooms in which ribbon-type cellulose acetate or other safety film is utilized in conjunction with electric arc, xenon or other light-source projection equipment that develops hazardous gases, dust or radiation. Where cellulose nitrate film is utilized or stored, such rooms shall comply with NFPA 40.

409.1.1 Projection room required. Every motion picture machine projecting film as mentioned within the scope of this section shall be enclosed in a projection room. Appurtenant electrical equipment, such as rheostats, transformers and generators, shall be within the projection room or in an adjacent room of equivalent construction. There shall be posted on the outside of each projection room door and within the projection room itself, a conspicuous sign with 1-inch (25 mm) block letters stating: SAFETY FILM ONLY PERMITTED IN THIS ROOM.

409.2 Construction of projection rooms. Every projection room shall be of permanent construction consistent with the construction requirements for the type of building in which the projection room is located. Openings are not required to be protected.

The room shall have a floor area of not less than 80 square feet (7.44 m²) for a single machine and at least 40 square feet (3.7 m²) for each additional machine. Each motion picture projector, floodlight, spotlight or similar piece of equipment shall have a clear working space of not less than 30 inches by 30 inches (762 mm by 762 mm) on each side and at the rear thereof, but only one such space shall be required between two adjacent projectors. The projection room and the rooms appurtenant thereto shall have a ceiling height of not less than 7 feet 6 inches (2286 mm). The aggregate of openings for projection equipment shall not exceed 25 percent of the area of the wall between the projection room and the auditorium. Openings shall be provided with glass or other approved material, so as to close completely the opening.

409.3 Projection room and equipment ventilation. Ventilation shall be provided in accordance with the *International Mechanical Code*.

409.3.1 Projection room.

409.3.1.1 Supply air. Each projection room shall be provided with adequate air supply inlets so arranged as to provide well-distributed air throughout the room. Air in-

let ducts shall provide an amount of air equivalent to the amount of air being exhausted by projection equipment. Air may be taken from the outside; from adjacent spaces within the building, provided the volume and infiltration rate is sufficient; or from the building air-conditioning system, provided it is so arranged as to provide sufficient air when other systems are not in operation.

409.3.1.2 Exhaust air. Projection rooms may be exhausted through the lamp exhaust system. The lamp exhaust system shall be positively interconnected with the lamp so that the lamp will not operate unless there is the airflow required for the lamp. Exhaust air ducts shall terminate at the exterior of the building in such a location that the exhaust air cannot be readily recirculated into any air supply system. The projection room ventilation system may also serve appurtenant rooms such as the generator room and the rewind room.

Each projection machine shall be provided with an exhaust duct that will draw air from each lamp and exhaust it directly to the outside of the building. The lamp exhaust may serve to exhaust air from the projection room to provide room air circulation. Such ducts shall be of rigid materials, except for a flexible connector approved for the purpose. The projection lamp or projection room exhaust system or both may be combined but shall not be interconnected with any other exhaust or return system, or both, within the building.

409.4 Lighting control. Provisions shall be made for control of the auditorium lighting and the means of egress lighting systems of theaters from inside the projection room and from at least one other convenient point in the building.

409.5 Miscellaneous equipment. Each projection room shall be provided with rewind and film storage facilities.

SECTION 410 STAGES AND PLATFORMS

410.1 Applicability. The provisions of this section shall apply to all parts of buildings and structures that contain stages or platforms and similar appurtenances as herein defined.

410.2 Definitions. The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein.

FLY GALLERY. A raised floor area above a stage from which the movement of scenery and operation of other stage effects are controlled.

GRIDIRON. The structural framing over a stage supporting equipment for hanging or flying scenery and other stage effects.

PINRAIL. A rail on or above a stage through which belaying pins are inserted and to which lines are fastened.

PLATFORM. A raised area within a building used for worship, the presentation of music, plays or other entertainment; the head table for special guests; the raised area for lecturers and speakers; boxing and wrestling rings; theater-in-the-round stages; and similar purposes wherein there are no overhead hanging curtains, drops, scenery or stage effects other than

lighting and sound. A temporary platform is one installed for not more than 30 days.

PROSCENIUM WALL. The wall that separates the stage from the auditorium or spectator seating area.

STAGE. A space within a building utilized for entertainment or presentations. Stage area shall be measured to include the entire performance area and adjacent backstage and support areas not separated from the performance area by fire-resistance-rated construction. Stage height shall be measured from the lowest point on the stage floor to the highest point of the roof or floor deck above the stage.

410.3 Stages. Stage construction shall comply with Sections 410.3.1 through 410.3.7.

410.3.1 Stage construction. Stages shall be constructed of materials as required for floors for the type of construction of the building in which such stages are located.

Exceptions:

1. Stages of Type IIB or IV construction with a nominal 2-inch wood deck, provided that the stage is separated from other areas in accordance with Section 410.3.5.
2. In buildings of Types IIA, IIIA and VA construction, a fire-resistance-rated floor is not required, provided the space below the stage is equipped with an automatic fire-extinguishing system in accordance with Section 903 or 904.
3. In all types of construction, the finished floor shall be constructed of wood or approved noncombustible materials. Openings through stage floors shall be equipped with tight-fitting, solid wood trap doors with approved safety locks.

410.3.2 Galleries, gridirons, catwalks and pinrails. Beams designed only for the attachment of portable or fixed theater equipment, gridirons, galleries and catwalks shall be constructed of approved materials consistent with the requirements for the type of construction of the building; and a fire-resistance rating shall not be required. These areas shall not be considered to be floors, stories, mezzanines or levels in applying this code.

Exception: Floors of fly galleries and catwalks shall be constructed of any approved material.

410.3.3 Exterior stage doors. Where protection of openings is required, exterior exit doors shall be protected with fire doors that comply with Section 714. Exterior openings that are located on the stage for means of egress or loading and unloading purposes, and that are likely to be open during occupancy of the theater, shall be constructed with vestibules to prevent air drafts into the auditorium.

410.3.4 Proscenium wall. Where the stage height is greater than 50 feet (15 240 mm), all portions of the stage shall be completely separated from the seating area by a proscenium wall with not less than a 2-hour fire-resistance rating extending continuously from the foundation to the roof.

410.3.5 Proscenium curtain. The proscenium opening of every stage with a height greater than 50 feet (15 240 mm) shall be provided with a curtain of approved material or an

approved water curtain complying with Section 903.3.1.1. The curtain shall be designed and installed to intercept hot gases, flames and smoke, and to prevent a glow from a severe fire on the stage from showing on the auditorium side for a period of 20 minutes. The closing of the curtain from the full open position shall be effected in less than 30 seconds, but the last 8 feet (2438 mm) of travel shall require not less than 5 seconds.

410.3.5.1 Activation. The curtain shall be activated by rate-of-rise heat detection installed in accordance with Section 907.10 operating at a rate of temperature rise of 15 to 20°F per minute (8 to 11°C per minute), and by an auxiliary manual control.

410.3.5.2 Fire test. A sample curtain with a minimum of two vertical seams shall be subjected to the standard fire test specified in ASTM E 119 for a period of 30 minutes. The curtain shall overlap the furnace edges by an amount that is appropriate to seal the top and sides. The curtain shall have a bottom pocket containing a minimum of 4 pounds per linear foot (58 N/m) of batten. The exposed surface of the curtain shall not glow, and flame or smoke shall not penetrate the curtain during the test period. Unexposed surface temperature and hose stream test requirements are not applicable to the proscenium fire safety curtain test.

410.3.5.3 Smoke test. Curtain fabrics shall have a smoke-developed rating of 25 or less when tested in accordance with ASTM E 84.

410.3.5.4 Tests. The completed proscenium curtain shall be subjected to operating tests prior to the issuance of a certificate of occupancy.

410.3.6 Scenery. Combustible materials used in sets and scenery shall be rendered flame resistant in accordance with Section 805 and the *International Fire Code*. Foam plastics and materials containing foam plastics shall comply with Section 2603 and the *International Fire Code*.

410.3.7 Stage ventilation. Emergency ventilation shall be provided for stages larger than 1,000 square feet (93 m²) in floor area, or with a stage height greater than 50 feet (15 240 mm). Such ventilation shall comply with Section 410.3.7.1 or 410.3.7.2.

410.3.7.1 Roof vents. Two or more vents constructed to open automatically by approved heat-activated devices and with an aggregate clear opening area of not less than 5 percent of the area of the stage shall be located near the center and above the highest part of the stage area. Supplemental means shall be provided for manual operation of the ventilator. Curbs shall be provided as required for skylights in Section 2610.2. Vents shall be labeled.

410.3.7.2 Smoke control. Smoke control in accordance with Section 909 shall be provided to maintain the smoke layer interface not less than 6 feet (1829 mm) above the highest level of the assembly seating or above the top of the proscenium opening where a proscenium wall is provided in compliance with Section 410.3.4.

410.4 Platform construction. Permanent platforms shall be constructed of materials as required for the type of construction

of the building in which the permanent platform is located. Permanent platforms are permitted to be constructed of fire-retardant-treated wood for Types I, II, and IV construction where the platforms are not more than 30 inches (762 mm) above the main floor, and not more than one-third of the room floor area and not more than 3,000 square feet (279 m²) in area. Where the space beneath the permanent platform is used for storage or any other purpose other than equipment, wiring or plumbing, the floor construction shall not be less than 1-hour fire-resistant construction. Where the space beneath the permanent platform is used only for equipment, wiring or plumbing, the underside of the permanent platform need not be protected.

410.4.1 Temporary platforms. Platforms installed for a period of not more than 30 days are permitted to be constructed of any materials permitted by the code. The space between the floor and the platform above shall only be used for plumbing and electrical wiring to platform equipment.

410.5 Dressing and appurtenant rooms. Dressing and appurtenant rooms shall comply with Sections 410.5.1 through 410.5.4.

410.5.1 Separation from stage. Where the stage height is greater than 50 feet (15 240 mm), the stage shall be separated from dressing rooms, scene docks, property rooms, workshops, storerooms and compartments appurtenant to the stage and other parts of the building by a fire barrier wall and horizontal assemblies, or both, with not less than a 2-hour fire-resistance rating with approved opening protectives. For stage heights of 50 feet (15 240 mm) or less, the required stage separation shall be a fire barrier wall and horizontal assemblies, or both, with not less a 1-hour fire-resistance rating with approved opening protectives.

410.5.2 Separation from each other. Dressing rooms, scene docks, property rooms, workshops, storerooms and compartments appurtenant to the stage shall be separated from each other by fire barrier wall and horizontal assemblies, or both, with not less than a 1-hour fire-resistance rating with approved opening protectives.

410.5.3 Opening protectives. Openings other than to trunk rooms and the necessary doorways at stage level shall not connect such rooms with the stage, and such openings shall be protected with fire door assemblies that comply with Section 714.

410.5.4 Stage exits. At least one approved means of egress shall be provided from each side of the stage; and from each side of the space under the stage. At least one means of escape shall be provided from each fly gallery and from the gridiron. A steel ladder, alternating tread stairway or spiral stairway is permitted to be provided from the gridiron to a scuttle in the stage roof.

410.6 Automatic sprinkler system. Stages shall be equipped with an automatic fire-extinguishing system in accordance with Chapter 9. The system shall be installed under the roof and gridiron, in the tie and fly galleries and in places behind the pro-

scenium wall of the stage and in dressing rooms, lounges, workshops and storerooms accessory to such stages.

Exceptions:

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided the concealed space is separated from the adjacent spaces by not less than $\frac{5}{8}$ -inch (15.9 mm) Type X gypsum board.
2. Sprinklers are not required for stages 1,000 square feet (93 m²) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.

410.7 Standpipes. Standpipe systems shall be provided in accordance with Section 905.

SECTION 411 SPECIAL AMUSEMENT BUILDINGS

411.1 General. Special amusement buildings having an occupant load of 50 or more shall comply with the requirements for the appropriate Group A occupancy and this section. Amusement buildings having an occupant load of less than 50 shall comply with the requirements for a Group B occupancy and this section.

Exception: Amusement buildings or portions thereof that are without walls or a roof and constructed to prevent the accumulation of smoke.

For flammable decorative materials, see the *International Fire Code*.

411.2 Special amusement building. A special amusement building is any temporary or permanent building or portion thereof that is occupied for amusement, entertainment or educational purposes and that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction so arranged that the means of egress path is not readily apparent due to visual or audio distractions or is intentionally confounded or is not readily available because of the nature of the attraction or mode of conveyance through the building or structure.

[F] 411.3 Automatic fire detection. Special amusement buildings shall be equipped with an automatic fire detection system in accordance with Section 907.

[F] 411.4 Automatic sprinklers. Special amusement buildings shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where the special amusement building is temporary, the sprinkler water supply shall be of an approved temporary means.

Exception: Automatic fire sprinklers are not required where the total floor area of a temporary special amusement building is less than 1,000 square feet (93 m²) and the travel distance from any point to an exit is less than 50 feet (15 240 mm).

[F] 411.5 Alarm. Actuation of a single smoke detector, the automatic sprinkler system or other automatic fire detection device shall immediately sound an alarm at the building at a constantly attended location from which emergency action can be initiated including the capability of manual initiation of requirements in Section 907.2.11.2.

[F] 411.6 Emergency voice/alarm communications system. An emergency voice/alarm communications system shall be provided in accordance with Sections 907.2.11 and 907.2.12.2, which is also permitted to serve as a public address system and shall be audible throughout the entire special amusement building.

411.7 Exit marking. Exit signs shall be installed at the required exit or exit access doorways of amusement buildings. Approved directional exit markings shall also be provided. Where mirrors, mazes or other designs are utilized that disguise the path of egress travel such that they are not apparent, approved low-level exit signs and directional path markings shall be provided and located not more than 8 inches (203 mm) above the walking surface and on or near the path of egress travel. Such markings shall become visible in an emergency. The directional exit marking shall be activated by the automatic fire detection system and the automatic sprinkler system in accordance with Section 907.2.11.2.

411.8 Interior finish. The interior finish shall be Class A in accordance with Section 803.1.

SECTION 412 AIRCRAFT-RELATED OCCUPANCIES

412.1 Airport traffic control towers.

412.1.1 General. The provisions of this section shall apply to airport traffic control towers not exceeding 1,500 square feet (140 m²) per floor occupied only for the following uses:

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.
4. Office spaces incidental to the tower operation.
5. Lounges for employees, including sanitary facilities.

412.1.2 Type of construction. Airport traffic control towers shall be constructed to conform to the height and area limitations of Table 412.1.2.

TABLE 412.1.2
HEIGHT AND AREA LIMITATIONS FOR AIRPORT
TRAFFIC CONTROL TOWERS

TYPE OF CONSTRUCTION	HEIGHT ^a (feet)	MAXIMUM AREA (square feet)
IA	Unlimited	1,500
IB	240	1,500
IIA	100	1,500
IIB	85	1,500
IIIA	65	1,500

For SI: 1 foot = 304.8 mm, 1 square foot = 0.093 m².

a. Height to be measured from grade to cab floor.

412.1.3 Egress. A minimum of one exit stairway shall be permitted for airport traffic control towers of any height provided that the occupant load per floor does not exceed 15. The stairway shall conform to the requirements of Section 1003.3.3. The stairway shall be separated from elevators by a minimum distance of one-half of the diagonal of the area served measured in a straight line. The exit stairway and elevator hoistway are permitted to be located in the same shaft enclosure, provided they are separated from each other by a 4-hour separation having no openings. Such stairway shall be pressurized to a minimum of 0.15 inch of water column (43 Pa) and a maximum of 0.35 inch of water column (101 Pa) in the shaft relative to the building with stairway doors closed. Stairways need not extend to the roof as specified in Section 1003.3.3.12. The provisions of Section 403 do not apply.

Exception: Smokeproof enclosures as set forth in Section 1005.3.2.5 are not required where required stairways are pressurized.

412.1.4 Automatic fire detection systems. Airport traffic control towers shall be provided with an automatic fire detection system installed in accordance with Section 907.2.

[F] 412.1.5 Standby power. A standby power system that conforms to Section 2702 shall be provided in airport traffic control towers more than 65 feet (19 812 mm) in height. Power shall be provided to the following equipment:

1. Pressurization equipment, mechanical equipment and lighting.
2. Elevator operating equipment.
3. Fire alarm and smoke detection systems.

412.1.6 Accessibility. Airport traffic control towers need not be accessible as specified in the provisions of Chapter 11.

412.2 Aircraft hangar.

412.2.1 Exterior walls. Exterior walls located less than 30 feet (9 144 mm) from property lines, lot lines or a public way shall have a fire-resistance rating not less than 2 hours.

412.2.2 Basements. Where hangars have basements, the floor over the basement shall be of Type IA construction and shall be made tight against seepage of water, oil or vapors. There shall be no opening or communication between basement and hangar. Access to the basement shall be from outside only.

412.2.3 Floor surface. Floors shall be graded and drained to prevent water or fuel from remaining on the floor. Floor drains shall discharge through an oil separator to the sewer or to an outside vented sump.

412.2.4 Heating equipment. Heating equipment shall be placed in another room separated by 2-hour fire-resistant construction. Entrance shall be from the outside or by means of a vestibule providing a two-doorway separation.

Exceptions:

1. Unit heaters suspended at least 10 feet (3048 mm) above the upper surface of wings or engine enclosures of the highest aircraft that may be housed in

the hangar and at least 8 feet (2438 mm) above the floor in shops, offices and other sections of the hangar communicating with storage or service areas.

2. A single interior door shall be allowed, provided the sources of ignition in the appliances are at least 18 inches (457 mm) above the floor.

412.2.5 Finishing. The process of “doping,” involving use of a volatile flammable solvent, or of painting, shall be carried on in a separate detached building equipped with automatic fire-extinguishing equipment in accordance with Section 903.

412.2.6 Fire suppression. Aircraft hangars shall be provided with fire suppression as required in NFPA 409.

Exception: Group II hangars as defined in NFPA 409 storing private aircraft without major maintenance or overhaul are exempt from foam suppression requirements.

412.3 Residential aircraft hangars. Residential aircraft hangars as defined in Section 412.3.1 shall comply with Sections 412.3.2 through 412.3.6.

412.3.1 Definition. The following word and term shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

RESIDENTIAL AIRCRAFT HANGAR. An accessory building less than 2,000 square feet (186 m²) and 20 feet (6096 mm) in height, constructed on a one- or two-family residential property where aircraft are stored. Such use will be considered as a residential accessory use incidental to the dwelling.

412.3.2 Fire separation. A hangar shall not be attached to a dwelling unless separated by walls having a fire-resistance rating of not less than 1 hour. Such separation shall be continuous from foundation to the underside of the roof and unpierced except for doors leading to the dwelling unit. Doors into the dwelling unit must be equipped with self-closing devices and conform to the requirements of Section 714 with at least a 4-inch (102 mm) noncombustible raised sill. Openings from a hangar directly into a room used for sleeping purposes shall not be permitted.

412.3.3 Egress. A hangar shall provide two means of egress. One of the doors into the dwelling shall be considered as meeting only one of the two means of egress.

[F] 412.3.4 Smoke detection. Smoke alarms shall be provided within the hangar in accordance with Section 907.2.21.

412.3.5 Independent systems. Mechanical and plumbing drain, waste and vent (DWV) systems installed within the hangar shall be independent of the systems installed within the dwelling. Building sewer lines may connect outside the structures.

Exception: Smoke detector wiring and feed for electrical subpanels in the hangar.

412.3.6 Height and area limits. Residential aircraft hangars shall not exceed 2,000 square feet (186 m²) in area and 20 feet (6096 mm) in height.

412.4 Aircraft paint hangars. Aircraft painting operations where flammable liquids are used in excess of the maximum allowable quantities per control area listed in Table 307.7(1) shall be conducted in an aircraft paint hangar that complies with the provisions of Section 412.4.

412.4.1 Occupancy group. Aircraft paint hangars shall be classified as Group H-2. Aircraft paint hangars shall comply with the applicable requirements of this code and the *International Fire Code* for such occupancy.

412.4.2 Construction. The aircraft paint hangar shall be of Type I or Type II construction.

412.4.3 Operations. Only those flammable liquids necessary for painting operations shall be permitted in quantities less than the maximum allowable quantities per control area in Table 307.7(1). Spray equipment cleaning operations shall be conducted in a liquid use, dispensing and mixing room.

412.4.4 Storage. Storage of flammable liquids shall be in a liquid storage room.

412.4.5 Fire suppression. Aircraft paint hangars shall be provided with fire suppression as required in NFPA 409.

412.4.6 Ventilation. Aircraft paint hangars shall be provided with ventilation as required in the *International Mechanical Code*.

412.5 Heliports and helistops.

412.5.1 General. Heliports and helistops may be erected on buildings or other locations where they are constructed in accordance with this section.

412.5.2 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

HELIPORT. An area of land or water or a structural surface that is used, or intended for use, for the landing and taking-off of helicopters, and any appurtenant areas that are used, or intended for use, for heliport buildings and other heliport facilities.

HELISTOP. The same as a “Heliport,” except that no fueling, defueling, maintenance, repairs or storage of helicopters is permitted.

412.5.3 Size. The touchdown or landing area for helicopters of less than 3,500 pounds (1588 kg) shall be a minimum of 20 feet (6096 mm) in length and width. The touchdown area shall be surrounded on all sides by a clear area having a minimum average width at roof level of 15 feet (4572 mm) but with no width less than 5 feet (1524 mm).

412.5.4 Design. Helicopter landing areas and the supports thereof on the roof of a building shall be noncombustible construction. Landing areas shall be designed to confine any flammable liquid spillage to the landing area itself and provisions shall be made to drain such spillage away from any exit or stairway serving the helicopter landing area or from a structure housing such exit or stairway. For structural design requirements, see Section 1609.

412.5.5 Exits and stairways. Exits and stairways from heliports and helistops shall comply with the provisions of

Chapter 10. Landing areas located on buildings or structures shall have two or more exits. Landing platforms or roof areas less than 60 feet (18 288 mm) in length, or less than 2,000 square feet (187 m²) in area, shall have at least two exits complying with Chapter 10 or shall have one exit complying with Chapter 10 and a fire escape or ladder leading to the floor below.

412.5.6 Rooftop heliports and helistops. Rooftop heliports and helistops shall comply with NFPA 418.

Heliports may be erected on buildings or other locations if they are constructed in accordance with this chapter.

SECTION 413 COMBUSTIBLE STORAGE

413.1 General. High-piled stock or rack storage in any occupancy group shall comply with the *International Fire Code*.

413.2 Attic, under-floor and concealed spaces. Attic, under-floor and concealed spaces used for storage of combustible materials shall be protected on the storage side as required for 1-hour fire-resistant construction. Openings shall be protected by assemblies that are self-closing and are of noncombustible construction or solid wood core not less than 1³/₄ inch (45 mm) in thickness.

Exceptions:

1. Areas protected by approved automatic sprinkler systems.
2. Group R-3 and Group U occupancies.

[F] SECTION 414 HAZARDOUS MATERIALS

414.1 General. The provisions of this section shall apply to buildings and structures occupied for the manufacturing, processing, dispensing, use or storage of hazardous materials.

414.1.1 Other provisions. Buildings and structures with an occupancy in Group H shall also comply with the applicable provisions of Section 415 and the *International Fire Code*.

414.1.2 Materials. The safe design of hazardous material occupancies is material dependent. Individual material requirements are also found in Sections 307 and 415, and in the *International Mechanical Code* and the *International Fire Code*.

414.1.3 Deleted.

414.2 Control areas. Control areas shall be those spaces within a building where quantities of hazardous materials not exceeding the maximum quantities allowed by this code are stored, dispensed, used or handled.

414.2.1 Construction requirements. Control areas shall be separated from each other by not less than a 1-hour fire barrier wall constructed in accordance with Chapter 7.

414.2.2 Number. The maximum number of control areas within a building shall be in accordance with Table 414.2.2.

414.2.3 Separation. The required fire-resistance rating for fire barrier assemblies shall be in accordance with Table 414.2.2. The floor construction of the control area and construction supporting the floor of the control area shall have a minimum 2-hour fire-resistance rating.

414.2.4 Hazardous material in Group M display and storage areas and in Group S storage areas. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials permitted within a single control area of a Group M or S occupancy or an outdoor control area is permitted to exceed the maximum allowable quantities per control area specified in Tables 307.7(1) and 307.7(2) without classifying the building or use as a high-hazard occupancy, provided that the materials are displayed and stored in accordance with the *International Fire Code* and quantities do not exceed the maximum allowable quantities specified in Table 414.2.4.

414.3 Ventilation. Rooms, areas or spaces of Group H in which explosive, corrosive, combustible, flammable or highly toxic dusts, mists, fumes, vapors or gases are or may be emitted due to the processing, use, handling or storage of materials shall be mechanically ventilated as required by the *International Fire Code* and the *International Mechanical Code*.

Ducts conveying explosives or flammable vapors, fumes or dusts shall extend directly to the exterior of the building without entering other spaces. Exhaust ducts shall not extend into or through ducts and plenums.

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

Emissions generated at work stations shall be confined to the area in which they are generated as specified in the *International Fire Code* and the *International Mechanical Code*.

The location of supply and exhaust openings, shall be in accordance with the *International Mechanical Code*. Exhaust air contaminated by highly toxic material shall be treated in accordance with the *International Fire Code*.

A manual shutoff control for ventilation equipment required by this section shall be provided outside the room adjacent to the principal access door to the room. The switch shall be of the break-glass type and shall be labeled: VENTILATION SYSTEM EMERGENCY SHUTOFF.

414.4 Hazardous material systems. Systems involving hazardous materials shall be suitable for the intended application. Controls shall be designed to prevent materials from entering or leaving process or reaction systems at other than the intended time, rate or path. Automatic controls, where provided, shall be designed to be fail safe.

**TABLE 414.2.2
DESIGN AND NUMBER OF CONTROL AREAS**

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA ^a	NUMBER OF CONTROL AREAS PER FLOOR ^b	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS ^c
Above grade	Higher than 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
Below grade	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

- a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 307.7(1) and 307.7(2), with all increases allowed in the footnotes of those tables.
- b. There shall be a maximum of two control areas per floor in Group M occupancies and in buildings or portions of buildings having Group S occupancies with storage conditions and quantities in accordance with Section 414.2.4.
- c. Fire barriers shall include walls and floors as necessary to provide separation from other portions of the building.

**TABLE 414.2.4
MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES
NONFLAMMABLE SOLIDS AND NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS^{d,e,f}**

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material ^a	Class	Solids (pounds)	Liquids gallons (pounds)
A. Health-hazard materials—nonflammable and noncombustible solids and liquids			
1. Corrosives ^{b,c}	Not Applicable	9,750	975
2. Highly toxics	Not Applicable	20 ^{b,c}	2 ^{b,c}
3. Toxics ^{b,c}	Not Applicable	1,000	100
B. Physical-hazard materials—nonflammable and noncombustible solids and liquids			
1. Oxidizers ^{b,c}	4	Not Allowed	Not Allowed
	3	1,150	115
	2	2,250	225
	1	18,000	1,800
2. Unstable (reactives) ^{b,c}	4	Not Allowed	Not Allowed
	3	550	55
	2	1,150	115
	1	Not Limited	Not Limited
3. Water (reactives)	3 ^{b,c}	550	55
	2 ^{b,c}	1,150	115
	1	Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

- a. Hazard categories are as specified in the *International Fire Code*.
- b. Maximum allowable quantities shall be increased 100 percent in buildings that are sprinklered in accordance with Section 903.3.1.1. When Note c also applies, the increase for both notes shall be applied accumulatively.
- c. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, in accordance with the *International Fire Code*. When Note b also applies, the increase for both notes shall be applied accumulatively.
- d. See Table 414.2.2 for design and number of control areas.
- e. Allowable quantities for other hazardous material categories shall be in accordance with Section 307.
- f. Maximum quantities shall be increased 100 percent in outdoor control areas.

414.5 Inside storage, dispensing and use. The inside storage, dispensing and use of hazardous materials in excess of the maximum allowable quantities per control area of Tables 307.7(1) and 307.7(2) shall be in accordance with Sections 414.5.1 through 414.5.5 and the *International Fire Code*.

414.5.1 Explosion control. Explosion control shall be provided in accordance with the *International Fire Code* as required by Table 414.5.1 where quantities of hazardous materials specified in Table 414.5.1 exceed the maximum allowable quantities in Table 307.7(1) or where a structure, room or space is occupied for purposes involving explosion hazards as required by Section 415 or the *International Fire Code*.

414.5.2 Monitor control equipment. Monitor control equipment shall be provided where required by the *International Fire Code*.

414.5.3 Automatic fire detection systems. Group H occupancies shall be provided with an automatic fire detection system in accordance with Section 907.2.

414.5.4 Standby or emergency power. Where mechanical ventilation, treatment, temperature control, alarm, detection or other electrically operated systems are required, such systems shall be connected to an emergency electrical system or standby power system in accordance with Section 2702.

Exceptions:

1. Storage areas for Class 1 and 2 oxidizers.
2. Storage areas for Class III, IV and V organic peroxides.
3. Storage, use and handling areas for highly toxic or toxic materials as provided for in the *International Fire Code*.

**TABLE 414.5.1
EXPLOSION CONTROL REQUIREMENTS^a**

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems ^b
HAZARD CATEGORY			
Combustible dusts ^c	----	Not Required	Required
Cryogenic flammables	----	Not Required	Required
Explosives	—	Required	Not Permitted
Flammable gas	Gaseous Liquefied	Not Required Not Required	Required Required
Flammable liquid	IA ^d IB ^e	Not Required Not Required	Required Required
Organic peroxides	U I	Required Required	Not Permitted Not Permitted
Oxidizer liquids and solids	4	Required	Not Permitted
Pyrophoric gas	----	Not Required	Required
Unstable (reactive)	4 3 Detonable 3 Nondetonable	Required Required Not Required	Not Permitted Not Permitted Required
Water-reactive liquids and solids	3 2 ^g	Not Required Not Required	Required Required
SPECIAL USES			
Acetylene generator rooms	----	Not Required	Required
Grain processing	----	Not Required	Required
Liquefied petroleum gas distribution facilities	—	Not Required	Required
Where explosion hazards exist ^f	Detonation Deflagration	Required Not Required	Not Permitted Required

a. See Section 414.1.3.

b. See the *International Fire Code*.

c. As generated during manufacturing or processing. See definition of "Combustible dust" in Chapter 3.

d. Storage or use.

e. In open use or dispensing.

f. Rooms containing dispensing and use of hazardous materials when an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

g. A method of explosion control shall be provided when Class 2 water-reactive materials can form potentially explosive mixtures.

4. Standby power for mechanical ventilation, treatment systems and temperature control systems shall not be required where an approved fail-safe engineered system is installed.

414.5.5 Spill control, drainage and containment. Rooms, buildings or areas occupied for the storage of solid and liquid hazardous materials shall be provided with a means to control spillage and to contain or drain off spillage and fire protection water discharged in the storage area where required in the *International Fire Code*. The methods of spill control shall be in accordance with the *International Fire Code*.

414.6 Outside storage, dispensing and use. The outside storage, dispensing and use of hazardous materials shall be in accordance with the *International Fire Code*.

414.6.1 Weather protection. Where weather protection is provided for sheltering outside hazardous material storage or use areas, such storage or use shall be considered outside storage or use, provided that all of the following conditions are met:

1. Structure supports and walls shall not obstruct more than one side nor more than 25 percent of the perimeter of the storage or use area.
2. The distance from the structure and the structure supports to buildings, lot lines, public ways or means of egress to a public way shall not be less than the distance required for an outside hazardous material storage or use area without weather protection.
3. The overhead structure shall be of approved noncombustible construction with a maximum area of 1,500 square feet (140 m²).

Exception: The increases permitted by Section 506 apply.

414.7 Emergency alarms. Emergency alarms for the detection and notification of an emergency condition in Group H occupancies shall be provided as set forth herein.

414.7.1 Storage. An approved manual emergency alarm system shall be provided in buildings, rooms or areas used for storage of hazardous materials. Emergency alarm-initiating devices shall be installed outside of each interior exit or exit-access door of storage buildings, rooms or areas. Activation of an emergency alarm-initiating device shall sound a local alarm to alert occupants of an emergency situation involving hazardous materials.

414.7.2 Dispensing, use and handling. Where hazardous materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 are transported through corridors or exit enclosures, there shall be an emergency telephone system, a local manual alarm station or an approved alarm-initiating device at not more than 150-foot (45 720 mm) intervals and at each exit and exit-access doorway throughout the transport route. The signal shall be relayed to an approved central, proprietary or remote station service or constantly attended on-site location and shall also initiate a local audible alarm.

414.7.3 Supervision. Emergency alarm systems shall be supervised by an approved central, proprietary or remote sta-

tion service or shall initiate an audible and visual signal at a constantly attended on-site location.

[F] SECTION 415 GROUPS H-1, H-2, H-3, H-4 AND H-5

415.1 Scope. The provisions of this section shall apply to the storage and use of hazardous materials in excess of the maximum allowable quantities per control area listed in Section 307.9. Buildings and structures with an occupancy in Group H shall also comply with the applicable provisions of Section 414 and the *International Fire Code*.

415.2 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein.

CONTINUOUS GAS DETECTION SYSTEM. A gas detection system where the analytical instrument is maintained in continuous operation and sampling is performed without interruption. Analysis is allowed to be performed on a cyclical basis at intervals not to exceed 30 minutes.

EMERGENCY CONTROL STATION. An approved location on the premises where signals from emergency equipment are received and which is staffed by trained personnel.

EXHAUSTED ENCLOSURE. An appliance or piece of equipment that consists of a top, a back and two sides providing a means of local exhaust for capturing gases, fumes, vapors and mists. Such enclosures include laboratory hoods, exhaust fume hoods and similar appliances and equipment used to locally retain and exhaust the gases, fumes, vapors and mists that could be released. Rooms or areas provided with general ventilation, in themselves, are not exhausted enclosures.

FABRICATION AREA. An area within a semiconductor fabrication facility and related research and development areas in which there are processes using hazardous production materials. Such areas are allowed to include ancillary rooms or areas such as dressing rooms and offices that are directly related to the fabrication area processes.

FLAMMABLE VAPORS OR FUMES. The concentration of flammable constituents in air that exceed 10 percent of their lower flammable limit (LFL).

GAS CABINET. A fully enclosed, noncombustible enclosure used to provide an isolated environment for compressed gas cylinders in storage or use. Doors and access ports for exchanging cylinders and accessing pressure-regulating controls are allowed to be included.

GAS ROOM. A separately ventilated, fully enclosed room in which only compressed gases and associated equipment and supplies are stored or used.

HAZARDOUS PRODUCTION MATERIAL (HPM). A solid, liquid or gas associated with semiconductor manufacturing that has a degree-of-hazard rating in health, flammability or reactivity of Class 3 or 4 as ranked by NFPA 704 and which is used directly in research, laboratory or production processes that have as their end product, materials that are not hazardous.

HPM FLAMMABLE LIQUID. An HPM liquid that is defined as either a Class I flammable liquid or a Class II or Class IIIA combustible liquid.

HPM ROOM. A room used in conjunction with or serving a Group H-5 occupancy, where HPM is stored or used and which is classified as a Group H-2, H-3 or H-4 occupancy.

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH). The concentration of air-borne contaminants which poses a threat of death, immediate or delayed permanent adverse health effects, or effects that could prevent escape from such an environment. This contaminant concentration level is established by the National Institute of Occupational Safety and Health (NIOSH) based on both toxicity and flammability. It generally is expressed in parts per million by volume (ppm v/v) or milligrams per cubic meter (mg/m³). [Comm 62.0415]

LIQUID. A material that has a melting point that is equal to or less than 68°F (20°C) and a boiling point that is greater than 68°F (20°C) at 14.7 psia (101 kPa). When not otherwise identified, the term “liquid” includes both flammable and combustible liquids.

LIQUID STORAGE ROOM. A room classified as a Group H-3 occupancy used for the storage of flammable or combustible liquids in an unopened condition.

LIQUID USE, DISPENSING AND MIXING ROOMS. Rooms in which Class I, Class II and Class IIIA flammable or combustible liquids are used, dispensed or mixed in open containers.

LOWER FLAMMABLE LIMIT (LFL). The minimum concentration of vapor in air at which propagation of flame will occur in the presence of an ignition source. The LFL is sometimes referred to as LEL or lower explosive limit.

NORMAL TEMPERATURE AND PRESSURE (NTP). A temperature of 70°F (21°C) and a pressure of 1 atmosphere [14.7 psia (101 kPa)].

SERVICE CORRIDOR. A fully enclosed passage used for transporting HPM and purposes other than required means of egress.

SOLID. A material that has a melting point, decomposes or sublimates at a temperature greater than 68°F (20°C).

STORAGE, HAZARDOUS MATERIALS.

1. The keeping, retention or leaving of hazardous materials in closed containers, tanks, cylinders or similar vessels, or
2. Vessels supplying operations through closed connections to the vessel.

USE (MATERIAL). Placing a material into action, including solids, liquids and gases.

WORKSTATION. A defined space or an independent principal piece of equipment using HPM within a fabrication area where a specific function, laboratory procedure or research activity occurs. Approved or listed hazardous materials storage cabinets, flammable liquid storage cabinets or gas cabinets serving a workstation are included as part of the workstation. A workstation is allowed to contain ventilation equipment, fire protection devices, detection devices, electrical devices and other processing and scientific equipment.

415.3 Location on property. Group H shall be located on property in accordance with the other provisions of this chapter. In Group H-2 or H-3, not less than 25 percent of the perimeter wall of the occupancy shall be an exterior wall.

Exceptions:

1. Liquid use, dispensing and mixing rooms having a floor area of not more than 500 square feet (46.5 m²) need not be located on the outer perimeter of the building where they are in accordance with the *International Fire Code* and NFPA 30.
2. Liquid storage rooms having a floor area of not more than 1,000 square feet (93 m²) need not be located on the outer perimeter where they are in accordance with the *International Fire Code* and NFPA 30.
3. Spray paint booths that comply with the *International Fire Code* need not be located on the outer perimeter.

415.3.1 Group H minimum distance to lot lines. Regardless of any other provisions, buildings containing Group H occupancies shall be set back a minimum distance from lot lines as set forth Items 1 through 4 below. Distances shall be measured from the walls enclosing the occupancy to lot lines, including those on a public way.

1. Group H-1. Not less than 75 feet (22 860 mm) and not less than required by Table 415.3.1.

Exception: Fireworks manufacturing buildings separated in accordance with NFPA 1124.

2. Group H-2. Not less than 30 feet (9144 mm) where the area of the occupancy exceeds 1,000 square feet (93 m²) and it is not required to be located in a detached building.
3. Groups H-2 and H-3. Not less than 50 feet (15 240 mm) where a detached building is required. See Table 415.3.2.
4. Groups H-2 and H-3. Occupancies containing materials with explosive characteristics. Not less than the distances required by Table 415.3.1.

415.3.2 Group H-1 and H-2 or H-3 detached buildings.

Where a detached building is required by Table 415.3.2, there are no requirements for wall and openings protection based on location on property.

415.4 Special provisions for Group H-1 occupancies. Group H-1 occupancies shall be in buildings used for no other purpose, shall not exceed one story in height and be without basement, crawl spaces or other under-floor spaces. Roofs shall be of lightweight construction with suitable thermal insulation to prevent sensitive material from reaching its decomposition temperature.

Group H-1 occupancies containing materials which are in themselves both physical and health hazards in quantities exceeding the maximum allowable quantities per control area in Table 307.7.(2) shall comply with requirements for both Group H-1 and Group H-4 occupancies.

**TABLE 415.3.1
MINIMUM SEPARATION DISTANCES FOR BUILDINGS CONTAINING EXPLOSIVE MATERIALS**

QUANTITY OF EXPLOSIVE MATERIAL ^a		MINIMUM DISTANCE (feet)		
		Lot lines ^b and inhabited buildings ^c		Separation of magazines ^{d, e, f}
Pounds over	Pounds not over	Barricaded ^d	Unbarricaded	
2	5	70	140	12
5	10	90	180	16
10	20	110	220	20
20	30	125	250	22
30	40	140	280	24
40	50	150	300	28
50	75	170	340	30
75	100	190	380	32
100	125	200	400	36
125	150	215	430	38
150	200	235	470	42
200	250	255	510	46
250	300	270	540	48
300	400	295	590	54
400	500	320	640	58
500	600	340	680	62
600	700	355	710	64
700	800	375	750	66
800	900	390	780	70
900	1,000	400	800	72
1,000	1,200	425	850	78
1,200	1,400	450	900	82
1,400	1,600	470	940	86
1,600	1,800	490	980	88
1,800	2,000	505	1,010	90
2,000	2,500	545	1,090	98
2,500	3,000	580	1,160	104
3,000	4,000	635	1,270	116
4,000	5,000	685	1,370	122
5,000	6,000	730	1,460	130
6,000	7,000	770	1,540	136
7,000	8,000	800	1,600	144
8,000	9,000	835	1,670	150
9,000	10,000	865	1,730	156
10,000	12,000	875	1,750	164
12,000	14,000	885	1,770	174
14,000	16,000	900	1,800	180
16,000	18,000	940	1,880	188
18,000	20,000	975	1,950	196

(continued)

TABLE 415.3.1—continued
MINIMUM SEPARATION DISTANCES FOR BUILDINGS CONTAINING EXPLOSIVE MATERIALS

QUANTITY OF EXPLOSIVE MATERIAL ^a		MINIMUM DISTANCE (feet)		
		Lot lines ^b and inhabited buildings ^c		Separation of magazines ^{d, e, f}
Pounds over	Pounds not over	Barricaded ^d	Unbarricaded	
20,000	25,000	1,055	2,000	210
25,000	30,000	1,130	2,000	224
30,000	35,000	1,205	2,000	238
35,000	40,000	1,275	2,000	248
40,000	45,000	1,340	2,000	258
45,000	50,000	1,400	2,000	270
50,000	55,000	1,460	2,000	280
55,000	60,000	1,515	2,000	290
60,000	65,000	1,565	2,000	300
65,000	70,000	1,610	2,000	310
70,000	75,000	1,655	2,000	320
75,000	80,000	1,695	2,000	330
80,000	85,000	1,730	2,000	340
85,000	90,000	1,760	2,000	350
90,000	95,000	1,790	2,000	360
95,000	100,000	1,815	2,000	370
100,000	110,000	1,835	2,000	390
110,000	120,000	1,855	2,000	410
120,000	130,000	1,875	2,000	430
130,000	140,000	1,890	2,000	450
140,000	150,000	1,900	2,000	470
150,000	160,000	1,935	2,000	490
160,000	170,000	1,965	2,000	510
170,000	180,000	1,990	2,000	530
180,000	190,000	2,010	2,010	550
190,000	200,000	2,030	2,030	570
200,000	210,000	2,055	2,055	590
210,000	230,000	2,100	2,100	630
230,000	250,000	2,155	2,155	670
250,000	275,000	2,215	2,215	720
275,000	300,000	2,275	2,275	770

For SI: 1 pound = 0.454 kg, 1 foot = 304.8 mm.

- The number of pounds of explosives listed is the number of pounds of trinitrotoluene (TNT) or the equivalent pounds of other explosive.
- The distance listed is the distance to lot line, including lot lines at public ways.
- Inhabited building is any building on the same property that is regularly occupied by human beings. Where two or more buildings containing explosives or magazines are located on the same property, each building or magazine shall comply with the minimum distances specified from inhabited buildings, and, in addition, they shall be separated from each other by not less than the distances shown for "Separation of Magazines," except that the quantity of explosive materials contained in detonator buildings or magazines shall govern in regard to the spacing of said detonator buildings or magazines from buildings or magazines containing other explosive materials. If any two or more buildings or magazines are separated from each other by less than the specified "Separation of Magazines" distances, then such two or more buildings or magazines, as a group, shall be considered as one building or magazine, and the total quantity of explosive materials stored in such group shall be treated as if the explosive were in a single building or magazine located on the site of any building or magazine of the group, and shall comply with the minimum distance specified from other magazines or inhabited buildings.
- Barricades shall effectively screen the building containing explosives from other buildings, public ways or magazines. Where mounds or reverted walls of earth are used for barricades, they shall not be less than 3 feet in thickness. A straight line from the top of any side wall of the building containing explosive materials to the eave line of any other building, magazine or a point 12 feet above the centerline of a public way shall pass through the barricades.
- Magazine is a building or structure approved for storage of explosive materials. In addition to the requirements of this code, magazines shall comply with the *International Fire Code*.
- The distance listed may be reduced by 50 percent where approved natural or artificial barriers are provided in accordance with the requirements in Note d.

**TABLE 415.3.2
REQUIRED DETACHED STORAGE**

DETACHED STORAGE IS REQUIRED WHEN THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN			
Material	Class	Solids and Liquids (tons) ^{a,b}	Gases (cubic feet) ^{a,b}
Explosives, blasting agents, black powder, fireworks 1.3G, detonable organic peroxides	Not Applicable	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3	1,200	Not Applicable
	Class 2	2,000	Not Applicable
Organic peroxides	Class I	Maximum Allowable Quantity	Not Applicable
	Class II	25	Not Applicable
	Class III	50	Not Applicable
Unstable (reactives) nondetonable	Class 3	1	2,000
	Class 2	25	10,000
Water reactives	Class 3	1	Not Applicable
	Class 2	25	Not Applicable
Pyrophoric gases	Not Applicable	Not Applicable	2,000

For SI: 1 ton = 906 kg, 1 cubic foot = 0.02832 m³.

- a. For materials that are detonable, the distance to other buildings or property lines shall be as specified in Table 415.3.1 based on trinitrotoluene (TNT) equivalence of the material. For all other materials, the distance shall be as indicated in Section 415.3.1.
- b. "Maximum Allowable Quantity" means the maximum allowable quantity per control area set forth in Table 307.7(1).

415.4.1 Floors in storage rooms. Floors in storage areas for organic peroxides, pyrophoric materials and unstable (reactive) materials shall be of liquid-tight, noncombustible construction.

415.5 Special provisions for Group H-2 and H-3 occupancies. Group H-2 and H-3 occupancies containing quantities of hazardous materials in excess of those set forth in Table 415.3.2 shall be in buildings used for no other purpose, shall not exceed one story in height and shall be without basements, crawl spaces or other under-floor spaces.

Group H-2 and H-3 occupancies containing water-reactive materials shall be resistant to water penetration. Piping for conveying liquids shall not be over or through areas containing water reactives, unless isolated by approved liquid-tight construction.

Exception: Fire protection piping.

415.5.1 Floors in storage rooms. Floors in storage areas for organic peroxides, oxidizers, pyrophoric materials, unstable (reactive) materials and water-reactive solids and liquids shall be of liquid-tight, noncombustible construction.

415.5.2 Waterproof room. Rooms or areas used for the storage of water-reactive solids and liquids shall be constructed in a manner which resists the penetration of water through the use of waterproof materials. Piping carrying water for other than approved automatic fire sprinkler systems shall not be within such rooms or areas.

415.6 Smoke and heat venting. Smoke and heat vents complying with Section 910 shall be installed in the following locations:

1. In Group H-1, H-2 or H-3, any of which are over 15,000 square feet (1394 m²) in single floor area.
2. In areas of buildings in Group H used for storing Class 2, 3 and 4 liquid and solid oxidizers; Class 1 and unclassified

detonable organic peroxides; Class 3 and 4 unstable (reactive) materials; or Class 2 or 3 water-reactive materials as required for a Class V hazard classification.

415.7 Group H-2. Occupancies in Group H-2 shall be constructed in accordance with Sections 415.7.1 through 415.7.4 and the *International Fire Code*.

415.7.1 Combustible dusts, grain processing and storage. The provisions of Sections 415.7.1.1 through 415.7.1.5 shall apply to buildings in which materials that produce combustible dusts are stored or handled. Buildings which store or handle combustible dusts shall comply with the applicable provisions of NFPA 61, NFPA 65, NFPA 120, NFPA 651, NFPA 654, NFPA 655, NFPA 664 and NFPA 8503, and the *International Fire Code*.

415.7.1.1 Type of construction and height exceptions. Buildings shall be constructed in compliance with the height and area limitations of Table 503 for Group H-2; except that where erected of Type I or II construction, the heights and areas of grain elevators and similar structures shall be unlimited, and where of Type IV construction, the maximum height shall be 65 feet (19 812 mm) and except further that, in isolated areas, the maximum height of Type IV structures shall be increased to 85 feet (25 908 mm).

415.7.1.2 Grinding rooms. Every room or space occupied for grinding or other operations that produce combustible dusts shall be enclosed with fire barriers and horizontal assemblies or both that have not less than a 2-hour fire-resistance rating where the area is not more than 3,000 square feet (279 m²), and not less than a 4-hour fire-resistance rating where the area is greater than 3,000 square feet (279 m²).

415.7.1.3 Conveyors. Conveyors, chutes, piping and similar equipment passing through the enclosures of rooms or spaces shall be constructed dirt tight and vapor tight, and be of approved noncombustible materials complying with Chapter 30.

415.7.1.4 Explosion control. Explosion control shall be provided as specified in the *International Fire Code*, or spaces shall be equipped with the equivalent mechanical ventilation complying with the *International Mechanical Code*.

415.7.1.5 Grain elevators. Grain elevators, malt houses and buildings for similar occupancies shall not be located within 30 feet (9144 mm) of interior lot lines or structures on the same lot, except where erected along a railroad right-of-way.

415.7.1.6 Coal pockets. Coal pockets located less than 30 feet (9144 mm) from interior lot lines or from structures on the same lot shall be constructed of not less than Type IB construction. Where more than 30 feet (9144 mm) from interior lot lines, or where erected along a railroad right-of-way, the minimum type of construction of such structures not more than 65 feet (19 812 mm) in height shall be Type IV.

415.7.2 Flammable and combustible liquids. The storage, handling, processing and transporting of flammable and combustible liquids shall be in accordance with the *International Mechanical Code* and the *International Fire Code*.

415.7.2.1 Mixed occupancies. Where the storage tank area is located in a building of two or more occupancies, and the quantity of liquid exceeds the maximum allowable quantity for one control area, the use shall be completely separated from adjacent fire areas in accordance with the requirements of Section 302.3.3.

415.7.2.1.1 Height exception. Where storage tanks are located within only a single-story building, the height limitation of Section 504 shall not apply for Group H.

415.7.2.2 Tank protection. Storage tanks shall be noncombustible and protected from physical damage. A fire barrier wall or horizontal assemblies or both around the storage tank(s) shall be permitted as the method of protection from physical damage.

415.7.2.3 Tanks. Storage tanks shall be approved tanks conforming to the requirements of the *International Fire Code*.

415.7.2.4 Suppression. Group H shall be equipped throughout with an approved automatic sprinkler system, installed in accordance with Section 903.

415.7.2.5 Leakage containment. A liquid-tight containment area compatible with the stored liquid shall be provided. The method of spill control, drainage control and secondary containment shall be in accordance with the *International Fire Code*.

Exception: Rooms where only double-wall storage tanks conforming to Section 415.7.2.3 are used to

store Class I, II and IIIA flammable and combustible liquids shall not be required to have a leakage containment area.

415.7.2.6 Leakage alarm. An approved automatic alarm shall be provided to indicate a leak in a storage tank and room. The alarm shall sound an audible signal, 15 dBA above the ambient sound level, at every point of entry into the room in which the leaking storage tank is located. An approved sign shall be posted on every entry door to the tank storage room indicating the potential hazard of the interior room environment, or the sign shall state: WARNING, WHEN ALARM SOUNDS, THE ENVIRONMENT WITHIN THE ROOM MAY BE HAZARDOUS. The leakage alarm shall also be supervised in accordance with Chapter 9 to transmit a trouble signal.

415.7.2.7 Tank vent. Storage tank vents shall terminate to the outdoor air in accordance with the *International Fire Code*.

415.7.2.8 Room ventilation. Storage tank areas storing Class I, II or IIIA liquids shall be provided with mechanical ventilation. The mechanical ventilation system shall be in accordance with the *International Mechanical Code* and the *International Fire Code*.

415.7.2.9 Explosion venting. Where Class I liquids are being stored, explosion venting shall be provided in accordance with the *International Fire Code*.

415.7.2.10 Tank openings other than vents. Tank openings other than vents from tanks inside buildings shall be designed to ensure that liquids or vapor concentrations are not released inside the building.

415.7.3 Liquefied petroleum gas distribution facilities. The design and construction of propane, butane, propylene, butylene and other liquefied petroleum gas distribution facilities shall conform to the applicable provisions of Sections 415.7.3.1 through 415.7.3.5.2. The storage and handling of liquefied petroleum gas systems shall conform to the *International Fire Code*. The design and installation of piping, equipment and systems that utilize liquefied petroleum gas shall be in accordance with the *International Fuel Gas Code*. Liquefied petroleum gas distribution facilities shall be ventilated in accordance with the *International Mechanical Code* and Section 415.7.3.1.

415.7.3.1 Air movement. Liquefied petroleum gas distribution facilities shall be provided with air inlets and outlets arranged so that air movement across the floor of the facility will be uniform. The total area of both inlet and outlet openings shall be at least 1 square inch (645 mm²) for each 1 square foot (0.093 m²) of floor area. The bottom of such openings shall not be more than 6 inches (152 mm) above the floor.

415.7.3.2 Construction. Liquefied petroleum gas distribution facilities shall be constructed in accordance with Section 415.7.3.3 for separate buildings, Section 415.7.3.4 for attached buildings or Section 415.7.3.5 for rooms within buildings.

415.7.3.3 Separate buildings. Where located in separate buildings, liquefied petroleum gas distribution facilities shall be occupied exclusively for that purpose or for other purposes having similar hazards. Such buildings shall be limited to one story in height and shall conform to Sections 415.7.3.3.1 through 415.7.3.3.3.

415.7.3.3.1 Floors. The floor shall not be located below ground level and any spaces beneath the floor shall be solidly filled or shall be unenclosed.

415.7.3.3.2 Materials. Walls, floors, ceilings, columns and roofs shall be constructed of noncombustible materials.

415.7.3.3.3 Explosion venting. Explosion venting shall be provided in accordance with the *International Fire Code*.

415.7.3.4 Attached buildings. Where liquefied petroleum gas distribution facilities are located in an attached structure, the attached perimeter shall not exceed 50 percent of the perimeter of the space enclosed and the facility shall comply with Sections 415.7.3.3 and 415.7.3.4.1. Where the attached perimeter exceeds 50 percent, such facilities shall comply with Section 415.7.3.5.

415.7.3.4.1 Fire separation assemblies. Separation of the attached structures shall be provided by fire barrier walls and horizontal assemblies, or both, having a fire-resistance rating of not less than 1 hour and shall not have openings. Fire barrier walls and horizontal assemblies, or both, between attached structures occupied only for the storage of LP-gas are permitted to have fire doors that comply with Section 714. Such fire barrier walls and horizontal assemblies, or both, shall be designed to withstand a static pressure of at least 100 pounds per square foot (psf) (4788 Pa), except where the building to which the structure is attached is occupied by operations or processes having a similar hazard.

415.7.3.5 Rooms within buildings. Where liquefied petroleum gas distribution facilities are located in rooms within buildings, such rooms shall be located in the first story and shall have at least one exterior wall with sufficient exposed area to provide explosion venting as required in the *International Fire Code*. The building in which the room is located shall not have a basement or unventilated crawl space and the room shall comply with Sections 415.7.3.5.1 and 415.7.3.5.2.

415.7.3.5.1 Materials. Walls, floors, ceilings and roofs of such rooms shall be constructed of approved noncombustible materials.

415.7.3.5.2 Common construction. Walls and floor/ceiling assemblies common to the room and to the building within which the room is located shall have a fire barrier wall and horizontal assembly or both of not less than 1 hour and without openings. Common walls for rooms occupied only for storage of LP-gas are permitted to have opening protectives complying with Section 714. Such walls and ceiling

shall be designed to withstand a static pressure of at least 100 psf (4788 Pa).

Exception: Where the building, within which the room is located, is occupied by operations or processes having a similar hazard.

415.7.4 Dry cleaning plants. The construction and installation of dry cleaning plants shall be in accordance with the requirements of this code, the *International Mechanical Code*, the *International Plumbing Code* and NFPA 32. Dry cleaning solvents and systems shall be classified in accordance with the *International Fire Code*.

415.8 Groups H-3 and H-4. Groups H-3 and H-4 shall be constructed in accordance with the applicable provisions of this code and the *International Fire Code*.

415.8.1 Gas rooms. When gas rooms are provided, such rooms shall be separated from other areas by not less than a 1-hour fire barrier.

415.8.2 Floors in storage rooms. Floors in storage areas for corrosive liquids and highly toxic or toxic materials shall be of liquid-tight, noncombustible construction.

415.8.3 Separation—highly toxic solids and liquids. Highly toxic solids and liquids not stored in approved hazardous materials storage cabinets shall be isolated from other hazardous materials storage by construction having a 1-hour fire-resistance rating.

415.9 Group H-5.

415.9.1 General. In addition to the requirements set forth elsewhere in this code, Group H-5 shall comply with the provisions of Section 415.9 and the *International Fire Code*.

415.9.2 Fabrication areas.

415.9.2.1 Hazardous materials in fabrication areas.

415.9.2.1.1 Aggregate quantities. The aggregate quantities of hazardous materials stored and used in a single fabrication area shall not exceed the quantities set forth in Table 415.9.2.1.1.

Exception: The quantity limitations for any hazard category in Table 415.9.2.1.1 shall not apply where the fabrication area contains quantities of hazardous materials not exceeding the maximum allowable quantities per control area established by Tables 307.7(1) and 307.7(2).

415.9.2.1.2 Hazardous production materials. The maximum quantities of hazardous production materials stored in a single fabrication area shall not exceed the maximum allowable quantities per control area established by Tables 307.7(1) and 307.7(2).

415.9.2.2 Separation. Fabrication areas, whose sizes are limited by the quantity of hazardous materials allowed by Table 415.9.2.1.1 shall be separated from each other, from exit access corridors, and from other parts of the building by not less than 1-hour fire barriers.

Exceptions:

1. Doors within such fire barrier walls, including doors to corridors, shall be only self-closing fire

TABLE 415.9.2.1.1
QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5^a

HAZARD CATEGORY		SOLIDS (pounds per square feet)	LIQUIDS (gallons per square feet)	GAS (feet ³ @ NTP/square feet)
PHYSICAL-HAZARD MATERIALS				
Combustible dust		Note b	Not Applicable	Not Applicable
Combustible fiber	Loose Baled	Note b Note b	Not Applicable	Not Applicable
Combustible liquid	II IIIA IIIB	Not Applicable	0.01 0.02 Not Limited	Not Applicable
Combination Class I, II and IIIA			0.04	
Cryogenic gas	Flammable Oxidizing	Not Applicable	Not Applicable	Note c 1.25
Explosives		Note b	Note b	Note b
Flammable gas	Gaseous Liquefied	Not Applicable	Not Applicable	Note b Note c
Flammable liquid	IA IB IC	Not Applicable	0.0025 0.025 0.025	Not Applicable
Combination Class IA, IB and IC			0.025	
Combination Class I, II and IIIA			0.04	
Flammable solid		0.001	Not Applicable	Not Applicable
Organic peroxide				
Unclassified detonable		Note b		
Class I		Note b		
Class II		0.025	Not Applicable	Not Applicable
Class III		0.1		
Class IV		Not Limited		
Class V		Not limited		
Oxidizing gas	Gaseous Liquefied			1.25 1.25
Combination of gaseous and liquefied		Not Applicable	Not Applicable	1.25
Oxidizer	Class 4 Class 3 Class 2 Class 1	Note b 0.003 0.003 0.003	Note b 0.003 0.003 0.003	Not Applicable
Combination	Class 1, 2, 3	0.003	0.003	
Pyrophoric material		Note b	0.00125	Notes c and d
Unstable reactive	Class 4 Class 3 Class 2 Class 1	Note b 0.025 0.1 Not Limited	Note b 0.0025 0.01 Not Limited	Note b Note b Note b Not Limited
Water reactive	Class 3 Class 2 Class 1	Note b 0.25 Not Limited	0.00125 0.025 Not Limited	Not Applicable
HEALTH-HAZARD MATERIALS				
Corrosives		Not Limited	Not Limited	Not Limited
Highly toxic		Not Limited	Not Limited	Note c
Toxics		Not Limited	Not Limited	Note c

For SI: 1 pound per square foot = 4.882 kg/m², 1 gallon per square foot = 0.025 L/m², 1 cubic foot @ NTP/square foot = 0.305 m³ @ NTP/m²,
1 cubic foot = 0.02832 m³.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication shall not exceed the maximum allowable quantities per control area in Tables 307.7(1) and 307.7(2).

c. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed 9,000 cubic feet at NTP.

d. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Tables 307.7(1) and 415.3.2.

assemblies having a fire-protection rating of not less than $\frac{3}{4}$ hour.

2. Windows between fabrication areas and exit access corridors are permitted to be fixed glazing listed and labeled for a fire-protection rating of at least $\frac{3}{4}$ hour in accordance with Section 714.

415.9.2.3 Location of occupied levels. Occupied levels of fabrication areas shall be located at or above the first story.

415.9.2.4 Floors. Except for surfacing, floors within fabrication areas shall be of noncombustible construction.

Openings through floors of fabrication areas are permitted to be unprotected where the interconnected levels are used solely for mechanical equipment directly related to such fabrication areas. See also Section 415.9.2.5.

Floors forming a part of an occupancy separation shall be liquid tight.

415.9.2.5 Shafts and openings through floors. Elevator shafts, vent shafts and other openings through floors shall be enclosed and the enclosure shall be as specified in Section 707. Mechanical, duct and piping penetrations within a fabrication area shall not extend through more than two floors. The annular space around penetrations for cables, cable trays, tubing, piping, conduit or ducts shall be sealed at the floor level to restrict the movement of air. The fabrication area, including the areas through which the ductwork and piping extend, shall be considered a single conditioned environment.

415.9.2.6 Ventilation. Mechanical exhaust ventilation shall be provided throughout the fabrication area at the rate of not less than 1 cubic foot per minute per square foot (0.044 L/S/m^2) of floor area. The exhaust air duct system of one fabrication area shall not connect to another duct system outside that fabrication area within the building.

A ventilation system shall be provided to capture and exhaust fumes and vapors at workstations.

Two or more operations at a workstation shall not be connected to the same exhaust system where either one or the combination of the substances removed could constitute a fire, explosion or hazardous chemical reaction within the exhaust duct system.

Exhaust ducts penetrating occupancy separations shall be contained in a shaft of equivalent fire-resistance construction. Exhaust ducts shall not penetrate fire walls.

Fire dampers shall not be installed in exhaust ducts.

415.9.2.7 Transporting hazardous production materials to fabrication areas. Hazardous production materials shall be transported to fabrication areas through enclosed piping or tubing systems that comply with Section 415.9.6.1, through service corridors complying with Section 415.9.4, or in exit access corridors as permitted in the exception to Section 415.9.3. The handling or transporting of hazardous production materials within service corridors shall comply with the *International Fire Code*.

415.9.2.8 Electrical.

415.9.2.8.1 General. Electrical equipment and devices within the fabrication area shall comply with the *ICC Electrical Code*. The requirements for hazardous locations need not be applied where the average air change is at least four times that set forth in Section 415.9.2.6 and where the number of air changes at any location is not less than three times that required by Section 415.9.2.6. The use of recirculated air shall be permitted.

415.9.2.8.2 Workstations. Workstations shall not be energized without adequate exhaust ventilation. See Section 415.9.2.6 for workstation exhaust ventilation requirements.

415.9.3 Exit access corridors. Exit access corridors shall comply with Chapter 10 and shall be separated from fabrication areas as specified in Section 415.9.2.2. Exit access corridors shall not contain HPM and shall not be used for transporting HPM except through closed piping systems as provided in Section 415.9.6.3.

Exception: Where existing fabrication areas are altered or modified, HPM is allowed to be transported in existing exit access corridors, subject to the following conditions:

1. Corridors. Exit access corridors adjacent to the fabrication area where the alteration work is to be done shall comply with Section 1004.3.2 for a length determined as follows:
 - 1.1. The length of the common wall of the corridor and the fabrication area; and
 - 1.2. For the distance along the exit access corridor to the point of entry of HPM into the exit access corridor serving that fabrication area.
2. Emergency alarm system. There shall be an emergency telephone system, a local manual alarm station or other approved alarm-initiating device within exit access corridors at not more than 150-foot (45 720 mm) intervals and at each exit and exit access doorway. The signal shall be relayed to an approved central, proprietary or remote station service or the emergency control station and shall also initiate a local audible alarm.
3. Pass-throughs. Self-closing doors having a fire-protection rating of not less than 1 hour shall separate pass-throughs from existing exit access corridors. Pass-throughs shall be constructed as required for the exit access corridors. Pass-throughs shall be protected by an approved automatic fire-extinguishing system.

415.9.4 Service corridors.

415.9.4.1 Occupancy. Service corridors shall be classified as Group H-5.

415.9.4.2 Use conditions. Service corridors shall be separated from exit access corridors as required by Section 415.9.2.2. Service corridors shall not be used as a required exit access corridor.

415.9.4.3 Mechanical ventilation. Service corridors shall be mechanically ventilated as required by Section 415.9.2.6 or at not less than six air changes per hour, whichever is greater.

415.9.4.4 Exiting. The maximum distance of travel from any point in a service corridor to an exterior exit door, egress corridor, horizontal exit, exit passageway, enclosed stairway or door into a fabrication area shall not exceed 75 feet (22 860 mm). Dead ends shall not exceed 4 feet (1219 mm) in length. There shall be not less than two exits, and not more than one-half of the required exits shall be into the fabrication area. Doors from service corridors shall swing in the direction of exit travel and shall be self-closing.

415.9.4.5 Minimum width. The minimum clear width of a service corridor shall be 5 feet (1524 mm), or 33 inches (838 mm) wider than the widest cart or truck used in the corridor, whichever is greater.

415.9.4.6 Emergency alarm system. Emergency alarm systems shall be provided in accordance with this section and Sections 414.7.1 and 414.7.2. The maximum allowable quantity per control area provisions shall not apply to emergency alarm systems required for HPM.

415.9.4.6.1 Service corridors. An emergency alarm system shall be provided in service corridors, with at least one alarm device in the service corridor.

415.9.4.6.2 Exit access corridors and exit enclosures. Emergency alarms for exit access corridors and exit enclosures shall comply with Section 414.7.2.

415.9.4.6.3 Liquid storage rooms, HPM rooms and gas rooms. Emergency alarms for liquid storage rooms, HPM rooms and gas rooms shall comply with Section 414.7.1.

415.9.4.6.4 Alarm-initiating devices. An approved emergency telephone system, local alarm manual pull stations, or other approved alarm-initiating devices are allowed to be used as emergency alarm-initiating devices.

415.9.4.6.5 Alarm signals. Activation of the emergency alarm system shall sound a local alarm and transmit a signal to the emergency control station.

415.9.5 Storage of hazardous production materials.

415.9.5.1 General. Storage of HPM in fabrication areas shall be within approved or listed storage cabinets or gas cabinets, or within a workstation. The storage of hazardous production in quantities greater than those listed in Tables 307.7(1) or 307.7(2) shall be in liquid storage rooms, HPM rooms or gas rooms as appropriate for the materials stored. The storage of other hazardous materials shall be in accordance with other applicable provisions of this code and the *International Fire Code*.

415.9.5.2 Construction.

415.9.5.2.1 HPM rooms and gas rooms. HPM rooms and gas rooms shall be separated from other ar-

reas by not less than a 2-hour fire barrier where the area is 300 square feet (27.9 m²) or more and not less than a 1-hour fire barrier where the area is less than 300 square feet (27.9 m²).

415.9.5.2.2 Liquid storage rooms. Liquid storage rooms shall be constructed in accordance with the following requirements:

1. Rooms in excess of 500 square feet (46.5 m²) shall have at least one exterior door approved for fire department access.
2. Rooms shall be separated from other areas by fire barriers having a fire-resistance rating of not less than 1-hour for rooms up to 150 square feet (13.9 m²) in area and not less than 2 hours where the room is more than 150 square feet (13.9 m²) in area.
3. Shelving, racks and wainscoting in such areas shall be of noncombustible construction or wood of not less than 1-inch (25 mm) nominal thickness.
4. Rooms used for the storage of Class I flammable liquids shall not be located in a basement.

415.9.5.2.3 Floors. Except for surfacing, floors of HPM rooms and liquid storage rooms shall be of noncombustible liquid-tight construction. Raised grating over floors shall be of noncombustible materials.

415.9.5.3 Location. Where HPM rooms, liquid storage rooms and gas rooms are provided, they shall have at least one exterior wall and such wall shall be not less than 30 feet (9144 mm) from property lines, including property lines adjacent to public ways.

415.9.5.4 Explosion control. Explosion control shall be provided where required by Section 414.5.1.

415.9.5.5 Exits. Where two exits are required from HPM rooms, liquid storage rooms and gas rooms, one shall be directly to the outside of the building.

415.9.5.6 Doors. Doors in a fire barrier wall, including doors to corridors, shall be self-closing fire assemblies having a fire-protection rating of not less than 3/4 hour.

415.9.5.7 Ventilation. Mechanical exhaust ventilation shall be provided in liquid storage rooms, HPM rooms and gas rooms at the rate of not less than 1 cubic foot per minute per square foot (0.044 L/S/m²) of floor area or six air changes per hour, whichever is greater, for categories of material.

Exhaust ventilation for gas rooms shall be designed to operate at a negative pressure in relation to the surrounding areas and direct the exhaust ventilation to an exhaust system.

415.9.5.8 Emergency alarm system. An approved emergency alarm system shall be provided for HPM rooms, liquid storage rooms and gas rooms.

Emergency alarm-initiating devices shall be installed outside of each interior exit door of such rooms.

Activation of an emergency alarm-initiating device shall sound a local alarm and transmit a signal to the emergency control station.

An approved emergency telephone system, local alarm manual pull stations or other approved alarm-initiating devices are allowed to be used as emergency alarm-initiating devices.

415.9.5.9 Separation of HPM. HPM stored in a liquid storage room, HPM room or gas room shall be separated from each other in the room in accordance with Table 415.9.5.9. Noncombustible partition separation shall extend not less than 18 inches (457 mm) above and to the sides of the stored material. Where separate rooms are required, the walls of such rooms are not required to have a fire-resistance rating. One-hour fire barrier construction shall be provided where 1-hour separation is required.

415.9.6 Piping and tubing.

415.9.6.1 General. Hazardous production materials piping and tubing shall comply with this section and ANSI B31.3.

415.9.6.2 Supply piping and tubing.

415.9.6.2.1 HPM having a health-hazard ranking of 3 or 4. Systems supplying gaseous HPM having a health-hazard ranking of 3 or 4 shall be welded throughout, except for connections, valves and fittings, to the systems that are within a ventilated enclosure.

415.9.6.2.2 Location in service corridors. Hazardous production materials supply piping or tubing in service corridors shall be exposed to view.

415.9.6.2.3 Excess flow control. Where HPM gases or liquids are carried in pressurized piping above 15 pounds per square inch gauge (psig) (103.4 kPa), excess flow control shall be provided. Where the piping originates from within a liquid storage room, HPM room or gas room, the excess flow control shall be located within the liquid storage room, HPM room or gas room. Where the piping originates from a bulk source, the excess flow control shall be located as close to the bulk source as practical.

415.9.6.3 Installations in exit access corridors and above other occupancies. The installation of hazardous production material piping and tubing within the space defined by the walls of exit access corridors and the floor or roof above or in concealed spaces above other occupancies shall be in accordance with Section 415.9.6.2 and the following conditions:

1. Automatic sprinklers shall be installed within the space unless the space is less than 6 inches (152 mm) in the least dimension.
2. Ventilation not less than six air changes per hour shall be provided. The space shall not be used to convey air from any other area.
3. Where the piping or tubing is used to transport HPM liquids, a receptor shall be installed below such piping or tubing. The receptor shall be designed to collect any discharge or leakage and drain it to an approved location. The 1-hour enclosure shall not be used as part of the receptor.
4. HPM supply piping and tubing and HPM nonmetallic waste lines shall be separated from the exit access corridor and from occupancies other than Group H-5 by construction as required for walls or

TABLE 415.9.5.9
MINIMUM SEPARATION OF HPM^{a,b}

MATERIALS	HIGHLY TOXIC	TOXIC	ACID	BASE	FLAMMABLE	OXIDIZER	WATER REACTIVE	PYROPHORIC	UNSTABLE REACTIVE	ORGANIC PEROXIDE
Highly toxic	—	NR	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.	1 hr.
Toxic	NR	—	S	S	S	S	S	S	S	S
Acid	1 hr.	S	—	S	S ^c	S	S	S ^c	S	S
Base	1 hr.	S	S	—	S	S	S	S	S	S
Flammable	1 hr.	S	S ^c	S	—	S	R	S	S	S
Oxidizers	1 hr.	S	S	S	S	—	S	S ^c	S	S
Water reactives	1 hr.	S	S	S	R	S	—	S	S	S
Pyrophoric	1 hr.	S	S ^c	S	S	S ^c	S	—	S	S
Unstable reactives	1 hr.	S	S	S	S	S	S	S	—	S
Organic peroxides	1 hr.	S	S	S	S	S	S	S	S	—

For SI: 1 foot = 304.8 mm.

a. NR = Not Required.

S = Separation by a partial noncombustible partition.

R = Separate rooms.

1 hr. = 1-hour fire-barrier construction.

b. Hazardous production material gas shall be separated from HPM liquids and solids by a 1-hour fire-barrier or shall be kept in approved gas cabinets. Hazardous production material gases shall be separated from gases in other HPM categories shown in Table 415.9.5.9, or shall be kept in approved gas cabinets.

c. Separation by not less than 20 feet is allowed in lieu of a noncombustible partition.

partitions that have a fire-protection rating of not less than 1 hour. Where gypsum wallboard is used, joints on the piping side of the enclosure are not required to be taped, provided the joints occur over framing members. Access openings into the enclosure shall be protected by approved fire-resistance-rated assemblies.

5. Readily accessible manual or automatic remotely activated fail-safe emergency shutoff valves shall be installed on piping and tubing other than waste lines at the following locations:

- 5.1. At branch connections into the fabrication area.

- 5.2. At entries into exit access corridors.

Exception: Transverse crossings of the corridors by supply piping that is enclosed within a ferrous pipe or tube for the width of corridor need not comply with Items 1 through 5.

415.9.6.4 Identification. Piping, tubing and HPM waste lines shall be identified in accordance with ANSI A13.1 to indicate the material being transported.

415.9.7 Continuous gas detection systems. A continuous gas detection system shall be provided for HPM gases when the physiological warning properties of the gas are at a higher level than the accepted permissible exposure limit (PEL) for the gas and for flammable gases in accordance with this section.

415.9.7.1 Where required. A continuous gas detection system shall be provided in the areas identified in Sections 415.9.7.1.1 through 415.9.7.1.4.

415.9.7.1.1 Fabrication areas. A continuous gas detection system shall be provided in fabrication areas when gas is used in the fabrication area.

415.9.7.1.2 HPM rooms. A continuous gas detection system shall be provided in HPM rooms when gas is used in the room.

415.9.7.1.3 Gas cabinets, exhausted enclosures and gas rooms. A continuous gas detection system shall be provided in gas cabinets and exhausted enclosures. A continuous gas detection system shall be provided in gas rooms when gases are not located in gas cabinets or exhausted enclosures.

415.9.7.1.4 Exit access corridors. When gases are transported in piping placed within the space defined by the walls of an exit access corridor and the floor or roof above the exit access corridor, a continuous gas-detection system shall be provided where piping is located and in the exit access corridor.

Exception: A continuous gas detection system is not required for occasional transverse crossings of the corridors by supply piping that is enclosed in a ferrous pipe or tube for the width of the corridor.

415.9.7.2 Gas detection system operation. The continuous gas detection system shall be capable of monitoring the room, area or equipment in which the gas is located at or below the permissible exposure limit (PEL) or ceiling

limit of the gas for which detection is provided. For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 20 percent of the lower explosive limit (LEL). Monitoring for highly toxic and toxic gases shall also comply with the requirements in the *International Fire Code* for highly toxic and toxic material.

415.9.7.2.1 Alarms. The gas detection system shall initiate a local alarm and transmit a signal to the emergency control station when a short-term hazard condition is detected. The alarm shall be both visual and audible and shall provide warning both inside and outside the area where the gas is detected. The audible alarm shall be distinct from all other alarms.

415.9.7.2.2 Shut off of gas supply. The gas detection system shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for which gas is detected when a short-term hazard condition is detected. Automatic closure of shutoff valves shall comply with the following:

Exception: Where the gas-detection sampling point initiating the gas detection system alarm is at the use location or within a gas valve enclosure of a branch line downstream of a piping distribution manifold, the shutoff valve for the branch line located in the piping distribution manifold enclosure shall automatically close.

1. Where the gas-detection sampling point initiating the gas detection system alarm is within a gas cabinet or exhausted enclosure, the shutoff valve in the gas cabinet or exhausted enclosure for the specific gas detected shall automatically close.
2. Where the gas-detection sampling point initiating the gas detection system alarm is within a room and compressed gas containers are not in gas cabinets or an exhausted enclosure, the shutoff valves on all gas lines for the specific gas detected shall automatically close.
3. Where the gas-detection sampling point initiating the gas detection system alarm is within a piping distribution manifold enclosure, the shutoff valve supplying the manifold for the compressed gas container of the specific gas detected shall automatically close.

415.9.8 Manual fire alarm system. An approved manual fire alarm system shall be provided throughout buildings containing Group H-5. Activation of the alarm system shall initiate a local alarm and transmit a signal to the emergency control station. The fire alarm system shall be designed and installed in accordance with Section 907.

415.9.9 Emergency control station. An emergency control station shall be provided on the premises at an approved location, outside of the fabrication area and shall be continu-

ously staffed by trained personnel. The emergency control station shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not necessarily be limited to, the following where such equipment or systems are required to be provided either in Section 415.9 or elsewhere in this code:

1. Automatic fire sprinkler system alarm and monitoring systems.
2. Manual fire alarm systems.
3. Emergency alarm systems.
4. Continuous gas detection systems.
5. Smoke detection systems.
6. Emergency power system.

415.9.10 Emergency power system. An emergency power system shall be provided in Group H-5 occupancies where required in Section 415.9.10.1. The emergency power system shall be designed to supply power automatically to required electrical systems when the normal electrical supply system is interrupted.

415.9.10.1 Where required. Emergency power shall be provided for electrically operated equipment and connected control circuits for the following systems:

1. HPM exhaust ventilation systems.
2. HPM gas cabinet ventilation systems.
3. HPM exhausted enclosure ventilation systems.
4. HPM gas room ventilation systems.
5. HPM gas detection systems.
6. Emergency alarm systems.
7. Manual fire alarm systems.
8. Automatic sprinkler system monitoring and alarm systems.
9. Electrically operated systems required elsewhere in this code applicable to the use, storage or handling of HPM.

415.9.10.2 Exhaust ventilation systems. Exhaust ventilation systems are allowed to be designed to operate at not less than one-half the normal fan speed on the emergency power system where it is demonstrated that the level of exhaust will maintain a safe atmosphere.

415.9.11 Fire sprinkler system protection in exhaust ducts for HPM.

415.9.11.1 General. Automatic fire sprinkler system protection shall be provided in exhaust ducts conveying vapors, fumes, mists or dusts generated from HPM in accordance with this section and the *International Mechanical Code*.

415.9.11.2 Metallic and noncombustible, nonmetallic exhaust ducts. Automatic fire sprinkler system protection shall be provided in metallic and noncombustible, nonmetallic exhaust ducts where all of the following conditions apply:

1. Where the largest cross-sectional diameter is equal to or greater than 10 inches (254 mm).
2. The ducts are within the building.
3. The ducts are conveying flammable vapors or fumes.

415.9.11.3 Combustible nonmetallic exhaust ducts.

Automatic fire sprinkler system protection shall be provided in combustible nonmetallic exhaust ducts where the largest cross-sectional diameter of the duct is equal to or greater than 10 inches (254 mm).

Exceptions:

1. Ducts listed or approved for applications without automatic fire sprinkler system protection.
2. Ducts not more than 12 feet (3658 mm) in length installed below ceiling level.

415.9.11.4 Automatic sprinkler locations. Sprinkler systems shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical ducts, sprinklers shall be installed at the top and at alternate floor levels.

[F] SECTION 416

APPLICATION OF FLAMMABLE FINISHES

416.1 General. The provisions of this section shall apply to the construction, installation and use of buildings and structures, or parts thereof, for the spraying of flammable paints, varnishes and lacquers or other flammable materials or mixtures or compounds used for painting, varnishing, staining or similar purposes. Such construction and equipment shall comply with NFPA 33 and 34.

416.2 Spray rooms. Spray rooms shall be enclosed with fire barrier walls and horizontal assemblies or both with not less than a 1-hour fire-resistance rating. Floors shall be water-proofed and drained in an approved manner.

416.2.1 Surfaces. The interior surfaces of spray rooms shall be smooth and shall be so constructed to permit the free passage of exhaust air from all parts of the interior and to facilitate washing and cleaning, and shall be so designed to confine residues within the room. Aluminum shall not be used.

416.3 Spraying spaces. Spraying spaces shall be ventilated with an exhaust system to prevent the accumulation of flammable mist or vapors in accordance with the *International Mechanical Code*. Where such spaces are not separately enclosed, noncombustible spray curtains shall be provided to restrict the spread of flammable vapors.

416.3.1 Surfaces. The interior surfaces of spraying spaces shall be smooth and continuous without edges, and shall be so constructed to permit the free passage of exhaust air from all parts of the interior and to facilitate washing and cleaning, and shall be so designed to confine residues within the spraying space. Aluminum shall not be used.

416.4 Fire protection. An automatic fire-extinguishing system shall be provided in all spray, dip and immersing spaces

and storage rooms, and shall be installed in accordance with Chapter 9.

[F] SECTION 417 DRYING ROOMS

417.1 General. A drying room or dry kiln installed within a building shall be constructed entirely of approved non-combustible materials or assemblies of such materials regulated by the approved rules or as required in the general and specific sections of Chapter 4 for special occupancies and where applicable to the general requirements of Chapter 28.

417.2 Piping clearance. Overhead heating pipes shall have a clearance of not less than 2 inches (51 mm) from combustible contents in the dryer.

417.3 Insulation. Where the operating temperature of the dryer is 175°F (79°C) or more, metal enclosures shall be insulated from adjacent combustible materials by not less than 12 inches (305 mm) of air space, or the metal walls shall be lined with 1/4 inch (6.35 mm) insulating mill board or other approved equivalent insulation.

417.4 Fire protection. Drying rooms designed for high-hazard materials and processes, including special occupancies as provided for in Chapter 4, shall be protected by an approved automatic fire-extinguishing system conforming to the provisions of Chapter 9.

[F] SECTION 418 ORGANIC COATINGS

418.1 Building features. Manufacturing of organic coatings shall be done only in buildings that do not have pits or basements.

418.2 Location. Organic coating manufacturing operations and operations incidental to or connected with organic coating manufacturing shall not be located in buildings having other occupancies.

418.3 Process mills. Mills operating with close clearances and that process flammable and heat-sensitive materials, such as nitrocellulose, shall be located in a detached building or in a noncombustible structure.

418.4 Tank storage. Storage areas for flammable and combustible liquid tanks inside of structures shall be located at or above grade and shall be separated from the processing area by 2-hour fire-resistance-rated construction.

418.5 Nitrocellulose storage. Nitrocellulose storage shall be located on a detached pad or in a separate structure or a room enclosed with 2-hour fire-resistance-rated construction.

418.6 Finished products. Storage rooms for finished products that are flammable or combustible liquids shall be separated from the processing area by a wall having a fire-resistance rating of at least 2 hours, and openings shall be protected with approved fire doors.

CHAPTER 5

GENERAL BUILDING HEIGHTS AND AREAS

SECTION 501 GENERAL

501.1 Scope. The provisions of this chapter control the height and area of structures hereafter erected and additions to existing structures.

501.2 Premises identification. Approved numbers or addresses shall be provided for new buildings in such a position as to be clearly visible and legible from the street or roadway fronting the property. Letters or numbers shall be a minimum 3 inches (76 mm) in height and stroke of minimum 0.5 inch (12.7 mm) of a contrasting color to the background itself.

SECTIONS 502 DEFINITIONS

502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

AREA, BUILDING. The area included within surrounding exterior walls (or exterior walls and fire walls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the building area if such areas are included within the horizontal projection of the roof or floor above.

BASEMENT. That portion of a building that is partly or completely below grade plane (See "Story above grade plane"). A basement shall be considered as a story above grade plane where the finished surface of the floor above the basement is:

1. More than 6 feet (1829 mm) above grade plane;
2. More than 6 feet (1829 mm) above the finished ground level for more than 50 percent of the total building perimeter; or
3. More than 12 feet (3658 mm) above the finished ground level at any point.

GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

HEIGHT, BUILDING. The vertical distance from grade plane to the average height of the highest roof surface.

HEIGHT, STORY. The vertical distance from top to top of two successive finished floor surfaces; and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

INDUSTRIAL EQUIPMENT PLATFORM. An unoccupied, elevated platform in an industrial occupancy used exclusively for mechanical systems and/or industrial process equipment, including the associated elevated walkways, stairs and ladders necessary to access the platform (see Section 505.5).

MEZZANINE. An intermediate level or levels between the floor and ceiling of any story with an aggregate floor area of not more than one-third of the area of the room or space in which the level or levels are located (see Section 505).

STORY. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above (also see "Basement" and "Mezzanine").

SECTION 503 GENERAL HEIGHT AND AREA LIMITATIONS

503.1 General. The height and area for buildings of different construction types shall be governed by the intended use of the building and shall not exceed the limits in Table 503 except as modified hereafter. Each part of a building included within the exterior walls or the exterior walls and fire walls where provided shall be permitted to be a separate building.

503.1.1 Basements. Basements need not be included in the total allowable area provided they do not exceed the area permitted for a one-story building.

503.1.2 Special industrial occupancies. Buildings and structures designed to house low-hazard industrial processes that require large areas and unusual heights to accommodate craneways or special machinery and equipment, including among others, rolling mills; structural metal fabrication shops and foundries; or the production and distribution of electric, gas or steam power, shall be exempt from the height and area limitations of Table 503.

503.1.3 Buildings on same lot. Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the height of each building and the aggregate area of buildings are within the limitations of Table 503 as modified by Sections 504 and 506. The provisions of this code applicable to the aggregate building shall be applicable to each building.

503.1.4 Type I construction. Buildings of Type I construction permitted to be of unlimited tabular heights and areas are not subject to the special requirements that allow unlimited area buildings in Section 507 or unlimited height in Sections 503.1.2 and 504.3 or increased height and areas for other types of construction.

503.2 Party walls. Any wall located on a property line between adjacent buildings which is used or adapted for joint service between the two buildings, shall be constructed as a fire wall in

accordance with Section 705, without openings and shall create separate buildings.

503.3 Area determination. The maximum area of a building shall be determined by multiplying the allowable area per floor (A_a), as determined in Section 506.1 by the number of stories up to a maximum of three stories.

Exception: Unlimited area buildings in accordance with Section 507.

SECTION 504 HEIGHT MODIFICATIONS

504.1 General. The heights permitted by Table 503 shall only be increased in accordance with this section.

Exception: The height of one-story aircraft hangars, aircraft paint hangars and buildings used for the manufacturing of aircraft shall not be limited if the building is provided with an automatic fire-extinguishing system in accordance with Chapter 9 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

504.2 Automatic sprinkler increase. For buildings protected throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story. For Group R buildings protected throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.2, the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one story, but shall not exceed four stories or 60 feet (18 288 mm), respectively. These increases are permitted in addition to the area increase.

Exceptions:

1. Group I-2 of Type IIB, III, IV or V construction.
2. Group H-1, H-2, H-3 or H-5.

504.3 Roof structures. Towers, spires, steeples and other roof structures shall be constructed of materials consistent with the required type of construction of the building except where other construction is permitted by Section 1509.2.1. Such structures shall not be used for habitation or storage. The structures shall be unlimited in height if of noncombustible materials and shall not extend more than 20 feet (6096 mm) above the allowable height if of combustible materials. See Chapter 15 for additional requirements.

SECTION 505 MEZZANINES

505.1 General. A mezzanine or mezzanines in compliance with this section shall be considered a portion of the floor below. Such mezzanines shall not contribute to the building area as regulated by Section 503.1. Such mezzanines shall not contribute to the number of stories as regulated by Section 503.1. The area of the mezzanine shall be included in determining the

fire area defined in Section 702. The clear height above and below the mezzanine floor construction shall not be less than 7 feet (2134 mm).

505.2 Area limitation. The aggregate area of a mezzanine or mezzanines within a room shall not exceed one-third of the area of that room or space in which they are located. The enclosed portions of rooms shall not be included in a determination of the size of the room in which the mezzanine is located. In determining the allowable mezzanine area, the area of the mezzanine shall not be included in the area of the room.

Exception: The aggregate area of mezzanines in buildings and structures of Type I or II construction for special industrial occupancies in accordance with Section 503.1.2 shall not exceed two-thirds of the area of the room.

505.3 Egress. Each occupant of a mezzanine shall have access to at least two independent means of egress where the common path of egress travel exceeds the limitations of Section 1004.2.5. Where a stairway provides a means of exit access from a mezzanine, the maximum travel distance includes the distance traveled on the stairway measured in the plane of the tread nosing.

Exception: A single means of egress shall be permitted in accordance with Section 1004.2.1.

505.4 Openness. A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches (1067 mm) high, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the occupant load of the aggregate area of the enclosed space does not exceed 10.
2. A mezzanine having two or more means of egress is not required to be open to the room in which the mezzanine is located, if at least one of the means of egress provides direct access to an exit from the mezzanine level.
3. Mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that the aggregate floor area of the enclosed space does not exceed 10 percent of the mezzanine area.
4. In industrial facilities, mezzanines used for control equipment are permitted to be glazed on all sides.
5. In Group F occupancies of unlimited area, meeting the requirements of Section 507.2 or Section 507.3, mezzanines or portions thereof are not required to be open to the room in which the mezzanines are located, provided that an approved fire alarm system is installed throughout the entire building or structure and notification appliances are installed throughout the mezzanines in accordance with the provisions of NFPA 72. In addition, the fire alarm system shall be initiated by automatic sprinkler water flow and manual activation.

TABLE 503
ALLOWABLE HEIGHT AND BUILDING AREAS
 Height limitations shown as stories and feet above grade plane.
 Area limitations as determined by the definition of "Area, building," per floor.

GROUP	HGT(feet) Hgt(S)	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
		UL	160	65	55	65	55	65	50	40
A-1	S A	UL UL	5 UL	3 15,500	2 8,500	3 14,000	2 8,500	3 15,000	2 11,500	1 5,500
A-2	S A	UL UL	11 UL	3 15,500	2 9,500	3 14,000	2 9,500	3 15,000	2 11,500	1 6,000
A-3	S A	UL UL	11 UL	3 15,500	2 9,500	3 14,000	2 9,500	3 15,000	2 11,500	1 6,000
A-4	S A	UL UL	11 UL	3 15,500	2 9,500	3 14,000	2 9,500	3 15,000	2 11,500	1 6,000
A-5	S A	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL	UL UL
B	S A	UL UL	11 UL	5 37,500	4 23,000	5 28,500	4 19,000	5 36,000	3 18,000	2 9,000
E	S A	UL UL	5 UL	3 26,500	2 14,500	3 23,500	2 14,500	3 25,500	1 18,500	1 9,500
F-1	S A	UL UL	11 UL	4 25,000	2 15,500	3 19,000	2 12,000	4 33,500	2 14,000	1 8,500
F-2	S A	UL UL	11 UL	5 37,500	3 23,000	4 28,500	3 18,000	5 50,500	3 21,000	2 13,000
H-1	S A	1 21,000	1 16,500	1 11,000	1 7,000	1 9,500	1 7,000	1 10,500	1 7,500	NP NP
H-2	S A	UL 21,000	3 16,500	2 11,000	1 7,000	2 9,500	1 7,000	2 10,500	1 7,500	1 3,000
H-3	S A	UL UL	6 60,000	4 26,500	2 14,000	4 17,500	2 13,000	4 25,500	2 10,000	1 5,000
H-4	S A	UL UL	7 UL	5 37,500	3 17,500	5 28,500	3 17,500	5 36,000	3 18,000	2 6,500
H-5	S A	3 UL	3 UL	3 37,500	3 23,000	3 28,500	3 19,000	3 36,000	3 18,000	2 9,000
I-1	S A	UL UL	9 55,000	4 19,000	3 10,000	4 16,500	3 10,000	4 18,000	3 10,500	2 4,500
I-2	S A	UL UL	4 UL	2 15,000	1 11,000	1 12,000	Np Np	1 12,000	1 9,500	NP NP
I-3	S A	UL UL	4 UL	2 15,000	1 11,000	2 10,500	1 7,500	2 12,000	2 7,500	1 5,000
I-4	S A	UL UL	5 60,500	3 26,500	2 13,000	3 23,500	2 13,000	3 25,500	1 18,500	1 9,000
M	S A	UL UL	11 UL	4 21,500	4 12,500	4 18,500	4 12,500	4 20,500	3 14,000	1 9,000
R-1	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
R-2 ^a	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
R-3 ^a	S A	UL UL	11 UL	4 UL	4 UL	4 UL	4 UL	4 UL	3 UL	3 UL
R-4	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
S-1	S A	UL UL	11 48,000	4 26,000	3 17,500	3 26,000	3 17,500	4 25,500	3 14,000	1 9,000
S-2	S A	UL UL	11 79,000	5 39,000	4 26,000	4 39,000	4 26,000	5 38,500	4 21,000	2 13,500
U	S A	UL UL	5 35,500	4 19,000	2 8,500	3 14,000	2 8,500	4 18,000	2 9,000	1 5,500

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

UL = Unlimited

a. As applicable in Section 101.2.

505.5 Industrial equipment platforms. Industrial equipment platforms in buildings shall not be considered as a portion of the floor below. Such equipment platforms shall not contribute to the building area as regulated by Section 503.1. Such equipment platforms shall not contribute to the number of stories as regulated by Section 503.1. The area of the industrial equipment platform shall not be included in determining the fire area. Industrial equipment platforms shall not be a part of any mezzanine, and such platforms and the walkways, stairs and ladders providing access to an equipment platform, shall not serve as a part of the means of egress from the building.

505.5.1 Area limitations. The aggregate area of all industrial equipment platforms within a room shall not exceed two-thirds of the area of the room in which they occur. Where an equipment platform is located in the same room as a mezzanine, the area of the mezzanine shall be determined by Section 505.2, and the combined aggregate area of the equipment platforms and mezzanines shall not exceed two-thirds of the room in which they occur.

505.5.2 Fire suppression. Industrial equipment platforms shall be fully protected by an automatic sprinkler system above and below the platform, installed in accordance with Section 903.3.

505.5.3 Guards. Equipment platforms shall have guards where required by Section 1003.2.12.

SECTION 506 AREA MODIFICATIONS

506.1 General. The areas limited by Table 503 shall be permitted to be increased due to frontage (I_f) and automatic sprinkler system protection (I_s) in accordance with the following:

$$A_a = A_t + \left[\frac{A_t I_f}{100} \right] + \left[\frac{A_t I_s}{100} \right] \quad (\text{Equation 5-1})$$

where:

A_a = Allowable area per floor (square feet).

A_t = Tabular area per floor in accordance with Table 503 (square feet).

I_f = Area increase due to frontage (percent) as calculated in accordance with Section 506.2.

I_s = Area increase due to sprinkler protection (percent) as calculated in accordance with Section 506.3.

506.1.1 Basements. A single basement need not be included in the total allowable area provided such basement does not exceed the area permitted for a one-story building.

506.2 Frontage increase. Every building shall adjoin or have access to a public way to receive an area increase for frontage. Where a building has more than 25 percent of its perimeter on a public way or open space having a minimum width of 20 feet (6096 mm), the frontage increase shall be determined in accordance with the following:

$$I_f = 100 \left[\frac{F}{P} - 0.25 \right] \frac{W}{30} \quad (\text{Equation 5-2})$$

where:

I_f = Area increase due to frontage (percent).

F = Building perimeter which fronts on a public way or open space having 20 feet (6096 mm) open minimum width (feet).

P = Perimeter of entire building (feet).

W = Minimum width of public way or open space (feet).

506.2.1 Width limits. W must be at least 20 feet (6096 mm) and the quantity W divided by 30 shall not exceed 1.0 except that for buildings which are permitted to be unlimited in area by Section 503.1.2, Section 507 or Section 508, the quantity W divided by 30 shall not exceed 2.0.

506.2.2 Open space limits. Such open space shall be either on the same lot or dedicated for public use and shall be accessed from a street or approved fire lane.

506.3 Automatic sprinkler system increase. Where a building is protected throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, the area limitation in Table 503 is permitted to be increased by 200 percent ($I_s = 200$) for multistory buildings and 300 percent ($I_s = 300$) for single-story buildings.

Exception: Group H-1, H-2 or H-3.

SECTION 507 UNLIMITED AREA BUILDINGS

507.1 Unsprinklered, one-story. The area of a one-story, Group F-2 or S-2 building shall not be limited when the building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

507.2 Sprinklered, one-story. The area of a one-story, Group A-4, B, F, M or S building shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1, and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

Exceptions:

- Buildings and structures of Types I and II construction for rack storage facilities, which do not have access by the public shall not be limited in height provided that such buildings conform to the requirements of Section 507.1 and NFPA 231C.
- The automatic sprinkler system shall not be required in areas occupied for indoor participant sports, such as tennis, skating, swimming and equestrian activities, in occupancies in Group A-4, provided that:
 - Exit doors directly to the outside are provided for occupants of the participant sports areas; and
 - The building is equipped with a fire alarm system with manual fire alarm boxes installed in accordance with Section 907.

507.3 Two-story. The area of a two-story, Group B, F, M or S building shall not be limited when the building is provided with

an automatic sprinkler system in accordance with Section 903.3.1.1 throughout, and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

507.4 Reduced open space. The permanent open space of 60 feet (18 288 mm) required in Sections 507.1, 507.2 and 507.3 shall be permitted to be reduced to not less than 40 feet (12 192 mm) provided the following requirements are met:

1. The reduced open space shall not be allowed for more than 75 percent of the perimeter of the building.
2. The exterior wall facing the reduced open space shall have a minimum fire-resistance rating of 3 hours.
3. Openings in the exterior wall, facing the reduced open space, shall have opening protectives with a fire-resistance rating of 3 hours.

507.5 High-hazard use groups. Groups H-2, H-3 and H-4 fire areas shall be permitted in unlimited area buildings having occupancies in Groups F and S, in accordance with the limitations of this section. Fire areas located at the perimeter of the unlimited area building shall not exceed 10 percent of the area of the building nor the area limitations specified in Table 503 as modified by Section 506.2, based upon the percentage of the perimeter of the fire area that fronts on a street or other unoccupied space. Other fire areas shall not exceed 25 percent of the area limitations specified in Table 503. Fire-resistance-rating requirements of fire barrier assemblies shall be in accordance with Table 302.3.3.

507.6 Aircraft paint hangar. The area of a one-story, Group H-2 aircraft paint hangar shall not be limited where such aircraft paint hangar complies with the provisions of Section 412.4 and is entirely surrounded by public ways or yards not less in width than one and one-half times the height of the building.

507.7 Group E buildings. The area of a one-story Group E building of Type II, IIIA or IV construction shall not be limited when the following criteria are met:

1. Each classroom shall have not less than two means of egress, with one of the means of egress being a direct exit to the outside of the building complying with Section 1005.
2. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
3. The building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

507.8 Motion picture theaters. In buildings of Type I or II construction, the area of one-story motion picture theaters shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

SECTION 508 SPECIAL PROVISIONS

508.1 General. The provisions in this section shall permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable heights and areas of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in this section for that special condition and other applicable requirements of this code.

cation and type of construction, provided the special condition complies with the provisions specified in this section for that special condition and other applicable requirements of this code.

508.2 Group S-2 enclosed parking garage with Groups A, B, M or R above. A basement and the first story above grade plane of a building shall be considered as a separate and distinct building for the purpose of determining area limitations, continuity of fire walls, limitation of number of stories and type of construction, when all of the following conditions are met:

1. The basement and the first story above grade plane is of Type IA construction and is separated from the building above with a horizontal assembly having a minimum 3-hour fire-resistance rating. Openings in the horizontal assembly having a minimum 3-hour fire-resistance rating shall be protected by shaft, stairway, ramp or escalator enclosures extending above and below such openings. The walls of such enclosures shall have not less than a 2-hour fire-resistance rating and openings therein shall be protected by opening protectives having a minimum 1½-hour fire-protection rating.

Exception: Where the walls of such enclosures extending below the horizontal assembly having a minimum 3-hour fire-resistance rating to the foundation are provided with a fire-resistance rating of not less than 3 hours with openings therein protected as required for walls forming a 3-hour fire barrier, the enclosure walls extending above such floor used as the horizontal assembly having a minimum 3-hour fire-resistance rating shall be permitted to have a 1-hour fire-resistance rating provided:

1. The building above is not required to be of Type I construction; and
2. The enclosure walls do not enclose an exit stairway, a ramp or an escalator required to have enclosure walls with not less than a 2-hour fire-resistance rating.
3. The building above the horizontal assembly having a minimum 3-hour fire-resistance rating contains only Group A having an assembly room with an occupant load of less than 300, or Group B, M or R; and
3. The building below the horizontal assembly having a minimum 3-hour fire-resistance rating is a Group S-2 enclosed parking garage, used exclusively for the parking and storage of private motor vehicles.

Exceptions:

1. Entry lobbies, mechanical rooms and similar uses incidental to the operation of the building shall be permitted.
2. Group A having an assembly room with an occupant load of less than 300, or Group B or M shall be permitted in addition to those uses incidental to the operation of the building (including storage areas), provided that the entire structure below the horizontal assembly having a minimum 3-hour fire-resistance rating is pro-

tected throughout by an approved automatic sprinkler system.

4. The maximum building height in feet shall not exceed the limits set forth in Table 503 for the least restrictive type of construction involved.

508.3 Group S-2 enclosed parking garage with Group S-2 open parking garage above. A Group S-2 enclosed parking garage located in the basement or first story below a Group S-2 open parking garage shall be classified as a separate and distinct building for the purpose of determining the type of construction when the following conditions are met:

1. The allowable area of the structure shall be such that the sum of the ratios of the actual area divided by the allowable area for each separate occupancy shall not exceed 1.0.
2. The Group S-2 enclosed parking garage is of Type I or II construction and is at least equal to the fire-resistance requirements of the Group S-2 Open Parking Garage.
3. The height and the number of the floors above the basement shall be limited as specified in Table 406.3.5.
4. The floor assembly separating the Group S-2 enclosed parking garage and Group S-2 open parking garage shall be protected as required for the floor assembly of the Group S-2 enclosed parking garage. Openings between the Group S-2 enclosed parking garage and Group S-2 open parking garage, except exit openings, shall not be required to be protected.
5. The Group S-2 enclosed parking garage is used exclusively for the parking or storage of private motor vehicles, but shall be permitted to contain an office, waiting room and toilet room having a total area of not more than 1,000 square feet (93 m²), and mechanical equipment rooms incidental to the operation of the building.

508.4 Special unlimited height for Groups B, M and R. The height of Group B, M and R buildings of Type IB construction shall not be limited, provided the fire resistance of columns shall be not less than 3 hours and the other structural members, including floors, shall be not less than that shown in Chapter 6, but in no case less than 2 hours, except that roofs and their supporting beams, girders, trusses and arches shall be not less than 1½ hours.

508.5 Parking beneath Group R. Where a maximum one-story above grade plane Group S-2 parking garage, enclosed or open, or combination thereof, of Type I construction or open of Type IV construction, with grade entrance, is provided under a building of Group R, the number of stories to be used in determining the minimum type of construction may be measured from the floor above such a parking area. The floor assembly between the parking garage and the Group R above shall comply with the type of construction required for the parking garage and shall also provide a fire-resistance rating not less than the mixed occupancy separation required in Section 302.3.3.

508.6 Group R-2 buildings of Type IIIA construction. The height limitation for buildings of Type IIIA construction in Group R-2 shall be increased to six stories and 75 feet (22 860 mm) where the first floor construction above the basement has a fire-resistance rating of not less than 3 hours and the floor area

is subdivided by 2-hour fire-resistance-rated fire walls into areas of not more than 3,000 square feet (279 m²).

508.7 Group R-2 buildings of Type IIA construction. The height limitation for buildings of Type IIA construction in Group R-2 shall be increased to nine stories and 100 feet (30 480 mm) where the building is separated by not less than 50 feet (15 240 mm) from any other building on the lot and from property lines, the exits are segregated in an area enclosed by a 2-hour fire-resistance-rated fire wall and the first floor construction has a fire-resistance rating of not less than 1½ hours.

508.8 Open parking garage beneath Groups A, I, B, M and R. Open parking garages constructed under Groups A, I, B, M and R shall not exceed the height and area limitations permitted under Section 406.3. The height and area of the portion of the building above the open parking garage shall not exceed the limitations in Section 503 for the upper occupancy. The height, in both feet and stories, of the portion of the building above the open parking garage shall be measured from grade plane and shall include both the open parking garage and the portion of the building above the parking garage.

508.8.1 Fire separation. Fire separation assemblies between the parking occupancy and the upper occupancy shall correspond to the required fire-resistance rating prescribed in Table 302.3.3 for the uses involved. The type of construction shall apply to each occupancy individually, except that structural members, including main bracing within the open parking structure, which is necessary to support the upper occupancy, shall be protected with the more restrictive fire-resistance-rated assemblies of the groups involved as shown in Table 601. Means of egress for the upper occupancy shall conform to Chapter 10 and shall be separated from the parking occupancy by fire barriers having at least a 2-hour fire-resistance rating as required by Section 706, with self-closing doors complying with Section 714. Means of egress from the open parking garage shall comply with Section 406.3.

Comm 62.0500 FIRE APPARATUS ACCESS

(1) General. Unobstructed fire lanes that are accessible from a public road shall be provided for every facility, building or portion of a building in accordance with this code.

(2) Extent.

(a) 1. Except as provided in par. (b), the fire lane shall extend to within 150 feet (45 720 mm) of all portions of the building or facility or any portion of the exterior wall of the first story as measured by an approved route around the exterior of the building or facility.

2. Where any part of the building or facility is more than 30 feet (9144 mm) above the lowest level of fire apparatus access, the fire lane shall also be parallel to one entire side of the building or facility with the near edge of the fire lane within 30 feet (9144 mm) of the building or facility on that parallel side.

(b) The fire code official may increase the dimension of 150 feet (45 720 mm) where any one of the following conditions are met:

1. The building is equipped with a complete automatic fire sprinkler system.

2. A code-complying fire lane cannot be provided due to location on property, topography, grades, waterways or other similar conditions, and an approved alternative means of fire protection is provided.

(3) Dimensions.

- (a) A fire lane shall have a minimum unobstructed vertical clearance of 13.5 feet (4115 mm).
- (b) Buildings or facilities with any part more than 30 feet (9144 mm) above the lowest level of fire apparatus access shall be provided with a fire lane capable of accommodating aerial fire apparatus. Overhead power or utility lines may not be located across or within a fire lane for aerial fire apparatus.
- (c) Except as provided in pars. (d) and (e), a fire lane shall have a minimum unobstructed width of 20 feet (1296 mm).
- (d) Where a fire hydrant is provided to supply fire apparatus on the fire lane, the minimum unobstructed width shall be 26 feet (1685 mm) for a minimum distance of 20 feet on each side of the fire hydrant.
- (e) Where any part of the building or facility is more than 30 feet (9144 mm) above the lowest level of fire apparatus access, the minimum unobstructed width of the fire lane parallel to one side of the building or facility as required under sub. (2) (a) 2., shall be 26 feet (1685 mm).

(4) Turning radius. The inside turning radius of a fire lane shall be 28 feet (8534 mm) or as determined by the fire code official.

(5) Dead ends. A dead-end fire lane that is longer than 150 feet (45 720 mm) shall terminate in a turnaround area which consists of one of the following:

- (a) A cul-de-sac with a minimum diameter of 70 feet (21 336 mm).
- (b) A 45-degree (0.79 rad) wye with a minimum length of 60 feet (21 336 mm) per side.
- (c) A 90-degree (1.57 rad) tee with a minimum length of 60 feet (21 336 mm) per side.

(6) Signage. The fire code official may require the installation and maintenance of signs related to fire lanes.

(7) Gates and barricades.

- (a) The fire code official may require the installation, maintenance, securement and emergency operability of gates or barricades across a fire lane.
- (b) Security gates may be installed across fire lanes subject to the approval of the fire code official.

(8) Surface. Fire lanes shall be designed, installed and maintained to support the imposed loads of fire apparatus and shall be surfaced to provide all-weather driving capabilities.

(9) Bridges and elevated surfaces. Bridges or elevated surfaces that are part of a fire lane shall be designed for a live load sufficient to carry the imposed load of the fire apparatus.

(10) Grade. The grade of the fire lane shall be approved by the fire code official based on the fire department apparatus and site topography.

(11) Timing. Required fire lanes shall be provided prior to the placement of combustible materials at the building site, or the construction of any portion of a building or facility above the footing and foundation.

CHAPTER 6

TYPES OF CONSTRUCTION

SECTION 601 GENERAL

601.1 Scope. The provisions of this chapter shall control the classification of buildings as to type of construction.

SECTION 602 CONSTRUCTION CLASSIFICATION

602.1 General. Buildings and structures erected or to be erected, altered or extended in height or area shall be classified in one of the five construction types defined in Sections 602.2 through 602.5. The building elements shall have a fire-resistance rating not less than that specified in Table 601 and exterior walls shall have a fire-resistance rating not less than that specified in Table 602.

602.1.1 Minimum requirements. A building or portion thereof shall not be required to conform to the details of a type of construction higher than that type, which meets the minimum requirements based on occupancy even though certain features of such a building actually conform to a higher type of construction.

602.2 Types I and II. Types I and II construction are those types of construction in which the building elements listed in Table 601 are of noncombustible materials.

602.3 Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies of a 2-hour rating or less.

602.4 Type IV. Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section. Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies with a 2-hour rating or less.

602.4.1 Columns. Wood columns shall be sawn or glued laminated and shall not be less than 8 inches (203 mm), nominal, in any dimension where supporting floor loads and not less than 6 inches (152 mm) nominal in width and not less than 8 inches (203 mm) nominal in depth where supporting roof and ceiling loads only. Columns shall be continuous or superimposed and connected in an approved manner.

602.4.2 Floor framing. Wood beams and girders shall be of sawn or glued laminated timber and shall be not less than 6 inches (152 mm) nominal in width and not less than 10 inches (254 mm) nominal in depth. Framed sawn or glued laminated timber arches, which spring from the floor line and support floor loads, shall be not less than 8 inches (203

mm) nominal in any dimension. Framed timber trusses supporting floor loads shall have members of not less than 8 inches (203 mm) nominal in any dimension.

602.4.3 Roof framing. Wood-framed or glued laminated-arches for roof construction, which spring from the floor line or from grade and do not support floor loads shall have members not less than 6 inches (152 mm) nominal in width and have less than 8 inches (203 mm) nominal in depth for the lower half of the height and not less than 6 inches (152 mm) nominal in depth for the upper half. Framed or glued laminated arches for roof construction that spring from the top of walls or wall abutments, framed timber trusses and other roof framing, which do not support floor loads, shall have members not less than 4 inches (102 mm) nominal in width and not less than 6 inches (152 mm) nominal in depth. Spaced members may be composed of two or more pieces not less than 3 inches (76 mm) nominal in thickness where blocked solidly throughout their intervening spaces or where spaces are tightly closed by a continuous wood cover plate of not less than 2 inches (51 mm) nominal in thickness secured to the underside of the members. Splice plates shall be not less than 3 inches (76 mm) nominal in thickness. Where protected by approved automatic sprinklers under the roof deck, framing members shall be not less than 3 inches (76 mm) nominal in width.

602.4.4 Floors. Floors shall be without concealed spaces. Wood floors shall be of sawn or glued laminated planks, splined, or tongue-and-groove, of not less than 3 inches (76 mm) nominal in thickness covered with 1-inch (25 mm) nominal dimension tongue-and-groove flooring, laid cross-wise or diagonally, or 0.5-inch (12.7 mm) particle board or planks not less than 4 inches (102 mm) nominal in width set on edge close together and well spiked and covered with 1-inch (25 mm) nominal dimension flooring or 1/2-inch (12.7 mm) wood structural panel or 0.5-inch (12.7 mm) particle board. The lumber shall be laid so that no continuous line of joints will occur except at points of support. Floors shall not extend closer than 0.5 inch (12.7 mm) to walls. Such 0.5-inch (12.7 mm) space shall be covered by a molding fastened to the wall and so arranged that it will not obstruct the swelling or shrinkage movements of the floor. Corbeling of masonry walls under the floor may be used in place of molding.

602.4.5 Roofs. Roofs shall be without concealed spaces and wood roof decks shall be sawn or glued laminated, splined or tongue-and-groove plank, not less than 2 inches (51 mm) thick, 1 1/8 (32 mm)-inch-thick wood structural panel (exterior glue), or of planks not less than 3 inches (76 mm) nominal wide, set on edge close together and laid as required for floors. Other types of decking may be used if providing equivalent fire resistance and structural properties.

602.4.6 Partitions. Partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25

mm) matched boards or laminated construction 4 inches (102 mm) thick, or of 1-hour fire-resistance-rated construction.

602.4.7 Exterior structural members. Where a horizontal separation of 20 feet (6096 mm) or more is provided, wood columns and arches conforming to heavy timber sizes may be used externally.

602.5 Type V. Type V construction is that type of construction in which the structural elements, exterior walls and interior walls are of any materials permitted by this code.

SECTION 603 COMBUSTIBLE MATERIAL IN TYPES I AND II CONSTRUCTION

603.1 Allowable uses. Combustible materials are permitted in buildings of Type I and Type II construction in the following applications:

1. Fire-retardant-treated wood shall be permitted in:
 - 1.1. Nonbearing partitions where the required fire-resistance rating is 2 hours or less.
 - 1.2. Nonbearing exterior walls where no fire rating is required.
 - 1.3. Roof construction as permitted in Table 601, Note c, Item 3.
2. Thermal and acoustical insulation, other than foam plastics, having a flame spread index of not more than 25.

Exceptions:

1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a flame spread index of not more than 100.
2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a flame spread index of not more than 200.
3. Foam plastics in accordance with Chapter 26.
4. Roof coverings that have an A, B or C classification.
5. Interior floor finish and interior finish, trim and millwork such as doors, door frames, window sashes and frames.
6. Where not installed over 15 feet (4572 mm) above grade, show windows, nailing or furring strips, wooden bulkheads below show windows, their frames, aprons and show cases.
7. Finish flooring applied directly to the floor slab or to wood sleepers that are firestopped in accordance with Section 716.2.7.
8. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and which do not establish a corridor serving an occupant load of 30 or

more may be constructed of fire-retardant-treated wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.

9. Platforms as permitted in Section 410.
10. Materials complying with Section 602 of the *International Mechanical Code*.
11. Combustible exterior wall coverings, balconies, bay or oriel windows, or similar appendages in accordance with Chapter 14.
12. Blocking such as for handrails, millwork, cabinets, and window and door frames.
13. Light-transmitting plastics as permitted by Chapter 26.
14. Mastics and caulking materials applied to provide flexible seals between components of exterior wall construction.
15. Exterior plastic veneer installed in accordance with Section 2605.2.
16. Nailing or furring strips as permitted by Section 803.3.
17. Heavy timber as permitted by Note c, Item 2, to Table 601 and Sections 602.4.7 and 1406.3.
18. Aggregates, component materials and admixtures as permitted by Section 703.2.2.
19. Sprayed cementitious and mineral fiber fire-resistance-rated materials installed to comply with Section 1704.11.
20. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 711.
21. Materials used to protect joints in fire-resistance-rated assemblies in accordance with Section 712.
22. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 716.5.

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A ^d	B	A	B	HT	A ^d	B
Structural frame ^a Including columns, girders, trusses	3 ^b	2 ^b	1	0	1	0	HT	1	0
Bearing walls									
Exterior ^f	3	2	1	0	2	2	2	1	0
Interior	3 ^b	2 ^b	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions	See Table 602 See Section 602								
Exterior									
Interior ^e									
Floor construction Including supporting beams and joists	2	2	1	0	1	0	HT	1	0
Roof construction Including supporting beams and joists	1½ ^c	1 ^c	1 ^c	0 ^c	1 ^c	0	HT	1 ^c	0

For SI: 1 foot = 304.8 mm.

- a. The structural frame shall be considered to be the columns and the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads. The members of floor or roof panels which have no connection to the columns shall be considered secondary members and not a part of the structural frame.
- b. Roof supports: Fire-resistance ratings of structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
- c. 1. Except in Factory-Industrial (F-I), Hazardous (H), Mercantile (M) and Moderate-Hazard Storage (S-1) occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.
2. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.
3. In Type I and Type II construction, fire-retardant-treated wood shall be allowed in buildings not over two stories including girders and trusses as part of the roof construction.
- d. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Section 506.3 or an allowable height increase in accordance with Section 504.2. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.
- e. For interior nonbearing partitions in Type IV construction, also see Section 602.4.6.
- f. Not less than the fire-resistance rating based on fire separation distance (see Table 602).

TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE^a

FIRE SEPARATION DISTANCE (feet)	TYPE OF CONSTRUCTION	GROUP H	GROUP F-1, M, S-1	GROUP A, B, E, F-2, I, R ^b , S-2, U
< 5 ^c	All	3	2	1
≥ 5	IA	3	2	1
< 10	Others	2	1	1
≥ 10	IA, IB	2	1	1
< 30	IIB, VB	1	0	0
	Others	1	1	1
≥ 30	All	0	0	0

For SI: 1 foot = 304.8 mm.

- a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.
- b. Group R-3 and Group U when used as accessory to Group R-3, as applicable in Section 101.2 shall not be required to have a fire-resistance rating where fire separation distance is 3 feet or more.
- c. See Section 503.2 for party walls.