SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

406.1 General.

All motor-vehicle-related occupancies shall comply with Section 406.2. *Private garages* and carports shall also comply with Section 406.3. Open public parking garages shall also comply with Sections 406.4 and 406.5. Enclosed public parking garages shall also comply with Sections 406.4 and 406.6. Motor fuel-dispensing facilities shall also comply with Section 406.7. *Repair garages* shall also comply with Section 406.8.

406.2 Design.

Private garages and carports, open and enclosed public parking garages, motor fuel-dispensing facilities and *repair garages* shall comply with Sections 406.2.1 through 406.2.9.

406.2.1 Automatic garage door openers and *vehicular gates*.

Automatic garage door openers shall be listed and labeled in accordance with UL 325. Where provided, *automatic vehicular gates* shall comply with Section 3110.

406.2.2 Clear height.

The clear height of each floor level in vehicle and pedestrian traffic areas shall be not less than 7 feet (2134 mm). Canopies under which fuels are dispensed shall have a clear height in accordance with Section 406.7.2.

Exception: A lower clear height is permitted for a parking tier in *mechanical-access open parking garages* where approved by the *building official.*

406.2.3 Accessible parking spaces.

Where parking is provided, accessible parking spaces, access aisles and vehicular routes serving accessible parking shall be provided in accordance with Section 1106.

406.2.4 Floor surfaces.

Floor surfaces shall be of concrete or similar approved noncombustible and nonabsorbent materials. The area of floor used for the 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. The surface of vehicle fueling pads in motor fuel-dispensing facilities shall be in accordance with Section 406.7.1.

Exceptions:

1. Asphalt parking surfaces shall be permitted at ground level for public parking garages and private carports.
2. Slip-resistant, nonabsorbent, *interior floor finishes* having a critical radiant flux not more than 0.45 W/cm^2, as determined by ASTM E648 or NFPA 253, shall be permitted in *repair garages.*

406.2.5 Sleeping rooms.

Openings between a motor vehicle-related occupancy and a room used for sleeping purposes shall not be permitted.

406.2.6 Fuel dispensing.

The dispensing of fuel shall only be permitted in motor fuel-dispensing facilities in accordance with Section 406.7.

406.2.7 Electric vehicle charging stations and systems.

Where provided, electric vehicle charging systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be *listed* and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be *listed* and labeled in accordance with UL 2594. Accessibility to *electric vehicle charging stations* shall be provided in accordance with Section 1107.

406.2.8 Mixed occupancies and uses.

Mixed uses shall be allowed in the same building as public parking garages and *repair garages* in accordance with Section 508.1. Mixed uses in the same building as an *open parking garage* are subject to Sections 402.4.2.3, 406.5.11, 508.1, 510.3, 510.4 and 510.7.

406.2.9 Equipment and appliances.

Equipment and appliances shall be installed in accordance with Sections 406.2.9.1 through 406.2.9.3 and the *International Mechanical Code*, *International Fuel Gas Code* and NFPA 70.

406.2.9.1 Elevation of ignition sources.

Equipment and appliances having an ignition source and located in hazardous locations and public garages, *private garages*, *repair garages*, automotive motor fuel-dispensing facilities and parking garages shall be elevated such that the

source of ignition is not less than 18 inches (457 mm) above the floor surface on which the equipment or appliance rests. For the purpose of this section, rooms or spaces that are not part of the living space of a *dwelling unit* and that communicate directly with a *private garage* through openings shall be considered to be part of the *private garage*.

Exception: Elevation of the ignition source is not required for appliances that are listed as flammable vapor ignition resistant.

406.2.9.1.1 Parking garages.

Connection of a parking garage with any room in which there is a fuel-fired appliance shall be by means of a vestibule providing a two-doorway separation, except that a single door is permitted where the sources of ignition in the appliance are elevated in accordance with Section 406.2.9.

Exception: This section shall not apply to appliance installations complying with Section 406.2.9.2 or 406.2.9.3.

406.2.9.2 Public garages.

Appliances located in public garages, motor fuel-dispensing facilities, *repair garages* or other areas frequented by motor vehicles shall be installed not less than 8 feet (2438 mm) above the floor. Where motor vehicles are capable of passing under an appliance, the appliance shall be installed at the clearances required by the appliance manufacturer and not less than 1 foot (305 mm) higher than the tallest vehicle garage door opening.

Exception: The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and installed in accordance with Section 406.2.9.1 and NFPA 30A.

406.2.9.3 Private garages.

Appliances located in *private garages* and carports shall be installed with a minimum clearance of 6 feet (1829 mm) above the floor.

Exception: The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and are installed in accordance with Section 406.2.9.1.

406.3 Private garages and carports.

Private garages and carports shall comply with Sections 406.2 and 406.3, or they shall comply with Sections 406.2 and 406.4.

406.3.1 Classification.

Private garages and carports shall be classified as Group U occupancies. Each *private garage* shall be not greater than 1,000 square feet (93 m^2) in area. Multiple *private garages* are permitted in a building where each *private garage* is separated from the other *private garages* by 1-hour *fire barriers* in accordance with Section 707, or 1-hour *horizontal assemblies* in accordance with Section 711, or both.

406.3.2 Separation.

For other than *private garages* adjacent to dwelling units, the separation of *private garages* from other occupancies shall comply with Section 508. Separation of *private garages* from *dwelling units* shall comply with Sections 406.3.2.1 and 406.3.2.2.

406.3.2.1 Dwelling unit separation.

The *private garage* shall be separated from the *dwelling unit* and its *attic* area by means of *gypsum board*, not less than $^1/_2$ inch (12.7 mm) in thickness, applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than a $^5/_8$-inch (15.9 mm) Type X *gypsum board* or equivalent and $^1/_2$-inch (12.7 mm) *gypsum board* applied to structures supporting the separation from habitable rooms above the garage. Door openings between a *private garage* and the *dwelling unit* shall be equipped with either solid wood doors or solid or honeycomb core steel doors not less than $1^3/_8$ inches (34.9 mm) in thickness, or doors in compliance with Section 716.2.2.1 with a *fire protection rating* of not less than 20 minutes. Doors shall be *self-closing* and self-latching.

406.3.2.2 Ducts.

Ducts in a *private garage* and ducts penetrating the walls or ceilings separating the *dwelling unit* from the garage, including its *attic* area, shall be constructed of sheet steel of not less than 0.019 inch (0.48 mm) in thickness and shall not have openings into the garage.

406.3.3 Carports.

Carports shall be open on not fewer than two sides. Carports open on fewer than two sides shall be considered to be a garage and shall comply with the requirements for *private garages*.

406.3.3.1 Carport separation.

A separation is not required between a Group R-3 and U carport, provided that the carport is entirely open on two or more sides and there are not enclosed areas above.

406.4 Public parking garages.

Parking garages, other than *private garages*, shall be classified as public parking garages and shall comply with the provisions of Sections 406.2 and 406.4 and shall be classified as either an *open parking garage* or an enclosed parking garage. *Open parking garages* shall also comply with Section 406.5. Enclosed parking garages shall also comply with Section 406.6. See Section 510 for special provisions for parking garages.

406.4.1 Guards.

Guards shall be provided in accordance with Section 1015. *Guards* serving as *vehicle barriers* shall comply with Sections 406.4.2 and 1015.

406.4.2 Vehicle barriers.

Vehicle barriers not less than 2 feet 9 inches (835 mm) in height shall be placed where the vertical distance from the floor of a drive lane or parking space to the ground or surface directly below is greater than 1 foot (305 mm). *Vehicle barriers* shall comply with the loading requirements of Section 1607.10.

Exception: *Vehicle barriers* are not required in vehicle storage compartments in a mechanical access parking garage.

406.4.3 Ramps.

Vehicle ramps shall not be considered as required *exits* unless pedestrian facilities are provided. Vehicle ramps that are utilized for vertical circulation as well as for parking shall not exceed a slope of 1 unit vertical in 15 units horizontal (6.67-percent slope).

406.5 Open parking garages.

Open parking garages shall comply with Sections 406.2, 406.4 and 406.5.

406.5.1 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 406.4.2.

406.5.2 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 shall be not less than 20 percent of the total perimeter wall area of each tier. The aggregate length of the openings considered to be providing natural *ventilation* shall be not less than 40 percent of the perimeter of the tier. Interior walls shall be not less than 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.

406.5.2.1 Openings below grade.

Where openings below grade provide required natural *ventilation*, the outside horizontal clear space shall be one and one-half times the depth of the opening. The width of the horizontal clear space shall be maintained from grade down to the bottom of the lowest required opening.

406.5.3 Mixed occupancies and uses.

Mixed uses shall be allowed in the same building as an *open parking garage* subject to the provisions of Sections 402.4.2.3, 406.5.11, 508.1, 510.3, 510.4 and 510.7.

406.5.4 Area and height.

Area and height of *open parking garages* shall be limited as set forth in Chapter 5 for Group S-2 occupancies and as further provided for in Section 508.1.

TABLE 406.5.4
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 m^2.

406.5.4.1 Single use.

Where the *open parking garage* is used exclusively for the parking or storage of private motor vehicles, and the building is without other uses, the area and height shall be permitted to comply with Table 406.5.4, along with increases allowed by Section 406.5.5.

Exception: The grade-level tier is permitted to contain an office, waiting and toilet rooms having a total combined area of not more than 1,000 square feet (93 m^2). Such area need not be separated from the *open parking garage*.

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 under these provisions to be a tier.

406.5.5 Area and height increases.

The allowable area and height of *open parking garages* shall be increased in accordance with the provisions of this section. Garages with sides open on three-fourths of the building's perimeter are permitted to be increased by 25 percent in area and one tier in height. Garages with sides open around the entire building's perimeter are permitted to be increased by 50 percent in area and one tier in height. For a side to be considered open under these provisions, the total area of openings along the side shall be not 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. For purposes of calculating the interior area of the side, the height shall not exceed 7 feet (2134 mm).

Allowable tier areas in Table 406.5.4 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. Not fewer than three sides of each such larger tier shall have continuous horizontal openings not less than 30 inches (762 mm) in clear height extending for not less than 80 percent of the length of the sides. All parts of such larger tier shall be not more than 200 feet (60 960 mm) horizontally from such an opening. In addition, each such opening shall face a street or *yard* with access to a street with a width of not less than 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 II construction, with all sides open, shall be unlimited in allowable area where the *building 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 be not 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. For purposes of calculating the interior area of the side, the height shall not exceed 7 feet (2134 mm). All portions of tiers shall be within 200 feet (60 960 mm) horizontally from such openings or other natural *ventilation* openings as defined in Section 406.5.2. These openings shall be permitted to be provided in *courts* with a minimum dimension of 20 feet (6096 mm) for the full width of the openings.

406.5.6 Fire separation distance.

Exterior walls and openings in *exterior walls* shall comply with Table 601 and Table 705.5. The distance to an adjacent *lot line* shall be determined in accordance with Section 705 and Table 705.5.

406.5.7 Means of egress.

Where persons other than parking attendants are permitted, *open parking garages* shall meet the *means of egress* requirements of Chapter 10. Where persons other than parking attendants are not permitted, there shall be not fewer than two exit stairways. Each *exit stairway* shall be not less than 36 inches (914 mm) in width. Lifts shall be permitted to be installed for use of employees only, provided that they are completely enclosed by noncombustible materials.

[F] 406.5.8 Standpipe system.

An *open parking garage* shall be equipped with a *standpipe system* as required by Section 905.3.

406.5.9 Enclosure of vertical openings.

Enclosure shall not be required for vertical openings except as specified in Section 406.5.7.

406.5.10 Ventilation.

Ventilation, other than the percentage of openings specified in Section 406.5.2, shall not be required.

406.5.11 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.

406.6 Enclosed parking garages.

Enclosed parking garages shall comply with Sections 406.2, 406.4 and 406.6.

406.6.1 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 Sections 504 and 506 as modified by Section 507. Roof parking is permitted.

406.6.2 Ventilation.

A mechanical *ventilation* system and exhaust system shall be provided in accordance with Chapters 4 and 5 of the International Mechanical Code.

> **Exception:** Mechanical *ventilation* shall not be required for enclosed parking garages that are accessory to one- and two-family *dwellings.*

[F] 406.6.3 Automatic sprinkler system.

An enclosed parking garage shall be equipped with an *automatic sprinkler system* in accordance with Section 903.2.10.

406.6.4 Mechanical-access enclosed parking garages.

Mechanical-access enclosed parking garages shall be in accordance with Sections 406.6.4.1 through 406.6.4.4.

406.6.4.1 Separation.

Mechanical-access enclosed parking garages shall be separated from other occupancies and accessory uses by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or by not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

406.6.4.2 Smoke removal.

A mechanical smoke removal system, installed in accordance with Section 910.4, shall be provided for all areas containing a *mechanical-access enclosed parking garage*.

406.6.4.3 Fire control equipment room.

Fire control equipment, consisting of the *fire alarm* control unit, mechanical *ventilation* controls and an emergency shutdown switch, shall be provided in a room located where the equipment is able to be accessed by the fire service from a secured exterior door of the building. The room shall be not less than 50 square feet (4.65 m^2) in area and shall be in a location that is approved by the fire code official.

406.6.4.3.1 Emergency shutdown switch.

The mechanical parking system shall be provided with a manually activated emergency shutdown switch for use by emergency personnel. The switch shall be clearly identified and shall be in a location approved by the fire code official.

406.6.4.4 Fire department access doors.

Access doors shall be provided in accordance with Section 3206.7 of the *International Fire Code.*

406.7 Motor fuel-dispensing facilities.

Motor fuel-dispensing facilities shall comply with the *International Fire Code* and Sections 406.2 and 406.7.

406.7.1 Vehicle fueling pad.

The vehicle shall be fueled on noncoated concrete or other *approved* paving material having a resistance not exceeding 1 megohm as determined by the methodology in CEN EN 1081.

406.7.2 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, heavy timber complying with Section 2304.11 or 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 heavy timber complying with Section 2304.11.
2. Plastics covered by aluminum facing having a thickness of not less than 0.010 inch (0.30 mm) or corrosion-resistant steel having a base metal thickness of not less than 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 E84 or UL 723 and a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D1929.
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 that the panels are located not less than 10 feet (3048 mm) from any building on the same *lot* 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 be not greater than 1,000 square feet (93 m^2). The

maximum area of any individual panel shall be not greater than 100 square feet (9.3 m^2).

406.7.2.1 Canopies used to support gaseous hydrogen systems.

Canopies that are used to shelter dispensing operations where flammable compressed gases are located on the roof of the *canopy* shall be in accordance with the following:

1. The *canopy* shall meet or exceed Type I construction requirements.
2. Operations located under *canopies* shall be limited to refueling only.
3. The *canopy* shall be constructed in a manner that prevents the accumulation of hydrogen gas.

406.8 Repair garages.

Repair garages shall be constructed in accordance with the *International Fire Code* and Sections 406.2 and 406.8. This occupancy shall not include motor fuel-dispensing facilities, as regulated in Section 406.7.

406.8.1 Ventilation.

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

[F] 406.8.2 Gas detection system.

Repair garages used for repair of vehicles fueled by nonodorized gases including but not limited to hydrogen and nonodorized LNG, shall be provided with a *gas detection system* that complies with Section 916. The *gas detection system* shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

[F] 406.8.2.1 System activation.

Activation of a gas detection alarm shall result in all of the following:

1. Initiation of distinct audible and visual alarm signals in the *repair garage*, where the *ventilation* system is interlocked with gas detection.
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] 406.8.2.2 Failure of the gas detection system.

Failure of the *gas detection system* shall automatically deactivate the heating system, activate the mechanical ventilation system where the system is interlocked with the *gas detection system*, and cause a trouble signal to sound at an *approved* location.

[F] 406.8.3 Automatic sprinkler system.

A *repair garage* shall be equipped with an *automatic sprinkler system* in accordance with Section 903.2.9.1.