

2021 Virginia Construction Code

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*.

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SECTION 502 BUILDING ADDRESS

502.1 Address identification.

New buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of $\frac{1}{2}$ inch (12.7 mm). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other approved sign or means shall be used to identify the structure.

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CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS

SECTION 503 GENERAL BUILDING HEIGHT AND AREA LIMITATIONS

503.1 General.

Unless otherwise specifically modified in [Chapter 4](#) and this chapter, *building height*, number of stories and *building area* shall not exceed the limits specified in [Sections 504](#) and [506](#) based on the type of *construction* as determined by [Section 602](#) and the occupancies as determined by [Section 302](#) except as modified hereafter. *Building height*, number of stories and *building area* provisions shall be applied independently. For the purposes of determining area limitations, height limitations and type of construction, each portion of a building separated by one or more *fire walls* complying with [Section 706](#) shall be considered to be a separate building.

503.1.1 Special industrial occupancies.

Buildings and structures designed to house special industrial processes that require large areas and unusual *building heights* to accommodate cranes 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 *building height*, number of stories and *building area* limitations specified in [Sections 504](#) and [506](#).

503.1.2 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 where the *building height*, number of stories of each building and the aggregate *building area* of the buildings are within the limitations specified in [Sections 504](#) and [506](#). The provisions of this code applicable to the aggregate building shall be applicable to each *building*.

503.1.3 Type I construction.

Buildings of Type I construction permitted to be of unlimited tabular *building heights and areas* are not subject to the special requirements that allow unlimited area buildings in [Section 507](#) or unlimited *building height* in [Sections 503.1.1](#) and [504.3](#) or increased *building heights and areas* for other types of construction.

503.1.4 Occupied roofs.

A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by [Table 504.4](#) for the *story* immediately below the roof. The area of the occupied roofs shall not be included in the *building area* as regulated by [Section 506](#). An occupied roof shall not be included in the *building height* or number of stories as regulated by [Section 504](#), provided that the *penthouses* and other enclosed *rooftop structures* comply with [Section 1511](#).

Exceptions:

1. The occupancy located on an occupied roof shall not be limited to the occupancies allowed on the *story* immediately below the roof where the building is equipped throughout with an *automatic sprinkler system* in accordance with [Section 903.3.1.1](#) or [903.3.1.2](#) and occupant notification in accordance with [Sections 907.5.2.1 and 907.5.2.3](#) is provided in the area of the occupied roof. *Emergency voice/alarm communication system notification per Section 907.5.2.2 shall also be provided in the area of the occupied roof where such system is required elsewhere in the building.*
2. Assembly occupancies shall be permitted on roofs of open parking spaces of Type I or Type II construction, in accordance with the exception to [Section 903.2.1.6](#).

503.1.4.1 Enclosures over occupied roof areas.

Elements or structures enclosing the occupied roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupied roof.

Exception: *Penthouses* constructed in accordance with [Section 1511.2](#) and towers, domes, spires and cupolas constructed in accordance with [Section 1511.5](#).

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CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS

SECTION 504 BUILDING HEIGHT AND NUMBER OF STORIES

504.1 General.

The height, in feet, and the number of stories of a building shall be determined based on the type of construction, occupancy classification and whether there is an *automatic sprinkler system* installed throughout the *building*.

Exception: The *building height* of one-story aircraft hangars, aircraft paint hangars and buildings used for the manufacturing of aircraft shall not be limited where the building is provided with an *automatic sprinkler system* or *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 *building height*.

504.1.1 Unlimited area buildings.

The height of unlimited area buildings shall be designed in accordance with [Section 507](#).

504.1.2 Special provisions.

The special provisions of [Section 510](#) permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable heights of buildings based on the occupancy classification and type of *construction*, provided the special condition complies with the provisions specified in [Section 510](#).

504.2 Mixed occupancy.

In a building containing mixed occupancies in accordance with [Section 508](#), no individual occupancy shall exceed the height and number of *story* limits specified in this section for the applicable occupancies.

504.3 Height in feet.

The maximum height, in feet, of a building shall not exceed the limits specified in [Table 504.3](#).

Exception: Towers, spires, steeples and other *rooftop structures* shall be constructed of materials consistent with the required type of construction of the *building* except where other *construction* is permitted by [Section 1511.2.4](#). Such structures shall not be used for habitation or storage. The structures shall be unlimited in height where of noncombustible materials and shall not extend more than 20 feet (6096 mm) above the allowable building *height* where of combustible materials (see [Chapter 15](#) for additional requirements).

**TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE^a**

OCCUPANCY CLASSIFICATION	See Footnotes	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A, B, E, F, M, S, U	NS ^b	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	270	180	85	85	70	60
H-1, H-2, H-3, H-5	NS ^{c, d}	UL	160	65	55	65	55	120	90	65	65	50	40
	S												
H-4	NS ^{c, d}	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	140	100	85	85	70	60
I-1 Condition 1, I-3	NS ^{d, e}	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	180	120	85	85	70	60
I-1 Condition 2, I-2	NS ^{d, e, f}	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85									
I-4	NS ^{d, g}	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	180	120	85	85	70	60
R ^h	NS ^d	UL	160	65	55	65	55	65	65	65	65	50	40
	S13D	60	60	60	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	270	180	85	85	70	60

For SI: 1 foot = 304.8 mm.

UL = Unlimited; NS = Buildings not equipped throughout with an automatic sprinkler

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system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.1](#); S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.2](#); S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.3](#).

- a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
- b. See [Section 903.2](#) for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
- c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.5](#).
- d. The NS value is only for use in evaluation of existing building height in accordance with the [International Existing Building Code](#).
- e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.6](#). For new Group I-1 occupancies Condition 1, see Exception 1 of [Section 903.2.6](#).
- f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.6](#) and [Section 1103.5](#) of the *International Fire Code*.
- g. For new Group I-4 occupancies, see Exceptions 2 and 3 of [Section 903.2.6](#).
- h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.8](#).

504.4 Number of stories.

The maximum number of stories [above grade plane](#) of a building shall not exceed the limits specified in [Table 504.4](#).

TABLE 504.4
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE^{a, b}

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION												
	See Footnotes	Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	3	3	3	2	1
	S	UL	6	4	3	4	3	9	6	4	4	3	2
A-2	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-3	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-4	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-5	NS	UL	UL	UL	UL	UL	UL	1	1	1	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	5	5	5	3	2
	S	UL	12	6	4	6	4	18	12	9	6	4	3
E	NS	UL	5	3	2	3	2	3	3	3	3	1	1
	S	UL	6	4	3	4	3	9	6	4	4	2	2
F-1	NS	UL	11	4	2	3	2	3	3	3	4	2	1
	S	UL	12	5	3	4	3	10	7	5	5	3	2
F-2	NS	UL	11	5	3	4	3	5	5	5	5	3	2
	S	UL	12	6	4	5	4	12	8	6	6	4	3

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H-1	NS ^{c, d}	1	1	1	1	1	1	NP	NP	NP	1	1	NP
	S							1	1	1			
H-2	NS ^{c, d}	UL	3	2	1	2	1	1	1	1	2	1	1
	S							2	2	2			
H-3	NS ^{c, d}	UL	6	4	2	4	2	3	3	3	4	2	1
	S							4	4	4			
H-4	NS ^{c, d}	UL	7	5	3	5	3	5	5	5	5	3	2
	S	UL	8	6	4	6	4	8	7	6	6	4	3
H-5	NS ^{c, d}	4	4	3	3	3	3	2	2	2	3	3	2
	S							3	3	3			
I-1 Condition 1	NS ^{d, e}	UL	9	4	3	4	3	4	4	4	4	3	2
	S	UL	10	5	4	5	4	10	7	5	5	4	3
I-1 Condition 2	NS ^{d, e}	UL	9	4		3	4	3	3	3	4	3	2
	S	UL	10	5				10	6	4			
I-2	NS ^{d, f}	UL	4	2		1	1	NP	NP	NP	1	1	NP
	S	UL	5	3				7	5	1			
I-3	NS ^{d, e}	UL	4	2	1	2	1	2	2	2	2	2	1
	S	UL	5	3	2	3	2	7	5	3	3	3	2
I-4	NS ^{d, g}	UL	5	3	2	3	2	3	3	3	3	1	1
	S	UL	6	4	3	4	3	9	6	4	4	2	2
M	NS	UL	11	4	2	4	2	4	4	4	4	3	1
	S	UL	12	5	3	5	3	12	8	6	5	4	2
R-1 ^h	NS ^d	UL	11		4	4	4	4	4	4	4	3	2
	S13R	4	4					4	4	4	4	4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3
R-2 ^h	NS ^d	UL	11	4		4	4	4	4	4	4	3	2
	S13R	4	4	4				4	4	4	4	4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3
R-3 ^h	NS ^d	UL	11									3	3
	S13D	4	4	4	4	4	4	4	4	4	4	3	3
	S13R	4	4									4	4
	S	UL	12	5	5	5	5	18	12	5	5	4	4
R-4 ^h	NS ^d	UL	11									3	2
	S13D	4	4	4	4	4	4	4	4	4	4	3	2
	S13R	4	4									4	3
	S	UL	12	5	5	5	5	18	12	5	5	4	3
S-1	NS	UL	11	4	2	3	2	4	4	4	4	3	1
	S	UL	12	5	4	4	4	10	7	5	5	4	2
S-2	NS	UL	11	5	3	4	3	4	4	4	5	4	2
	S	UL	12	6	4	5	4	12	8	5	6	5	3
U	NS	UL	5	4	2	3	2	4	4	4	4	2	1
	S	UL	6	5	3	4	3	9	6	5	5	3	2

UL = Unlimited; NP = Not Permitted; NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.1](#); S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.2](#); S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.3](#).

- See [Chapters 4](#) and [5](#) for specific exceptions to the allowable height in this chapter.
- See [Section 903.2](#) for the minimum thresholds for protection by an automatic

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sprinkler system for specific occupancies.

- c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.5](#).
- d. The NS value is only for use in evaluation of existing *building height* in accordance with the [International Existing Building Code](#).
- e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.6](#). For new Group I-1 occupancies, Condition 1, see Exception 1 of [Section 903.2.6](#).
- f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.6](#) and [1103.5](#) of the *International Fire Code*.
- g. For new Group I-4 occupancies, see Exceptions 2 and 3 of [Section 903.2.6](#).
- h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.8](#).

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CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS

SECTION 505 MEZZANINES AND EQUIPMENT PLATFORMS

505.1 General.

Mezzanines shall comply with [Section 505.2](#). Equipment platforms shall comply with [Section 505.3](#).

505.2 Mezzanines.

A mezzanine or mezzanines in compliance with [Section 505.2](#) shall be considered a portion of the story below. Such mezzanines shall not contribute to either the building area or number of stories as regulated by [Section 503.1](#). The area of the mezzanine shall be included in determining the fire area. The clear height above and below the mezzanine floor construction shall be not less than 7 feet (2134 mm).

505.2.1 Area limitation.

The aggregate area of a mezzanine or mezzanines within a room shall be not greater than one-third of the floor area of that room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area 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 floor area of the room.

Exceptions:

1. The aggregate area of mezzanines in buildings and structures of Type I or II construction for special industrial occupancies in accordance with [Section 503.1.1](#) shall be not greater than two-thirds of the floor area of the room.
2. The aggregate area of mezzanines in buildings and structures of Type I or II construction shall be not greater than one-half of the floor area of the room in buildings and structures equipped throughout with an approved automatic sprinkler system in accordance with [Section 903.3.1.1](#) and an approved emergency voice/alarm communication system in accordance with [Section 907.5.2.2](#).
3. The aggregate area of a mezzanine within a dwelling unit that is located in a building equipped throughout with an approved automatic sprinkler system in accordance with [Section 903.3.1.1](#) or [903.3.1.2](#) shall not be greater than one-half of the floor area of the room, provided that:
 - 3.1. Except for enclosed closets and bathrooms, the mezzanine shall be open to the room in which such mezzanine is located;
 - 3.2. The opening to the room shall be unobstructed except for walls not more than 42 inches (1067 mm) in height, columns and posts; and
 - 3.3. Exceptions to [Section 505.2.3](#) shall not be permitted.

505.2.1.1 Aggregate area of mezzanines and equipment platforms.

Where a room contains both a mezzanine and an equipment platform, the aggregate area of the two raised floor levels shall be not greater than two-thirds of the floor area of that room or space in which they are located. The area of the mezzanine shall not exceed the area determined in accordance with [Section 505.2.1](#).

505.2.2 Means of egress.

The means of egress for mezzanines shall comply with the applicable provisions of [Chapter 10](#).

505.2.3 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) in height, 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 is not greater than 10.
2. A mezzanine having two or more exits or access to exits is not required to be open to the room in which the mezzanine is located.
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 is not greater than 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 occupancies other than Groups H and I, which are no more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with [Section 903.3.1.1](#), a mezzanine having two or more exits or access to exits shall not be required to be open to the room in which the mezzanine is located.

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505.3 Equipment platforms.

Equipment platforms in buildings shall not be considered as a portion of the floor below. Such *equipment platforms* shall not contribute to either the *building area* or the number of *stories* as regulated by Section 503.1. The area of the *equipment platform* shall not be included in determining the *fire area* in accordance with Section 903. *Equipment platforms* shall not be a part of any *mezzanine* and such platforms and the walkways, *stairways*, *alternating tread devices* and ladders providing access to an *equipment platform* shall not serve as a part of the *means of egress* from the building.

505.3.1 Area limitation.

The aggregate area of all *equipment platforms* within a room shall be not greater than two-thirds of the area of the room in which they are located. Where an *equipment platform* is located in the same room as a *mezzanine*, the area of the *mezzanine* shall be determined by [Section 505.2.1](#) and the combined aggregate area of the *equipment platforms* and *mezzanines* shall be not greater than two-thirds of the room in which they are located. The area of the *mezzanine* shall not exceed the area determined in accordance with Section 505.2.1.

505.3.2 Automatic sprinkler system.

Where located in a building that is required to be protected by an *automatic sprinkler system*, *equipment platforms* shall be fully protected by sprinklers above and below the platform, where required by the standards referenced in [Section 903.3](#).

505.3.3 Guards.

Equipment platforms shall have *guards* where required by [Section 1015.2](#).

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SECTION 506 BUILDING AREA

506.1 General.

The floor area of a building shall be determined based on the type of construction, occupancy classification, whether there is an *automatic sprinkler system* installed throughout the building and the amount of building frontage on *public way* or open space.

506.1.1 Unlimited area buildings.

Unlimited area buildings shall be designed in accordance with [Section 507](#).

506.1.2 Special provisions.

The special provisions of [Section 510](#) permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable areas of buildings based on the occupancy classification and type of construction, provided the special condition complies with the provisions specified in [Section 510](#).

506.1.3 Basements.

Basements need not be included in the total allowable floor area of a building provided the total area of such *basements* does not exceed the area permitted for a one-story *above grade plane* building.

506.2 Allowable area determination.

The allowable area of a building shall be determined in accordance with the applicable provisions of [Sections 506.2.1](#), [506.2.2](#) and [506.3](#).

TABLE 506.2
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET^{a, b}

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A-1	NS	UL	UL	15,50 0	8,500	14,00 0	8,500	45,00 0	30,00 0	18,75 0	15,00 0	11,5 00	5,50 0
	S1	UL	UL	62,00 0	34,00 0	56,00 0	34,00 0	180,0 00	120,0 00	75,00 0	60,00 0	46,0 00	22,0 00
	SM	UL	UL	46,50 0	25,50 0	42,00 0	25,50 0	135,0 00	90,00 0	56,25 0	45,00 0	34,5 00	16,5 00
A-2	NS	UL	UL	15,50 0	9,500	14,00 0	9,500	45,00 0	30,00 0	18,75 0	15,00 0	11,5 00	6,00 0
	S1	UL	UL	62,00 0	38,00 0	56,00 0	38,00 0	180,0 00	120,0 00	75,00 0	60,00 0	46,0 00	24,0 00
	SM	UL	UL	46,50 0	28,50 0	42,00 0	28,50 0	135,0 00	90,00 0	56,25 0	45,00 0	34,5 00	18,0 00
A-3	NS	UL	UL	15,50 0	9,500	14,00 0	9,500	45,00 0	30,00 0	18,75 0	15,00 0	11,5 00	6,00 0
	S1	UL	UL	62,00 0	38,00 0	56,00 0	38,00 0	180,0 00	120,0 00	75,00 0	60,00 0	46,0 00	24,0 00
	SM	UL	UL	46,50 0	28,50 0	42,00 0	28,50 0	135,0 00	90,00 0	56,25 0	45,00 0	34,5 00	18,0 00
A-4	NS	UL	UL	15,50 0	9,500	14,00 0	9,500	45,00 0	30,00 0	18,75 0	15,00 0	11,5 00	6,00 0
	S1	UL	UL	62,00 0	38,00 0	56,00 0	38,00 0	180,0 00	120,0 00	75,00 0	60,00 0	46,0 00	24,0 00
	SM	UL	UL	46,50 0	28,50 0	42,00 0	28,50 0	135,0 00	90,00 0	56,25 0	45,00 0	34,5 00	18,0 00
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S1			UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	SM			UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	NS	UL	UL	37,50 0	23,00 0	28,50 0	19,00 0	108,0 00	72,00 0	45,00 0	36,00 0	18,0 00	9,00 0

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B	S1	UL	UL	150,000	92,000	114,000	76,000	432,000	288,000	180,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	324,000	216,000	135,000	108,000	54,000	27,000
E	NS	UL	UL	26,500	14,500	23,500	14,500	76,500	51,000	31,875	25,500	18,500	9,500
	S1	UL	UL	106,000	58,000	94,000	58,000	306,000	204,000	127,500	102,000	74,000	38,000
	SM	UL	UL	79,500	43,500	70,500	43,500	229,500	153,000	95,625	76,500	55,500	28,500
F-1	NS	UL	UL	25,000	15,500	19,000	12,000	100,500	67,000	41,875	33,500	14,000	8,500
	S1	UL	UL	100,000	62,000	76,000	48,000	402,000	268,000	167,500	134,000	56,000	34,000
	SM	UL	UL	75,000	46,500	57,000	36,000	301,500	201,000	125,625	100,500	42,000	25,500
F-2	NS	UL	UL	37,500	23,000	28,500	18,000	151,500	101,000	63,125	50,500	21,000	13,000
	S1	UL	UL	150,000	92,000	114,000	72,000	606,000	404,000	252,500	202,000	84,000	52,000
	SM	UL	UL	112,500	69,000	85,500	54,000	454,500	303,000	189,375	151,500	63,000	39,000
H-1	NS ^c	21,000	16,500	11,000	7,000	9,500	7,000	10,500	10,500	10,500	10,500	7,500	NP
	S1												
H-2	NS ^c	21,000	16,500	11,000	7,000	9,500	7,000	10,500	10,500	10,500	10,500	7,500	3,000
	S1												
	SM												
H-3	NS ^c	UL	60,000	26,500	14,000	17,500	13,000	25,500	25,500	25,500	25,500	10,000	5,000
	S1												
	SM												
H-4	NS ^{c, d}	UL	UL	37,500	17,500	28,500	17,500	72,000	54,000	40,500	36,000	18,000	6,500
	S1	UL	UL	150,000	70,000	114,000	70,000	288,000	216,000	162,000	144,000	72,000	26,000
	SM	UL	UL	112,500	52,500	85,500	52,500	216,000	162,000	121,500	108,000	54,000	19,500
H-5	NS ^{c, d}	UL	UL	37,500	23,000	28,500	19,000	72,000	54,000	40,500	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	288,000	216,000	162,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	216,000	162,000	121,500	108,000	54,000	27,000
I-1	NS ^{d, e}	UL	55,000	19,000	10,000	16,500	10,000	54,000	36,000	18,000	18,000	10,500	4,500
	S1	UL	220,000	76,000	40,000	66,000	40,000	216,000	144,000	72,000	72,000	42,000	18,000
	SM	UL	165,000	57,000	30,000	49,500	30,000	162,000	108,000	54,000	54,000	31,500	13,500
I-2	NS ^{d, f}	UL	UL	15,000	11,000	12,000	NP	36,000	24,000	12,000	12,000	9,500	NP
	S1	UL	UL	60,000	44,000	48,000	NP	144,000	96,000	48,000	48,000	38,000	NP
	SM	UL	UL	45,000	33,000	36,000	NP	108,000	72,000	36,000	36,000	28,500	NP
I-3	NS ^{d, e}	UL	UL	15,000	10,000	10,500	7,500	36,000	24,000	12,000	12,000	7,500	5,000
	S1	UL	UL	60,000	40,000	42,000	30,000	144,000	96,000	48,000	48,000	30,000	20,000
	SM	UL	UL	45,000	30,000	31,500	22,500	108,000	72,000	36,000	36,000	22,500	15,000

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I-4	NS ^{d, g}	UL	60,50 0	26,50 0	13,00 0	23,50 0	13,00 0	76,50 0	51,00 0	25,50 0	25,50 0	18,5 00	9,00 0
	S1	UL	121,0 00	106,0 00	52,00 0	94,00 0	52,00 0	306,0 00	204,0 00	102,0 00	102,0 00	74,0 00	36,0 00
	SM	UL	181,5 00	79,50 0	39,00 0	70,50 0	39,00 0	229,5 00	153,0 00	76,50 0	76,50 0	55,5 00	27,0 00
M	NS	UL	UL	21,50 0	12,50 0	18,50 0	12,50 0	61,50 0	41,00 0	26,62 5	20,50 0	14,0 00	9,00 0
	S1	UL	UL	86,00 0	50,00 0	74,00 0	50,00 0	246,0 00	164,0 00	102,5 00	82,00 0	56,0 00	36,0 00
	SM	UL	UL	64,50 0	37,50 0	55,50 0	37,50 0	184,5 00	123,0 00	76,87 5	61,50 0	42,0 00	27,0 00
R-1 ^h	NS ^d	UL	UL	24,00 0	16,00 0	24,00 0	16,00 0	61,50 0	41,00 0	25,62 5	20,50 0	12,0 00	7,00 0
	S13R												
	S1	UL	UL	96,00 0	64,00 0	96,00 0	64,00 0	246,0 00	164,0 00	102,5 00	82,00 0	48,0 00	28,0 00
	SM	UL	UL	72,00 0	48,00 0	72,00 0	48,00 0	184,5 00	123,0 00	76,87 5	61,50 0	36,0 00	21,0 00
R-2 ^h	NS ^d	UL	UL	24,00 0	16,00 0	24,00 0	16,00 0	61,50 0	41,00 0	25,62 5	20,50 0	12,0 00	7,00 0
	S13R												
	S1	UL	UL	96,00 0	64,00 0	96,00 0	64,00 0	246,0 00	164,0 00	102,5 00	82,00 0	48,0 00	28,0 00
	SM	UL	UL	72,00 0	48,00 0	72,00 0	48,00 0	184,5 00	123,0 00	76,87 5	61,50 0	36,0 00	21,0 00
R-3 ^h	NS ^d	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S13D												
	S13R												
	S1												
	SM												
R-4 ^h	NS ^d	UL	UL	24,00 0	16,00 0	24,00 0	16,00 0	61,50 0	41,00 0	25,62 5	20,50 0	12,0 00	7,00 0
	S13D												
	S13R												
	S1	UL	UL	96,00 0	64,00 0	96,00 0	64,00 0	246,0 00	164,0 00	102,5 00	82,00 0	48,0 00	28,0 00
	SM	UL	UL	72,00 0	48,00 0	72,00 0	48,00 0	184,5 00	123,0 00	76,87 5	61,50 0	36,0 00	21,0 00
S-1	NS	UL	48,00 0	26,00 0	17,50 0	26,00 0	17,50 0	76,50 0	51,00 0	31,87 5	25,50 0	14,0 00	9,00 0
	S1	UL	192,0 00	104,0 00	70,00 0	104,0 00	70,00 0	306,0 00	204,0 00	127,5 00	102,0 00	56,0 00	36,0 00
	SM	UL	144,0 00	78,00 0	52,50 0	78,00 0	52,50 0	229,5 00	153,0 00	95,62 5	76,50 0	42,0 00	27,0 00
S-2	NS	UL	79,00 0	39,00 0	26,00 0	39,00 0	26,00 0	115,5 00	77,00 0	48,12 5	38,50 0	21,0 00	13,5 00
	S1	UL	316,0 00	156,0 00	104,0 00	156,0 00	104,0 00	462,0 00	308,0 00	192,5 00	154,0 00	84,0 00	54,0 00
	SM	UL	237,0 00	117,0 00	78,00 0	117,0 00	78,00 0	346,5 00	231,0 00	144,3 75	115,5 00	63,0 00	40,5 00
U	NS ⁱ	UL	35,50 0	19,00 0	8,500	14,00 0	8,500	54,00 0	36,00 0	22,50 0	18,00 0	9,00 0	5,50 0
	S1	UL	142,0 00	76,00 0	34,00 0	56,00 0	34,00 0	216,0 00	144,0 00	90,00 0	72,00 0	36,0 00	22,0 00
	SM	UL	106,5 00	57,00 0	25,50 0	42,00 0	25,50 0	162,0 00	108,0 00	67,50 0	54,00 0	27,0 00	16,5 00

For SI: 1 square foot = 0.0929 m².

UL = Unlimited; NP = Not Permitted; NS = Buildings not equipped throughout with an automatic sprinkler system; S1 = Buildings a maximum of one story above grade plane

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equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.1](#); SM = Buildings two or more stories above grade plane equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.1](#); S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.2](#); S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.3](#).

- a. See [Chapters 4 and 5](#) for specific exceptions to the allowable area in this chapter.
- b. See [Section 903.2](#) for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
- c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.5](#).
- d. The NS value is only for use in evaluation of existing building area in accordance with the *International Existing Building Code*.
- e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.6](#). For new Group I-1 occupancies, Condition 1, see Exception 1 of [Section 903.2.6](#).
- f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.6](#) and [Section 1103.5](#) of the *International Fire Code*.
- g. New Group I-4 occupancies see Exceptions 2 and 3 of [Section 903.2.6](#).
- h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with [Section 903.2.8](#).
- i. The maximum allowable area for a single-story nonsprinklered Group U greenhouse is permitted to be 9,000 square feet, or the allowable area shall be permitted to comply with Table C102.1 of Appendix C.

506.2.1 Single-occupancy buildings.

The allowable area of [each story](#) of a single-occupancy building shall be determined in accordance with [Equation 5-1](#):

$$A_a = A_t + (NS \times I_f)$$

where:

(Equation 5-1)

A_a = Allowable area (square feet).

A_t = Tabular allowable area factor (NS, S1, S13R or S13D value, as applicable) in accordance with [Table 506.2](#).

NS = Tabular allowable area factor in accordance with [Table 506.2](#) for nonsprinklered building (regardless of whether the building is sprinklered).

I_f = Area factor increase due to frontage (percent) as calculated in accordance with [Section 506.3](#).

The allowable area per story of a single-occupancy building with a maximum of three stories above grade shall be determined by [Equation 5-1](#). The total allowable area of a single-occupancy building more than three stories above grade plane shall be determined in accordance with [Equation 5-2](#):

$$A_a = [A_t + (NS \times I_f)] \times S_a$$

where:

(Equation 5-2)

A_a = Allowable area (square feet).

A_t = Tabular allowable area factor (NS, S13R, S13D or SM value, as applicable) in accordance with [Table 506.2](#).

NS = Tabular allowable area factor in accordance with [Table 506.2](#) for a nonsprinklered building (regardless of whether the building is sprinklered).

I_f = Area factor increase due to frontage (percent) as calculated in accordance with [Section 506.3](#).

S_a = 3 where the actual number of stories above grade plane exceeds three, or

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$S_a = 4$ where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2.

The actual area of any individual floor shall not exceed the allowable area per Equation 5-1.

506.2.2 Mixed-occupancy buildings.

The allowable area of each story of a mixed-occupancy building shall be determined in accordance with the applicable provisions of, Section 508.3.2 for nonseparated occupancies and Section 508.4.2 for separated occupancies.

For buildings with more than three stories above grade plane, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such stories, determined in accordance with Equation 5-3 based on the applicable provisions of Section 508.1, shall not exceed three.

$$A_a = [A_t + (NS \times I_f)]$$

where: (Equation 5-3)

A_a = Allowable area (square feet).

A_t = Tabular allowable area factor (NS, S13R, S13D or SM value, as applicable) in accordance with Table 506.2.

NS = Tabular allowable area factor in accordance with Table 506.2 for a nonsprinklered building, regardless of whether the building is sprinklered.

I_f = Area factor increase due to frontage (percent) as calculated in accordance with Section 506.3.

Exception: For buildings designed as separated occupancies under Section 508.4 and equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2, the total building area shall be such that the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such stories determined in accordance with Equation 5-3 based on the applicable provisions of Section 508.1, shall not exceed four.

506.2.2.1 Group H-2 or H-3 mixed occupancies.

For a building containing Group H-2 or H-3 occupancies, the allowable area shall be determined in accordance with Section 508.4.2, with the automatic sprinkler system increase applicable only to the portions of the building not classified as Group H-2 or H-3.

506.3 Frontage increase.

Every building shall adjoin or have access to a public way to receive an area factor increase based on frontage. Area factor increase shall be determined in accordance with Sections 506.3.1 through 506.3.3.

506.3.1 Minimum percentage of perimeter.

To qualify for an area factor increase based on frontage, a building shall have not less than 25 percent of its perimeter on a public way or open space. 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.

506.3.2 Minimum frontage distance.

To qualify for an area factor increase based on frontage, the public way or open space adjacent to the building perimeter shall have a minimum distance (W) of 20 feet (6096 mm) measured at right angles from the building face to any of the following:

- 1. The closest interior lot line.
- 2. The entire width of a street, alley or public way.
- 3. The exterior face of an adjacent building on the same property.

The frontage increase shall be based on the smallest public way or open space that is 20 feet (6096 mm) or greater, and the percentage of building perimeter having a minimum 20 feet (6096 mm) public way or open space.

506.3.3 Amount of increase.

The area factor increase based on frontage shall be determined in accordance with Table 506.3.3.

**TABLE 506.3.3
FRONTAGE INCREASE FACTOR^a**

PERCENTAGE OF BUILDING PERIMETER	OPEN SPACE (feet)			
	0 to less than 20	20 to less than 25	25 to less than 30	30 or greater
0 to less than 25	0	0	0	0

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25 to less than 50	0	0.17	0.21	0.25
50 to less than 75	0	0.33	0.42	0.50
75 to 100	0	0.50	0.63	0.75

506.3.3.1 Section 507 buildings.

Where a building meets the requirements of Section 507, as applicable, except for compliance with the minimum 60-foot (18 288 mm) *public way* or *yard* requirement, the area factor increase based on frontage shall be determined in accordance with Table 506.3.3.1.

TABLE 506.3.3.1
SECTION 507 BUILDINGS^a

PERCENTAGE OF BUILDING PERIMETER	OPEN SPACE (feet)					
	30 to less than 35	35 to less than 40	40 to less than 45	45 to less than 50	50 to less than 55	55 to less than 60
0 to less than 25	0	0	0	0	0	0
25 to less than 50	0.29	0.33	0.38	0.42	0.46	0.50
50 to less than 75	0.58	0.67	0.75	0.83	0.92	1.00
75 to 100	0.88	1.00	1.13	1.25	1.38	1.50

a. Interpolation is permitted.

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2021 Virginia Construction Code

CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS

SECTION 507 UNLIMITED AREA BUILDINGS

507.1 General.

The area of buildings of the occupancies and configurations specified in [Sections 507.1](#) through [507.13](#) shall not be limited. Basements not more than one *story* below *grade plane* shall be permitted.

507.1.1 Accessory occupancies.

Accessory occupancies shall be permitted in unlimited area buildings in accordance with the provisions of [Section 508.2](#), otherwise the requirements of [Sections 507.3](#) through [507.13](#) shall be applied, where applicable.

507.2 Measurement of open spaces.

Where [Sections 507.3](#) through [507.13](#) require buildings to be surrounded and adjoined by *public ways* and *yards*, those open spaces shall be determined as follows:

1. *Yards* shall be measured from the building perimeter in all directions to the closest interior *lot lines* or to the exterior face of an opposing building located on the same *lot*, as applicable.
2. Where the building fronts on a *public way*, the entire width of the *public way* shall be used.

507.2.1 Reduced open space.

The *public ways* or *yards* of 60 feet (18 288 mm) in width required in [Sections 507.3](#), [507.4](#), [507.5](#), [507.6](#) and [507.12](#) shall be permitted to be reduced to not less than 40 feet (12 192 mm) in width, provided that the following requirements are met:

1. The reduced width shall not be allowed for more than 75 percent of the perimeter of the building.
2. The *exterior walls* facing the reduced width shall have a *fire-resistance rating* of not less than 3 hours.
3. Openings in the *exterior walls* facing the reduced width shall have opening protectives with a *fire protection rating* of not less than 3 hours.

507.3 Nonsprinklered, one-story buildings.

The area of a Group F-2 or S-2 building not more than one *story* in height shall not be limited where the building is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width.

507.4 Sprinklered, one-story buildings.

The area of a Group A-4 building not more than one *story above grade plane* of other than Type V construction, or the area of a Group B, F, M or S building no more than one *story above grade plane* of any construction type, shall not be limited where 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:

1. Buildings and structures of Type I or II construction for rack storage facilities that do not have access by the public shall not be limited in height, provided that such buildings conform to the requirements of [Sections 507.4](#) and [903.3.1.1](#) and [Chapter 32](#) of the *International Fire Code*.
2. 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 the following criteria are met:
 - 2.1. *Exit* doors directly to the outside are provided for occupants of the participant sports areas.
 - 2.2. The building is equipped with a *fire alarm system* with *manual fire alarm boxes* installed in accordance with [Section 907](#).
 - 2.3. An *automatic sprinkler system* is provided in storage rooms, press boxes, concession booths or other spaces ancillary to the sport activity space.

507.4.1 Mixed occupancy buildings with Groups A-1 and A-2.

Group A-1 and A-2 occupancies of other than Type V construction shall be permitted within mixed occupancy buildings of unlimited area complying with [Section 507.4](#), provided that the following criteria are met:

1. Group A-1 and A-2 occupancies are separated from other occupancies as required for separated occupancies in [Section 508.4.4](#) with no reduction allowed in the *fire-resistance rating* of the separation based upon the installation of an *automatic sprinkler system*.
2. Each area of the portions of the building used for Group A-1 or A-2 occupancies shall not exceed the maximum allowable area permitted for such occupancies in [Section 503.1](#).

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3. *Exit* doors from Group A-1 and A-2 occupancies shall discharge directly to the exterior of the building.

507.5 Two-story buildings.

The area of a Group B, F, M or S building not more than two *stories above grade plane* shall not be limited where the building is equipped throughout with an *automatic sprinkler system* 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.

507.6 Group A-3 buildings of Type II construction.

The area of a Group A-3 building not more than one *story above grade plane*, used as a *place of religious worship*, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor *swimming pool* or tennis court of Type II construction, shall not be limited provided that the following criteria are met:

1. The building shall not have a *stage* other than a *platform*.
2. The building shall be equipped throughout with an *automatic sprinkler system* in accordance with [Section 903.3.1.1](#).
3. The building shall be surrounded and adjoined by *public ways or yards* not less than 60 feet (18 288 mm) in width.

507.7 Group A-3 buildings of Type III and IV construction.

The area of a Group A-3 building of Type III or IV construction, with not more than one *story above grade plane* and used as a *place of religious worship*, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor *swimming pool* or tennis court, shall not be limited provided that the following criteria are met:

1. The building shall not have a *stage* other than a *platform*.
2. The building shall be equipped throughout with an *automatic sprinkler system* in accordance with [Section 903.3.1.1](#).
3. The assembly floor shall be located at or within 21 inches (533 mm) of street or grade level and all *exits* are provided with *ramps* complying with [Section 1012](#) to the street or grade level.
4. The building shall be surrounded and adjoined by *public ways or yards* not less than 60 feet (18 288 mm) in width.

507.8 Group H-2, H-3 and H-4 occupancies.

Group H-2, H-3 and H-4 occupancies shall be permitted in unlimited area buildings containing Group F or S occupancies in accordance with [Sections 507.4](#) and [507.5](#) and the provisions of [Sections 507.8.1](#) through [507.8.4](#).

507.8.1 Allowable area.

The aggregate floor area of Group H occupancies located in an unlimited area building shall not exceed 10 percent of the area of the building or the area limitations for the Group H occupancies as specified in [Section 506](#) based on the perimeter of each Group H floor area that fronts on a *public way* or open space.

507.8.1.1 Located within the building.

The aggregate floor area of Group H occupancies not located at the perimeter of the building shall not exceed 25 percent of the area limitations for the Group H occupancies as specified in [Section 506](#).

507.8.1.1.1 Rooms for flammable or combustible liquid use, dispensing or mixing in open systems.

Rooms for flammable or combustible liquid use, dispensing or mixing in open systems 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](#).

507.8.1.1.2 Liquid storage rooms and rooms for flammable or combustible liquid use in closed systems.

Liquid storage rooms *and rooms for flammable or combustible liquid use in closed systems* 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](#).

507.8.1.1.3 Spray paint booths.

Spray paint booths that comply with the [International Fire Code](#) need not be located on the outer perimeter.

507.8.2 Located on building perimeter.

Except as provided for in [Section 507.8.1.1](#), Group H occupancies shall be located on the perimeter of the building. In Group H-2 and H-3 occupancies, not less than 25 percent of the perimeter of such occupancies shall be an *exterior wall*.

507.8.3 Occupancy separations.

Group H occupancies shall be separated from the remainder of the unlimited area building and from each other in accordance with [Table 508.4](#).

507.8.4 Height limitations.

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For two-story, unlimited area buildings, Group H occupancies shall not be located more than one story above grade plane unless permitted based on the allowable height and number of stories and feet as specified in [Section 504](#) based on the type of construction of the unlimited area building.

507.9 Unlimited mixed occupancy buildings with Group H-5.

The area of a Group B, F, H-5, M or S building not more than two stories above grade plane shall not be limited where the building is equipped throughout with an automatic sprinkler system 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, provided that the following criteria are met:

1. Buildings containing Group H-5 occupancy shall be of Type I or II construction.
2. Each area used for Group H-5 occupancy shall be separated from other occupancies as required in [Sections 415.11](#) and [508.4](#).
3. Each area used for Group H-5 occupancy shall not exceed the maximum allowable area permitted for such occupancies in [Section 503.1](#) including modifications of [Section 506](#).

Exception: Where the Group H-5 occupancy exceeds the maximum allowable area, the Group H-5 shall be subdivided into areas that are separated by 2-hour fire barriers.

507.10 Aircraft paint hangar.

The area of a Group H-2 aircraft paint hangar not more than one story above grade plane shall not be limited where such aircraft paint hangar complies with the provisions of [Section 412.5](#) and is surrounded and adjoined by public ways or yards not less in width than one and one-half times the building height.

507.11 Group E buildings.

The area of a Group E building not more than one story above grade plane, of Type II, IIIA or IV construction, shall not be limited provided that 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 1022](#).
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.

507.12 Motion picture theaters.

In buildings of Type II construction, the area of a motion picture theater located on the first story above grade plane shall not be limited where 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.

507.13 Covered and open mall buildings and anchor buildings.

The area of covered and open mall buildings and anchor buildings not exceeding three stories in height that comply with [Section 402](#) shall not be limited.

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CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS

SECTION 508 MIXED USE AND OCCUPANCY

508.1 General.

Each portion of a building shall be individually classified in accordance with [Section 302.1](#). Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of [Section 508.2](#), [508.3](#), [508.4](#) or [508.5](#), or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with [Section 510](#).
2. Where required by [Table 415.6.5](#), areas of Group H-1, H-2 and H-3 occupancies shall be located in a *detached building* or structure.

508.2 Accessory occupancies.

Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of [Sections 508.2.1](#) through [508.2.4](#).

508.2.1 Occupancy classification.

Accessory occupancies shall be individually classified in accordance with [Section 302.1](#). The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

508.2.2 Allowable building height.

The allowable height and number of *stories* of the building containing accessory occupancies shall be in accordance with [Section 504](#) for the main occupancy of the building.

508.2.3 Allowable building area.

The allowable area of the building shall be based on the applicable provisions of [Section 506](#) for the main occupancy of the building. Aggregate accessory occupancies shall not occupy more than 10 percent of the floor area of the *story* in which they are located and shall not exceed the tabular values for nonsprinklered buildings in [Table 506.2](#) for each such accessory occupancy.

508.2.4 Separation of occupancies.

No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with [Section 508.4](#).
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from accessory occupancies contiguous to them in accordance with the requirements of [Section 420](#).

508.3 Nonseparated occupancies.

Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

508.3.1 Occupancy classification.

Nonseparated occupancies shall be individually classified in accordance with [Section 302.1](#). The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space. In addition, the most restrictive provisions of [Chapter 9](#) that apply to the nonseparated occupancies shall apply to the total nonseparated occupancy area.

508.3.1.1 High-rise buildings.

Where nonseparated occupancies occur in a *high-rise building*, the most restrictive requirements of [Section 403](#) that apply to the nonseparated occupancies shall apply throughout the *high-rise building*.

508.3.1.2 Group I-2, Condition 2 occupancies.

Where one of the nonseparated occupancies is Group I-2, Condition 2, the most restrictive requirements of [Sections 407](#), [509](#) and [712](#) shall apply throughout the *fire area* containing the Group I-2 occupancy. The most restrictive requirements of [Chapter 10](#) shall apply to the path of egress from the Group I-2, Condition 2 occupancy up to and including the *exit discharge*.

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508.3.2 Allowable building area, height and number of stories.

The allowable *building area*, *height* and number of *stories* of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with [Section 503.1](#).

508.3.3 Separation.

No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 occupancies shall be separated from all other occupancies in accordance with [Section 508.4](#).
2. Group I-1, R-1, R-2 and R-3 *dwelling units* and *sleeping units* shall be separated from other *dwelling* or *sleeping units* and from other occupancies contiguous to them in accordance with the requirements of [Section 420](#).

508.4 Separated occupancies.

Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)^f

OCCUPANCY	A, E		I-1 ^a , I-3, I-4		I-2		R ^a		F-2, S-2 ^b , U		B ^e , F-1, M, S-1		H-1		H-2		H-3, H-4		H-5	
	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS	S	NS
A, E	N	N	1	2	2	NP	1	2	N	1	1	2	NP	NP	3	4	2	3	2	NP
I-1 ^a , I-3, I-4	1	2	N	N	2	NP	1	NP	1	2	1	2	NP	NP	3	NP	2	NP	2	NP
I-2	2	NP	2	NP	N	N	2	NP	2	NP	2	NP	NP	NP	3	NP	2	NP	2	NP
R ^a	1	2	1	NP	2	NP	N	N	1 ^c	2 ^c	1	2	NP	NP	3	NP	2	NP	2	NP
F-2, S-2 ^b , U	N	1	1	2	2	NP	1 ^c	2 ^c	N	N	1	2	NP	NP	3	4	2	3	2	NP
B ^e , F-1, M, S-1	1	2	1	2	2	NP	1	2	1	2	N	N	NP	NP	2	3	1	2	1	NP
H-1	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	N	NP	NP	NP	NP	NP	NP	NP
H-2	3	4	3	NP	3	NP	3	NP	3	4	2	3	NP	NP	N	NP	1	NP	1	NP
H-3, H-4	2	3	2	NP	2	NP	2	NP	2	3	1	2	NP	NP	1	NP	1 ^d	NP	1	NP
H-5	2	NP	2	NP	2	NP	2	NP	2	NP	1	NP	NP	NP	1	NP	1	NP	N	NP

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.1](#).

NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with [Section 903.3.1.1](#).

N = No separation requirement.

NP = Not Permitted.

- a. See [Section 420](#).
- b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but not to less than 1 hour.
- c. See [Sections 406.3.2 and 406.6.4](#).
- d. Separation is not required between occupancies of the same classification.
- e. See [Section 422.2](#) for *ambulatory care facilities*.
- f. Occupancy separations that serve to define fire area limits established in [Chapter 9](#) for requiring fire protection systems shall also comply with [Section 707.3.10](#) and [Table 707.3.10](#) in accordance with [Section 901.7](#).

508.4.1 Occupancy classification.

Separated occupancies shall be individually classified in accordance with [Section 302.1](#). Each separated space shall

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comply with this code based on the occupancy classification of that portion of the building. The most restrictive provisions of [Chapter 9](#) that apply to the separate occupancies shall apply to the total nonfire-barrier-separated occupancy areas. Occupancy separations that serve to define *fire area* limits established in [Chapter 9](#) for requiring a *fire protection system* shall also comply with [Section 901.7](#).

508.4.2 Allowable building area.

In each *story*, the *building area* shall be such that the sum of the ratios of the actual *building area* of each separated occupancy divided by the allowable *building area* of each separated occupancy shall not exceed 1.

508.4.3 Allowable building height and number of stories.

Each separated occupancy shall comply with the *building height limitations* and *story limitations* based on the type of construction of the building in accordance with [Section 503.1](#).

Exception: Special provisions of [Section 510](#) shall permit occupancies at *building heights* and number of *stories* other than provided in [Section 503.1](#).

508.4.4 Separation.

Individual occupancies shall be separated from adjacent occupancies in accordance with [Table 508.4](#).

508.4.4.1 Construction.

Required separations shall be *fire barriers* constructed in accordance with [Section 707](#) or *horizontal assemblies* constructed in accordance with [Section 711](#), or both, so as to completely separate adjacent occupancies. *Mass timber elements serving as fire barriers or horizontal assemblies to separate occupancies in Type IV-B or IV-C construction shall be separated from the interior of the building with an approved thermal barrier consisting of gypsum board that is not less than 1/2 inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.*

Relocated

508.5 Live/work units

A *live/work unit* shall comply with [Sections 508.5](#) through [508.5.11](#).

Exception: *Dwelling or sleeping units* that include an office that is less than 10 percent of the area of the *dwelling unit* are permitted to be classified as *dwelling units* with accessory occupancies in accordance with [Section 508.2](#).

508.5.1 Limitations.

The following shall apply to *live/work areas*:

1. The *live/work unit* is permitted to be not greater than 3,000 square feet (279 m²) in area.
2. The nonresidential area is permitted to be not more than 50 percent of the area of each *live/work unit*.
3. The nonresidential area function shall be limited to the first or main floor only of the *live/work unit*.
4. Not more than five nonresidential workers or employees are allowed to occupy the nonresidential area at any one time.

508.5.2 Occupancies.

Live/work units shall be classified as a Group R-2 occupancy. Separation requirements found in [Sections 420](#) and [508](#) shall not apply within the *live/work unit* where the *live/work unit* is in compliance with [Section 508.5](#). Nonresidential uses that would otherwise be classified as either a Group H or S occupancy shall not be permitted in a *live/work unit*.

Exception: Storage shall be permitted in the *live/work unit* provided that the aggregate area of storage in the nonresidential portion of the *live/work unit* shall be limited to 10 percent of the space dedicated to nonresidential activities.

508.5.3 Means of egress.

Except as modified by this section, the *means of egress* components for a *live/work unit* shall be designed in accordance with [Chapter 10](#) for the function served.

508.5.4 Egress capacity.

The egress capacity for each element of the *live/work unit* shall be based on the *occupant load* for the function served in accordance with [Table 1004.5](#).

508.5.5 Spiral stairways.

Spiral stairways that conform to the requirements of [Section 1011.10](#) shall be permitted.

508.5.6 Vertical openings.

Floor openings between floor levels of a *live/work unit* are permitted without enclosure.

[F] 508.5.7 Fire protection.

The *live/work unit* shall be provided with a monitored *fire alarm* system where required by [Section 907.2.9](#) and an

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automatic sprinkler system in accordance with [Section 903.2.8](#).

508.5.8 Structural.

Floors within a *live/work unit* shall be designed for the *live loads* in [Table 1607.1](#), based on the function within the space.

508.5.9 Accessibility.

Accessibility shall be designed in accordance with [Chapter 11](#) for the function served.

508.5.10 Ventilation.

The applicable *ventilation* requirements of the [International Mechanical Code](#) shall apply to each area within the *live/work unit* for the function within that space.

508.5.11 Plumbing facilities.

The nonresidential area of the *live/work unit* shall be provided with minimum plumbing facilities as specified by [Chapter 29](#), based on the function of the nonresidential area. Where the nonresidential area of the *live/work unit* is required to be accessible by [Section 1108.6.2.1](#), the plumbing fixtures specified by [Chapter 29](#) shall be accessible.

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SECTION 509 INCIDENTAL USES

509.1 General

Incidental uses located within single occupancy or mixed occupancy buildings shall comply with the provisions of this section. Incidental uses are ancillary functions associated with a given occupancy that generally pose a greater level of risk to that occupancy and are limited to those uses specified in [Table 509.1](#).

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

**[F]TABLE 509.1
INCIDENTAL USES**

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and provide 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 sprinkler system
In Group E occupancies, laboratories and vocational shops not classified as Group H	1 hour or provide automatic sprinkler system
In Group I-2 occupancies, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
In <i>ambulatory care facilities</i> , laboratories not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
In Group I-2, laundry rooms over 100 square feet	1 hour
Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces	1 hour
In Group I-2, physical plant maintenance shops	1 hour
In <i>ambulatory care facilities</i> or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater	1 hour
In other than <i>ambulatory care facilities</i> and Group I-2 occupancies, waste and linen collection rooms over 100 square feet	1 hour or provide automatic sprinkler system
In <i>ambulatory care facilities</i> or Group I-2 occupancies, storage rooms greater than 100 square feet	1 hour
Electrical installations and transformers	See Sections 110.26 through 110.34 and Sections 450.8 through 450.48 of NFPA 70 for protection and separation requirements.

For SI: 1 square foot = 0.0929 m², 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m³.

509.2 Occupancy classification.

Incidental uses shall not be individually classified in accordance with [Section 302.1](#). Incidental uses shall be included in the building occupancies within which they are located.

509.3 Area limitations.

Incidental uses shall not occupy more than 10 percent of the *building area* of the *story* in which they are located.

509.4 Separation and protection.

The incidental uses specified in [Table 509.1](#) shall be separated from the remainder of the building or equipped with an *automatic sprinkler system*, or both, in accordance with the provisions of that table.

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509.4.1 Separation.

Where [Table 509.1](#) specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the building by a *fire barrier* constructed in accordance with [Section 707](#) or a *horizontal assembly* constructed in accordance with [Section 711](#), or both. Construction supporting 1-hour *fire barriers* or *horizontal assemblies* used for incidental use separations in buildings of Type IIB, IIIB and VB construction is not required to be fire-resistance rated unless required by other sections of this code.

509.4.1.1 Type IV-B and IV-C construction.

Where [Table 509.1](#) specifies a fire-resistance-rated separation, *mass timber elements serving as fire barriers or horizontal assemblies* in Type IV-B or IV-C construction shall be separated from the interior of the incidental use with an *approved thermal barrier* consisting of *gypsum board* that is not less than $\frac{1}{2}$ inch (12.7 mm) in thickness or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

509.4.2 Protection.

Where [Table 509.1](#) permits an *automatic sprinkler system* without a *fire barrier*, the incidental uses shall be separated from the remainder of the building by construction capable of resisting the passage of smoke. The walls shall extend from the top of the foundation or floor assembly below to the underside of the ceiling that is a component of a fire-resistance-rated floor assembly or roof assembly above or to the underside of the floor or roof sheathing, deck or slab above. Doors shall be self- or automatic-closing upon detection of smoke in accordance with [Section 716.2.6.6](#). Doors shall not have air transfer openings and shall not be undercut in excess of the clearance permitted in accordance with [NFPA 80](#). Walls surrounding the incidental use shall not have air transfer openings unless provided with *smoke dampers* in accordance with [Section 710.8](#).

509.4.2.1 Protection limitation.

Where an *automatic sprinkler system* is provided in accordance with [Table 509.1](#), only the space occupied by the incidental use need be equipped with such a system.

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CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS

SECTION 510 SPECIAL PROVISIONS

510.1 General.

The provisions in [Sections 510.2 through 510.9](#) shall permit the use of special conditions that are exempt from, or modify, the specific requirements of this chapter regarding the allowable *building 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 such condition and other applicable requirements of this code. The provisions of [Sections 510.2 through 510.8](#) are to be considered independent and separate from each other.

510.2 Horizontal building separation allowance.

A building shall be considered as separate and distinct buildings for the purpose of determining area limitations, continuity of *fire walls*, limitation of number of *stories* and type of construction where the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 3 hours. Where vertical offsets are provided as part of a *horizontal assembly*, the vertical offset and the structure supporting the vertical offset shall have a *fire-resistance rating* of not less than 3 hours.
2. The building below, including the *horizontal assembly*, is of Type IA construction.
3. *Shaft, stairway, ramp* and escalator enclosures through the *horizontal assembly* shall have not less than a 2-hour *fire-resistance rating* with opening protectives in accordance with [Section 716](#).

Exception: Where the enclosure walls below the *horizontal assembly* have not less than a 3-hour *fire-resistance rating* with opening protectives in accordance with [Section 716](#), the enclosure walls extending above the *horizontal assembly* shall be permitted to have a 1-hour *fire-resistance rating*, provided [that the following conditions are met](#):

1. The building above the *horizontal assembly* is not required to be of Type I construction.
 2. The enclosure connects fewer than four stories.
 3. The enclosure opening protectives above the *horizontal assembly* have a *fire protection rating* of not less than 1 hour.
4. [Interior exit stairways](#) located within the Type IA building are permitted to be of combustible materials where the following requirements are met:
 - 4.1. The building above the Type IA building is of Type III, IV, or V construction.
 - 4.2. The *stairway* located in the Type IA building is enclosed by 3-hour *fire-resistance-rated construction with opening protectives in accordance with Section 716*.
 5. The building or buildings above the *horizontal assembly* shall be permitted to have multiple Group A occupancy uses, each with an *occupant load* of less than 300, or Group B, M, R or S occupancies.
 6. The building below the *horizontal assembly* shall be protected throughout by an *approved automatic sprinkler system* in accordance with [Section 903.3.1.1](#), and shall be permitted to be any occupancy allowed by this code except Group H.
 7. The maximum *building height* in feet (mm) shall not exceed the limits set forth in [Section 504.3](#) for the building having the smaller allowable height as measured from the *grade plane*.

510.3 Group S-2 enclosed parking garage with Group S-2 open parking garage above.

A Group S-2 enclosed parking garage with not more than one *story above grade plane* and located 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 where the following conditions are met:

1. The allowable area of the building 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.
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 tiers of the Group S-2 *open parking garage* shall be limited as specified in [Table 406.5.4](#).
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,

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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 associated with the operation of the building.

510.4 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 shall 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 508.4](#).

510.5 Group R-1 and R-2 buildings of Type IIIA construction.

For buildings of Type IIIA construction in Groups R-1 and R-2, the maximum allowable height in [Table 504.3](#) shall be increased by 10 feet (3048 mm) and the maximum allowable number of stories in [Table 504.4](#) shall be increased by one where the first-floor assembly 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).

510.6 Group R-1 and R-2 buildings of Type IIA construction.

The height limitation for buildings of Type IIA construction in Groups R-1 and 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 *lot lines*, the *exits* are segregated in an area enclosed by a 2-hour fire-resistance-rated *fire wall* and the first floor assembly has a *fire-resistance rating* of not less than 1½ hours.

510.7 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 406.5](#). 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.

510.7.1 Fire separation.

Fire barriers constructed in accordance with [Section 707](#) or *horizontal assemblies* constructed in accordance with [Section 711](#) between the parking occupancy and the upper occupancy shall correspond to the required *fire-resistance rating* prescribed in [Table 508.4](#) 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 not less than a 2-hour *fire-resistance rating* as required by [Section 707](#) with *self-closing doors* complying with [Section 716](#) or *horizontal assemblies* having not less than a 2-hour *fire-resistance rating* as required by [Section 711](#), with *self-closing doors* complying with [Section 716](#). *Means of egress* from the *open parking garage* shall comply with [Section 406.5](#).

510.8 Group B or M buildings with Group S-2 open parking garage above.

Group B or M occupancies located below a Group S-2 *open parking garage* of a lesser type of construction shall be considered as a separate and distinct building from the Group S-2 *open parking garage* for the purpose of determining the type of construction where the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 2 hours.
2. The occupancies in the building below the *horizontal assembly* are limited to Groups B and M.
3. The occupancy above the *horizontal assembly* is limited to a Group S-2 *open parking garage*.
4. The building below the *horizontal assembly* is of Type IA construction.

Exception: The building below the *horizontal assembly* shall be permitted to be of Type IB or II construction, but not less than the type of construction required for the Group S-2 *open parking garage* above, where the building below is not greater than one *story* in height above *grade plane*.

5. The height and area of the building below the *horizontal assembly* does not exceed the limits set forth in [Section 503](#).
6. The height and area of the Group S-2 *open parking garage* does not exceed the limits set forth in [Section 406.5](#). The height, in both feet and *stories*, of the Group S-2 *open parking garage* shall be measured from *grade plane* and shall include the building below the *horizontal assembly*.
7. *Exits* serving the Group S-2 *open parking garage* shall [discharge at grade with direct and unobstructed access](#) to a street or *public way* and are separated from the building below the *horizontal assembly* by 2-hour *fire barriers* constructed in accordance with [Section 707](#) or 2-hour *horizontal assemblies* constructed in accordance with [Section](#)

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711, or both.

510.9 Multiple buildings above a horizontal assembly.

Where two or more buildings are provided above the *horizontal assembly* separating a Group S-2 parking garage or building below from the buildings above in accordance with the special provisions in [Section 510.2](#), [510.3](#) or [510.8](#), the buildings above the *horizontal assembly* shall be regarded as separate and distinct buildings from each other and shall comply with all other provisions of this code as applicable to each separate and distinct building.