

2021 Virginia Construction Code

CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS

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

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.