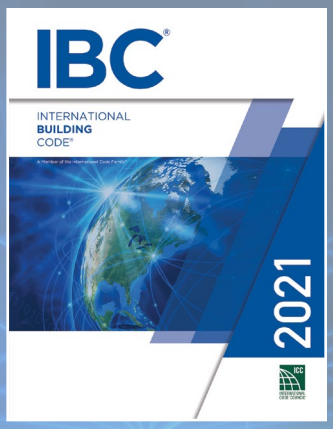

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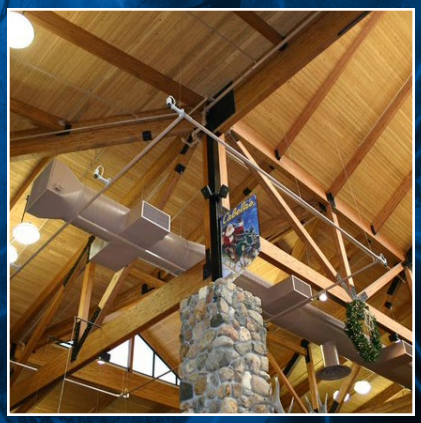

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2021 Code Conforming Wood Design and the IBC

Introduction

Wood construction offers distinct design options typically not found in a single structural material. It is inexpensive, readily available, easy to work with, strong and adaptable. The economic, environmental and energy efficiency advantages account for more buildings being constructed of wood than any other structural material.

The intent of this book is to summarize the allowable wood use in buildings in accordance with the International Code Council (ICC) 2021 *International Building Code*® (IBC®). Emphasis will be placed on the design flexibility permitted for wood in commercial construction. This publication is not a replacement for the IBC and does not encompass all of the design options in the IBC. The IBC, along with any local amendments, should always be consulted for applicable, specific requirements related to designs and site conditions.

New in the 2021 *Code Conforming Wood Design* (CCWD) *and the IBC* is content specific to the three new Types of Construction that were added to the 2021 IBC. Height and Area tables have been updated for each new Type of Construction. Additionally, new provisions added elsewhere in the code applicable to mass timber construction are identified. ICC and AWC also developed a document titled *Mass Timber Buildings and the IBC*® containing code provisions and extensive commentary. It is available in the ICC Store.

Table of Contents

1. General Information

Use and Occupancy Classification

Building code requirements are dependent on the appropriate classification of the building or structure for its design purpose or current occupancy. Eight occupancy classifications are discussed in this book:

Group A, Assembly
Group B, Business
Group E, Educational

Group F, Factory/Industrial
Group I, Institutional
Group M, Mercantile
Group R, Residential
Group S, Storage

The occupancies are described below, but when a structure is proposed for a purpose that is not specifically listed, it should be classified in the group that the occupancy most nearly resembles in accordance with Section 302.1. The authority having jurisdiction e.g., the building or fire official, has the ultimate responsibility for rendering interpretations of the code, including designation of the occupancy classification.

Group H (Hazardous) and Group U (Utility and Miscellaneous) occupancies also may be of wood construction but are beyond the scope of this book.

Assembly Occupancies

The IBC lists Assembly (Group A) occupancies in Section 303. Group A occupancies are divided into five subcategories. Group A-1 includes fixed seating occupancies for viewing performing arts, television studios with audience seating and motion pictures. Group A-2 includes buildings in which food and drink consumption occurs (e.g., restaurants, banquet halls, casinos, bars and nightclubs); Group A-3 includes places of religious worship, waiting areas in terminals, recreation, amusement and other assembly uses not included in the other groups; Group A-4 includes indoor viewing of sporting events and activities with spectator seating (e.g., arenas, skating rinks, swimming pools and tennis courts); and Group A-5 includes outdoor grandstands, stadiums and amusement park structures.

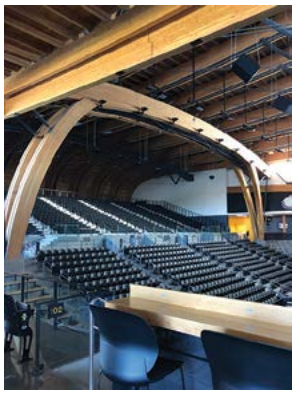


Figure 1—Assembly Occupancy

Business Occupancies

Section 304 describes Business (Group B) occupancies. Group B uses are for office, professional, or service-type transactions, including the storage of records. It is a broad use group that often is chosen when a use does not fit another use group description. Group B can include airport traffic control towers, ambulatory care facilities complying with Section 422, animal hospitals, kennels and pounds, banks, barber and beauty shops, car washes, civic administration, outpatient clinics, dry cleaning and laundry (pick-up and delivery stations and self-service), educational occupancies for students above the 12th grade including higher education laboratories (see Section 428), electronic data processing, testing and research laboratories, food processing establishments not associated with restaurants and dining facilities not more than 2,500 square feet in area, motor vehicle showrooms, post offices, print shops, professional service offices, radio and television stations, telephone exchanges, and training and skill development facilities not located in a school.

Figure 2—Business Occupancy

Educational Occupancies

The IBC lists Educational (Group E) occupancies in Section 305. Group E includes any buildings or portions of a structure used to educate six or more people through the 12th grade. Buildings or portions of a structure used for supervision, personal care or education of more than five children, at least $2^1/_2$ years old, for fewer than 24 hours are also Group E structures.

Figure 3—Educational Occupancy

Factory/Industrial Occupancies

Section 306 defines Factory/Industrial (Group F) occupancies. Group F is subdivided into two occupancy groups: Group F-1 and Group F-2. Group F-1, moderate-hazard factory industrial, includes buildings or portions of buildings used for the manufacturing of materials that cannot be classified as Group F-2, low-hazard industrial. Group F-1 includes the manufacturing of aircraft, appliances, motor vehicles, boats, recreational vehicles, business machines, photo equipment, construction and agricultural machinery, engines, metals, woodworking and millwork, and food processing establishments and commercial kitchens not associated with restaurants and dining facilities and more than 2,500 square feet in area. Group F-1 also includes textile production—canvas, clothing, carpet, hemp, jute and paper—and laundries, printing and publishing, soaps and plastic products, beverages having over 16-percent alcohol content, optical goods, wood working and wood distillation.

Figure 4—Factory/Industrial Occupancy

Group F-2, low-hazard industrial occupancies, are buildings and facilities used for beverage production (up to and including 16-percent alcohol), brick, ceramics, glass, gypsum, ice, metal fabrication and assembly and foundries.

Institutional Occupancies

The IBC lists Institutional (Group I) occupancies in Section 308. Group I includes four subcategories: Group I-1 includes residential and custodial care for more than 16 people receiving care (24-hour care); Group I-2 includes hospitals, foster care facilities (24-hour care), nursing homes and detoxification facilities for more than five people receiving care; Group I-3 includes facilities with five or more people under restraint or security (e.g., jails, detention centers and prisons); and Group I-4 includes day care facilities for more than five adults or children receiving less than 24-hour care.

Figure 5—Institutional Occupancy

Group I-1, I-2 and I-3 occupancies are further broken into conditions based on the occupants' ability to respond to an emergency.

Mercantile Occupancies

Section 309 describes Mercantile (Group M) occupancies. Group M includes department stores, drugstores, greenhouses with display and sale of plants having public access, markets, motor fuel-dispensing facilities, retail or wholesale stores and salesrooms. Essentially any place involving the display and sale of merchandise to the public is classified as a Group M occupancy.

Figure 6—Mercantile Occupancy

Residential Occupancies

The IBC lists Residential (Group R) occupancies in Section 310. Group R contains four subcategories. Group R-1 includes hotels, motels and transient boarding houses with more than 10 occupants; Group R-2 includes apartments, live/work units, timeshare properties and nontransient hotels and motels. R-2 also includes nontransient congregate living facilities with more than 16 occupants such as dormitories and boarding houses. Group R-3 includes single- and two-family dwellings, adult and child day care facilities with less than six occupants receiving care, congregate living facilities—transient (10 or fewer occupants) and nontransient (16 or fewer occupants)—and lodging houses (five or fewer guest rooms and 10 or fewer occupants). Group R-4 includes residential care and assisted living facilities for six to 16 clients who reside on a 24-hour basis. Group R-4 occupancies are further broken into two conditions: Condition 1 where all occupants are capable of responding to an emergency without assistance and Condition 2 where limited assistance may be necessary for any single occupant. This book does not cover requirements for residential occupancies constructed in accordance with the *International Residential Code* (IRC).

Figure 7—Residential Occupancy

Storage Occupancies

Section 311 covers Storage (Group S) occupancies. Group S includes subcategories Group S-1, moderate-hazard storage and Group S-2, low-hazard storage. Group S-1 contains buildings occupied for storage uses that are not classified as Group S-2, including aircraft hangars, beverages over 16-percent alcohol content, clothing, books, paper, lumber, fur, furniture, mattresses, tires, tobacco products, sugar, soap and glue. Group S-1 also includes indoor storage of boats and motor vehicle repair garages that comply with the maximum allowable quantities of hazardous materials.

Figure 8—Storage Occupancy

Group S-2 includes buildings used for storage of noncombustible materials such as beverages up to 16-percent alcohol content, cement, chalk, dry cell batteries, electrical coils and motors, glass, stoves, washers and dryers, metal furniture, metals and food products in noncombustible containers, fresh fruit in nonplastic containers and frozen foods. Open and enclosed public parking garages are also Group S-2 occupancies.

Referenced Code and Standards

The IBC is developed by the International Code Council. Industry and professional standards are referenced in the IBC to clarify specific code requirements. Chapter 35 of the IBC provides a list of the standards referenced, the agency that writes the standard, the identification and title of the standard and its effective date.

Standards represent a consensus on how a material, product or assembly is to be designed, manufactured, tested or installed so it achieves a specified level of performance. Several key standards relating to the design of wood structures are utilized by the IBC. Specifically, the 2021 IBC references four American National Standards which are promulgated by American Wood Council (AWC):

- 2018 *National Design Specification*® (NDS®) *for Wood Construction*
- 2021 *Permanent Wood Foundation* (PWF) *Design Specification*
- 2021 *Special Design Provisions for Wind and Seismic* (SDPWS)
- 2018 *Wood Frame Construction Manual* (WFCM) *for One- and Two-Family Dwellings*

The NDS details structural and fire design methods for the use of lumber, glued-laminated timber, prefabricated wood I-joists, structural composite lumber, wood structural panels and cross-laminated timber. The PWF specification is used for the design of wood foundation systems. The SDPWS addresses materials, design and construction of wood members, fasteners and assemblies used to resist wind and seismic forces. The WFCM includes design and construction provisions for connections, wall systems, floor systems and roof systems. A range of structural elements is also covered, including sawn lumber, structural glued-laminated timber, wood structural sheathing, prefabricated wood I-joists and trusses.

Section 10, Resources, of this book provides information on how to obtain these standards and other related materials.

Figure 9—Referenced standards

2. Types of Construction

Chapter 6 of the IBC defines types of construction, with wood construction typically found in Type V, IV and III. Additionally, the IBC has specific applications that permit the use of wood in construction Types I and II, which are defined as noncombustible. These circumstances are addressed in Sections 5 and 6 of this book.

Type V Construction

Type V construction permits the use of wood or other approved materials for structural elements, including structural frame members, bearing walls, floor and roof construction, as well as nonbearing elements such as exterior walls and interior partitions. Type V construction is further defined as Type VA (all interior and exterior load-bearing walls, floors, roofs and all structural members are designed or protected to provide a minimum 1-hour fire-resistance rating) and Type VB (no fire-resistance rating is required for structural elements based on IBC Table 601).

Figure 10—Type V construction

Type IV Construction

Type IV construction changed significantly in the 2021 IBC, with the addition of three new types of mass timber (MT) construction and the renaming of the historic Type IV to Type IV-HT. The four Type IV construction types are identified as Type IV-A, Type IV-B, Type IV-C and Type IV-HT. Type IV-A, IV-B, and IV-C construction use mass timber building elements and, where required, noncombustible protection to achieve fire-resistance ratings from 1 to 3 hours. Mass timber is defined in Section 202 as structural elements of Type IV construction, primarily wood products that meet minimum cross-section dimensions of Type IV construction (see Section 2304.11). Building elements in Type IV-A construction require protection with noncombustible material for $^{2}/_{3}$ of the required fire-resistance rating. Type IV-B permits some exposed mass timber in the ceiling and walls. When the mass timber is protected, at least $^{2}/_{3}$ of the required fire-resistance rating is required to be of noncombustible protection. When unprotected, the exposed mass timber must be designed for the required fire-resistance rating. In Type IV-C construction, mass timber elements are permitted to be exposed, but must be designed for the required fire-resistance rating (see Figure 12).

Figure 11—Type IV construction

Table 1. Required Fire-resistance Ratings of Building Elements in Hours

Existing Construction Types	**TYPE I-A—Fire-resistance-rated, noncombustible**			
	Exterior Bearing Walls 3 Hrs.*	Structural Frame 3 Hrs.*	Floors 2 Hrs.*	Roofs 1½ Hrs.*
	Note: Dual water supply for fire suppression systems required at 420 feet elevation and above. *Permitted to be reduced by 1 Hr. ($^1/_2$ Hr. for roofs) with certain fire sprinkler controls for buildings less than 420 feet high.			
	TYPE I-B—Fire-resistance-rated, noncombustible			
	Exterior Bearing Walls 2 Hrs.*	Structural Frame 2 Hrs.*	Floors 2 Hrs.	Roofs 1 Hr.
	Note: *Permitted to be reduced by 1 Hr. with certain fire sprinkler controls for less hazardous uses, smaller fuel loads			
	TYPE II-A—Fire-resistance-rated, noncombustible			
	Exterior Bearing Walls 1 Hr.	Structural Frame 1 Hr.	Floors 1 Hr.	Roofs 1 Hr.
	TYPE II-B—Unrated, noncombustible			
	Noncombustible materials, but no fire resistance required			
	TYPE III-A—Fire-resistance-rated, combustible, with fire-resistance-rated, noncombustible or FRTW exterior walls			
	Exterior Bearing Walls 2 Hrs.	Structural Frame 1 Hr.	Floors 1 Hr.	Roofs 1 Hr.
	TYPE III-B—Unrated, combustible, with fire-resistance-rated, noncombustible or FRTW exterior walls			
	Exterior Bearing Walls 2 Hrs.	Structural Frame None	Floors None	Roofs None
New Construction Types	**TYPE IV-A—Fire-resistance-rated, protected mass timber**			
	Exterior Bearing Walls 3 Hrs.	Structural Frame 3 Hrs.	Floors 2 Hrs.	Roofs $1^1/_2$ Hrs.
	Note: Dual water supply for fire suppression systems required at 120 feet elevation and above. No reductions in ratings permitted.			
	TYPE IV-B—Fire-resistance-rated, protected mass timber with limited unprotected elements			
	Exterior Bearing Walls 2 Hrs.	Structural Frame 2 Hrs.	Floors 2 Hrs.	Roofs 1 Hr.
	Note: Dual water supply for fire suppression systems required at 120 feet elevation and above. No reductions in ratings permitted.			
	TYPE IV-C—Fire-resistance-rated, exposed mass timber with limited protected elements			
	Exterior Bearing Walls 2 Hrs.	Structural Frame 2 Hrs.	Floors 2 Hrs.	Roofs 1 Hr.
	Note: No reductions in ratings permitted.			
Existing Construction Types	**TYPE IV-HT—Heavy Timber**			
	Exterior Bearing Walls 2 Hr.	Structural Frame Heavy Timber or 1 Hr.	Floors Heavy Timber	Roofs Heavy Timber
	TYPE V-A—Fire-resistance-rated, combustible			
	Exterior Bearing Walls 1 Hr.	Structural Frame 1 Hr.	Floors 1 Hr.	Roofs 1 Hr.
	TYPE V-B—Unrated, combustible			

Figure 12—Table 1 from *Mass Timber Buildings and the IBC®*

The number of significant changes to the 2021 IBC and IFC are impractical to cover in the *Code Conforming Wood Design and the IBC.* The International Code Council and the American Wood Council collaborated to produce *Mass Timber Buildings and the IBC®*. This publication comprehensively covers all the new sections introduced in the 2021 IBC and IFC, which pertain to the three new types of mass timber construction. The book contains the new code sections as they appear in the code and commentary associated with the actual provisions. The commentary is based on reason statements developed by the ICC Ad Hoc Committee on Tall Wood Buildings and provides valuable insight into the requirements. The book is available through the ICC Store.

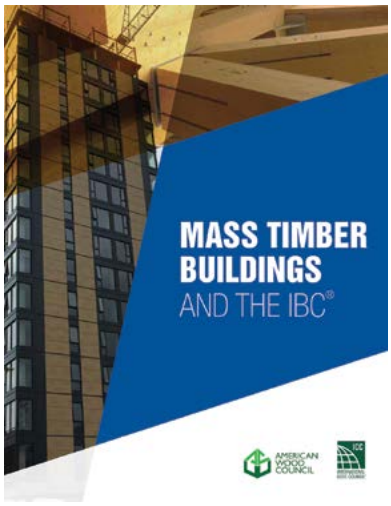


Figure 13—*Mass Timber Buildings and the IBC®*

Type IV-HT (Heavy Timber) is the new designation of the historic Type IV construction dating back to the IBC legacy codes. Often referred to as mill construction, it has exterior walls made of noncombustible materials, fire-retardant-treated wood (FRTW), or cross-laminated timber (CLT) protected in accordance with Section 602.4.4. Interior building elements must be of solid wood, glued-laminated timber, CLT or structural composite lumber. Concealed spaces are permitted as discussed in Section 5 of this book. Columns supporting roof and ceiling loads must be a minimum nominal dimension of 6 inches by 8 inches and 8 inches by 8 inches if supporting floor loads. Floor beams and girders must be a minimum nominal dimension of 6 inches by 10 inches, and roof beams and girders must be a minimum nominal dimension of 4 inches by 6 inches. Flooring must be a minimum nominal 3-inch thickness covered with 1-inch nominal dimension tongue-and-groove flooring or 4-inch-thick CLT. Roof decking must be of a minimum nominal 2-inch thickness, $1^1/_8$-inch-thick wood structural panels, or 3-inch-thick CLT. Partitions must be 1-hour fire-resistance-rated construction or a minimum of two layers of 1-inch nominal boards or laminated construction 4 inches thick.

Type III Construction

Type III construction requires exterior walls to be noncombustible material or FRTW having a minimum 2-hour fire-resistance rating. All other building elements are permitted to be wood or other approved materials. Type IIIA construction needs to provide a minimum 1-hour fire-resistance rating for all building elements other than nonbearing walls, and Type IIIB construction does not require any fire-resistance rating other than the exterior load-bearing wall based on IBC Table 601.

Figure 14—Type III construction

Type I and II Construction

Type I and II construction requires structural building elements to be of noncombustible materials. Sections 5 and 6 of this book outline circumstances where wood is permitted in Type I and II buildings.

Figure 15—Type I and II Construction

3. Allowable Heights and Areas for Type III, IV and V Construction

General building height and area allowances are given in Chapter 5 of the IBC. Allowances are shown in IBC Tables 504.3, 504.4 and 506.2 for height, number of stories and area factor, (A_t), respectively. Excerpts of the tables are shown in Figure 16.

As previously discussed, three new mass timber construction types have been added to the 2021 IBC. Each new construction type has its own height limitation, number of stories permitted and allowable building areas. Type IV-B height and story limits were established based on equivalent performance to Type I-B. The number of stories permitted for Type IV-A was based on current practice. Area factors were established by applying a multiplier to Type IV-HT tabular areas.

The maximum height, number of stories permitted and area of a building is dependent on the occupancy classification and the presence and type of an automatic sprinkler system, as provided in Tables 504.3, 504.4 and 506.2. The increases allowed due to the installation of an automatic sprinkler system are included in the respective tables. Table 504.3, Allowable Building Height in Feet Above Grade Plane, allows for a 20-foot increase in height when the building is equipped with an automatic sprinkler system installed in accordance with NFPA 13, except for Type IV-A and IV-B construction, which can have much greater increases for certain occupancy classifications. Buildings of Residential Group R occupancies equipped with an automatic sprinkler system installed in accordance with NFPA 13R or NFPA 13D are limited in height. These limitations in allowable heights reflect differences in the requirements of NFPA 13R and NFPA 13D versus NFPA 13.

Similarly, Table 504.4, Allowable Number of Stories Above Grade Plane, allows for a one-story increase when the building is equipped with an automatic sprinkler system installed in accordance with NFPA 13, except for Type IV-A, IV-B and IV-C construction, which can have greater increases for certain occupancy classifications. Residential Group R occupancies equipped with automatic sprinkler systems installed in accordance with NFPA 13R or NFPA 13D are limited by the scope of the standards, which is reflected in the story increase or decrease in Table 504.4.

Additional increases are possible depending on the building's location on the lot and by using some of the design options in Chapter 5. Additional limits for the allowable area of certain occupancies or situations without sprinklers can be found in Chapter 10.

Increases and limits are discussed in detail in this section, as shown in Tables 504.3 and 504.4, respectively. This applies to all occupancies addressed in this book, except Group I-2 and certain Group I-1 Condition 2 occupancies, which do not always allow the number of stories to be increased when an automatic sprinkler system is installed.

For Group R buildings in Type V construction, a similar height increase (but no area increase) is given for the use of NFPA 13R-compliant systems: up to 60 feet and four stories in accordance with Section 504.3.

	OCCUPANCY CLASSIFICATION		TYPE OF CONSTRUCTION							
			Type III		Type IV				Type V	
			A	B	A	B	C	HT	A	B
Table 504.3: Allowable Building Height (feet above Grade)	A, B, E, F, M, S, U	NS	65	55	65	65	65	65	50	40
		S	85	75	270	180	85	85	70	60
	I-1 Condition 1, I-3	NS	65	55	65	65	65	65	50	40
		S	85	75	180	120	85	85	70	60
	I-1 Condition 2, I-2	NS	65	55	65	65	65	65	50	40
		S								
	I-4	NS	65	55	65	65	65	65	50	40
		S	85	75	180	120	85	85	70	60
	R	NS	65	55	65	65	65	65	50	40
		S13R	60	60	60	60	60	60	60	60
		S	85	75	270	180	85	85	70	60
Table 504.4: Allowable Number of Stories above Grade	A-1	NS	3	2	3	3	3	3	2	1
		S	4	3	9	6	4	4	3	2
	A-2, A-3, A-4	NS	3	2	3	3	3	3	2	1
		S	4	3	18	12	6	4	3	2
	B	NS	5	3	5	5	5	5	3	2
		S	6	4	18	12	9	6	4	3
	E	NS	3	2	3	3	3	3	1	1
		S	4	3	9	6	4	4	2	2
	M	NS	4	2	4	4	4	4	3	1
		S	5	3	12	8	6	5	4	2
	S-2	NS	4	3	4	4	4	5	4	2
		S	5	4	12	8	5	6	5	3
	R-1[1], R-2[1]	S13R	4	4	4	4	4	4	4	3
		S	5	5	18	12	8	5	4	3

Figure 16–Table 504.3, 504.4 and 506.2 Excerpts (continued next page)

	OCCUPANCY CLASSIFICATION		TYPE OF CONSTRUCTION							
			Type III		Type IV				Type V	
			A	B	A	B	C	HT	A	B
Table 506.2: Allowable Area Factor	A-1[2], A-2, A-3	NS	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
		S1	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
		SM	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
	B	NS	28,500	19,000	108,000	72,000	45,000	36,000	18,000	9,000
		S1	114,000	76,000	432,000	288,000	180,000	144,000	72,000	36,000
		SM	85,500	57,000	324,000	216,000	135,000	108,000	54,000	27,000
	E	NS	23,500	14,500	76,500	51,000	31,875	25,500	18,500	9,500
		S1	94,000	58,000	306,000	204,000	127,500	102,000	74,000	38,000
		SM	70,500	43,500	229,500	153,000	95,625	76,500	55,500	28,500
	M	NS	18,500	12,500	61,500	41,000	26,625	20,500	14,000	9,000
		S1	74,000	50,000	246,000	164,000	102,500	82,000	56,000	36,000
		SM	55,500	37,500	184,500	123,000	76,875	61,500	42,000	27,000
	S-2	NS	39,000	26,000	115,500	77,000	48,125	38,500	21,000	13,500
		S1	156,000	104,000	462,000	308,000	192,500	154,000	84,000	54,000
		SM	117,000	78,000	346,500	231,000	144,375	115,500	63,000	40,500
	R-1[1], R-2[1]	S13R	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
		S1	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
		SM	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000

1. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.
2. Allowable Area Factor for Type III-B and Type V-B construction are smaller than shown. Type IV allowable area factors are permitted.

NS—nonsprinklered; S—sprinklered (NFPA 13 System); S13R—sprinklered NFPA 13R requirements (NFPA 13R System); S1—single-story sprinklered building (NFPA 13 System); SM—multistory sprinklered building (NFPA 13 System).

Figure 16–Tables 504.3, 504.4 and 506.2 Excerpts (continued from previous page)

Allowable Building Area Increases

Sections 506.2 and 506.3 provide criteria whereby the allowable area for single and mixed-occupancy buildings can be determined based on whether an automatic sprinkler system is installed or frontage factors apply. Equation 5-1 establishes the allowable area for each story of a single-occupancy building with a maximum of three stories above grade plane. A single-story basement does not need to be included in the total allowable building area when the basement does not exceed the area permitted for a single story (see Section 506.1.3). IBC Equation 5-1 establishes the maximum allowable area per story for a single-occupancy building.

The allowable area per story of a single-occupancy building shall be determined by the following equation:

$$A_a = A_t + (NS \times I_f) \qquad \textbf{(Equation 5-1)}$$

where:

A_a = Allowable building area (square feet).

A_t = Tabular allowable area factor (NS, S1, S13R or SM value, as applicable) in accordance with Table 506.2 (square feet).

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. See Figures 17 and 19 of this book.

IBC Equation 5-2 establishes the maximum allowable aggregate area of a single-occupancy building more than three stories above grade plane, and simply includes the additional factor, S_a, as defined below. Keep in mind that while IBC Equation 5-2 produces the allowable area per building, IBC Equation 5-1 above still provides the limitation on the allowable area for any one floor within that building.

The allowable area for a single-occupancy building more than 3 stories above grade plane shall be determined by the following equation:

$$A_a = [A_t + (NS \times I_f)] \times S_a \qquad \textbf{(Equation 5-2)}$$

where:

A_a = Allowable building area (square feet).

A_t = Tabular allowable area factor (NS, S1, S13R or SM value, as applicable) in accordance with Table 506.2 (square feet).

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 building stories above grade plane exceeds three, or

S_a = 4 where the building is equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13R (Group R occupancies, see Section 903.3.1.2).

Mixed-occupancy Buildings

Provisions to increase the area of mixed-occupancy buildings that contain nonseparated or separated occupancies are provided in Section 506.2.2. For buildings not exceeding three stories, the allowable area for each story is determined using Equation 5-3, which is identical to Equation 5-1. For buildings with more than three stories, the aggregate sum of the ratios of the actual area of each story divided by the allowable area of such stories shall not exceed 3. Where $S_a = 4$, as permitted above and buildings are designed as separated occupancies, the ratio shall not exceed 4.

Allowable Increases for Frontage

Buildings adjacent to open space adjoining a public way having any portion of exterior walls a minimum of 20 feet to the closest interior lot line, the exterior face of an adjacent building on the same property, or the entire width of the public way for more than 25 percent of the building perimeter, may have the allowable floor area from Table 506.2 increased using Equations 5-1 or 5-2. The area

factor increase based on frontage, I_f, used in Equations 5-1 and 5-2 is provided in Table 506.3.3. Factors are provided for building perimeters with 25 percent or more of qualifying frontage based on the smallest public way or open space that is 20 feet or greater. I_f has a value of 0 when less than 25 percent of the building perimeter qualifies as open space and a maximum value of 0.75 when 75 percent or more of the building perimeter has open space of 30 feet or more.

IBC Table 506.3.3 Frontage Increase Factor[a] (I_f)

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

a. Interpolation is permitted

Figure 17—IBC Frontage Increase Factor

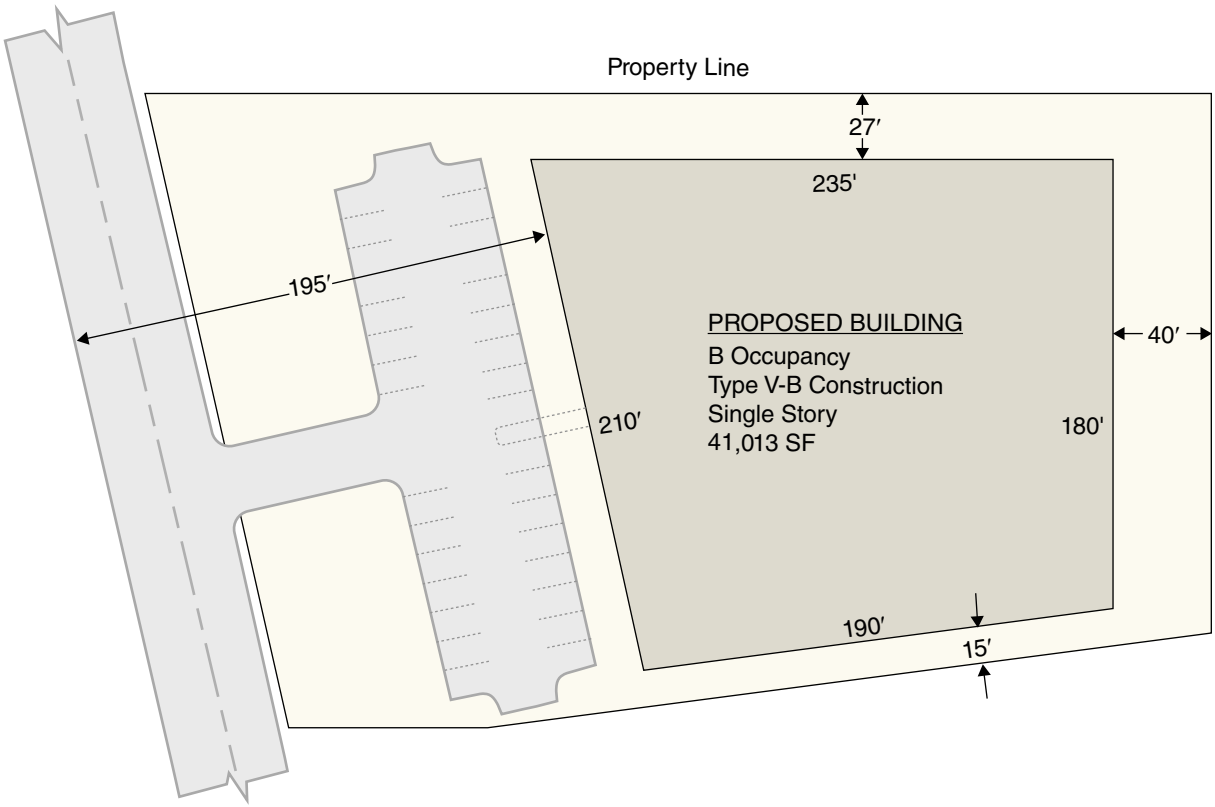


Figure 18—Allow Building Area Example (calculations follow)

Allowable Building Area Example

Given: One-story, Type V-B Business Occupancy, 41,013 square feet (sf)—see Figure 18

Determine: Can this building be constructed without a sprinkler system?

Solution 1: Using 2021 IBC

Per Table 506.2: $A_t(NS) = 9{,}000$ sf
$A_t(S1) = 36{,}000$ sf
$A_t(SM) = 27{,}000$ sf

Per Section 506.3.1, a building is required to have at least 25 percent of its perimeter on a public way or open space that is accessed from a street or approved fire lane. Verify this requirement.

Determine total perimeter: 210 ft + 235 ft + 180 ft + 190 ft = 815 ft

Check for minimum qualifying perimeter with 20 ft of open space: 210 ft

210 ft/815 ft = 0.257 = 25.7%, therefore a frontage increase may be applied

Calculate frontage increase.

Determine the minimum open space (feet) required by Table 506.3.3:

27 ft (note the 190 ft side has a 15 ft open space which does not qualify)

Calculate perimeter with qualifying sides: 210 ft + 235 ft + 180 ft = 625 ft

Calculate percentage of building perimeter required by Table 506.3.3:

625 ft/815 ft = 0.767 = 76.7%

Per Table 506.3.3:

- Open Space of 27 feet is in the **25 to less than 30** column.
- Percentage of building perimeter is in the **75% to 100%** row.

Find the corresponding frontage factor: $I_f = 0.63$

Calculate allowable floor area using Equation 5-1. $A_t = NS$ when not sprinklered.

$A_a = A_t + (NS \times I_f) = 9{,}000 \text{ sf} + (9{,}000 \text{ sf} \times 0.63) = 14{,}670 \text{ sf}$

41,013 sf proposed area > 14,670 sf allowable area; therefore no good (NG)

Because interpolation is permitted in Table 506.3.3, I_f is determined to be 0.678.

$A_a = A_t + (NS \times I_f) = 9{,}000 \text{ sf} + (9{,}000 \text{ sf} \times 0.678) = 15{,}102 \text{ sf}$

41,013 sf proposed area > 15,102 sf allowable area; therefore NG

Calculate allowable floor area as a sprinklered building, complying with NFPA 13. $A_t = S1$.

$A_a = A_t + (NS \times I_f) = 36{,}000 \text{ sf} + (9{,}000 \text{ sf} \times 0.63) = 41{,}670 \text{ sf}$

41,013 sf proposed area < 41,670 sf allowable area; therefore OK

Because interpolation is permitted in Table 506.3.3, I_f can also be 0.678.

$A_a = A_t + (NS \times I_f) = 36{,}000 \text{ sf} + (9{,}000 \text{ sf} \times 0.678) = 42{,}102 \text{ sf}$

41,013 sf proposed area < 42,102 sf allowable area; therefore OK

Conclusion: Type V-B is permitted when the building is equipped with an NFPA 13 system

Solution 2: Using CCWD Maximum Building Area Tables

Per Section 506.3.1, a building is required to have at least 25 percent of its perimeter on a public way or open space that is accessed from a street or approved fire lane. Verify this requirement.

Determine total perimeter: 210 ft + 235 ft + 180 ft + 190 ft = 815 ft

Check for minimum qualifying perimeter with 20 ft of open space: 210 ft

210 ft/815 ft = 0.257 = 25.7%, therefore a frontage increase may be applied

Determine the minimum open space (feet) required by Table 506.3.3: 27 ft

Calculate perimeter with qualifying sides: 210 ft + 235 ft + 180 ft = 625 ft

Calculate percentage of building perimeter required by Table 506.3.3:

625 ft/815 ft = 0.767 = 76.7%

Determine values using CCWD maximum building area tables. Note that CCWD Tables 1-18 include maximum floor areas that incorporate frontage increases. Therefore, in this example, the term base value, A_b, is used to differentiate from the term area factor, A_t, used elsewhere.

For a nonsprinklered, Group B Occupancy, use CCWD Table 3

Base value $A_b = 9{,}000$ sf (for frontage 0 to ≤ 25)

Find nonsprinklered frontage increase interpolation value in CCWD Table 19

$I_f = 1.678$

$A_a = A_b \times I_f = 9{,}000 \text{ sf} \times 1.678 = 15{,}102 \text{ sf}$

41,013 sf proposed area > 15,102 sf allowable area

For a sprinklered, B Occupancy, use CCWD Table 4

Base value, $A_b = 36{,}000$ sf (for frontage 0 to ≤ 25)

Find sprinklered frontage increase interpolation value in CCWD Table 20

$I_f = 1.170$

$A_a = A_b \times I_f = 36{,}000 \text{ sf} \times 1.170 = 42{,}120 \text{ sf}$

41,013 sf proposed area < 42,120 sf allowable area

(Note, the difference between the IBC calculated area and the CCWD calculated area is because of rounding in the CCWD tables)

Conclusion: Type V-B is permitted when the building is equipped with an NFPA 13 system

Unlimited Area Buildings

The area of certain buildings is not limited. Whether a building can be of unlimited area is based on the number of stories, occupancy and site features as described in Section 507, Unlimited Area Buildings. In general, the width of the open space must exceed 60 feet for the building to be unlimited area. For example, Section 507.5 permits buildings of Group B, F, M or S not more than two stories above grade plane, sprinklered with an NFPA 13-compliant system, and with 60 feet of frontage to be unlimited in area. When the only condition not met for unlimited area buildings is the 60 feet of open space, the following value for I_f is permitted based on the provisions of Section 506.3 and Table 506.3.3.1.

IBC Table 506.3.3.1, Section 507 Buildings[a] (I_f)

PERCENTAGE OF BUILDING PERIMETER	OPEN SPACE (feet)					
	30 to less than 35	35 to less than 40	40 to less than 45	45 to not less than 50	50 to not less than 55	55 to not 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.

Figure 19—IBC Frontage Increase for Unlimited Area Buildings

Area Limits for Nonsprinklered Buildings in Chapter 9

Many occupancies have allowable floor areas determined by Chapter 5 that are greater than fire areas permitted in Chapter 9 for nonsprinklered buildings. Fire area provisions are based on the occupancy classification, so they apply to all construction types, not just wood. The allowable area per story can exceed allowable fire areas and a sprinkler system may be required.

If sprinklers are provided, allowable area increases for both sprinklers and open frontage may be taken, if applicable. Alternatively, fire areas may be kept below sprinkler thresholds by compartmentalizing floor areas with fire-resistance-rated construction in accordance with the definition of “Fire Area” and the requirements of Chapter 7. For several occupancies covered in this book, the requirement for sprinklers can also be triggered by specific use, height above grade or occupant load.

In addition to reducing property loss due to fire, sprinklers offer a substantial increase to life safety, which is well documented and merits the consideration of designers for that reason alone. Further, their advantages can also be economic. The code contains incentives for providing sprinklers, including:

- An exception to draftstopping in other than R occupancies (Sections 718.3 and 718.4)
- Increased height, floor area and number of stories in a building
- Reductions in corridor ratings and corridor opening protection (Section 1020.2)
- Increased exit access travel distance (Section 1017.2)
- An option for protection of concealed spaces in heavy timber (Section 602.4.4.3)
- Reductions in dwelling unit separations
- An alternative to emergency escape openings
- An alternative to certain fire and smoke damper requirements
- An allowance for more interior finish flexibility

For these reasons, the addition of sprinklers should always be considered in the overall cost analysis for any project.

Maximum Building Area Tables

The tables at the end of this book illustrate the allowable area and height increases permitted for individual occupancies.

- Tables 1, 3, 5, 7, 9, 12 and 17 list nonsprinklered maximum building area per story for each occupancy.
- Tables 2, 4, 6, 8, 11, 13, 16 and 18 list NFPA 13-compliant sprinklered maximum building area per story for each occupancy.
- Tables 10 and 15 list NFPA 13R-compliant sprinklered maximum building area per story for Group I and R occupancies.
- Table 14 lists NFPA 13D-compliant sprinklered maximum building area per story for Group R-3 and R-4 Condition 1 occupancies.
- Tables 19, 20 and 21 list interpolation values for area factor increases due to frontage.

Mixed Use and Occupancy

Mixed use and occupancy buildings are permitted a total allowable building area determined in accordance with Section 508. More than one occupancy in a single building can be accommodated by using the allowable area of the most restrictive occupancy (referred to as "nonseparated occupancies" in accordance with Section 508.3). Alternatively, the occupancies can be regulated as "separated occupancies" (Section 508.4) to allow somewhat larger floor areas. This methodology will often mandate separation of the occupancies by fire barriers or horizontal assemblies, or both, in accordance with Table 508.4. The code also accommodates limited area spaces that are accessory to the function of the main occupancy if the restrictions of Section 508.2 are followed. See Section 506.2.2 for additional limits for single-story and multistory mixed occupancy buildings. Note that incidental uses are covered in Section 509 of the code and always require separation in accordance with Table 509.1.

In Type IV-B and IV-C construction, the construction of fire barriers and horizontal assemblies used as occupancy or incidental use separations with mass timber building elements must include a thermal barrier consisting of gypsum board that is not less than $^{1}/_{2}$″ thick or other tested material (Sections 508.4.4.1 and 509.4.4.1).

Unlimited Area Buildings

Buildings of certain uses that meet frontage requirements are permitted to be unlimited in area, as explained in the following sections.

One-Story Buildings—Sprinklered

The following unlimited area buildings with a single story above grade plane are permitted if the building is equipped throughout with an NFPA 13-compliant automatic sprinkler system and surrounded on all sides by public ways or yards not less than 60-feet wide.

Section 507.2.1 allows up to 75 percent of the perimeter open space to be less than 60 feet in width in some cases. There must be at least 40 feet of public way or yard width provided and the exterior wall and all openings on those portions require 3-hour minimum fire-resistance and fire protection ratings.

Unlimited area Group B, F, M and S buildings of any construction type are permitted with no special restrictions in Section 507.4. The width can be reduced to 40 feet in accordance with Section 507.2.1.

Unlimited area Group A-4 buildings of Type III and IV construction are permitted by Section 507.4. For indoor activities such as tennis, swimming, skating and equestrian venues, the sprinkler system is not required in participant areas if exit doors lead directly outside from participant areas; a fire alarm system with manual fire alarm boxes is installed as required by Section 907; and storage rooms, press boxes, concession booths or other ancillary spaces to the sport activity are provided with sprinklers. The width can be reduced to 40 feet in accordance with Section 507.2.1.

Unlimited area Group E buildings are permitted by Section 507.11 when of Type IIIA or IV construction and each classroom has two means of egress, with one means of egress a direct exit to the outside of the building complying with Section 1022.

Unlimited area Group A-3 buildings of Type III or IV construction, used as a place of religious worship, community hall, dance hall, exhibition hall, gymnasium, lecture hall, indoor swimming pool or tennis court, are permitted by Section 507.7 provided that the building does not have a stage other than a platform, the assembly floor is located within 21 inches of street or grade level and all exits are provided with ramps to the street or grade level.

Group A-1 and A-2 occupancies of Type III or IV construction are permitted by Section 507.4.1 in mixed occupancy buildings of unlimited area B, F, M or S occupancies provided the occupancies are separated as required in Section 508.4.4 with no reduction allowed in the fire-resistance rating of the separation based on the installation of an automatic sprinkler system, each A-1 or A-2 portion of the building does not exceed the maximum allowable area for such occupancy in accordance with Section 503.1, and all exit doors from Group A-1 and A-2 occupancies must discharge directly to the exterior of the building.

One-Story Buildings—Nonsprinklered

Nonsprinklered unlimited area Group F-2 or S-2 buildings, of any construction type, with a single story are permitted by Section 507.3 provided they are surrounded on all sides by public ways or yards not less than 60-feet wide. The width can be reduced to 40 feet in accordance with Section 507.2.1.

Two-Story Buildings—Sprinklered

Unlimited area Group B, F, M or S buildings up to two stories above grade plane of any construction type are permitted by Section 507.5 provided they are equipped throughout with an NFPA 13-compliant automatic sprinkler system and are surrounded on all sides by public ways or yards not less than 60-feet wide. The width can be reduced to 40 feet in accordance with Section 507.2.1.

Allowable Increases with Fire Walls

A fire wall is a fire-resistance-rated wall with protected openings that restricts the spread of fire. It extends continuously from the foundation to or through the roof and has sufficient structural stability under fire conditions to allow the collapse of construction on either side without collapse of the fire wall. Fire walls built in compliance with Section 706 create separate buildings for the

purpose of area limitations and other code-required features. Fire walls separating Group A, B, E, I, R-1 and R-2 occupancies require a 3-hour minimum fire-resistance rating that can be reduced to a 2-hour minimum for Type V construction. Fire walls separating Group F-1, S-1 and M occupancies require a 3-hour minimum fire-resistance rating with no reduction allowance. Group F-2, S-2, R-3 and R-4 occupancies require only a 2-hour minimum fire-resistance rating. Separate buildings sharing a common fire wall are evaluated individually for allowable heights and areas based on the occupancy use and type of construction.

Fire walls in Type V construction may be wood frame; in other construction types they must be of approved noncombustible materials in accordance with Section 706.3.

Special Provisions for Podium Buildings

Under specific circumstances, buildings of different types of construction are allowed to be built on top of each other and are commonly referred to as podium buildings. They are only permitted under the special provisions found in Section 510. They are also referred to as stacked or pedestal buildings.

Figure 20—Podium Building

Section 510.2 requires a 3-hour minimum fire-resistance-rated horizontal assembly between the lower and upper buildings, including any vertical offsets which are a part of the horizontal assembly and structure supporting such offsets. The lower building, including the horizontal assembly, must be Type IA construction and sprinklered in accordance with NFPA 13. The upper building's type of construction and allowable number of stories above grade are determined as if it did not have a building below, thus permitting all types of construction above the Type IA construction podium. The total height in feet, however, is still limited and measured from grade plane in accordance with Section 510.2, Item 7, and is limited to the smaller allowable height of the occupancy classification and construction type. Group B, M, R and S occupancies (including Group S-2 open and enclosed parking garages) are permitted in the upper building, subject to the building height and area limitations discussed previously. Multiple Group A occupancies, each with an occupant load of less than 300, are also permitted. The lower building is permitted to be any occupancy except Group H. Combustible interior exit stairways with 3-hour fire-resistance-rated construction located in the building of Type IA construction are permitted when the building above is of Types III, IV, or V construction.

For Group R occupancies located on an above-ground parking structure, Section 510.4 permits the number of stories to be measured from the floor above the parking area. Single-story Group S-2 parking garages of Type I construction or open parking garages of Type IV construction are permitted. The floor assembly between the parking garage and the Group R above must be the type of construction required for the parking garage, must provide a fire-resistance rating in accordance with Table 508.4 and must comply with the requirements for horizontal assemblies in accordance with Section 711.

In Section 510.5, Type IIIA construction in Groups R-1 and R-2 may be increased above the general limitations of Table 504.3 by 10 feet in height and Table 504.4 by one story above grade.

Section 510.5 specifies the first-floor assembly must have 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. These increases do not apply to R occupancies equipped with an NFPA 13R sprinkler system.

Section 510.7 contains another alternative with conditions independent of Section 510.2. The upper building height and area are limited as previously discussed and the open parking garage is regulated in Section 406.5 and is permitted to be Type IV construction. The height of the upper building is measured from the grade plane and includes the open parking garage level. See the other conditions listed in Section 510.7 regarding separate means of egress and other protected features if this alternative is used.

Multiple upper buildings may be positioned above a horizontal assembly complying with Sections 510.2, 510.3 or 510.8 and shall be treated as separate buildings in accordance with Section 510.9.

See the special provisions for the protection of attics in wood frame special-occupancy podium buildings in Section 903.3.1.2.3. This section has specific application to construction designed in accordance with Sections 510.2 and 510.4, based on the height of the roof above the lowest level of required fire department vehicle access.

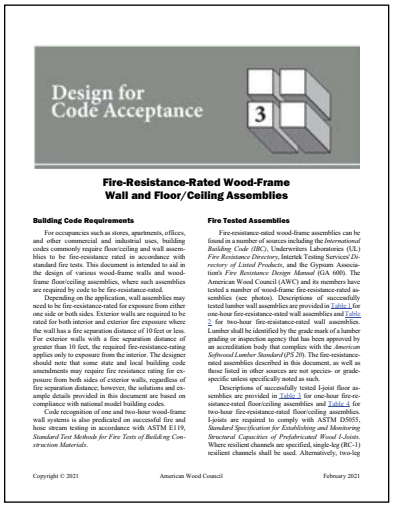
4. Establishing Fire Resistance

Table 601 establishes the required fire resistance of building elements (primarily the structural frame, walls, floors and roofs) based on the construction type of the building (e.g., Type III-A, Type III-B, Type IV-A). Required ratings are given in hours. The exception is Type IV-HT, where the heavy timber structural elements are assumed to have inherent fire resistance due to their required minimum dimensions (no fire-resistance rating is required except for bearing walls).

Fire-resistance rating describes the time at which a building element or assembly reaches specific failure criteria when exposed to a standard fire. Fire resistance of wood members and assemblies may be established by testing in accordance with Section 703.2.1, by any one of five analytical methods listed in Section 703.2.2 or by an alternative protective method approved by the code official.

Tested Assemblies

The fire-resistance rating of wall, floor-ceiling, and roof-ceiling assemblies is often established by testing in accordance with the ASTM E119 or UL 263 standard. Using the results of these tests, an assembly is typically assigned a 1-, 2- or 3-hour fire-resistance rating. Common light-frame wood assemblies have been tested to determine the fire-resistance rating, whereas the fire-resistance rating of mass timber is determined using analytical methods (see more below). Designers can find descriptions for tested combustible assemblies in several sources, including IBC Tables 721.1(2) and Table 721.1(3), and compiled in documents such as the *AWC Design for Code Acceptance* (DCA 3), the UL *Fire Resistance Directory* or the Gypsum Association *Fire Resistance Design Manual.* Manufacturers are also a good source of fire test


Design for Code Acceptance 3

Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies

Building Code Requirements

For occupancies such as stores, apartments, offices, and other commercial and industrial uses, building codes commonly require floor/ceiling and wall assemblies to be fire-resistance rated in accordance with standard fire tests. This document is intended to aid in the design of various wood-frame walls and wood-frame floor/ceiling assemblies, where such assemblies are required by code to be fire-resistance-rated.

Depending on the application, wall assemblies may need to be fire-resistance-rated for exposure from either one side or both sides. Exterior walls are required to be rated for both interior and exterior fire exposure where the wall has a fire separation distance of 10 feet or less. For exterior walls with a fire separation distance of greater than 10 feet, the required fire-resistance-rating applies only to exposure from the interior. The designer should note that some state and local building code amendments may require fire resistance rating for exposure from both sides of exterior walls, regardless of fire separation distance; however, the solutions and example details provided in this document are based on compliance with national model building codes.

Code recognition of one and two-hour wood-frame wall systems is also predicated on successful fire and hose stream testing in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction Materials*.

Fire Tested Assemblies

Fire-resistance-rated wood-frame assemblies can be found in a number of sources including the *International Building Code (IBC)*, Underwriters Laboratories (UL) *Fire Resistance Directory*, Intertek Testing Services' *Directory of Listed Products*, and the Gypsum Association's *Fire Resistance Design Manual* (GA 600). The American Wood Council (AWC) and its members have tested a number of wood-frame fire-resistance-rated assemblies (see photos). Descriptions of successfully tested lumber wall assemblies are provided in Table 1 for one-hour fire-resistance-rated wall assemblies and Table 2 for two-hour fire-resistance-rated wall assemblies. Lumber shall be identified by the grade mark of a lumber grading or inspection agency that has been approved by an accreditation body that complies with the *American Softwood Lumber Standard* (PS 20). The fire-resistance-rated assemblies described in this document, as well as those listed in other sources are not species- or grade-specific unless specifically noted as such.

Descriptions of successfully tested I-joist floor assemblies are provided in Table 3 for one-hour fire-resistance-rated floor/ceiling assemblies and Table 4 for two-hour fire-resistance-rated floor/ceiling assemblies. I-joists are required to comply with ASTM D5055, *Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists*. Where resilient channels are specified, single-leg (RC-1) resilient channels shall be used. Alternatively, two-leg

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Figure 21—*Fire-resistance-rated Wood-frame Wall and Floor/ Ceiling Assemblies (DCA 3)*

reports where a proprietary system may preclude a general listing. Design professionals should identify the source of the fire-resistance rating on the building plans.

Analytical Fire-Resistance Methods

Analytical methods provide a cost-effective alternative to full-scale fire testing. Section 703.2.2 lists five methods that typically rely on test results for their justification. The fire-resistance rating of light-frame assemblies and mass timber building elements will most likely be determined by calculation as permitted by Section 703.2.2, Item 3. Requirements of this method can be determined using the provisions of Section 722 (see Figures 22 and 23).

The fire resistance of light-wood-frame assemblies can be calculated using the provisions of Section 722.6, which is based on the known fire resistance of many tested assemblies. The information in AWC *Design for Code Acceptance* (DCA 4), *Component Additive Method (CAM) for Calculating and Demonstrating Assembly Fire Endurance*, is the basis for these code provisions. The CAM method is limited to fire-resistance ratings of no more than 1-hour.

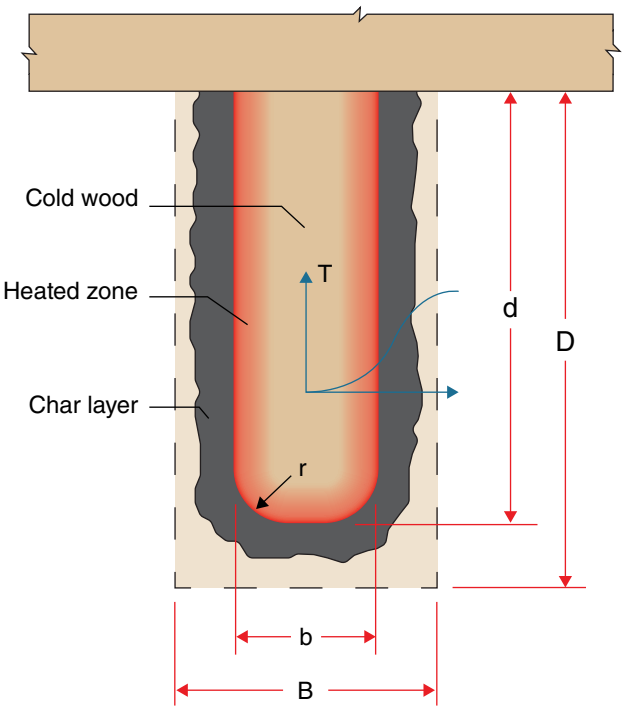

Figure 22—Reduction in Dimensions of a Beam or Column due to Charring on 3 sides

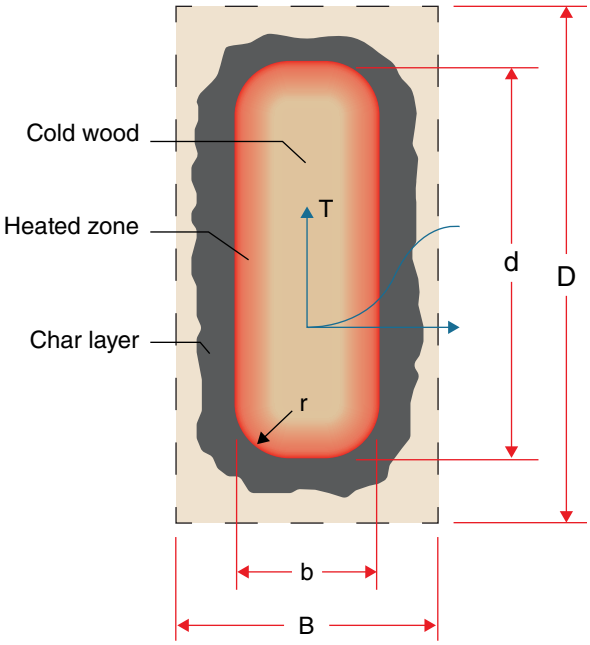

Figure 23—Reduction in Dimensions of a Beam or Column due to Charring on 4 sides

The fire resistance of exposed wood members may be calculated using the provisions of Chapter 16 of the NDS (see Section 722.1).

AWC's Technical Report No. 10 (TR10) *Calculating the Fire Resistance of Wood Members and Assemblies*, contains full details of the NDS method as well as design examples.

AWC has received ANSI approval of its new *Fire Design Specification for Wood Construction* (FDS) as an American National Standard. The new standard, designated as ANSI/AWC FDS-2022, brings together all the provisions for the fire design of wood members, assemblies, and connections to meet code requirements.

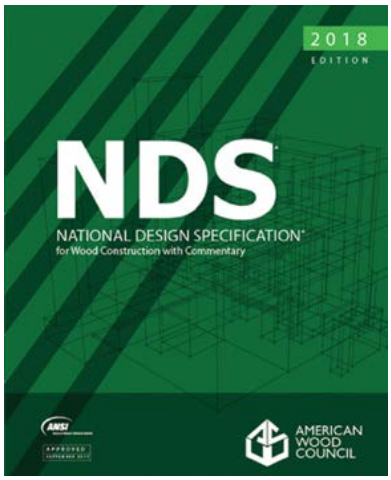

Figure 24—2018 NDS

Since 2001, the NDS has contained provisions for the structural design of unprotected wood members exposed to a standardized ASTM E119 fire exposure. The FDS contains these existing provisions and also provides calculation procedures to address the added fire resistance and thermal benefits of protection provided by the use of additional wood cover, gypsum panel products, and insulation. In addition, calculation provisions have been developed to provide standardized methods of calculating thermal separation and burn-through requirements as required in ASTM E119 and as provided in TR10.

Figure 25—2022 FDS

Determining Fire Resistance of Protected Mass Timber

In Type IV-A and Type IV-B construction, certain mass timber building elements must be protected with one or more layers of noncombustible protection. The fire resistance of protected mass timber building elements can be determined by summing the contribution from the mass timber and noncombustible protection as specified in Section 722.7. The required contribution to the fire-resistance rating of the mass timber building element provided by noncombustible protection is determined by Table 722.7.1(1). Table 722.7.1(2) gives noncombustible protection contribution times for certain types of noncombustible protection. The fire-resistance rating required for the building element (IBC Tables 601 and 705.5) is determined by adding the fire-resistance contribution provided by the noncombusitble protection to the fire resistance of the mass timber element itself. Once the required contribution time for the mass timber is determined, the calculations used for exposed mass timber in the NDS can be used to evaluate the actual time provided. The more time contributed by the noncombustible material, the less time required of the mass timber and vice-versa. The calculation method can be used wherever mass timber is required to have a fire-resistance rating.

Fire protection of connectors and fasteners used to join fire-resistance-rated mass timber building elements can be designed using engineering analysis or evaluated as part of an assembly tested in accordance with ASTM E119 or UL 263. Design criteria for fire protection of connections are provided in Section 2304.10.1, where temperature-rise limits are established to protect the connection.

5. Wood Use in "Noncombustible" Construction

Type I and II construction require the use of noncombustible materials for most load-bearing building elements, but there are allowances for the use of untreated wood, FRTW, and heavy timber. A list of where combustible material is permitted in Type I and II construction can be found in Section 603.1. There are 27 instances where combustible materials are permitted, most of which include the use of wood. For example, wood is permitted for handrails, millwork, cabinets and window and door frames. Furring or nailing strips used in connection with "set-out" construction are also permitted. Show windows, wooden bulkheads below the window and nailing and furring strips are also permitted to be wood if the window is not more than 15 feet above grade.

Fire-Retardant-Treated Wood

There are several applications for the use of fire-retardant-treated wood (FRTW) in Type I and II construction. These allowances are recognized in Table 601 and Section 603.1. Roof construction, including structural framing, is permitted to be FRTW, except for Type IA construction of three stories or more where the lowest roof member is less than 20 feet measured vertically from the upper floor. FRTW is permitted in some nonbearing partitions where the required fire-resistance rating does not exceed 2 hours, and it may be used in nonbearing exterior walls that do not require a fire-resistance rating.

As stated, FRTW may also be used in exterior walls of Type III and IV-HT construction, which are required to be noncombustible by definition. The code provisions that assume noncombustible

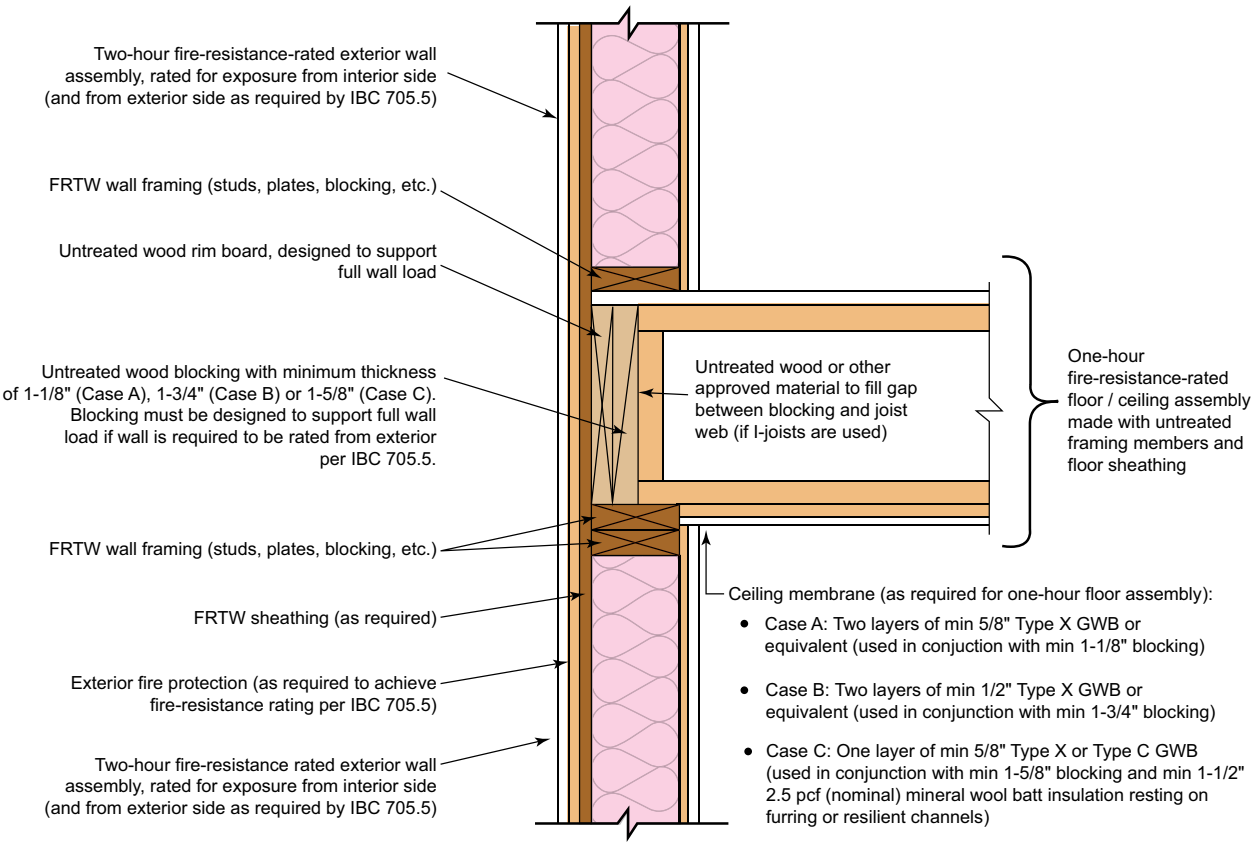

Figure 26—Example wall/floor intersection detail from DCA 3

exterior walls, but permit FRTW, have become subject to interpretation. Typically, a practical solution to these code questions can be achieved by working closely with the code official during the design phase. Several code-compliant solutions for where FRTW is required in the exterior wall of Type III construction are provided in the AWC *Design for Code Acceptance* (DCA 3). (See Figure 26). In general, FRTW is only required in the framing and sheathing used to construct the exterior wall. In platform framing, floor assemblies bear on exterior walls and are not considered to be part of the exterior wall for the purpose of determining where FRTW is required.

Heavy Timber Members

Heavy timber (HT) complying with Section 2304.11 is permitted in roof construction as an alternative to 1-hour or less fire-resistance-rated noncombustible construction. This provision allows HT use in roofs of all types of noncombustible construction except Type IA. In Type IV-HT, heavy timber columns and arches are permitted on the exterior of walls if the fire separation distance is 20 feet or more.

Figure 27—Heavy timber roof

6. Wood Features

Wood may be used as an architectural or structural component of a building. It is a renewable and sustainable material. Wood can be used in foundations, doors, windows, exterior and interior finishes, trim and roofing.

Wood Foundations

Wood foundations for buildings are permitted when designed and installed in accordance with the ANSI/AWC *Permanent Wood Foundation Design Specification* (PWF). Insulated wood foundation systems conserve energy and easily accommodate the installation of wiring, plumbing, ductwork and interior finishes.

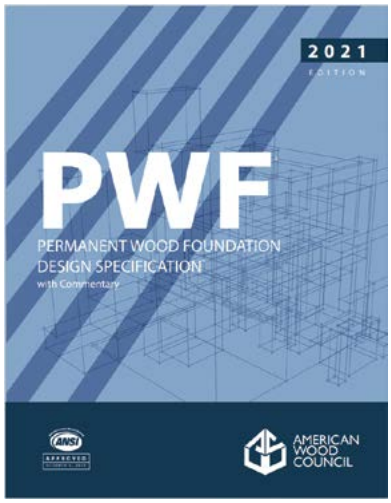

Figure 28—2021 PWF

Wood Walls and Partitions

Stud framing is permitted for all load-bearing and nonload-bearing interior walls and partitions in Type III and V construction. Type IV-HT construction permits partitions of 1-hour fire-resistance-rated construction (Section 2304.11.2.2) or solid wood formed by at least two layers of 1-inch matched boards or 4-inch-thick laminated construction. In Type I and II construction, partitions dividing single tenant offices or retail and not creating corridors serving 30 or more occupants are permitted to be FRTW, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet in height (Section 603.1, Item 11).

Wood Interior Finish

In general, wood materials may be used as interior finish in almost all occupancies. Table 803.13 establishes interior wall and ceiling finish requirements by occupancy. The material performance classification is determined by testing in accordance with the ASTM E84 or UL 723 standard and results in a classification as Class A (flame spread index 0–25); Class B (26–75) or Class C (76–200). All classifications must have a smoke-developed index between 0–450 (Section 803.1.2).

Nonsprinklered buildings typically require materials with lower flame spread indices than sprinklered buildings. Figure 30 contains two tables outlining the required interior finish minimum classification for exit enclosures and passageways, corridors and enclosed spaces and rooms.

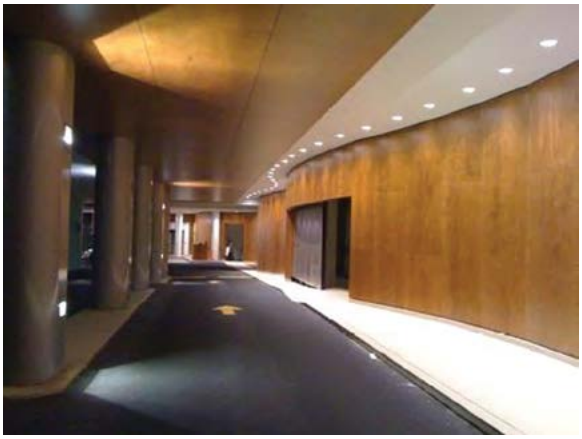

Figure 29—Wood interior finish

Nonsprinklered Buildings: Minimum Interior Finish Classification by Occupancy[a]			
Location	Minimum Interior Finish Classification		
	A[b]	B	C
Interior exit stairways and ramps and exit passageways[c]	A, B, E, I, M, R-1, R-4	F, R-2, S	R-3
Corridors and enclosures for exit access stairways and ramps	A[d], I-2, I-3, I-4	B, E, I-1, M, R-1, R-2, R-4, S	F, R-3
Enclosed spaces and rooms	—	A-1[e], A-2[e], I, R-4	A-3, A-4, A-5, B, E, F, M, R-1, R-2, R-3, S

a. This simplified table is not comprehensive; more exceptions can be found in Table 803.13 footnotes.
b. Except in Group I-3, buildings less than three stories above grade plane permit the reduction of the exit enclosure and exit passageway classifications to Class B.
c. Exit enclosures and exit passageways are permitted to use Class C wainscotting or paneling in the grade lobby for not more than 1,000 square feet of applied surface when applied to a noncombustible base.
d. Lobby areas in corridors may use Class B interior finishes for Group A occupancies.
e. Places of assembly with an occupant load of 300 persons or less may use Class C interior finishes.

Figure 30—Summary of Table 803.13 Interior Wall and Ceiling Finish Requirements by Occupancy (continued next page)

Sprinklered Buildings: Minimum Interior Finish Classification by Occupancy[a, b]			
Location	Minimum Interior Finish Classification		
	A	B[c]	C
Interior exit stairways and ramps and exit passageways[d]	I-3	A, B, E, I-1, I-2, I-4, M, R-1, R-4	F, R-2, R-3, S
Corridors and enclosures for exit access stairways and ramps	I-3	A, I-2, I-4	B, E, F, I-1, M, R, S
Enclosed spaces and rooms	—	I-2, I-4	A, B, E, F, I-1, I-3, M, R, S

a. This simplified table is not comprehensive; more exceptions can be found in Table 803.13 footnotes.
b. Automatic sprinkler system meeting the requirements of NFPA 13 or NFPA 13R as appropriate.
c. Except in Group I-3, buildings less than three stories above grade plane permit the reduction of the exit enclosure and exit passageway classifications to Class C.
d. Exit enclosures and exit passageways are permitted to use Class C wainscotting or paneling in the grade lobby for not more than 1,000 square feet of applied surface when applied to a noncombustible base.

Figure 30—Summary of Table 803.13 Interior Wall and Ceiling Finish Requirements by Occupancy (continued from previous page)

Most wood species qualify as Class B, while some, such as alder, aspen, yellow birch, cottonwood, maple, oak, red pine and yellow poplar qualify as Class C. Wood boards and panels may meet Class A criteria when pressure treated with a fire-retardant chemical. Flame spread information according to wood species is provided in the AWC *Design for Code Acceptance* (DCA 1), *Flame Spread Performance of Wood Products Used for Interior Finish*, which is available for free from the AWC website.

Traditional wood floor covering is exempt from interior floor finish requirements (Section 804.1). Exposed portions of Type IV structural members are also exempt from the interior finish requirements except in interior exit stairways, interior exit ramps and exit passageways (Section 803.3).

Wood Interior Trim

Baseboards, chair rails, picture molding, handrails, guards, windows and doors are permitted to be wood or wood-based materials. Trim is required to meet a Class C flame spread classification and combustible trim, excluding handrails and guards, cannot exceed 10 percent of the wall or ceiling area to which it is attached (Section 806.7).

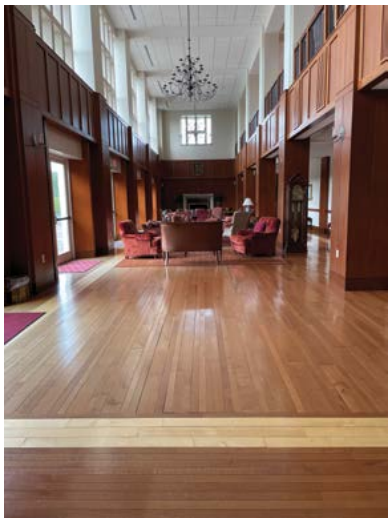

Figure 31—Wood interior trim

Wood Doors and Windows

Wood doors and windows are permitted in exterior and interior walls. Exterior openings are generally required to be protected as an opening protective assembly when the exterior wall is within given distances of a lot line. Table 705.5 determines when the exterior walls are required to be fire-resistance rated due

to occupancy group and location on the lot, and Table 705.8 defines the allowable percentages of protected and unprotected openings allowed in those walls.

Unlimited areas of unprotected openings are permitted by Table 705.8, provided the exterior walls are 30 feet or more from the lot line, or 20 feet or more if the building is equipped throughout with an automatic sprinkler system. No unprotected openings are permitted in the exterior wall within 5 feet of the lot line for non-sprinklered buildings or in any building if the wall is closer than 3 feet from the lot line.

Figure 32—Wood windows

Bay and oriel windows must conform to the type of construction required for the building; however, FRTW is permitted for these windows in buildings not more than three stories above grade plane and of Type I, II, III and IV construction (Section 705.2.4).

Interior wood door assemblies are required to be fire-protection rated when the wall assembly they are in requires a fire-resistance rating and opening protection. The minimum required fire-protection rating of the fire door assembly is given in Table 716.1(2) and ranges from 20 minutes to 3 hours based on the required fire-resistance rating and type of wall assembly.

Combustible exterior wall coverings

Wood exterior wall coverings are not limited on Type V construction and permitted on buildings of Type I, II, III or IV construction up to 40 feet above grade or 60 feet if FRTW. Where the fire separation distance (FSD) is 5 feet or less, combustible exterior wall coverings are limited to no more than 10 percent of the exterior wall surface area, except there is no area limit for FRTW. Wood or wood-based combustible exterior wall coverings are exempt from testing in accordance with NFPA 268 (Section 1405.1).

Wood Siding

Wood siding products come in a variety of sizes, shapes and textures, ranging from wood shingles and shakes to boards and wood structural panels. Each material brings different characteristics in look and performance. The IBC addresses the minimum expectations of these products in Chapter 14 as exterior wall components and Chapter 23 as a wood building material.

Figure 33—Wood siding

Wood shingles as a weather covering are required to be a minimum $^3/_8$-inch thick and wood siding without sheathing is required to be $^1/_2$-inch thick. According to Table 1404.2, wood siding less than $^1/_2$-inch thick is to be installed over sheathing for support in accordance with Section 2304.6.

Wood Veneer

Wood veneer, which by definition adds no strength to the wall, is permitted provided it is applied over noncombustible backing, and the veneer is 1-inch nominal thickness, 0.438-inch exterior hardboard siding or 0.375-inch exterior-type wood structural panels or particleboard. Open or spaced veneers without concealed spaces are not permitted to project more than 24 inches from the building wall (Section 1404.5).

Wood Balconies, Open Exterior Exit Stairs and Ramps

Exterior balconies may be of Type IV construction or of wood construction that provides a fire-resistance rating equal to the floor rating required by Table 601. The aggregate length of the balcony is limited to 50 percent of the building perimeter on each floor. Type I or II structures not more than three stories above grade plane are permitted to have FRTW in the balcony as long as the balcony is not a required exit. Type III, IV and V buildings may have Type V balcony construction without requiring a fire-resistance rating if the balcony is sprinkler protected. Where sprinkler protection is extended to the balcony, the length limitation of the balcony is eliminated (Section 705.2.3.1).

Figure 34—Wood exterior balcony

Open exterior exit stairs and ramps may be constructed of wood when the building is of Type IV and V construction (Sections 1011.7 and 1012.7). The IBC limits their use to buildings that do not exceed six stories above grade and do not have occupied floor levels located more than 75 feet above the lowest level of vehicular access by the fire department (Section 1027.2).

Where an enclosed framed balcony or elevated walking surface is exposed to the weather, openings must be provided to allow for cross ventilation (Section 2304.12.2.5).

Wood Roof Coverings

Roof assemblies and coverings are divided into classifications in accordance with testing by the ASTM E108 or UL 790 standard. FRTW roof coverings are tested in accordance with the ASTM D2898 standard. Table 1505.1 requires a minimum Class B roof covering for all types of construction except Type IIB, IIIB and VB. These construction types are permitted a minimum of Class C materials, and if the buildings are not more than two stories above grade plane and have no more than 6,000 square feet of roof area and 10-foot minimum frontage width on all sides of the roof, they are permitted to use No. 1 cedar or redwood shakes and No. 1 shingles (Table 1505.1).

Figure 35—Wood shakes

Fire-retardant-treated wood shingles and shakes can qualify for Class A, B or C classification. Wood shingles and wood shake installation requirements are located in Sections 1507.8 and 1507.9, respectively, with a summary of the installation requirements in Table 1507.8.

Wood Projection Limitations

Regardless of the material used or the construction type, Section 705.2 places limits on the proximity of projections to the line used to calculate fire separation distance (FSD). According to Table 705.2, projections are not permitted when the FSD is less than 2 feet. When the FSD is 2 feet to less than 3 feet, the projection may extend to within 2 feet of the line used to determine the FSD. When the FSD is 3 feet to less than 5 feet, the minimum distance is $^{2}/_{3}$ of the distance from the line used to determine the FSD. Lastly, for a FSD of 5 feet or greater, projections cannot come within 40 inches of the line used to determine the FSD.

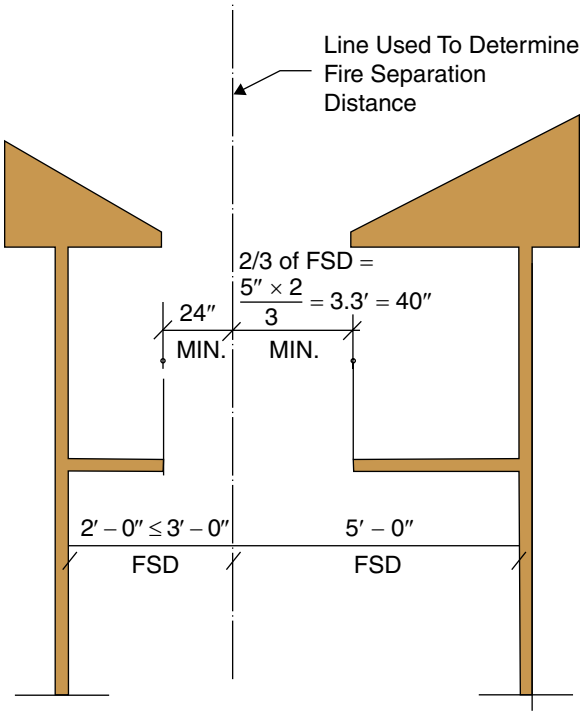

Figure 36—Wood projection limitations

In Type III, IV, and V construction, projections of any material are permitted subject to the limitation of Section 705.2.3. That section requires that projections located within 5 feet of the line used to determine the FSD must be one of the following:

- Noncombustible materials.
- Combustible materials with a minimum 1-hour fire-resistance rating.
- Heavy timber construction.
- FRTW.
- As permitted in Section 705.2.3.1.

Note that the exception in Section 705.2.3 allows projections in Group R-3 and U occupancies to be of typical Type VB construction (protection in the form of rated construction, heavy timber construction or FRTW is not required) when the fire separation distance is greater than or equal to 5 feet.

Wood Rooftop Structures

Wood penthouses are limited by the construction classification permitted for the building and for purposes of height and area are considered a portion of the story below the penthouse as long as they comply with Section 1511. FRTW is permitted for use on buildings of Type I construction two stories or less above grade plane and in Type II construction when the exterior of the penthouse is 5 feet or more from lot lines in accordance with Section 1511.2.4.

Type III, IV and V-A construction permit a penthouse with no fire-resistance rating to be Type IV construction or FRTW if 20 feet or more from the lot line. A fire-resistance rating of not less than 1 hour is required when the exterior wall of the penthouse of any type of construction is less than 20 feet from the lot line.

Wood penthouses used to enclose tanks or elevators must not exceed 28 feet in height above the roof. If used for other purposes, the penthouse height is limited to 18 feet maximum (Section 1511.2.1).

Wood mechanical equipment screens, fences or enclosures limited to 4 feet in height are permitted if the FSD is at least 20 feet (Section 1511.6.2).

Wood towers, spires, domes and cupolas are permitted on buildings of Type III, IV and V provided that they do not exceed 85 feet in height above grade plane or 200 square feet in area. The IBC places further limitations on these structures in Section 1511.5.

Wood in Locations Subject to Decay or Termites

Wood used above ground that is located where it will be exposed to weather, moisture or termites is required to be naturally durable wood or preservative-treated wood using water-borne preservatives, in accordance with AWPA U1 for above-ground use. Naturally durable decay-resistant wood species are heartwoods of redwood, cedar, black locust and black walnut. Naturally durable termite-resistant wood species are heartwood of redwood, Alaska yellow-cedar, Eastern red cedar and Western red cedar (Sections 202 and 2304.12).

7. Structural Considerations

The primary focus of IBC Chapter 23 is structural considerations for the design of buildings and structures that incorporate wood and wood-based products. Wood product quality standards, general construction requirements including the minimum number of fasteners, structural and fire-resistance design, and conventional construction methods are covered in Chapter 23. Alternative methods and materials can be used where engineering analysis and testing justify their use; however, the general requirements of Section 2304 apply to all elements of wood frame construction.

Compliance Paths

The IBC permits five paths to design wood structural elements, and compliance with one or more is required (Section 2302.1):

- Allowable Stress Design (ASD)
- Load and Resistance Factor Design (LRFD)
- Conventional Light-Frame Construction
- AWC *Wood Frame Construction Manual* (WFCM)
- ICC 400 for Log Structures

The first two methods are engineered design. Allowable stress design (ASD) prescribes the use of load combinations specified in Chapter 16 as well as the general requirements in Section 2304, the lateral force-resisting system provisions in Section 2305, and the ASD requirements of Section 2306. Load and resistance factor design (LRFD), permitted by Section 2307, also requires the use of the load combinations in Chapter 16, the general requirements in Section 2304 and the lateral force-resisting system provisions in Section 2305.

The prescriptive provisions of conventional light-frame construction in Section 2308 use typical configurations and methods that do not require the calculation of loads or analysis by a design

professional. The use of these provisions is limited to buildings of relatively small volume that do not incorporate unusual configurations, elements, or loading.

The AWC *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM) and *ICC 400, Standard on the Design and Construction of Log Structures*, are also permitted as design and construction alternatives for buildings within their scopes.

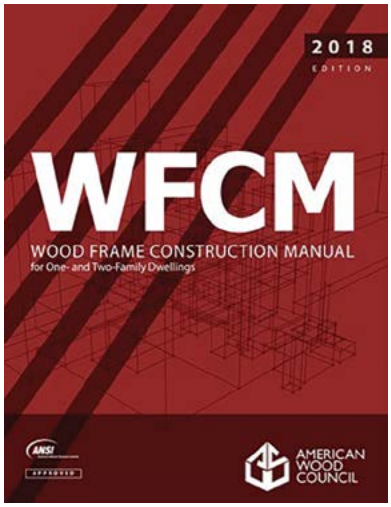

Figure 37—2018 WFCM

Standards and Quality

Section 2303 references manufacturing standards, specification criteria and use and application provisions for wood and wood products. The materials that have production and quality control standards include structural sawn lumber; end-jointed lumber; prefabricated wood I-joists; structural glued-laminated timber (defined in IBC Chapter 2); cross-laminated timber (defined in IBC Chapter 2); wood structural panels (defined in IBC Chapter 2); fiberboard sheathing (when used structurally); hardboard siding (when used structurally); particleboard; preservative-treated and fire-retardant-treated wood (defined in IBC Chapter 2); structural log members; structural composite lumber; round timber poles and piles; engineered wood rim board (defined in IBC Chapter 2); wood trusses; joist hangers; nails; and staples.

All lumber used to support loads in a building or structure is required to be properly identified with a grade mark of a lumber inspection agency complying with DOC PS 20, the *American Softwood Lumber Standard* (see www.alsc.org for a list of grading agencies and representative grade stamps). A certificate of inspection is an acceptable alternative to a grade mark for precut remanufactured or rough-sawn lumber and for sizes larger than 3-inch nominal thickness since industry practice does not individually label such products.

Engineered wood products, preservative-treated wood and fire-retardant-treated wood are required to meet industry standards specific to their use, as codified within this section.

Framing

The general requirements of Section 2304 govern framing, sheathing, decking and fasteners. It is worth noting that conventional light-frame construction of Section 2308 does not require computations to determine the size of members or fasteners; however, ASD and LRFD designs assume actual member sizes rather than nominal sizes. Specifications for framing walls, roofs, and floors in accordance with Section 2308 provide resistance for loading within the limited scope of 2308. Section 2304.3 specifies that bottom plates are required to have a minimum thickness of a nominal 2-inch-thick framing member with a width at least equal to the stud it is supporting in order to ensure loads are fully transferred.

Structural Panels and Sheathing

Wood structural panels are defined in Chapter 2 as plywood, oriented strand board (OSB) and composite panels. Exterior sheathing is required to be manufactured with exterior glue (Exposure 1 or Exterior) and, when exposed to the weather, to have an exterior exposure

durability classification. In enclosed buildings with a mean roof height not greater than 30 feet, wood structural panel sheathing, connections and framing spacing must meet the wind design requirements of Table 2304.6.1. Tables 2304.8(1) through (5) specify maximum allowable spans, minimum grade requirements and maximum loads for floor and roof sheathing.

Lumber Decking

Section 2304.9 provides installation and fastening requirements for lumber decking, which is a method of floor construction that employs individual wood members connected to supporting framing. Each piece of lumber is required to be square-end trimmed and supported in one of five layup patterns: simple span, two-span continuous, combination simple and two-span continuous, cantilevered pieces intermixed, or controlled random (Section 2304.9.2). Section 2304.9.3 prescribes nailing requirements for mechanically laminated decking (also known as nail-laminated timber or NLT) which consists of square-edged dimension lumber laminations set on edge and nailed to the adjacent pieces and to the supports. Other lumber decking patterns and connections are permitted with engineered design.

Connectors and Fasteners

Requirements for fasteners must be met in accordance with Section 2304.10. Fastening requirements are prescribed in Table 2304.10.2, which provides the minimum number and size of fasteners connecting wood members. Engineered designs may produce greater fastening requirements than those prescribed in Table 2304.10.2. The number and type of fastener are based on carbon steel. The use of stainless steel or other approved fasteners requires an engineered design. Where wall framing members are not continuous from the foundation sill to the roof, the members shall be secured to ensure a continuous load path. Sheet metal clamps, ties or clips must also be corrosion-resistant (often galvanized steel) if they are subject to moisture. Joist and framing anchors may be used in accordance with the manufacturer's instructions, and other fasteners such as clips, staples and glues are permitted when approved by the building official. Such approval should be based on evidence of testing by the manufacturer and installation in accordance with the manufacturer's specifications.

Figure 38—Beam column connection

Fasteners in contact with preservative-treated and fire-retardant-treated wood are required to be corrosion resistant (often of hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper in accordance with Section 2304.10.6) because chemicals used in the treatments more quickly corrode untreated steel fasteners.

Lateral Force-Resisting Systems

The general design requirements for lateral force-resisting systems in Section 2305 are applicable to engineered structures. This section applies to structures using wood-framed shear walls or wood-framed diaphragms to resist wind, seismic or other lateral loads. When individual elements within conventionally constructed structures need to be engineered, these provisions may be able to be applied without engineering the entire structure. Deflection of wood diaphragms and shear walls fastened with nails and the design of CLT diaphragms and shear walls is determined in accordance with AWC *Special Design Provisions for Wind and Seismic* (AWC SDPWS). For wood structural panel diaphragms and shear walls fastened with staples, where the assemblies are uniformly fastened throughout, the IBC permits the calculation of deflection through the use of the equations found in Sections 2305.2 and 2305.3.

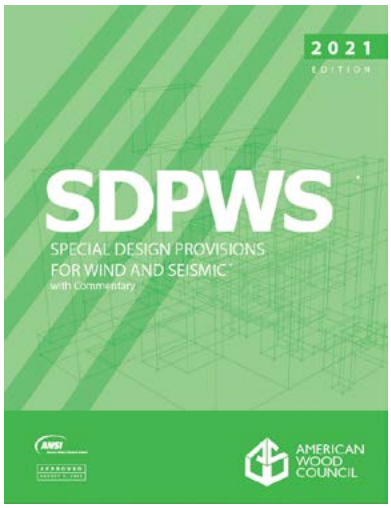

Figure 39—2021 SDPWS

Engineered Design

Sections 2306 and 2307 contain several specifications that are intended to be the minimum acceptable methods for constructing wood elements in structures. When designed and built in accordance with the standards listed in these sections, a building or structure is deemed to comply with the code. The most common and applicable practices for engineered design are summarized in the standards listed in Section 2306.1. Section 2307.1 refers the code user to AWC NDS and AWC SDPWS.

Conventional Light Frame

The provisions of Section 2308 are prescriptive and can be used to construct certain wood structures in limited application—generally building construction having closely spaced framing (not exceeding 24 inches on center) with studs up to 2 x 6 inches in size and rafters up to 2 × 12 inches in size. Section 2308.2 and its subsections spell out the limitations for the use of conventional construction provisions without design. These include height limits ranging from one story in Seismic Design Categories D and E to three stories in Categories A and B; a maximum floor-to-floor height of 11 feet, 7 inches in all seismic zones; exterior bearing walls and interior bracing walls limited to a stud height of 10 feet; floor live loads not exceeding 40 psf; basic wind speeds (*V*) not exceeding 130 mph; and others (see Section 2308.2 for the full list of limitations).

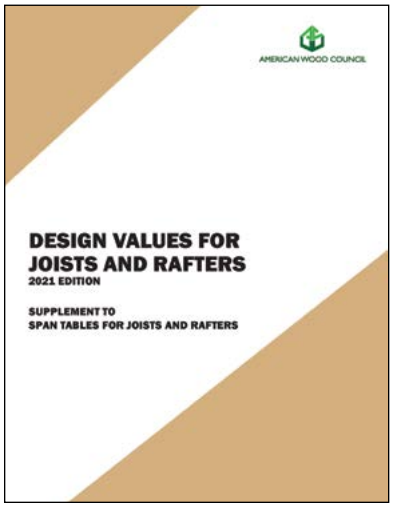

Figure 40—2021 STJR

Span Tables

Span tables are provided for girders, floor joists, ceiling joists and rafters in Tables 2308.4.1.1(1)–(2), 2308.4.2.1(1)–(2), 2308.7.1(1)–(2), and 2308.7.2(1)–(6), respectively. Spans of only the most common species and grades of wood are shown, and

the tables in the 2021 AWC *Span Tables for Joists and Rafters* (STJR) and errata should be consulted to determine spans for species and grades not shown. See Section 2308.7.7 for how the use of purlins and struts allows the reduction of rafter spans. An excerpt from Table 2308.4.2.1(1) is shown in Figure 41. Additionally, AWC has a span calculator based on STJR available on their website.

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
16	Douglas Fir-Larch	SS	11-4	15-0	19-1	23-3	11-4	15-0	19-1	23-0
	Douglas Fir-Larch	#1	10-11	14-5	18-5	21-4	10-8	13-6	16-5	19-1
	Douglas Fir-Larch	#2	10-9	14-1	17-2	19-11	9-11	12-7	15-5	17-10
	Douglas Fir-Larch	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6
	Hem-Fir	SS	10-9	14-2	18-0	21-11	10-9	14-2	18-0	21-11
	Hem-Fir	#1	10-6	13-10	17-8	20-9	10-4	13-1	16-0	18-7
	Hem-Fir	#2	10-0	13-2	16-10	19-8	9-10	12-5	15-2	17-7
	Hem-Fir	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6
	Southern Pine	SS	11-2	14-8	18-9	22-10	11-2	14-8	18-9	22-10
	Southern Pine	#1	10-9	14-2	18-0	21-4	10-9	13-9	16-1	19-1
	Southern Pine	#2	10-3	13-3	15-8	18-6	9-4	11-10	14-0	16-6
	Southern Pine	#3	7-11	10-10	12-1	14-4	7-1	8-11	10-10	12-10
	Spruce-Pine-Fir	SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-4
	Spruce-Pine-Fir	#1	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
	Spruce-Pine-Fir	#2	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
	Spruce-Pine-Fir	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6

Figure 41—Excerpt of Table 2308.4.2.1(1) Floor Joist Spans for Common Lumber Species (Residential sleeping areas, live load = 30 psf, L/Δ = 360)

See Sections 2308.4 and 2308.7 for prescriptive framing details for floors and roofs, including required bearing, lateral support, notches and holes, and framing around openings.

Wind Uplift

Section 2308.7.5 requires compliance with both Table 2304.10.2, which is the fastening schedule, and Table 2308.7.5, which specifies the minimum uplift resistance to be provided between the roof framing and wall below in conventional construction. For allowable stress design wind speeds (V_{asd}) of less than 85 mph, uplift ties are not required. When uplift ties are required by the table, a connector is required on every rafter or truss to the stud below, assuming the roof framing is spaced 24 inches on center, in accordance with Table 2308.7.5, Footnote b.

Wall Framing

The size, height and spacing of studs are required to be in accordance with Table 2308.5.1. When studs in bearing walls exceed 10 feet or the structure is outside the scope of applicability of the conventional construction requirements, studs must be designed in accordance with accepted engineering practice. Studs in nonload-bearing walls and partitions are permitted up to 20 feet in height and can be spaced up to 24 inches on center.

Figure 42—Stud wall framing

Section 2308.5 and subsections contain prescriptive framing provisions for walls. Generally, bearing and exterior wall studs are required to be capped with overlapping double top plates, which serve three major functions: the overlapping plates tie the building together, the top plates serve as supports for joists and rafters, and they serve as chords for floor and roof diaphragms. The single bottom plate serves to anchor the wall to the floor and must have a nominal thickness of not less than 2 inches and a width not less than the width of the wall studs. Openings in exterior bearing walls require headers made of double 2-inch nominal framing lumber.

Wall Bracing

Braced wall panels are portions of walls, as required by Table 2308.6.1, composed of bracing materials and methods specified in Table 2308.6.3(1). Section 2308.6.4 stipulates the minimum panel dimensions for certain bracing methods. A provision exists allowing a minimum 32-inch wall bracing length in lieu of the 48-inch length required elsewhere, or a minimum 16-inch panel length built as a portal, to allow flexibility in constructing braced wall panels adjacent to garage doors and other similar openings (Section 2308.6.5). Cripple walls with studs exceeding 14 inches in height in Seismic Design Categories A, B and C must meet the bracing requirements (Section 2308.6.6).

Figure 43—Wall bracing

8. Precautions During Construction

Chapter 33 provides minimum fire safety precautions during construction for all buildings. The chapter includes provisions for fire extinguishers, standpipes, means of egress and sprinkler system commissioning. The *International Fire Code®* (IFC®) also contains detailed requirements for fire precautions during construction that are required to be implemented by Section 3302.3.

Water Supply for Fire Protection

Construction sites for buildings of Types III, IV, and V are required to be provided with a water supply prior to the commencement of the above-ground framing (Section 3313.3). Water supply is based on the fire separation distance between the new construction and the property line, only when the adjacent property contains an existing building or can be built on. A minimum water volume of 500 gallons per minute from a hydrant within 500 feet of all combustible building materials must be provided. Greater volumes may be required based on the fire separation distance (FSD). A FSD of less than 30 feet requires the minimum volume or the total fire flow for the building when constructed, whichever is greater. When the FSD is 30 feet up to 60 feet, the fire flow volume is reduced by 50 percent. For a FSD of 60 feet or greater, the water supply is not based on fire flow. Fire flow calculations are provided in IFC Appendix B.

Fire Watch

Section 3314 requires a fire watch to be provided during nonworking hours for construction that exceeds 40 feet in height above the lowest adjacent grade at any point around the building perimeter and with an aggregate area exceeding 50,000 square feet per story, where required by the fire code official. The IFC contains additional fire watch provisions which are listed at the end of this section.

Fire Extinguishers

During construction, one portable fire extinguisher must be placed at each stairway on all floor levels with combustible materials, in each storage or construction shed, and where special hazards exist in accordance with Section 3309.

Maintaining Means of Egress

During construction, when a building height reaches 40 feet above the lowest level of fire department vehicle access, a minimum of one temporary or permanent stairway must be provided. As construction progresses, such stairways shall be extended to within one floor of the highest point of construction having secured decking or flooring in accordance with Section 3310.

Standpipes

In buildings required to have standpipes, a minimum of one must be available during construction for fire department use. The standpipe is installed before the construction is 40 feet above fire department access. The standpipe is to be placed adjacent to usable stairs and requires fire department hose connections. It must be extended during construction to within one floor of the highest point of construction having secured decking or flooring in accordance with Section 3311. During demolition, a standpipe is to be maintained in working condition. The standpipe may be demolished floor by floor as demolition proceeds.

Sprinkler System Commissioning

The sprinkler system must be tested and approved before the certificate of occupancy is awarded in accordance with Section 3312.

Additional requirements in the *International Fire Code*

Types IV-A, IV-B and IV-C construction are subject to specific safeguards once construction reaches the 7th floor. A single layer of noncombustible protection, as required for the type of construction in Section 602.4, must be installed on mass timber walls and ceilings beginning on levels more than four levels below active construction. The exterior wall covering must be installed at the same time as the noncombustible protection.

Additional requirements for fire safety during construction required by IBC Section 3302.3 but found in the IFC are as follows:

- Temporary heating equipment must be listed and labeled; installation and maintenance of the equipment must be in accordance with the listing (IFC Section 3304).
- Smoking is prohibited except in approved areas with posted signage (IFC Section 3305.1).
- A fire watch must be maintained with qualified personnel if required by the fire code official (IFC Section 3305.5).
- Welding operations must comply with IFC Chapter 35. Temporary electrical wiring must comply with NFPA 70 (IFC Section 3305.7).
- The owner must designate a site safety director responsible for the site safety plan during construction. Requirements for the program are listed in IFC Section 3303.
- An accessible emergency phone must be provided in an approved location at the construction site. The construction site street address and fire department emergency phone number must be posted by the phone (IFC Section 3310).
- Fire-fighting vehicle access must be provided within 100 feet of temporary or permanent fire department connections (IFC Section 3311).
- An approved water supply for fire protection must be available (IFC Section 3313).
- Safeguards during roofing operations must be in accordance with IFC Section 3318.

9. Energy and Acoustical Considerations

International Energy Conservation Code Compliance

Chapter 13 of *Mass Timber Buildings and the IBC®* provides additional information on the use of mass timber in the *International Energy Conservation Code®* (IECC®). Mass timber complies with the definition of "mass" as it relates to the heat capacity as defined in the IECC. This provides designers with the flexibility to use either the mass wall or non-mass wall *U*-factors to demonstrate compliance with envelope requirements.

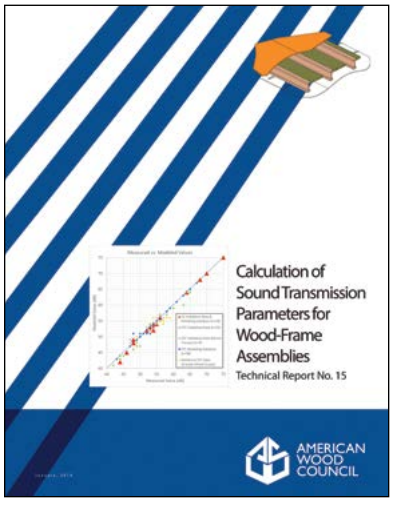

Figure 44—Technical Report 15

Acoustics

Building codes stipulate minimum requirements regarding noise transmission through common interior walls and floor/ceiling assemblies that separate dwelling units from each other and public areas. Two parameters are used to establish these minimum acoustical requirements: sound transmission class (STC) and impact insulation class (IIC). Several floor/ceiling assemblies listed in DCA 3 contain STC and IIC sound ratings. Additionally, AWC has

developed a sound transmission model for estimating STC and IIC values in certain floor/ceiling configurations, as described in AWC Technical Report 15 (TR15) *Calculation of Sound Transmission Parameters for Wood-Frame Assemblies*. A calculator tool, based on the TR15 model, is available on the AWC website. Sound ratings are a function of the joist spacing resilient channel spacing and various floor toppings with and without gypsum concrete.

Chapter 12 of *Mass Timber Buildings and the IBC®* addresses various compliance paths for mass timber wall and floor/ceiling assemblies. Although there were no changes to the acoustic provisions in the 2021 IBC specific to mass timber construction, assemblies must comply with the performance criteria for all types of construction.

10. Resources

For additional assistance and information, contact the American Wood Council (AWC) at (202) 463-2766 or info@awc.org. For additional assistance and information from the International Code Council (ICC), see www.iccsafe.org.

Published Referenced Standards from the American Wood Council

The documents published by AWC are referenced in the IBC. These standards and related code publications, design aids, technical reports and guides for wood design and construction can be purchased or viewed at www.awc.org.

ANSI/AWC NDS	2018 *National Design Specification (NDS) for Wood Construction with 2018 Supplement*
ANSI/AWC SDPWS	2021 *Special Design Provisions for Wind and Seismic*
ANSI/AWC WFCM	2018 *Wood Frame Construction Manual for One- and Two-Family Dwellings*
ANSI/AWC PWF	2021 *Permanent Wood Foundation Design Specification*
AWC STJR	2021 *Span Tables for Joists and Rafters*
AWC WCD No. 4	2003 *Wood Construction Data—Plank and Beam Framing for Residential Buildings*

Published Referenced Standards from Other Associations

Standards from additional organizations are referenced in this publication. The following table lists the standard, its title and the site from which the standard is available.

Standard-Edition	Title	Website
AAMA/WDMA/CSA 101/I.S.2/A440—17	*North American Fenestration Standard/ Specifications for Windows, Doors and Skylights*	aamanet.org wdma.com
APA PDS—12	*Panel Design Specification*	apawood.org
ASCE 7—16	*Minimum Design Loads and Associated Criteria for Buildings and Other Structures*	asce.org

Standard-Edition	Title	Website
ASTM D2898—10/17	*Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood Fire Testing*	astm.org
ASTM E84—18B	*Test Methods for Surface Burning Characteristics of Building Materials*	
ASTM E108—17	*Test Methods for Fire Tests of Roof Coverings*	
ASTM E119—18B	*Test Methods for Fire Tests of Building Construction and Materials*	
AWPA C1—03	*All Timber Products—Preservative Treatment by Pressure Processes*	awpa.com
AWPA M4—15	*Standard for the Care of Preservative-Treated Wood Products*	
AWPA U1—20	*USE CATEGORY SYSTEM: User Specification for Treated Wood Except Commodity Specification H*	
2021 IBC	2021 *International Building Code®*	iccsafe.org
2021 IRC	2021 *International Residential Code®*	
ICC 400—17	*Standard on Design and Construction of Log Structures*	
ICC 600—20	*Standard for Residential Construction in High-Wind Regions*	
NFPA 13—19	*Installation of Sprinkler Systems*	nfpa.org
NFPA 13D—19	*Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*	
NFPA 13R—19	*Installation of Sprinkler Systems in Low-Rise Residential Occupancies*	
NFPA 70—20	*National Electrical Code*	
UL 263—11	*Standard for Fire Tests of Building Construction and Materials, with revisions through June 2015*	ul.com
UL 723—18	*Standard for Test for Surface Burning Characteristics of Building Materials, with revisions through August 2013*	
UL 790—04	*Standard Test Methods for Fire Tests of Roof Coverings with revisions through July 2014*	

Additional Resources

AWC DCA 1	*Flame Spread Performance of Wood Products Used for Interior Finish*
AWC DCA 3	*Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies*
AWC DCA 4	*CAM for Calculating and Demonstrating Assembly Fire Resistance*
AWC DCA 5	*Post Frame Buildings*
AWC DCA 7	*Meeting Residential Energy Requirements with Wood-Frame Construction*
AWC FDS	*Fire Design Specification for Wood Construction* 2022
AWC TR-10	*Calculating the Fire Resistance of Wood Members and Assemblies*
AWC TR-15	*Calculation of Sound Transmission Parameters for Wood-Frame Assemblies*

11. Maximum Building Area Tables

These tables are organized by occupancy category. Each category has a nonsprinklered and sprinklered allowable building area table that contains the maximum number of stories and maximum allowable area per floor for Type III, IV and V construction.

Note that where applicable, the maximum floor area for four or more stories above grade plane is tabulated by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the actual number of stories. The floor area of the stories is assumed to be equal. Therefore, if total building area is calculated based on these tables, the maximum floor area per story should be multiplied by the corresponding number of stories in the table.

Example: Assume a Group B occupancy building using Type IIIA Construction with NFPA 13 sprinklers. Also assume 100 percent open frontage around the building (with at least 30 feet but less than 60 feet of open space on every side). Determine the total allowable building areas for a one-, two-, three- and four-story building using Table 4. Figure 45 shows the solution.

Solution:

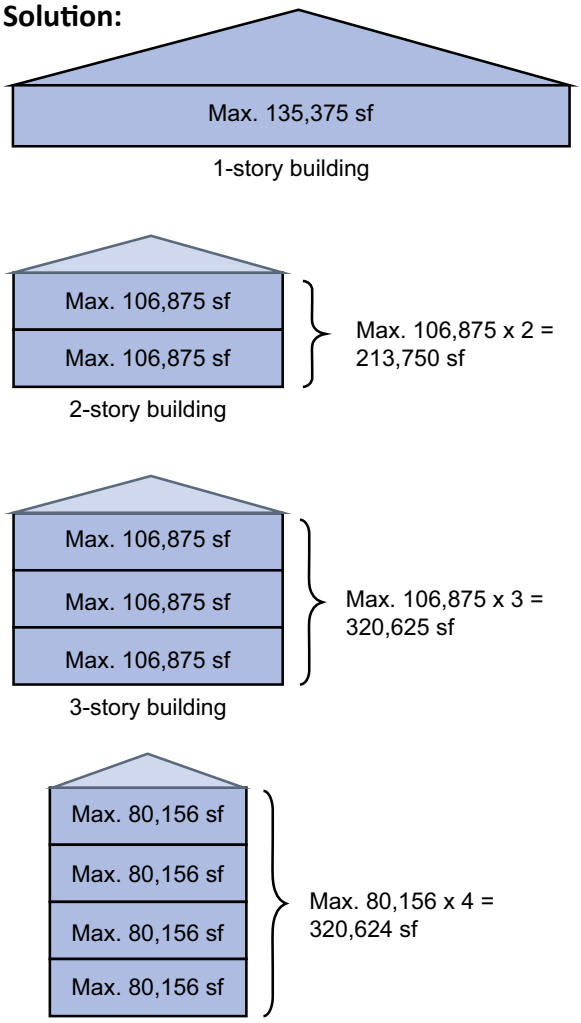

Figure 45—Example using Maximum Building Area Tables

Group A Buildings

Section 903.2.1 requires all Group A-1, A-3 and A-4 buildings to have automatic sprinkler systems installed when the fire area exceeds 12,000 square feet, the occupant load exceeds 300, or the fire area containing the Group A-1, A-3 or A-4 occupancy is located on a floor other than a floor containing the level of exit discharge. An automatic sprinkler system is required on all Group A-2 occupancies when the fire area exceeds 5,000 square feet, the occupant load exceeds 100, or the fire area containing the Group A-2 occupancy is located on a floor other than a floor containing the level of exit discharge.

Additional sprinkler requirements may apply for Group A buildings containing a multitheater complex, Group A-5 occupancies with enclosed areas under the grandstand or bleachers, assembly occupancies on the roof or buildings containing multiple fire areas containing Group A occupancies which share exits or exit access components.

Maximum floor areas per story for Group A occupancies are included in Table 1 for nonsprinklered buildings and Table 2 for NFPA 13-compliant sprinklered buildings.

**Table 1—Group A Nonsprinklered Buildings—
Maximum floor area per story**

Group A-1 Nonsprinklered Buildings[a, b, c]									
No. of stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2[f]	0 to < 25	14,000	8,500	45,000	30,000	18,750	15,000	11,500	5,500
	25 to < 50	17,500	10,625	56,250	37,500	23,438	18,750	14,375	6,875
	50 to < 75	21,000	12,750	67,500	45,000	28,125	22,500	17,250	8,250
	75 to 100	24,500	14,875	78,750	52,500	32,813	26,250	20,125	9,625
3	0 to < 25	14,000	NP	45,000	30,000	18,750	15,000	NP	NP
	25 to < 50	17,500	NP	56,250	37,500	23,438	18,750	NP	NP
	50 to < 75	21,000	NP	67,500	45,000	28,125	22,500	NP	NP
	75 to 100	24,500	NP	78,750	52,500	32,813	26,250	NP	NP
Groups A-2, A-3, A-4 Nonsprinklered Buildings[a, b, c, d]									
No. of stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2[f]	0 to < 25	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	25 to < 50	17,500	11,875	56,250	37,500	23,438	18,750	14,375	7,500
	50 to < 75	21,000	14,250	67,500	45,000	28,125	22,500	17,250	9,000
	75 to 100	24,500	16,625	78,750	52,500	32,813	26,250	20,125	10,500
3	0 to < 25	14,000	NP	45,000	30,000	18,750	15,000	NP	NP
	25 to < 50	17,500	NP	56,250	37,500	23,438	18,750	NP	NP
	50 to < 75	21,000	NP	67,500	45,000	28,125	22,500	NP	NP
	75 to 100	24,500	NP	78,750	52,500	32,813	26,250	NP	NP
Group A-5 Nonsprinklered Buildings[a, e]									
No. of stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	UL	UL	UL	UL	UL	UL	UL	UL
	25 to < 50	UL	UL	UL	UL	UL	UL	UL	UL
	50 to < 75	UL	UL	UL	UL	UL	UL	UL	UL
	75 to 100	UL	UL	UL	UL	UL	UL	UL	UL

(continues)

Table 1—Group A Nonsprinklered Buildings—Maximum floor area per story—continued

Group A-5 Nonsprinklered Buildings[a, e]									
No. of stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
2 or more	0 to < 25	UL	UL	NP	NP	NP	UL	UL	UL
	25 to < 50	UL	UL	NP	NP	NP	UL	UL	UL
	50 to < 75	UL	UL	NP	NP	NP	UL	UL	UL
	75 to 100	UL	UL	NP	NP	NP	UL	UL	UL

NP = Not Permitted.
UL = Unlimited.

a. Frontage based on open space widths of 30 feet or more.
b. Interpolation permitted.
c. Sprinklers must be provided for Group A-1, A-3 and A-4 occupancies when the fire area exceeds 12,000 square feet in accordance with Section 903.2.1, or by reason of other specific conditions in that section. In lieu of sprinklers, compartmentalization of the floor area into fire areas not more than 12,000 square feet can be provided with fire-resistance-rated construction in accordance with Chapter 7.
d. Sprinklers must be provided for Group A-2 occupancies when the fire area exceeds 5,000 square feet in accordance with Section 903.2.1.2, or by reason of other specific conditions in that section. In lieu of sprinklers, compartmentalization of the floor area into fire areas not more than 5,000 square feet can be provided with fire-resistance-rated construction in accordance with Chapter 7.
e. Sprinklers must be provided for all enclosed Group A-5 accessory uses in excess of 1,000 square feet in accordance with Section 903.2.1.5.
f. Type V-B construction does not permit two stories above grade plane.

Table 2—Group A NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story

Group A-1 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	56,000	34,000	180,000	120,000	75,000	60,000	46,000	22,000
	25 to < 50	59,500	36,125	191,250	127,500	79,688	63,750	48,875	23,375
	50 to < 75	63,000	38,250	202,500	135,000	84,375	67,500	51,750	24,750
	75 to 100	66,500[d]	40,375[d]	213,750[d]	142,500[d]	89,063[d]	71,250[d]	54,625	26,125
2	0 to < 25	42,000	25,500	135,000	90,000	56,250	45,000	34,500	16,500
	25 to < 50	45,500	27,625	146,250	97,500	60,938	48,750	37,375	17,875
	50 to < 75	49,000	29,750	157,500	105,000	65,625	52,500	40,250	19,250
	75 to 100	52,500	31,875	168,750	112,500	70,313	56,250	43,125	20,625
3	0 to < 25	42,000	25,500	135,000	90,000	56,250	45,000	34,500	NP
	25 to < 50	45,500	27,625	146,250	97,500	60,938	48,750	37,375	NP
	50 to < 75	49,000	29,750	157,500	105,000	65,625	52,500	40,250	NP
	75 to 100	52,500	31,875	168,750	112,500	70,313	56,250	43,125	NP

(continues)

Table 2—Group A NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group A-1 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
4	0 to < 25	31,500	NP	101,250	67,500	42,188	33,750	NP	NP
	25 to < 50	34,125	NP	109,688	73,125	45,703	36,563	NP	NP
	50 to < 75	36,750	NP	118,125	78,750	49,219	39,375	NP	NP
	75 to 100	39,375	NP	126,563	84,375	52,734	42,188	NP	NP
5	0 to < 25	NP	NP	81,000	54,000	NP	NP	NP	NP
	25 to < 50	NP	NP	87,750	58,500	NP	NP	NP	NP
	50 to < 75	NP	NP	94,500	63,000	NP	NP	NP	NP
	75 to 100	NP	NP	101,250	67,500	NP	NP	NP	NP
6	0 to < 25	NP	NP	67,500	45,000	NP	NP	NP	NP
	25 to < 50	NP	NP	73,125	48,750	NP	NP	NP	NP
	50 to < 75	NP	NP	78,750	52,500	NP	NP	NP	NP
	75 to 100	NP	NP	84,375	56,250	NP	NP	NP	NP
7	0 to < 25	NP	NP	57,857	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	62,679	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	67,500	NP	NP	NP	NP	NP
	75 to 100	NP	NP	72,321	NP	NP	NP	NP	NP
8	0 to < 25	NP	NP	50,625	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	54,844	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	59,063	NP	NP	NP	NP	NP
	75 to 100	NP	NP	63,281	NP	NP	NP	NP	NP
9	0 to < 25	NP	NP	45,000	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	48,750	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	52,500	NP	NP	NP	NP	NP
	75 to 100	NP	NP	56,250	NP	NP	NP	NP	NP

(continues)

Table 2—Group A NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group A-2, A-3, A-4 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	25 to < 50	59,500	40,375	191,250	127,500	79,688	63,750	48,875	25,500
	50 to < 75	63,000	42 ,750	202,500	135,000	84,375	67,500	51,750	27,000
	75 to 100	66,500[d,e]	45,125[d,e]	213,750[d,e]	142,500[d,e]	89,063[d,e]	71,250[d,e]	54,625	28,500
2	0 to < 25	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
	25 to < 50	45,500	30,875	146,250	97,500	60,938	48,750	37,375	19,500
	50 to < 75	49,000	33,250	157,500	105,000	65,625	52,500	40,250	21,000
	75 to 100	52,500	35,625	168,750	112,500	70,313	56,250	43,125	22,500
3	0 to < 25	42,000	28,500	135,000	90,000	56,250	45,000	34,500	NP
	25 to < 50	45,500	30,875	146,250	97,500	60,938	48,750	37,375	NP
	50 to < 75	49,000	33,250	157,500	105,000	65,625	52,500	40,250	NP
	75 to 100	52,500	35,625	168,750	112,500	70,313	56,250	43,125	NP
4	0 to < 25	31,500	NP	101,250	67,500	42,188	33,750	NP	NP
	25 to < 50	34,125	NP	109,688	73,125	45,703	36,563	NP	NP
	50 to < 75	36,750	NP	118,125	78,750	49,219	39,375	NP	NP
	75 to 100	39,375	NP	126,563	84,375	52,734	42,188	NP	NP
5	0 to < 25	NP	NP	81,000	54,000	33,750	NP	NP	NP
	25 to < 50	NP	NP	87,750	58,500	36,563	NP	NP	NP
	50 to < 75	NP	NP	94,500	63,000	39,375	NP	NP	NP
	75 to 100	NP	NP	101,250	67,500	42,188	NP	NP	NP
6	0 to < 25	NP	NP	67,500	45,000	28,125	NP	NP	NP
	25 to < 50	NP	NP	73,125	48,750	30,469	NP	NP	NP
	50 to < 75	NP	NP	78,750	52,500	32,813	NP	NP	NP
	75 to 100	NP	NP	84,375	56,250	35,156	NP	NP	NP
7	0 to < 25	NP	NP	57,857	38,571	NP	NP	NP	NP
	25 to < 50	NP	NP	62,679	41,786	NP	NP	NP	NP
	50 to < 75	NP	NP	67,500	45,000	NP	NP	NP	NP
	75 to 100	NP	NP	72,321	48,214	NP	NP	NP	NP

(continues)

Table 2—Group A NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group A-2, A-3, A-4 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
8	0 to < 25	NP	NP	50,625	33,750	NP	NP	NP	NP
	25 to < 50	NP	NP	54,844	36,563	NP	NP	NP	NP
	50 to < 75	NP	NP	59,063	39,375	NP	NP	NP	NP
	75 to 100	NP	NP	63,281	42,188	NP	NP	NP	NP
9	0 to < 25	NP	NP	45,000	30,000	NP	NP	NP	NP
	25 to < 50	NP	NP	48,750	32,500	NP	NP	NP	NP
	50 to < 75	NP	NP	52,500	35,000	NP	NP	NP	NP
	75 to 100	NP	NP	56,250	37,500	NP	NP	NP	NP
10	0 to < 25	NP	NP	40,500	27,000	NP	NP	NP	NP
	25 to < 50	NP	NP	43,875	29,250	NP	NP	NP	NP
	50 to < 75	NP	NP	47,250	31,500	NP	NP	NP	NP
	75 to 100	NP	NP	50,625	33,750	NP	NP	NP	NP
11	0 to < 25	NP	NP	36,818	24,545	NP	NP	NP	NP
	25 to < 50	NP	NP	39,886	26,591	NP	NP	NP	NP
	50 to < 75	NP	NP	42,955	28,636	NP	NP	NP	NP
	75 to 100	NP	NP	46,023	30,682	NP	NP	NP	NP
12	0 to < 25	NP	NP	33,750	22,500	NP	NP	NP	NP
	25 to < 50	NP	NP	36,563	24,375	NP	NP	NP	NP
	50 to < 75	NP	NP	39,375	26,250	NP	NP	NP	NP
	75 to 100	NP	NP	42,188	28,125	NP	NP	NP	NP
13	0 to < 25	NP	NP	31,154	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	33,750	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	36,346	NP	NP	NP	NP	NP
	75 to 100	NP	NP	38,942	NP	NP	NP	NP	NP

(continues)

Table 2—Group A NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group A-2, A-3, A-4 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
14	0 to < 25	NP	NP	28,929	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	31,339	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	33,750	NP	NP	NP	NP	NP
	75 to 100	NP	NP	36,161	NP	NP	NP	NP	NP
15	0 to < 25	NP	NP	27,000	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	29,250	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	31,500	NP	NP	NP	NP	NP
	75 to 100	NP	NP	33,750	NP	NP	NP	NP	NP
16	0 to < 25	NP	NP	25,313	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	27,422	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	29,531	NP	NP	NP	NP	NP
	75 to 100	NP	NP	31,641	NP	NP	NP	NP	NP
17	0 to < 25	NP	NP	23,824	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	25,809	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	27,794	NP	NP	NP	NP	NP
	75 to 100	NP	NP	29,779	NP	NP	NP	NP	NP
18	0 to < 25	NP	NP	22,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	24,375	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	26,250	NP	NP	NP	NP	NP
	75 to 100	NP	NP	28,125	NP	NP	NP	NP	NP
Group A-5 Sprinklered Buildings[b]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
UL	0 to < 25	UL	UL	UL	UL	UL	UL	UL	UL
	25 to < 50	UL	UL	UL	UL	UL	UL	UL	UL
	50 to < 75	UL	UL	UL	UL	UL	UL	UL	UL
	75 to 100	UL	UL	UL	UL	UL	UL	UL	UL

NP = Not Permitted.
UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.
b. Frontage based on open space widths of 30 feet or more.
c. Interpolation permitted.
d. Group A-1 and A-2 occupancies may be in unlimited area mixed occupancy buildings when meeting the provisions of Section 507.4.1.
e. Group A-4 may be unlimited in area if the frontage width is at least 60 feet, and the building is of Type III or IV construction in accordance with Section 507.4.

Group B Buildings

Section 903.2.2 requires all Group B buildings containing an ambulatory care facility to have an automatic sprinkler system installed when either the building contains four or more care recipients who are incapable of self-preservation or one or more care recipients that are incapable of self-preservation who are located on a level other than the level of exit discharge. The automatic sprinkler system shall be installed throughout that entire floor containing the ambulatory care facility, the floors below the floor where such care is provided, the floors between where such care is provided and the nearest level of exit discharge, the level of exit discharge, and the floors below the level of exit discharge.

Maximum floor areas per story for Group B occupancies are included in Table 3 for nonsprinklered buildings and Table 4 for NFPA 13-compliant sprinklered buildings.

Table 3—Group B Nonsprinklered Buildings—Maximum floor area per story[a, b, c, d]

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2, 3[e]	0 to < 25	28,500	19,000	108,000	72,000	45,000	36,000	18,000	9,000
	25 to < 50	35,625	23,750	135,000	90,000	56,250	45,000	22,500	11,250
	50 to < 75	42,750	28,500	162,000	108,000	67,500	54,000	27,000	13,500
	75 to 100	49,875	33,250	189,000	126,000	78,750	63,000	31,500	15,750
4	0 to < 25	21,375	NP	81,000	54,000	33,750	27,000	NP	NP
	25 to < 50	26,719	NP	101,250	67,500	42,188	33,750	NP	NP
	50 to < 75	32,063	NP	121,500	81,000	50,625	40,500	NP	NP
	75 to 100	37,406	NP	141,750	94,500	59,063	47,250	NP	NP
5	0 to < 25	17,100	NP	64,800	43,200	27,000	21,600	NP	NP
	25 to < 50	21,375	NP	81,000	54,000	33,750	27,000	NP	NP
	50 to < 75	25,650	NP	97,200	64,800	40,500	32,400	NP	NP
	75 to 100	29,925	NP	113,400	75,600	47,250	37,800	NP	NP

NP = Not Permitted.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Sprinklers must be provided for ambulatory care facilities in accordance with Section 903.2.2.

e. Type V-B construction does not permit three stories above grade plane.

Table 4—Group B NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c]

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	114,000	76,000	432,000	288,000	180,000	144,000	72,000	36,000
	25 to < 50	121,125	80,750	459,000	306,000	191,250	153,000	76,500	38,250
	50 to < 75	128,250	85,500	486,000	324,000	202,500	162,000	81,000	40,500
	75 to 100[d]	135,375	90,250	513,000	342,000	213,750	171,000	85,500	42,750
2, 3	0 to < 25	85,500	57,000	324,000	216,000	135,000	108,000	54,000	27,000
	25 to < 50	92,625	61,750	351,000	234,000	146,250	117,000	58,500	29,250
	50 to <75	99,750	66,500	378,000	252,000	157,500	126,000	63,000	31,500
	75 to 100[d]	106,875	71,250	405,000	270,000	168,750	135,000	67,500	33,750
4	0 to < 25	64,125	42,750	243,000	162,000	101,250	81,000	40,500	NP
	25 to < 50	69,469	46,313	263,250	175,500	109,688	87,750	43,875	NP
	50 to < 75	74,813	49,875	283,500	189,000	118,125	94,500	47,250	NP
	75 to 100	80,156	53,438	303,750	202,500	126,563	101,250	50,625	NP
5	0 to < 25	51,300	NP	194,400	129,600	81,000	64,800	NP	NP
	25 to < 50	55,575	NP	210,600	140,400	87,750	70,200	NP	NP
	50 to < 75	59,850	NP	226,800	151,200	94,500	75,600	NP	NP
	75 to 100	64,125	NP	243,000	162,000	101,250	81,000	NP	NP
6	0 to < 25	42,750	NP	162,000	108,000	67,500	54,000	NP	NP
	25 to < 50	46,313	NP	175,500	117,000	73,125	58,500	NP	NP
	50 to < 75	49,875	NP	189,000	126,000	78,750	63,000	NP	NP
	75 to 100	53,438	NP	202,500	135,000	84,375	67,500	NP	NP
7	0 to < 25	NP	NP	138,857	92,571	57,857	NP	NP	NP
	25 to < 50	NP	NP	150,429	100,286	62,679	NP	NP	NP
	50 to < 75	NP	NP	162,000	108,000	67,500	NP	NP	NP
	75 to 100	NP	NP	173,571	115,714	72,321	NP	NP	NP
8	0 to < 25	NP	NP	121,500	81,000	50,625	NP	NP	NP
	25 to < 50	NP	NP	131,625	87,750	54,844	NP	NP	NP
	50 to < 75	NP	NP	141,750	94,500	59,063	NP	NP	NP
	75 to 100	NP	NP	151,875	101,250	63,281	NP	NP	NP

(continues)

Table 4—Group B NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c]—continued

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
9	0 to < 25	NP	NP	108,000	72,000	45,000	NP	NP	NP
	25 to < 50	NP	NP	117,000	78,000	48,750	NP	NP	NP
	50 to < 75	NP	NP	126,000	84,000	52,500	NP	NP	NP
	75 to 100	NP	NP	135,000	90,000	56,250	NP	NP	NP
10	0 to < 25	NP	NP	97,200	64,800	NP	NP	NP	NP
	25 to < 50	NP	NP	105,300	70,200	NP	NP	NP	NP
	50 to < 75	NP	NP	113,400	75,600	NP	NP	NP	NP
	75 to 100	NP	NP	121,500	81,000	NP	NP	NP	NP
11	0 to < 25	NP	NP	88,364	58,909	NP	NP	NP	NP
	25 to < 50	NP	NP	95,727	63,818	NP	NP	NP	NP
	50 to < 75	NP	NP	103,091	68,727	NP	NP	NP	NP
	75 to 100	NP	NP	110,455	73,636	NP	NP	NP	NP
12	0 to < 25	NP	NP	81,000	54,000	NP	NP	NP	NP
	25 to < 50	NP	NP	87,750	58,500	NP	NP	NP	NP
	50 to < 75	NP	NP	94,500	63,000	NP	NP	NP	NP
	75 to 100	NP	NP	101,250	67,500	NP	NP	NP	NP
13	0 to < 25	NP	NP	74,769	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	81,000	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	87,231	NP	NP	NP	NP	NP
	75 to 100	NP	NP	93,462	NP	NP	NP	NP	NP
14	0 to < 25	NP	NP	69,429	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	75,214	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	81,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	86,786	NP	NP	NP	NP	NP
15	0 to < 25	NP	NP	64,800	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	70,200	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	75,600	NP	NP	NP	NP	NP
	75 to 100	NP	NP	81,000	NP	NP	NP	NP	NP

(continues)

Table 4—Group B NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c]—continued

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
16	0 to < 25	NP	NP	60,750	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	65,813	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	70,875	NP	NP	NP	NP	NP
	75 to 100	NP	NP	75,938	NP	NP	NP	NP	NP
17	0 to < 25	NP	NP	57,176	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	61,941	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	66,706	NP	NP	NP	NP	NP
	75 to 100	NP	NP	71,471	NP	NP	NP	NP	NP
18	0 to < 25	NP	NP	54,000	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	58,500	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	63,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	67,500	NP	NP	NP	NP	NP

NP = Not Permitted.

UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Sprinklered Group B buildings of one or two stories may be unlimited in area if 100 percent of the frontage width is at least 60 feet in accordance with Sections 507.4 and 507.5

Group E Buildings

Section 903.2.3 requires all Group E buildings to have automatic sprinkler systems installed when the fire area exceeds 12,000 square feet, the Group E occupancy is located on a floor other than the level of exit discharge serving the Group E occupancy, or the occupant load of the fire area exceeds 300.

Maximum floor areas per story for Group E occupancies are included in Table 5 for nonsprinklered buildings and Table 6 for NFPA 13-compliant sprinklered buildings.

Table 5—Group E Nonsprinklered Buildings—Maximum floor area per story[a, b, c]

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	23,500	14,500	76,500	51,000	31,875	25,500	18,500	9,500
	25 to < 50	29,375	18,125	95,625	63,750	39,844	31,875	23,125	11,875
	50 to < 75	35,250	21,750	114,750	76,500	47,813	38,250	27,750	14,250
	75 to 100	41,125	25,375	133,875	89,250	55,781	44,625	32,375	16,625
2	0 to < 25	23,500	14,500	76,500	51,000	31,875	25,500	NP	NP
	25 to < 50	29,375	18,125	95,625	63,750	39,844	31,875	NP	NP
	50 to < 75	35,250	21,750	114,750	76,500	47,813	38,250	NP	NP
	75 to 100	41,125	25,375	133,875	89,250	55,781	44,625	NP	NP
3	0 to < 25	23,500	NP	76,500	51,000	31,875	25,500	NP	NP
	25 to < 50	29,375	NP	95,625	63,750	39,844	31,875	NP	NP
	50 to < 75	35,250	NP	114,750	76,500	47,813	38,250	NP	NP
	75 to 100	41,125	NP	133,875	89,250	55,781	44,625	NP	NP

NP = Not Permitted.

a. Frontage based on open space widths of 30 feet or more.

b. Interpolation permitted.

c. Sprinklers must be provided for Group E occupancies when the fire area exceeds 12,000 square feet in accordance with Section 903.2.3, or by reason of other specific conditions in that section. In lieu of sprinklers, compartmentalization of the floor area into fire areas not more than 12,000 square feet can be provided with fire-resistance-rated construction in accordance with Chapter 7.

Table 6—Group E NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c]

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	94,000	58,000	306,000	204,000	127,500	102,000	74,000	38,000
	25 to < 50	99,875	61,625	325,125	216,750	135,469	108,375	78,625	40,375
	50 to < 75	105,750	65,250	344,250	229,500	143,438	114,750	83,250	42,750
	75 to 100	111,625[d]	68,875	363,375[d]	242,250[d]	151,406[d]	121,125[d]	87,875	45,125
2	0 to < 25	70,500	43,500	229,500	153,000	95,625	76,500	55,500	28,500
	25 to < 50	76,375	47,125	248,625	165,750	103,594	82,875	60,125	30,875
	50 to < 75	82,250	50,750	267,750	178,500	111,563	89,250	64,750	33,250
	75 to 100	88,125	54,375	286,875	191,250	119,531	95,625	69,375	35,625
3	0 to < 25	70,500	43,500	229,500	153,000	95,625	76,500	NP	NP
	25 to < 50	76,375	47,125	248,625	165,750	103,594	82,875	NP	NP
	50 to < 75	82,250	50,750	267,750	178,500	111,563	89,250	NP	NP
	75 to 100	88,125	54,375	286,875	191,250	119,531	95,625	NP	NP
4	0 to < 25	52,875	NP	172,125	114,750	71,719	57,375	NP	NP
	25 to < 50	57,281	NP	186,469	124,313	77,695	62,156	NP	NP
	50 to < 75	61,688	NP	200,813	133,875	83,672	66,938	NP	NP
	75 to 100	66,094	NP	215,156	143,438	89,648	71,719	NP	NP
5	0 to < 25	NP	NP	137,700	91,800	NP	NP	NP	NP
	25 to < 50	NP	NP	149,175	99,450	NP	NP	NP	NP
	50 to < 75	NP	NP	160,650	107,100	NP	NP	NP	NP
	75 to 100	NP	NP	172,125	114,750	NP	NP	NP	NP
6	0 to < 25	NP	NP	114,750	76,500	NP	NP	NP	NP
	25 to < 50	NP	NP	124,313	82,875	NP	NP	NP	NP
	50 to < 75	NP	NP	133,875	89,250	NP	NP	NP	NP
	75 to 100	NP	NP	143,438	95,625	NP	NP	NP	NP
7	0 to < 25	NP	NP	98,357	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	106,554	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	114,750	NP	NP	NP	NP	NP
	75 to 100	NP	NP	122,946	NP	NP	NP	NP	NP

(continues)

Table 6—Group E NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c]—continued

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
8	0 to < 25	NP	NP	86,063	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	93,234	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	100,406	NP	NP	NP	NP	NP
	75 to 100	NP	NP	107,578	NP	NP	NP	NP	NP
9	0 to < 25	NP	NP	76,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	82,875	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	89,250	NP	NP	NP	NP	NP
	75 to 100	NP	NP	95,625	NP	NP	NP	NP	NP

NP = Not Permitted.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Single-story Group E buildings may be of unlimited area when meeting the requirements of Section 507.11.

Group F Buildings

Section 903.2.4 requires all Group F-1 buildings to have automatic sprinkler systems installed when the fire area exceeds 12,000 square feet, the Group F-1 occupancy is located more than three stories above the grade plane, or the combined area of all Group F-1 fire areas on all floors, including mezzanines, exceeds 24,000 square feet.

Additional sprinkler requirements may apply for Group F buildings used for woodworking operations, manufacturing distilled spirits, or manufacturing upholstered furniture or mattresses.

Maximum floor areas per story for Group F occupancies are included in Table 7 for nonsprinklered buildings and Table 8 for NFPA 13-compliant sprinklered buildings.

Table 7—Group F Nonsprinklered Buildings—Maximum floor area per story

Group F-1 Nonsprinklered Buildings[a, b, c, d, e]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2[f]	0 to < 25	19,000	12,000	100,500	67,000	41,875	33,500	14,000	8,500
	25 to < 50	23,750	15,000	125,625	83,750	52,344	41,875	17,500	10,625
	50 to < 75	28,500	18,000	150,750	100,500	62,813	50,250	21,000	12,750
	75 to 100	33,250	21,000	175,875	117,250	73,281	58,625	24,500	14,875
3	0 to < 25	19,000	NP	100,500	67,000	41,875	33,500	NP	NP
	25 to < 50	23,750	NP	125,625	83,750	52,344	41,875	NP	NP
	50 to < 75	28,500	NP	150,750	100,500	62,813	50,250	NP	NP
	75 to 100	33,250	NP	175,875	117,250	73,281	58,625	NP	NP
4	0 to < 25	NP	NP	NP	NP	NP	25,125	NP	NP
	25 to < 50	NP	NP	NP	NP	NP	31,406	NP	NP
	50 to < 75	NP	NP	NP	NP	NP	37,688	NP	NP
	75 to 100	NP	NP	NP	NP	NP	43,969	NP	NP
Group F-2 Nonsprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2, 3[g]	0 to < 25	28,500	18,000	151,500	101,000	63,125	50,500	21,000	13,000
	25 to < 50	35,625	22,500	189,375	126,250	78,906	63,125	26,250	16,250
	50 to < 75	42,750	27,000	227,250	151,500	94,688	75,750	31,500	19,500
	75 to 100[h]	49,875	31,500	265,125	176,750	110,469	88,375	36,750	22,750
4	0 to < 25	21,375	NP	113,625	75,750	47,344	37,875	NP	NP
	25 to < 50	26,719	NP	142,031	94,688	59,180	47,344	NP	NP
	50 to < 75	32,063	NP	170,438	113,625	71,016	56,813	NP	NP
	75 to 100	37,406	NP	198,844	132,563	82,852	66,281	NP	NP

(continues)

Table 7—Group F Nonsprinklered Buildings—Maximum floor area per story—continued

Group F-2 Nonsprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
5	0 to < 25	NP	NP	90,900	60,600	37,875	30,300	NP	NP
	25 to < 50	NP	NP	113,625	75,750	47,344	37,875	NP	NP
	50 to < 75	NP	NP	136,350	90,900	56,813	45,450	NP	NP
	75 to 100	NP	NP	159,075	106,050	66,281	53,025	NP	NP

NP = Not Permitted.
UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.
b. Frontage based on open space widths of 30 feet or more.
c. Interpolation permitted.
d. Sprinklers must be provided in woodworking areas in Group F-1 occupancies when the fire area exceeds 2,500 square feet in accordance with Section 903.2.4.1 and when areas manufacturing upholstered furniture or mattresses exceed 2,500 square feet in accordance with Section 903.2.4.
e. Sprinklers must be provided for Group F-1 occupancies when the fire area exceeds 12,000 square feet, or the combined area of all Group F-1 occupancies exceeds 24,000 square feet, in accordance with Section 903.2.4, or by reason of other specific conditions in that section. In lieu of sprinklers, compartmentalization of the floor area into fire areas not more than 12,000 square feet per compartment and not more than 24,000 square feet total can be provided with fire-resistance-rated construction in accordance with Chapter 7.
f. Type V-B construction does not permit two stories above grade plane.
g. Type V-B construction does not permit three stories above grade plane.
h. Single-story Group F-2 occupancies may be unlimited in area if 100 percent of the frontage width is at least 60 feet in accordance with Section 507.3.

Table 8—Group F NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story

Group F-1 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	76,000	48,000	402,000	268,000	167,500	134,000	56,000	34,000
	25 to < 50	80,750	51,000	427,125	284,750	177,969	142,375	59,500	36,125
	50 to < 75	85,500	54,000	452,250	301,500	188,438	150,750	63,000	38,250
	75 to 100[d]	90,250	57,000	477,375	318,250	198,906	159,125	66,500	40,375
2	0 to < 25	57,000	36,000	301,500	201,000	125,625	100,500	42,000	25,500
	25 to < 50	61,750	39,000	326,625	217,750	136,094	108,875	45,500	27,625
	50 to < 75	66,500	42,000	351,750	234,500	146,563	117,250	49,000	29,750
	75 to 100[d]	71,250	45,000	376,875	251,250	157,031	125,625	52,500	31,875

(continues)

Table 8—Group F NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group F-1 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
3	0 to < 25	57,000	36,000	301,500	201,000	125,625	100,500	42,000	NP
	25 to < 50	61,750	39,000	326,625	217,750	136,094	108,875	45,500	NP
	50 to < 75	66,500	42,000	351,750	234,500	146,563	117,250	49,000	NP
	75 to 100	71,250	45,000	376,875	251,250	157,031	125,625	52,500	NP
4	0 to < 25	42,750	NP	226,125	150,750	94,219	75,375	NP	NP
	25 to < 50	46,313	NP	244,969	163,313	102,070	81,656	NP	NP
	50 to < 75	49,875	NP	263,813	175,875	109,922	87,938	NP	NP
	75 to 100	53,438	NP	282,656	188,438	117,773	94,219	NP	NP
5	0 to < 25	NP	NP	180,900	120,600	75,375	60,300	NP	NP
	25 to < 50	NP	NP	195,975	130,650	81,656	65,325	NP	NP
	50 to < 75	NP	NP	211,050	140,700	87,938	70,350	NP	NP
	75 to 100	NP	NP	226,125	150,750	94,219	75,375	NP	NP
6	0 to < 25	NP	NP	150,750	100,500	NP	NP	NP	NP
	25 to < 50	NP	NP	163,313	108,875	NP	NP	NP	NP
	50 to < 75	NP	NP	175,875	117,250	NP	NP	NP	NP
	75 to 100	NP	NP	188,438	125,625	NP	NP	NP	NP
7	0 to < 25	NP	NP	129,214	86,143	NP	NP	NP	NP
	25 to < 50	NP	NP	139,982	93,321	NP	NP	NP	NP
	50 to < 75	NP	NP	150,750	100,500	NP	NP	NP	NP
	75 to 100	NP	NP	161,518	107,679	NP	NP	NP	NP
8	0 to < 25	NP	NP	113,063	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	122,484	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	131,906	NP	NP	NP	NP	NP
	75 to 100	NP	NP	141,328	NP	NP	NP	NP	NP
9	0 to < 25	NP	NP	100,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	108,875	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	117,250	NP	NP	NP	NP	NP
	75 to 100	NP	NP	125,625	NP	NP	NP	NP	NP

(continues)

Table 8—Group F NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group F-1 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
10	0 to < 25	NP	NP	100,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	108,875	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	117,250	NP	NP	NP	NP	NP
	75 to 100	NP	NP	125,625	NP	NP	NP	NP	NP
Group F-2 Sprinklered Buildings[a, b, c]									
No. of Stories	**% Frontage**	**Maximum floor area per story (sq. ft.)**							
		III-A	**III-B**	**IV-A**	**IV-B**	**IV-C**	**IV-HT**	**V-A**	**V-B**
1	0 to < 25	114,000	72,000	606,000	404,000	252,500	202,000	84,000	52,000
	25 to < 50	121,125	76,500	643,875	429,250	268,281	214,625	89,250	55,250
	50 to < 75	128,250	81,000	681,750	454,500	284,063	227,250	94,500	58,500
	75 to 100[d]	135,375	85,500	719,625	479,750	299,844	239,875	99,750	61,750
2[d], 3	0 to < 25	85,500	54,000	454,500	303,000	189,375	151,500	63,000	39,000
	25 to < 50	92,625	58,500	492,375	328,250	205,156	164,125	68,250	42,250
	50 to < 75	99,750	63,000	530,250	353,500	220,938	176,750	73,500	45,500
	75 to 100[d]	106,875	67,500	568,125	378,750	236,719	189,375	78,750	48,750
4	0 to < 25	64,125	40,500	340,875	227,250	142,031	113,625	47,250	NP
	25 to < 50	69,469	43,875	369,281	246,188	153,867	123,094	51,188	NP
	50 to < 75	74,813	47,250	397,688	265,125	165,703	132,563	55,125	NP
	75 to 100	80,156	50,625	426,094	284,063	177,539	142,031	59,063	NP
5	0 to < 25	51,300	NP	272,700	181,800	113,625	90,900	NP	NP
	25 to < 50	55,575	NP	295,425	196,950	123,094	98,475	NP	NP
	50 to < 75	59,850	NP	318,150	212,100	132,563	106,050	NP	NP
	75 to 100	64,125	NP	340,875	227,250	142,031	113,625	NP	NP
6	0 to < 25	NP	NP	227,250	151,500	94,688	75,750	NP	NP
	25 to < 50	NP	NP	246,188	164,125	102,578	82,063	NP	NP
	50 to < 75	NP	NP	265,125	176,750	110,469	88,375	NP	NP
	75 to 100	NP	NP	284,063	189,375	118,359	94,688	NP	NP

(continues)

Table 8—Group F NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group F-2 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
7	0 to < 25	NP	NP	194,786	129,857	NP	NP	NP	NP
	25 to < 50	NP	NP	211,018	140,679	NP	NP	NP	NP
	50 to < 75	NP	NP	227,250	151,500	NP	NP	NP	NP
	75 to 100	NP	NP	243,482	162,321	NP	NP	NP	NP
8	0 to < 25	NP	NP	170,438	113,625	NP	NP	NP	NP
	25 to < 50	NP	NP	184,641	123,094	NP	NP	NP	NP
	50 to < 75	NP	NP	198,844	132,563	NP	NP	NP	NP
	75 to 100	NP	NP	213,047	142,031	NP	NP	NP	NP
9	0 to < 25	NP	NP	151,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	164,125	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	176,750	NP	NP	NP	NP	NP
	75 to 100	NP	NP	189,375	NP	NP	NP	NP	NP
10	0 to < 25	NP	NP	136,350	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	147,713	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	159,075	NP	NP	NP	NP	NP
	75 to 100	NP	NP	170,438	NP	NP	NP	NP	NP
11	0 to < 25	NP	NP	123,955	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	134,284	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	144,614	NP	NP	NP	NP	NP
	75 to 100	NP	NP	154,943	NP	NP	NP	NP	NP
12	0 to < 25	NP	NP	113,625	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	123,094	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	132,563	NP	NP	NP	NP	NP
	75 to 100	NP	NP	142,031	NP	NP	NP	NP	NP

NP = Not Permitted.

UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Sprinklered Group F buildings of one or two stories may be unlimited in area if 100 percent of the frontage width is at least 60 feet in accordance with Sections 507.4 and 507.5.

Group I Buildings

Section 903.2.6 requires all Group I buildings to have automatic sprinkler systems. Therefore, there are no maximum building heights and areas for nonsprinklered Group I buildings, with a single exception: Exception 2 of Section 903.2.6 allows Group I-4 day care facilities on the ground floor (level of exit discharge) to be nonsprinklered when there is an exterior exit door in every room where care is provided. Table 9 includes maximum floor areas for Group I-4 nonsprinklered buildings.

Additionally, Section 903.2.6 allows Group I-1 Condition 1 buildings to use NFPA 13R-compliant sprinkler systems. In this case, there is no increase in area for having a sprinkler, rather only an increase in area for frontage is allowed. NFPA 13R-compliant maximum floor areas are shown in Table 10.

Table 11 includes maximum floor areas for Group I occupancies with NFPA 13-compliant sprinklers.

Table 9—Group I-4 Nonsprinklered Buildings—Maximum floor area per story[a, b, c]

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2[d]	0 to < 25	23,500	13,000	76,500	51,000	25,500	25,500	18,500	9,000
	25 to < 50	29,375	16,250	95,625	63,750	31,875	31,875	23,125	11,250
	50 to < 75	35,250	19,500	114,750	76,500	38,250	38,250	27,750	13,500
	75 to 100	41,125	22,750	133,875	89,250	44,625	44,625	32,375	15,750
3[e]	0 to < 25	23,500	NP	76,500	51,000	25,500	25,500	NP	NP
	25 to < 50	29,375	NP	95,625	63,750	31,875	31,875	NP	NP
	50 to < 75	35,250	NP	114,750	76,500	38,250	38,250	NP	NP
	75 to 100	41,125	NP	133,875	89,250	44,625	44,625	NP	NP

NP = Not Permitted.

a. Frontage based on open space widths of 30 feet or more.
b. Interpolation permitted.
c. Section 903.2.6 Exception 2 permits Group I-4 day care facilities to be nonsprinklered when the facility is at the level of exit discharge and has at least one exterior exit door from each room where care is provided.
d. Type V-A and V-B construction do not permit two stories above grade plane.
e. Maximum floor areas for nonsprinklered buildings above one story apply to existing construction only.

Table 10—Group I-1 Condition 1, NFPA 13R-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c, d]

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2	0 to > 25	16,500	10,000	54,000	36,000	18,000	18,000	10,500	4,500
	25 to > 50	20,625	12,500	67,500	45,000	22,500	22,500	13,125	5,625
	50 to > 75	24,750	15,000	81,000	54,000	27,000	27,000	15,750	6,750
	75 to 100	28,875	17,500	94,500	63,000	31,500	31,500	18,375	7,875

(continues)

Table 10—Group I-1 Condition 1, NFPA 13R-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c, d]—continued

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
3	0 to > 25	16,500	10,000	54,000	36,000	18,000	18,000	10,500	NP
	25 to > 50	20,625	12,500	67,500	45,000	22,500	22,500	13,125	NP
	50 to > 75	24,750	15,000	81,000	54,000	27,000	27,000	15,750	NP
	75 to 100	28,875	17,500	94,500	63,000	31,500	31,500	18,375	NP
4	0 to > 25	16,500	NP	54,000	36,000	18,000	18,000	NP	NP
	25 to > 50	20,625	NP	67,500	45,000	22,500	22,500	NP	NP
	50 to > 75	24,750	NP	81,000	54,000	27,000	27,000	NP	NP
	75 to 100	28,875	NP	94,500	63,000	31,500	31,500	NP	NP

NP = Not Permitted.

a. NFPA 13R-compliant sprinklered buildings do not receive an increase of area for sprinklers. There is an increase in building area for open frontage, if applicable. The maximum floor area for four or more stories above grade plane was determined in accordance with Section 506.2.1, taking $S_a = 4$ as permitted for buildings equipped with an NFPA 13R sprinkler system.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Section 903.2.6 permits Group I-1 occupancies to be sprinklered with NFPA 13R-compliant systems. The occupancies do not qualify for area increases due to sprinklers.

Table 11—Group I NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story

Group I-1 Condition 1 Sprinklered Buildings[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	66,000	40,000	216,000	144,000	72,000	72,000	42,000	18,000
	25 to < 50	70,125	42,500	229,500	153,000	76,500	76,500	44,625	19,125
	50 to < 75	74,250	45,000	243,000	162,000	81,000	81,000	47,250	20,250
	75 to 100	78,375	47,500	256,500	171,000	85,500	85,500	49,875	21,375
2, 3	0 to < 25	49,500	30,000	162,000	108,000	54,000	54,000	31,500	13,500
	25 to < 50	53,625	32,500	175,500	117,000	58,500	58,500	34,125	14,625
	50 to < 75	57,750	35,000	189,000	126,000	63,000	63,000	36,750	15,750
	75 to 100	61,875	37,500	202,500	135,000	67,500	67,500	39,375	16,875
4	0 to < 25	37,125	22,500	121,500	81,000	40,500	40,500	23,625	NP
	25 to < 50	40,219	24,375	131,625	87,750	43,875	43,875	25,594	NP
	50 to < 75	43,313	26,250	141,750	94,500	47,250	47,250	27,563	NP
	75 to 100	46,406	28,125	151,875	101,250	50,625	50,625	29,531	NP

(continues)

Table 11—Group I NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group I-1 Condition 1 Sprinklered Buildings[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
5	0 to < 25	29,700	NP	97,200	64,800	32,400	32,400	NP	NP
	25 to < 50	32,175	NP	105,300	70,200	35,100	35,100	NP	NP
	50 to < 75	34,650	NP	113,400	75,600	37,800	37,800	NP	NP
	75 to 100	37,125	NP	121,500	81,000	40,500	40,500	NP	NP
6	0 to < 25	NP	NP	81,000	54,000	NP	NP	NP	NP
	25 to < 50	NP	NP	87,750	58,500	NP	NP	NP	NP
	50 to < 75	NP	NP	94,500	63,000	NP	NP	NP	NP
	75 to 100	NP	NP	101,250	67,500	NP	NP	NP	NP
7	0 to < 25	NP	NP	69,429	46,286	NP	NP	NP	NP
	25 to < 50	NP	NP	75,214	50,143	NP	NP	NP	NP
	50 to < 75	NP	NP	81,000	54,000	NP	NP	NP	NP
	75 to 100	NP	NP	86,786	57,857	NP	NP	NP	NP
8	0 to < 25	NP	NP	60,750	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	65,813	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	70,875	NP	NP	NP	NP	NP
	75 to 100	NP	NP	75,938	NP	NP	NP	NP	NP
9	0 to < 25	NP	NP	54,000	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	58,500	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	63,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	67,500	NP	NP	NP	NP	NP
10	0 to < 25	NP	NP	48,600	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	52,650	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	56,700	NP	NP	NP	NP	NP
	75 to 100	NP	NP	60,750	NP	NP	NP	NP	NP

(continues)

Table 11—Group I NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group I-1 Condition 2 Sprinklered Buildings[a, b, c, e]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	66,000	40,000	216,000	144,000	72,000	72,000	42,000	18,000
	25 to < 50	70,125	42,500	229,500	153,000	76,500	76,500	44,625	19,125
	50 to < 75	74,250	45,000	243,000	162,000	81,000	81,000	47,250	20,250
	75 to 100	78,375	47,500	256,500	171,000	85,500	85,500	49,875	21,375
2	0 to < 25	49,500	30,000	162,000	108,000	54,000	54,000	31,500	13,500
	25 to < 50	53,625	32,500	175,500	117,000	58,500	58,500	34,125	14,625
	50 to < 75	57,750	35,000	189,000	126,000	63,000	63,000	36,750	15,750
	75 to 100	61,875	37,500	202,500	135,000	67,500	67,500	39,375	16,875
3	0 to < 25	49,500	30,000	162,000	108,000	54,000	54,000	31,500	NP
	25 to < 50	53,625	32,500	175,500	117,000	58,500	58,500	34,125	NP
	50 to < 75	57,750	35,000	189,000	126,000	63,000	63,000	36,750	NP
	75 to 100	61,875	37,500	202,500	135,000	67,500	67,500	39,375	NP
4	0 to < 25	37,125	NP	121,500	81,000	40,500	40,500	NP	NP
	25 to < 50	40,219	NP	131,625	87,750	43,875	43,875	NP	NP
	50 to < 75	43,313	NP	141,750	94,500	47,250	47,250	NP	NP
	75 to 100	46,406	NP	151,875	101,250	50,625	50,625	NP	NP
5	0 to < 25	NP	NP	97,200	64,800	NP	NP	NP	NP
	25 to < 50	NP	NP	105,300	70,200	NP	NP	NP	NP
	50 to < 75	NP	NP	113,400	75,600	NP	NP	NP	NP
	75 to 100	NP	NP	121,500	81,000	NP	NP	NP	NP
6	0 to < 25	NP	NP	81,000	54,000	NP	NP	NP	NP
	25 to < 50	NP	NP	87,750	58,500	NP	NP	NP	NP
	50 to < 75	NP	NP	94,500	63,000	NP	NP	NP	NP
	75 to 100	NP	NP	101,250	67,500	NP	NP	NP	NP
7	0 to < 25	NP	NP	69,429	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	75,214	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	81,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	86,786	NP	NP	NP	NP	NP

(continues)

Table 11—Group I NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group I-1 Condition 2 Sprinklered Buildings[a, b, c, e]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
8	0 to < 25	NP	NP	60,750	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	65,813	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	70,875	NP	NP	NP	NP	NP
	75 to 100	NP	NP	75,938	NP	NP	NP	NP	NP
9	0 to < 25	NP	NP	54,000	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	58,500	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	63,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	67,500	NP	NP	NP	NP	NP
10	0 to < 25	NP	NP	48,600	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	52,650	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	56,700	NP	NP	NP	NP	NP
	75 to 100	NP	NP	60,750	NP	NP	NP	NP	NP
Group I-2 Sprinklered Buildings[a, b, c, e]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	48,000	NP	144,000	96,000	48,000	48,000	38,000	NP
	25 to < 50	51,000	NP	153,000	102,000	51,000	51,000	40,375	NP
	50 to < 75	54,000	NP	162,000	108,000	54,000	54,000	42,750	NP
	75 to 100	57,000	NP	171,000	114,000	57,000	57,000	45,125	NP
2, 3	0 to < 25	NP	NP	108,000	72,000	NP	NP	NP	NP
	25 to < 50	NP	NP	117,000	78,000	NP	NP	NP	NP
	50 to < 75	NP	NP	126,000	84,000	NP	NP	NP	NP
	75 to 100	NP	NP	135,000	90,000	NP	NP	NP	NP
4	0 to < 25	NP	NP	81,000	54,000	NP	NP	NP	NP
	25 to < 50	NP	NP	87,750	58,500	NP	NP	NP	NP
	50 to < 75	NP	NP	94,500	63,000	NP	NP	NP	NP
	75 to 100	NP	NP	101,250	67,500	NP	NP	NP	NP

(continues)

Table 11—Group I NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group I-2 Sprinklered Buildings[a, b, c, e]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
5	0 to < 25	NP	NP	64,800	43,200	NP	NP	NP	NP
	25 to < 50	NP	NP	70,200	46,800	NP	NP	NP	NP
	50 to < 75	NP	NP	75,600	50,400	NP	NP	NP	NP
	75 to 100	NP	NP	81,000	54,000	NP	NP	NP	NP
6	0 to < 25	NP	NP	54,000	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	58,500	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	63,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	67,500	NP	NP	NP	NP	NP
7	0 to < 25	NP	NP	46,286	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	50,143	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	54,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	57,857	NP	NP	NP	NP	NP
Group I-3 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	42,000	30,000	144,000	96,000	48,000	48,000	30,000	20,000
	25 to < 50	44,625	31,875	153,000	102,000	51,000	51,000	31,875	21,250
	50 to < 75	47,250	33,750	162,000	108,000	54,000	54,000	33,750	22,500
	75 to 100	49,875	35,625	171,000	114,000	57,000	57,000	35,625	23,750
2	0 to < 25	31,500	22,500	108,000	72,000	36,000	36,000	22,500	15,000
	25 to < 50	34,125	24,375	117,000	78,000	39,000	39,000	24,375	16,250
	50 to < 75	36,750	26,250	126,000	84,000	42,000	42,000	26,250	17,500
	75 to 100	39,375	28,125	135,000	90,000	45,000	45,000	28,125	18,750
3	0 to < 25	31,500	NP	108,000	72,000	36,000	36,000	22,500	NP
	25 to < 50	34,125	NP	117,000	78,000	39,000	39,000	24,375	NP
	50 to < 75	36,750	NP	126,000	84,000	42,000	42,000	26,250	NP
	75 to 100	39,375	NP	135,000	90,000	45,000	45,000	28,125	NP

(continues)

Table 11—Group I NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group I-3 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
4	0 to < 25	NP	NP	81,000	54,000	NP	NP	NP	NP
	25 to < 50	NP	NP	87,750	58,500	NP	NP	NP	NP
	50 to < 75	NP	NP	94,500	63,000	NP	NP	NP	NP
	75 to 100	NP	NP	101,250	67,500	NP	NP	NP	NP
5	0 to < 25	NP	NP	64,800	43,200	NP	NP	NP	NP
	25 to < 50	NP	NP	70,200	46,800	NP	NP	NP	NP
	50 to < 75	NP	NP	75,600	50,400	NP	NP	NP	NP
	75 to 100	NP	NP	81,000	54,000	NP	NP	NP	NP
6	0 to < 25	NP	NP	54,000	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	58,500	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	63,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	67,500	NP	NP	NP	NP	NP
7	0 to < 25	NP	NP	46,286	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	50,143	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	54,000	NP	NP	NP	NP	NP
	75 to 100	NP	NP	57,857	NP	NP	NP	NP	NP
Group I-4 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	94,000	52,000	306,000	204,000	102,000	102,000	74,000	36,000
	25 to < 50	99,875	55,250	325,125	216,750	108,375	108,375	78,625	38,250
	50 to < 75	105,750	58,500	344,250	229,500	114,750	114,750	83,250	40,500
	75 to 100	111,625	61,750	363,375	242,250	121,125	121,125	87,875	42,750
2	0 to < 25	70,500	39,000	229,500	153,000	76,500	76,500	55,500	27,000
	25 to < 50	76,375	42,250	248,625	165,750	82,875	82,875	60,125	29,250
	50 to < 75	82,250	45,500	267,750	178,500	89,250	89,250	64,750	31,500
	75 to 100	88,125	48,750	286,875	191,250	95,625	95,625	69,375	33,750
3	0 to < 25	70,500	39,000	229,500	153,000	76,500	76,500	NP	NP
	25 to < 50	76,375	42,250	248,625	165,750	82,875	82,875	NP	NP
	50 to < 75	82,250	45,500	267,750	178,500	89,250	89,250	NP	NP
	75 to 100	88,125	48,750	286,875	191,250	95,625	95,625	NP	NP

(continues)

Table 11—Group I NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group I-4 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
4	0 to < 25	52,875	NP	172,125	114,750	57,375	57,375	NP	NP
	25 to < 50	57,281	NP	186,469	124,313	62,156	62,156	NP	NP
	50 to < 75	61,688	NP	200,813	133,875	66,938	66,938	NP	NP
	75 to 100	66,094	NP	215,156	143,438	71,719	71,719	NP	NP
5	0 to < 25	NP	NP	137,700	91,800	NP	NP	NP	NP
	25 to < 50	NP	NP	149,175	99,450	NP	NP	NP	NP
	50 to < 75	NP	NP	160,650	107,100	NP	NP	NP	NP
	75 to 100	NP	NP	172,125	114,750	NP	NP	NP	NP
6	0 to < 25	NP	NP	114,750	76,500	NP	NP	NP	NP
	25 to < 50	NP	NP	124,313	82,875	NP	NP	NP	NP
	50 to < 75	NP	NP	133,875	89,250	NP	NP	NP	NP
	75 to 100	NP	NP	143,438	95,625	NP	NP	NP	NP
7	0 to < 25	NP	NP	98,357	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	106,554	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	114,750	NP	NP	NP	NP	NP
	75 to 100	NP	NP	122,946	NP	NP	NP	NP	NP
8	0 to < 25	NP	NP	86,063	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	93,234	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	100,406	NP	NP	NP	NP	NP
	75 to 100	NP	NP	107,578	NP	NP	NP	NP	NP
9	0 to < 25	NP	NP	76,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	82,875	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	89,250	NP	NP	NP	NP	NP
	75 to 100	NP	NP	95,625	NP	NP	NP	NP	NP

NP = Not Permitted.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Section 903.2.6 permits Group I-1 Condition 1 occupancies to be sprinklered with an NFPA 13R system that does not qualify for area increases due to sprinklers. See Table 10 for area limits.

Group M Buildings

Section 903.2.7 requires all Group M buildings to have automatic sprinkler systems installed when the fire area exceeds 12,000 square feet, the Group M occupancy is located more than three stories above the grade plane, or the combined area of all Group M fire areas on all floors, including mezzanines, exceeds 24,000 square feet.

Additional sprinkler requirements may apply for Group M buildings used for display and sale of upholstered furniture or mattresses, or where storage of merchandise is in high-piled or rack storage arrays.

Maximum floor areas per story for Group M occupancies are included in Table 12 for nonsprinklered buildings and Table 13 for NFPA 13-compliant sprinklered buildings.

Table 12—Group M Nonsprinklered Buildings—Maximum floor area per story[a, b, c, d]

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2[e]	0 to < 25	18,500	12,500	61,500	41,000	26,625	20,500	14,000	9,000
	25 to < 50	23,125	15,625	76,875	51,250	33,281	25,625	17,500	11,250
	50 to < 75	27,750	18,750	92,250	61,500	39,938	30,750	21,000	13,500
	75 to 100	32,375	21,875	107,625	71,750	46,594	35,875	24,500	15,750
3	0 to < 25	18,500	NP	61,500	41,000	26,625	20,500	14,000	NP
	25 to < 50	23,125	NP	76,875	51,250	33,281	25,625	17,500	NP
	50 to < 75	27,750	NP	92,250	61,500	39,938	30,750	21,000	NP
	75 to 100	32,375	NP	107,625	71,750	46,594	35,875	24,500	NP
4	0 to < 25	13,875	NP	46,125	30,750	19,969	15,375	NP	NP
	25 to < 50	17,344	NP	57,656	38,438	24,961	19,219	NP	NP
	50 to < 75	20,813	NP	69,188	46,125	29,953	23,063	NP	NP
	75 to 100	24,281	NP	80,719	53,813	34,945	26,906	NP	NP

NP = Not Permitted.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Sprinklers must be provided for Group M occupancies when the fire area exceeds 12,000 square feet, or the combined area of all Group M occupancies exceeds 24,000 square feet, in accordance with Section 903.2.7, or by reason of other specific conditions in that section. In lieu of sprinklers, compartmentalization of the floor area into fire areas not more than 12,000 square feet per compartment and not more than 24,000 square feet total can be provided with fire-resistance-rated construction in accordance with Chapter 7.

e. Type V-B construction does not permit two stories above grade plane.

Table 13—Group M NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c]

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	74,000	50,000	246,000	164,000	102,500	82,000	56,000	36,000
	25 to < 50	78,625	53,125	261,375	174,250	109,156	87,125	59,500	38,250
	50 to < 75	83,250	56,250	276,750	184,500	115,813	92,250	63,000	40,500
	75 to 100[d]	87,875	59,375	292,125	194,750	122,469	97,375	66,500	42,750
2	0 to < 25	55,500	37,500	184,500	123,000	76,875	61,500	42,000	27,000
	25 to < 50	60,125	40,625	199,875	133,250	83,531	66,625	45,500	29,250
	50 to < 75	64,750	43,750	215,250	143,500	90,188	71,750	49,000	31,500
	75 to 100[d]	69,375	46,875	230,625	153,750	96,844	76,875	52,500	33,750
3	0 to < 25	55,500	37,500	184,500	123,000	76,875	61,500	42,000	NP
	25 to < 50	60,125	40,625	199,875	133,250	83,531	66,625	45,500	NP
	50 to < 75	64,750	43,750	215,250	143,500	90,188	71,750	49,000	NP
	75 to 100	69,375	46,875	230,625	153,750	96,844	76,875	52,500	NP
4	0 to < 25	41,625	NP	138,375	92,250	57,656	46,125	31,500	NP
	25 to < 50	45,094	NP	149,906	99,938	62,648	49,969	34,125	NP
	50 to < 75	48,563	NP	161,438	107,625	67,641	53,813	36,750	NP
	75 to 100	52,031	NP	172,969	115,313	72,633	57,656	39,375	NP
5	0 to < 25	33,300	NP	110,700	73,800	46,125	36,900	NP	NP
	25 to < 50	36,075	NP	119,925	79,950	50,119	39,975	NP	NP
	50 to < 75	38,850	NP	129,150	86,100	54,113	43,050	NP	NP
	75 to 100	41,625	NP	138,375	92,250	58,106	46,125	NP	NP
6	0 to < 25	NP	NP	92,250	61,500	38,438	NP	NP	NP
	25 to < 50	NP	NP	99,938	66,625	41,766	NP	NP	NP
	50 to < 75	NP	NP	107,625	71,750	45,094	NP	NP	NP
	75 to 100	NP	NP	115,313	76,875	48,422	NP	NP	NP
7	0 to < 25	NP	NP	79,071	52,714	NP	NP	NP	NP
	25 to < 50	NP	NP	85,661	57,107	NP	NP	NP	NP
	50 to < 75	NP	NP	92,250	61,500	NP	NP	NP	NP
	75 to 100	NP	NP	98,839	65,893	NP	NP	NP	NP

(continues)

Table 13—Group M NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story[a, b, c]—continued

No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
8	0 to < 25	NP	NP	69,188	46,125	NP	NP	NP	NP
	25 to < 50	NP	NP	74,953	49,969	NP	NP	NP	NP
	50 to < 75	NP	NP	80,719	53,813	NP	NP	NP	NP
	75 to 100	NP	NP	86,484	57,656	NP	NP	NP	NP
9	0 to < 25	NP	NP	61,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	66,625	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	71,750	NP	NP	NP	NP	NP
	75 to 100	NP	NP	76,875	NP	NP	NP	NP	NP
10	0 to < 25	NP	NP	55,350	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	59,963	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	64,575	NP	NP	NP	NP	NP
	75 to 100	NP	NP	69,188	NP	NP	NP	NP	NP
11	0 to < 25	NP	NP	50,318	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	54,511	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	58,705	NP	NP	NP	NP	NP
	75 to 100	NP	NP	62,898	NP	NP	NP	NP	NP
12	0 to < 25	NP	NP	46,125	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	49,969	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	53,813	NP	NP	NP	NP	NP
	75 to 100	NP	NP	57,656	NP	NP	NP	NP	NP

NP = Not Permitted.
UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.
b. Frontage based on open space widths of 30 feet or more.
c. Interpolation permitted.
d. Sprinklered Group M buildings of one or two stories may be unlimited in area if 100 percent of the frontage width is at least 60 feet in accordance with Sections 507.4 and 507.5.

Group R Buildings

Section 903.2.8 requires all Group R buildings to have automatic sprinkler systems; therefore, there are no maximum building heights and areas for nonsprinklered Group R buildings. When using NFPA 13D- or 13R-compliant sprinkler systems, there is no increase in area for having a sprinkler system, rather only an increase in area for frontage is allowed. NFPA 13D- and NFPA 13R-compliant maximum floor areas are included in Tables 14 and 15, respectively. Table 16 includes NFPA 13-compliant maximum floor areas.

Use of NFPA 13D-compliant sprinkler systems is allowed for one- and two-family dwellings, townhouses and certain congregate living facilities (Group R-3 and Group R-4 Condition 1) in accordance with Sections 903.2.8 and 903.3.1.3. NFPA 13D-compliant sprinkler systems are also allowed in single-family dwellings with care facilities for five or fewer individuals receiving care.

Table 14—Group R-3 and R-4 Condition 1, NFPA 13D-Compliant Sprinklered Buildings—Maximum floor area per story

Group R-3 Sprinklered Buildings—NFPA 13D Compliant[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
See Below	0 to > 25	UL	UL	UL	UL	UL	UL	UL	UL
	25 to > 50	UL	UL	UL	UL	UL	UL	UL	UL
	50 to > 75	UL	UL	UL	UL	UL	UL	UL	UL
	75 to 100	UL	UL	UL	UL	UL	UL	UL	UL
Maximum No. of Stories		4	4	4	4	4	4	3	3
Group R-4 Condition 1 Sprinklered Buildings—NFPA 13D Compliant[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2	0 to > 25	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	25 to > 50	30,000	20,000	76,875	51,250	32,031	25,625	15,000	8,750
	50 to > 75	36,000	24,000	92,250	61,500	38,438	30,750	18,000	10,500
	75 to 100	42,000	28,000	107,625	71,750	44,844	35,875	21,000	12,250
3	0 to > 25	24,000	16,000	61,500	41,000	25,625	20,500	12,000	NP
	25 to > 50	30,000	20,000	76,875	51,250	32,031	25,625	15,000	NP
	50 to > 75	36,000	24,000	92,250	61,500	38,438	30,750	18,000	NP
	75 to 100	42,000	28,000	107,625	71,750	44,844	35,875	21,000	NP

(continues)

Table 14—Group R-3 and R-4 Condition 1, NFPA 13D-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group R-4 Condition 1 Sprinklered Buildings—NFPA 13D Compliant[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
4	0 to > 25	24,000	16,000	61,500	41,000	25,625	20,500	NP	NP
	25 to > 50	30,000	20,000	76,875	51,250	32,031	25,625	NP	NP
	50 to > 75	36,000	24,000	92,250	61,500	38,438	30,750	NP	NP
	75 to 100	42,000	28,000	107,625	71,750	44,844	35,875	NP	NP

NP = Not Permitted.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. NFPA 13D-compliant sprinkler systems are allowed in Group R-3 and Group R-4 Condition 1 residences only in accordance with Section 903.3.1.3. Group R-4 Condition 2 buildings require NFPA 13R-compliant sprinkler systems.

Table 15—Group R, NFPA 13R-Compliant Sprinklered Buildings—Maximum floor area per story

Group R-1, R-2, R-4 Sprinklered Buildings—NFPA 13R-Compliant[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2, 3	0 to > 25	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	25 to > 50	30,000	20,000	76,875	51,250	32,031	25,625	15,000	8,750
	50 to > 75	36,000	24,000	92,250	61,500	38,438	30,750	18,000	10,500
	75 to 100	42,000	28,000	107,625	71,750	44,844	35,875	21,000	12,250
4[e]	0 to > 25	24,000	16,000	61,500	41,000	25,625	20,500	12,000	NP
	25 to > 50	30,000	20,000	76,875	51,250	32,031	25,625	15,000	NP
	50 to > 75	36,000	24,000	92,250	61,500	38,438	30,750	18,000	NP
	75 to 100	42,000	28,000	107,625	71,750	44,844	35,875	21,000	NP

(continues)

Table 15—Group R, NFPA 13R-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group R-3 Sprinklered Buildings—NFPA 13R-Compliant [a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
See Below	0 to > 25	UL	UL	UL	UL	UL	UL	UL	UL
	25 to > 50	UL	UL	UL	UL	UL	UL	UL	UL
	50 to > 75	UL	UL	UL	UL	UL	UL	UL	UL
	75 to 100	UL	UL	UL	UL	UL	UL	UL	UL
Maximum No. of Stories		4	4	4	4	4	4	4	4

NP = Not Permitted.
UL = Unlimited.

a. NFPA 13R-compliant sprinklered buildings do not receive an increase of area for sprinklers. There is an increase in building area for open frontage, if applicable.
b. Frontage based on open space widths of 30 feet or more.
c. Interpolation permitted.
d. The floor level of the highest story shall be 30 feet or less above the lowest level of fire department vehicle access and the floor level of the lowest story shall be 30 feet or less below the lowest level of fire department vehicle access in accordance with Section 903.3.1.2.
e. The maximum floor area for four or more stories above grade plane was determined in accordance with Section 506.2.1, taking $S_a = 4$ as permitted for buildings equipped with an NFPA 13R sprinkler system. The floor area of the four stories is assumed to be equal.

Table 16—Group R, NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story

Group R-1, R-2, R-4 Sprinklered Buildings[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	25 to < 50	102,000	68,000	261,375	174,250	108,906	87,125	51,000	29,750
	50 to < 75	108,000	72,000	276,750	184,500	115,313	92,250	54,000	31,500
	75 to 100	114,000	76,000	292,125	194,750	121,719	97,375	57,000	33,250
2, 3	0 to < 25	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000
	25 to < 50	78,000	52,000	199,875	133,250	83,281	66,625	39,000	22,750
	50 to < 75	84,000	56,000	215,250	143,500	89,688	71,750	42,000	24,500
	75 to 100	90,000	60,000	230,625	153,750	96,094	76,875	45,000	26,250

(continues)

Table 16—Group R, NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group R-1, R-2, R-4 Sprinklered Buildings[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
4	0 to < 25	54,000	36,000	138,375	92,250	57,656	46,125	27,000	NP
	25 to < 50	58,500	39,000	149,906	99,938	62,461	49,969	29,250	NP
	50 to < 75	63,000	42,000	161,438	107,625	67,266	53,813	31,500	NP
	75 to 100	67,500	45,000	172,969	115,313	72,070	57,656	33,750	NP
5	0 to < 25	43,200	28,800	110,700	73,800	46,125	36,900	NP	NP
	25 to < 50	46,800	31,200	119,925	79,950	49,969	39,975	NP	NP
	50 to < 75	50,400	33,600	129,150	86,100	53,813	43,050	NP	NP
	75 to 100	54,000	36,000	138,375	92,250	57,656	46,125	NP	NP
6	0 to < 25	NP	NP	92,250	61,500	38,438	NP	NP	NP
	25 to < 50	NP	NP	99,938	66,625	41,641	NP	NP	NP
	50 to < 75	NP	NP	107,625	71,750	44,844	NP	NP	NP
	75 to 100	NP	NP	115,313	76,875	48,047	NP	NP	NP
7	0 to < 25	NP	NP	79,071	52,714	32,946	NP	NP	NP
	25 to < 50	NP	NP	85,661	57,107	35,692	NP	NP	NP
	50 to < 75	NP	NP	92,250	61,500	38,438	NP	NP	NP
	75 to 100	NP	NP	98,839	65,893	41,183	NP	NP	NP
8	0 to < 25	NP	NP	69,188	46,125	28,828	NP	NP	NP
	25 to < 50	NP	NP	74,953	49,969	31,230	NP	NP	NP
	50 to < 75	NP	NP	80,719	53,813	33,633	NP	NP	NP
	75 to 100	NP	NP	86,484	57,656	36,035	NP	NP	NP
9	0 to < 25	NP	NP	61,500	41,000	NP	NP	NP	NP
	25 to < 50	NP	NP	66,625	44,417	NP	NP	NP	NP
	50 to < 75	NP	NP	71,750	47,833	NP	NP	NP	NP
	75 to 100	NP	NP	76,875	51,250	NP	NP	NP	NP
10	0 to < 25	NP	NP	55,350	36,900	NP	NP	NP	NP
	25 to < 50	NP	NP	59,963	39,975	NP	NP	NP	NP
	50 to < 75	NP	NP	64,575	43,050	NP	NP	NP	NP
	75 to 100	NP	NP	69,188	46,125	NP	NP	NP	NP

(continues)

Table 16—Group R, NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group R-1, R-2, R-4 Sprinklered Buildings[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
11	0 to < 25	NP	NP	50,318	33,545	NP	NP	NP	NP
	25 to < 50	NP	NP	54,511	36,341	NP	NP	NP	NP
	50 to < 75	NP	NP	58,705	39,136	NP	NP	NP	NP
	75 to 100	NP	NP	62,898	41,932	NP	NP	NP	NP
12	0 to < 25	NP	NP	46,125	30,750	NP	NP	NP	NP
	25 to < 50	NP	NP	49,969	33,313	NP	NP	NP	NP
	50 to < 75	NP	NP	53,813	35,875	NP	NP	NP	NP
	75 to 100	NP	NP	57,656	38,438	NP	NP	NP	NP
13	0 to < 25	NP	NP	42,577	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	46,125	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	49,673	NP	NP	NP	NP	NP
	75 to 100	NP	NP	53,221	NP	NP	NP	NP	NP
14	0 to < 25	NP	NP	39,536	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	42,830	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	46,125	NP	NP	NP	NP	NP
	75 to 100	NP	NP	49,420	NP	NP	NP	NP	NP
15	0 to < 25	NP	NP	36,900	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	39,975	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	43,050	NP	NP	NP	NP	NP
	75 to 100	NP	NP	46,125	NP	NP	NP	NP	NP
16	0 to < 25	NP	NP	34,594	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	37,477	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	40,359	NP	NP	NP	NP	NP
	75 to 100	NP	NP	43,242	NP	NP	NP	NP	NP
17	0 to < 25	NP	NP	32,559	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	35,272	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	37,985	NP	NP	NP	NP	NP
	75 to 100	NP	NP	40,699	NP	NP	NP	NP	NP

(continues)

Table 16—Group R, NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group R-1, R-2, R-4 Sprinklered Buildings[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
18	0 to < 25	NP	NP	30,750	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	33,313	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	35,875	NP	NP	NP	NP	NP
	75 to 100	NP	NP	38,438	NP	NP	NP	NP	NP
Group R-3 Sprinklered Buildings[a, b, c, d]									
No. of Stories	**% Frontage**	**Maximum floor area per story (sq. ft.)**							
		III-A	**III-B**	**IV-A**	**IV-B**	**IV-C**	**IV-HT**	**V-A**	**V-B**
See Below	0 to < 25	UL	UL	UL	UL	UL	UL	UL	UL
	25 to < 50	UL	UL	UL	UL	UL	UL	UL	UL
	50 to < 75	UL	UL	UL	UL	UL	UL	UL	UL
	75 to 100	UL	UL	UL	UL	UL	UL	UL	UL
Maximum No. of Stories		5	5	18	12	5	5	4	4

NP = Not Permitted.

UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage is based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Group R occupancies must have an NFPA 13 sprinkler system unless specifically allowed an NFPA 13R or 13D sprinkler system in accordance with Section 903.3.1. If NFPA 13R is used, the floor level of the highest story shall be 30 feet or less above the lowest level of fire department vehicle access and the floor level of the lowest story shall be 30 feet or less below the lowest level of fire department vehicle access in accordance with Section 903.3.1.2, and there is no increase in area per floor for sprinklers. Using NFPA 13D, there is no increase in building height or area due to use of the automatic sprinkler system in accordance with Tables 504.3 and 504.4, use the rows for nonsprinklered buildings to determine maximum building area. See Tables 14 and 15 for area increases due to frontage.

Group S Buildings

Section 903.2.9 requires all Group S-1 buildings to have automatic sprinkler systems installed when the fire area exceeds 12,000 square feet, the Group S-1 occupancy is located more than three stories above the grade plane, the combined area of all Group S-1 fire areas on all floors, including mezzanines, exceeds 24,000 square feet, or the fire area of a Group S-1 building used for the commercial storage of motor vehicles exceeds 5,000 square feet.

Additional sprinkler requirements may apply for Group S buildings used as repair garages, bulk storage of tires, storage of distilled spirits or wine, storage of upholstered furniture or mattresses, or Group S-2 parking garages.

Maximum floor areas per story for Group S occupancies are included in Table 17 for nonsprinklered buildings and Table 18 for NFPA 13-compliant sprinklered buildings.

Table 17—Group S Nonsprinklered Buildings—Maximum floor area per story

Group S-1 Nonsprinklered Buildings[a, b, c, d, e, f]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1, 2[g]	0 to < 25	26,000	17,500	76,500	51,000	31,875	25,500	14,000	9,000
	25 to < 50	32,500	21,875	95,625	63,750	39,844	31,875	17,500	11,250
	50 to < 75	39,000	26,250	114,750	76,500	47,813	38,250	21,000	13,500
	75 to 100	45,500	30,625	133,875	89,250	55,781	44,625	24,500	15,750
3	0 to < 25	26,000	NP	76,500	51,000	31,875	25,500	14,000	NP
	25 to < 50	32,500	NP	95,625	63,750	39,844	31,875	17,500	NP
	50 to < 75	39,000	NP	114,750	76,500	47,813	38,250	21,000	NP
	75 to 100	45,500	NP	133,875	89,250	55,781	44,625	24,500	NP
4	0 to < 25	NP	NP	57,375	38,250	23,906	19,125	NP	NP
	25 to < 50	NP	NP	71,719	47,813	29,883	23,906	NP	NP
	50 to < 75	NP	NP	86,063	57,375	35,859	28,688	NP	NP
	75 to 100	NP	NP	100,406	66,938	41,836	33,469	NP	NP

NP = Not Permitted.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.
b. Frontage based on open space widths of 30 feet or more.
c. Interpolation permitted.
d. Group S-1 occupancies with storage of commercial motor vehicles must have sprinklers when the fire area exceeds 5,000 square feet in accordance with Section 903.2.10.1. Group S-1 occupancies used to store mattresses or upholstered furniture must be sprinklered when the fire area exceeds 2,500 square feet in accordance with Section 903.2.9.4. Sprinklers must be provided for Group S-1 occupancies when the fire area exceeds 12,000 square feet per compartment, or the combined area of all Group S-1 occupancies exceeds 24,000 square feet total, in accordance with Section 903.2.9, or by reason of other specific conditions in that section. In lieu of sprinklers, compartmentalization of the floor area can be provided with fire-resistance-rated construction in accordance with Chapter 7.
e. Repair garages in Group S-1 occupancies with more than one story, including basements, must have sprinklers when a fire area exceeds 10,000 square feet in accordance with Section 903.2.9.1, or by reason of other specific conditions in that section.
f. Group S-1 occupancies storing tires must be sprinklered when the fire area exceeds 20,000 cubic feet in accordance with Section 903.2.9.2.
g. Type V-B construction does not permit two stories above grade plane.

(continues)

Table 17—Group S Nonsprinklered Buildings—Maximum floor area per story—continued

Group S-2 Nonsprinklered Buildings[a, b, c, d]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1[f], 2, 3[e]	0 to < 25	39,000	26,000	115,500	77,000	48,125	38,500	21,000	13,500
	25 to < 50	48,750	32,500	144,375	96,250	60,156	48,125	26,250	16,875
	50 to < 75	58,500	39,000	173,250	115,500	72,188	57,750	31,500	20,250
	75 to 100[f]	68,250	45,500	202,125	134,750	84,219	67,375	36,750	23,625
4	0 to < 25	29,250	NP	86,625	57,750	36,094	28,875	15,750	NP
	25 to < 50	36,563	NP	108,281	72,188	45,117	36,094	19,688	NP
	50 to < 75	43,875	NP	129,938	86,625	54,141	43,313	23,625	NP
	75 to 100	51,188	NP	151,594	101,063	63,164	50,531	27,563	NP
5	0 to < 25	NP	NP	NP	NP	NP	23,100	NP	NP
	25 to < 50	NP	NP	NP	NP	NP	28,875	NP	NP
	50 to < 75	NP	NP	NP	NP	NP	34,650	NP	NP
	75 to 100	NP	NP	NP	NP	NP	40,425	NP	NP

NP = Not Permitted.

UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.

b. Frontage based on open space widths of 30 feet or more.

c. Interpolation permitted.

d. Group S-2 occupancies with enclosed parking garages must have sprinklers when the fire area exceeds 12,000 square feet per compartment, in accordance with Section 903.2.10, or by reason of other specific conditions in that section. Buildings with parking garages for commercial trucks or buses must be sprinklered when the fire area exceeds 5,000 square feet.

e. Type V-B construction does not permit three stories above grade plane.

f. Single-story Group S-2 occupancies may be unlimited in area if 100 percent of the frontage width is at least 60 feet in accordance with Section 507.3.

Table 18—Group S NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story

Group S-1 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	104,000	70,000	306,000	204,000	127,500	102,000	56,000	36,000
	25 to < 50	110,500	74,375	325,125	216,750	135,469	108,375	59,500	38,250
	50 to < 75	117,000	78,750	344,250	229,500	143,438	114,750	63,000	40,500
	75 to 100[d]	123,500	83,125	363,375	242,250	151,406	121,125	66,500	42,750
2	0 to < 25	78,000	52,500	229,500	153,000	95,625	76,500	42,000	27,000
	25 to < 50	84,500	56,875	248,625	165,750	103,594	82,875	45,500	29,250
	50 to < 75	91,000	61,250	267,750	178,500	111,563	89,250	49,000	31,500
	75 to 100[d]	97,500	65,625	286,875	191,250	119,531	95,625	52,500	33,750
3	0 to < 25	78,000	52,500	229,500	153,000	95,625	76,500	42,000	NP
	25 to < 50	84,500	56,875	248,625	165,750	103,594	82,875	45,500	NP
	50 to < 75	91,000	61,250	267,750	178,500	111,563	89,250	49,000	NP
	75 to 100	97,500	65,625	286,875	191,250	119,531	95,625	52,500	NP
4	0 to < 25	58,500	39,375	172,125	114,750	71,719	57,375	31,500	NP
	25 to <50	63,375	42,656	186,469	124,313	77,695	62,156	34,125	NP
	50 to <75	68,250	45,938	200,813	133,875	83,672	66,938	36,750	NP
	75 to 100	73,125	49,219	215,156	143,438	89,648	71,719	39,375	NP
5	0 to < 25	NP	NP	137,700	91,800	57,375	45,900	NP	NP
	25 to < 50	NP	NP	149,175	99,450	62,156	49,725	NP	NP
	50 to < 75	NP	NP	160,650	107,100	66,938	53,550	NP	NP
	75 to 100	NP	NP	172,125	114,750	71,719	57,375	NP	NP
6	0 to < 25	NP	NP	114,750	76,500	NP	NP	NP	NP
	25 to < 50	NP	NP	124,313	82,875	NP	NP	NP	NP
	50 to < 75	NP	NP	133,875	89,250	NP	NP	NP	NP
	75 to 100	NP	NP	143,438	95,625	NP	NP	NP	NP
7	0 to < 25	NP	NP	98,357	65,571	NP	NP	NP	NP
	25 to < 50	NP	NP	106,554	71,036	NP	NP	NP	NP
	50 to < 75	NP	NP	114,750	76,500	NP	NP	NP	NP
	75 to 100	NP	NP	122,946	81,964	NP	NP	NP	NP

(continues)

Table 18—Group S NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group S-1 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
8	0 to < 25	NP	NP	86,063	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	93,234	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	100,406	NP	NP	NP	NP	NP
	75 to 100	NP	NP	107,578	NP	NP	NP	NP	NP
9	0 to < 25	NP	NP	76,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	82,875	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	89,250	NP	NP	NP	NP	NP
	75 to 100	NP	NP	95,625	NP	NP	NP	NP	NP
10	0 to < 25	NP	NP	68,850	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	74,588	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	80,325	NP	NP	NP	NP	NP
	75 to 100	NP	NP	86,063	NP	NP	NP	NP	NP

NP = Not Permitted.
UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.
b. Frontage based on open space widths of 30 feet or more.
c. Interpolation permitted.
d. Sprinklered Group S buildings of one or two stories may be unlimited in area if 100 percent of the frontage width is at least 60 feet in accordance with Sections 507.4 and 507.5.

Table 18—Group S NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group S-2 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
1	0 to < 25	156,000	104,000	462,000	308,000	192,500	154,000	84,000	54,000
	25 to < 50	165,750	110,500	490,875	327,250	204,531	163,625	89,250	57,375
	50 to < 75	175,500	117,000	519,750	346,500	216,563	173,250	94,500	60,750
	75 to 100[d]	185,250	123,500	548,625	365,750	228,594	182,875	99,750	64,125

(continues)

Table 18—Group S NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group S-2 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
2[d], 3	0 to < 25	117,000	78,000	346,500	231,000	144,375	115,500	63,000	40,500
	25 to < 50	126,750	84,500	375,375	250,250	156,406	125,125	68,250	43,875
	50 to < 75	136,500	91,000	404,250	269,500	168,438	134,750	73,500	47,250
	75 to 100[d]	146,250	97,500	433,125	288,750	180,469	144,375	78,750	50,625
4	0 to < 25	87,750	58,500	259,875	173,250	108,281	86,625	47,250	NP
	25 to < 50	95,063	63,375	281,531	187,688	117,305	93,844	51,188	NP
	50 to < 75	102,375	68,250	303,188	202,125	126,328	101,063	55,125	NP
	75 to 100	109,688	73,125	324,844	216,563	135,352	108,281	59,063	NP
5	0 to < 25	70,200	NP	207,900	138,600	86,625	69,300	37,800	NP
	25 to < 50	76,050	NP	225,225	150,150	93,844	75,075	40,950	NP
	50 to < 75	81,900	NP	242,550	161,700	101,063	80,850	44,100	NP
	75 to 100	87,750	NP	259,875	173,250	108,281	86,625	47,250	NP
6	0 to < 25	NP	NP	173,250	115,500	NP	57,750	NP	NP
	25 to < 50	NP	NP	187,688	125,125	NP	62,563	NP	NP
	50 to < 75	NP	NP	202,125	134,750	NP	67,375	NP	NP
	75 to 100	NP	NP	216,563	144,375	NP	72,188	NP	NP
7	0 to < 25	NP	NP	148,500	99,000	NP	NP	NP	NP
	25 to < 50	NP	NP	160,875	107,250	NP	NP	NP	NP
	50 to < 75	NP	NP	173,250	115,500	NP	NP	NP	NP
	75 to 100	NP	NP	185,625	123,750	NP	NP	NP	NP
8	0 to < 25	NP	NP	129,938	86,625	NP	NP	NP	NP
	25 to < 50	NP	NP	140,766	93,844	NP	NP	NP	NP
	50 to < 75	NP	NP	151,594	101,063	NP	NP	NP	NP
	75 to 100	NP	NP	162,422	108,281	NP	NP	NP	NP
9	0 to < 25	NP	NP	115,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	125,125	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	134,750	NP	NP	NP	NP	NP
	75 to 100	NP	NP	144,375	NP	NP	NP	NP	NP

(continues)

Table 18—Group S NFPA 13-Compliant Sprinklered Buildings—Maximum floor area per story—continued

Group S-2 Sprinklered Buildings[a, b, c]									
No. of Stories	% Frontage	Maximum floor area per story (sq. ft.)							
		III-A	III-B	IV-A	IV-B	IV-C	IV-HT	V-A	V-B
10	0 to < 25	NP	NP	103,950	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	112,613	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	121,275	NP	NP	NP	NP	NP
	75 to 100	NP	NP	129,938	NP	NP	NP	NP	NP
11	0 to < 25	NP	NP	94,500	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	102,375	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	110,250	NP	NP	NP	NP	NP
	75 to 100	NP	NP	118,125	NP	NP	NP	NP	NP
12	0 to < 25	NP	NP	86,625	NP	NP	NP	NP	NP
	25 to < 50	NP	NP	93,844	NP	NP	NP	NP	NP
	50 to < 75	NP	NP	101,063	NP	NP	NP	NP	NP
	75 to 100	NP	NP	108,281	NP	NP	NP	NP	NP

NP = Not Permitted.
UL = Unlimited.

a. The maximum floor area for four or more stories above grade plane was determined by dividing the maximum total allowable building area determined in accordance with Section 506.2.1 by the number of stories. The floor area of the stories is assumed to be equal.
b. Frontage based on open space widths of 30 feet or more.
c. Interpolation permitted.
d. Sprinklered Group S buildings of one or two stories may be unlimited in area if 100 percent of the frontage width is at least 60 feet in accordance with Sections 507.4 and 507.5.

12. Area Factor Increase Due to Frontage—Interpolation Tables

To determine the area factor increase due to frontage, I_f, based on interpolation for calculation of allowable building areas, use the following approach:

1. Select the appropriate table (1-18) based on the building occupancy type and sprinkler coverage.
2. Select the maximum floor area per story from the "% frontage" row labeled "0 to < 25" based on the number of building stories.
3. Determine the minimum frontage distance per IBC Section 506.3.2 which is 20 feet or greater.
4. Determine the minimum percentage of perimeter based on IBC Section 506.3.1.
5. For a nonsprinklered building, use Table 19 to determine I_f.
6. For a one-story building, use Table 20 to determine I_f.
7. For a multistory building, use Table 21 to determine I_f.
8. Multiply the maximum floor area per story from Step 2 by I_f.
9. The resulting number is the allowable area per floor if all floors in the building are the same area.

See Figure 18 for an allowable building area calculation using this approach.

Table 19—Area Factor Increase Due to Frontage, I_f, for Nonsprinklered Buildings

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	1.170	1.178	1.186	1.194	1.202	1.210	1.218	1.226	1.234	1.242	1.250
26	0	1.176	1.185	1.193	1.202	1.210	1.218	1.227	1.235	1.243	1.252	1.260
27	0	1.183	1.192	1.200	1.209	1.218	1.227	1.235	1.244	1.253	1.261	1.270
28	0	1.189	1.198	1.208	1.217	1.226	1.235	1.244	1.253	1.262	1.271	1.280
29	0	1.196	1.205	1.215	1.224	1.234	1.244	1.253	1.262	1.271	1.281	1.290
30	0	1.202	1.212	1.222	1.232	1.242	1.252	1.262	1.271	1.281	1.290	1.300
31	0	1.208	1.219	1.229	1.240	1.250	1.260	1.270	1.280	1.290	1.300	1.310
32	0	1.215	1.226	1.236	1.247	1.258	1.269	1.279	1.289	1.300	1.310	1.320
33	0	1.221	1.232	1.244	1.255	1.266	1.277	1.288	1.298	1.309	1.319	1.330
34	0	1.228	1.239	1.251	1.262	1.274	1.286	1.296	1.307	1.318	1.329	1.340
35	0	1.234	1.246	1.258	1.270	1.282	1.294	1.305	1.316	1.328	1.339	1.350
36	0	1.240	1.253	1.265	1.278	1.290	1.302	1.314	1.325	1.337	1.348	1.360
37	0	1.247	1.260	1.272	1.285	1.298	1.311	1.323	1.334	1.346	1.358	1.370
38	0	1.253	1.266	1.280	1.293	1.306	1.319	1.331	1.344	1.356	1.368	1.380
39	0	1.260	1.273	1.287	1.300	1.314	1.328	1.340	1.353	1.365	1.378	1.390

(continues)

Table 19—Area Factor Increase Due to Frontage, I_f, for Nonsprinklered Buildings—continued

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
40	0	1.266	1.280	1.294	1.308	1.322	1.336	1.349	1.362	1.374	1.387	1.400
41	0	1.272	1.287	1.301	1.316	1.330	1.344	1.358	1.371	1.384	1.397	1.410
42	0	1.279	1.294	1.308	1.323	1.338	1.353	1.366	1.380	1.393	1.407	1.420
43	0	1.285	1.300	1.316	1.331	1.346	1.361	1.375	1.389	1.402	1.416	1.430
44	0	1.292	1.307	1.323	1.338	1.354	1.370	1.384	1.398	1.412	1.426	1.440
45	0	1.298	1.314	1.330	1.346	1.362	1.378	1.392	1.407	1.421	1.436	1.450
46	0	1.304	1.321	1.337	1.354	1.370	1.386	1.401	1.416	1.431	1.445	1.460
47	0	1.311	1.328	1.344	1.361	1.378	1.395	1.410	1.425	1.440	1.455	1.470
48	0	1.317	1.334	1.352	1.369	1.386	1.403	1.419	1.434	1.449	1.465	1.480
49	0	1.324	1.341	1.359	1.376	1.394	1.412	1.427	1.443	1.459	1.474	1.490
50	0	1.330	1.348	1.366	1.384	1.402	1.420	1.436	1.452	1.468	1.484	1.500
51	0	1.337	1.355	1.373	1.392	1.410	1.428	1.445	1.461	1.477	1.494	1.510
52	0	1.344	1.362	1.381	1.400	1.418	1.437	1.453	1.470	1.487	1.503	1.520
53	0	1.350	1.369	1.388	1.407	1.426	1.445	1.462	1.479	1.496	1.513	1.530
54	0	1.357	1.376	1.396	1.415	1.434	1.454	1.471	1.488	1.505	1.523	1.540
55	0	1.364	1.384	1.403	1.423	1.442	1.462	1.480	1.497	1.515	1.532	1.550
56	0	1.371	1.391	1.411	1.431	1.450	1.470	1.488	1.506	1.524	1.542	1.560
57	0	1.378	1.398	1.418	1.438	1.459	1.479	1.497	1.515	1.534	1.552	1.570
58	0	1.384	1.405	1.426	1.446	1.467	1.487	1.506	1.524	1.543	1.561	1.580
59	0	1.391	1.412	1.433	1.454	1.475	1.496	1.514	1.533	1.552	1.571	1.590
60	0	1.398	1.419	1.440	1.462	1.483	1.504	1.523	1.542	1.562	1.581	1.600
61	0	1.405	1.426	1.448	1.469	1.491	1.512	1.532	1.551	1.571	1.590	1.610
62	0	1.412	1.433	1.455	1.477	1.499	1.521	1.541	1.560	1.580	1.600	1.620
63	0	1.418	1.441	1.463	1.485	1.507	1.529	1.549	1.570	1.590	1.610	1.630
64	0	1.425	1.448	1.470	1.493	1.515	1.538	1.558	1.579	1.599	1.620	1.640
65	0	1.432	1.455	1.478	1.500	1.523	1.546	1.567	1.588	1.608	1.629	1.650
66	0	1.439	1.462	1.485	1.508	1.531	1.554	1.576	1.597	1.618	1.639	1.660
67	0	1.446	1.469	1.492	1.516	1.539	1.563	1.584	1.606	1.627	1.649	1.670
68	0	1.452	1.476	1.500	1.524	1.547	1.571	1.593	1.615	1.636	1.658	1.680
69	0	1.459	1.483	1.507	1.531	1.556	1.580	1.602	1.624	1.646	1.668	1.690
70	0	1.466	1.490	1.515	1.539	1.564	1.588	1.610	1.633	1.655	1.678	1.700

(continues)

Table 19—Area Factor Increase Due to Frontage, I_f, for Nonsprinklered Buildings—continued

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
71	0	1.473	1.498	1.522	1.547	1.572	1.596	1.619	1.642	1.665	1.687	1.710
72	0	1.480	1.505	1.530	1.555	1.580	1.605	1.628	1.651	1.674	1.697	1.720
73	0	1.486	1.512	1.537	1.562	1.588	1.613	1.637	1.660	1.683	1.707	1.730
74	0	1.493	1.519	1.545	1.570	1.596	1.622	1.645	1.669	1.693	1.716	1.740
75	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
76	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
77	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
78	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
79	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
80	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
81	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
82	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
83	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
84	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
85	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
86	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
87	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
88	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
89	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
90	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
91	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
92	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
93	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
94	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
95	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
96	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
97	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
98	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
99	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750
100	0	1.500	1.526	1.552	1.578	1.604	1.630	1.654	1.678	1.702	1.726	1.750

Table 20—Area Factor Increase Due to Frontage, I_f, for One-story Buildings

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	1.043	1.045	1.047	1.049	1.051	1.053	1.055	1.057	1.059	1.061	1.063
26	0	1.044	1.046	1.048	1.050	1.053	1.055	1.057	1.059	1.061	1.063	1.065
27	0	1.046	1.048	1.050	1.052	1.055	1.057	1.059	1.061	1.063	1.065	1.068
28	0	1.047	1.050	1.052	1.054	1.057	1.059	1.061	1.063	1.066	1.068	1.070
29	0	1.049	1.051	1.054	1.056	1.059	1.061	1.063	1.066	1.068	1.070	1.073
30	0	1.051	1.053	1.056	1.058	1.061	1.063	1.065	1.068	1.070	1.073	1.075
31	0	1.052	1.055	1.057	1.060	1.063	1.065	1.068	1.070	1.073	1.075	1.078
32	0	1.054	1.056	1.059	1.062	1.065	1.067	1.070	1.072	1.075	1.077	1.080
33	0	1.055	1.058	1.061	1.064	1.067	1.069	1.072	1.075	1.077	1.080	1.083
34	0	1.057	1.060	1.063	1.066	1.069	1.071	1.074	1.077	1.080	1.082	1.085
35	0	1.059	1.062	1.065	1.068	1.071	1.074	1.076	1.079	1.082	1.085	1.088
36	0	1.060	1.063	1.066	1.069	1.073	1.076	1.078	1.081	1.084	1.087	1.090
37	0	1.062	1.065	1.068	1.071	1.075	1.078	1.081	1.084	1.087	1.090	1.093
38	0	1.063	1.067	1.070	1.073	1.077	1.080	1.083	1.086	1.089	1.092	1.095
39	0	1.065	1.068	1.072	1.075	1.079	1.082	1.085	1.088	1.091	1.094	1.098
40	0	1.067	1.070	1.074	1.077	1.081	1.084	1.087	1.090	1.094	1.097	1.100
41	0	1.068	1.072	1.075	1.079	1.083	1.086	1.089	1.093	1.096	1.099	1.103
42	0	1.070	1.073	1.077	1.081	1.085	1.088	1.092	1.095	1.098	1.102	1.105
43	0	1.071	1.075	1.079	1.083	1.087	1.090	1.094	1.097	1.101	1.104	1.108
44	0	1.073	1.077	1.081	1.085	1.089	1.092	1.096	1.099	1.103	1.106	1.110
45	0	1.075	1.079	1.083	1.087	1.091	1.095	1.098	1.102	1.105	1.109	1.113
46	0	1.076	1.080	1.084	1.088	1.093	1.097	1.100	1.104	1.108	1.111	1.115
47	0	1.078	1.082	1.086	1.090	1.095	1.099	1.102	1.106	1.110	1.114	1.118
48	0	1.079	1.084	1.088	1.092	1.097	1.101	1.105	1.108	1.112	1.116	1.120
49	0	1.081	1.085	1.090	1.094	1.099	1.103	1.107	1.111	1.115	1.119	1.123
50	0	1.083	1.087	1.092	1.096	1.101	1.105	1.109	1.113	1.117	1.121	1.125
51	0	1.084	1.089	1.093	1.098	1.103	1.107	1.111	1.115	1.119	1.123	1.128
52	0	1.086	1.091	1.095	1.100	1.105	1.109	1.113	1.118	1.122	1.126	1.130
53	0	1.088	1.092	1.097	1.102	1.107	1.111	1.116	1.120	1.124	1.128	1.133
54	0	1.089	1.094	1.099	1.104	1.109	1.113	1.118	1.122	1.126	1.131	1.135

(continues)

Table 20—Area Factor Increase Due to Frontage, I_f, for One-story Buildings—continued

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
55	0	1.091	1.096	1.101	1.106	1.111	1.116	1.120	1.124	1.129	1.133	1.138
56	0	1.093	1.098	1.103	1.108	1.113	1.118	1.122	1.127	1.131	1.136	1.140
57	0	1.094	1.099	1.105	1.110	1.115	1.120	1.124	1.129	1.133	1.138	1.143
58	0	1.096	1.101	1.106	1.112	1.117	1.122	1.126	1.131	1.136	1.140	1.145
59	0	1.098	1.103	1.108	1.113	1.119	1.124	1.129	1.133	1.138	1.143	1.148
60	0	1.100	1.105	1.110	1.115	1.121	1.126	1.131	1.136	1.140	1.145	1.150
61	0	1.101	1.107	1.112	1.117	1.123	1.128	1.133	1.138	1.143	1.148	1.153
62	0	1.103	1.108	1.114	1.119	1.125	1.130	1.135	1.140	1.145	1.150	1.155
63	0	1.105	1.110	1.116	1.121	1.127	1.132	1.137	1.142	1.147	1.152	1.158
64	0	1.106	1.112	1.118	1.123	1.129	1.134	1.140	1.145	1.150	1.155	1.160
65	0	1.108	1.114	1.119	1.125	1.131	1.137	1.142	1.147	1.152	1.157	1.163
66	0	1.110	1.115	1.121	1.127	1.133	1.139	1.144	1.149	1.154	1.160	1.165
67	0	1.111	1.117	1.123	1.129	1.135	1.141	1.146	1.151	1.157	1.162	1.168
68	0	1.113	1.119	1.125	1.131	1.137	1.143	1.148	1.154	1.159	1.165	1.170
69	0	1.115	1.121	1.127	1.133	1.139	1.145	1.150	1.156	1.161	1.167	1.173
70	0	1.117	1.123	1.129	1.135	1.141	1.147	1.153	1.158	1.164	1.169	1.175
71	0	1.118	1.124	1.131	1.137	1.143	1.149	1.155	1.160	1.166	1.172	1.178
72	0	1.120	1.126	1.132	1.139	1.145	1.151	1.157	1.163	1.168	1.174	1.180
73	0	1.122	1.128	1.134	1.141	1.147	1.153	1.159	1.165	1.171	1.177	1.183
74	0	1.123	1.130	1.136	1.143	1.149	1.155	1.161	1.167	1.173	1.179	1.185
75	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
76	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
77	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
78	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
79	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
80	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
81	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
82	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
83	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
84	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
85	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188

(continues)

Table 20—Area Factor Increase Due to Frontage, I_f, for One-story Buildings—continued

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
86	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
87	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
88	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
89	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
90	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
91	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
92	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
93	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
94	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
95	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
96	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
97	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
98	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
99	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188
100	0	1.125	1.132	1.138	1.145	1.151	1.158	1.164	1.170	1.176	1.182	1.188

Table 21—Area Factor Increase Due to Frontage, I_f, for Multistory Buildings

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	1.057	1.059	1.062	1.065	1.067	1.070	1.073	1.075	1.078	1.081	1.083
26	0	1.059	1.062	1.064	1.067	1.070	1.073	1.076	1.078	1.081	1.084	1.087
27	0	1.061	1.064	1.067	1.070	1.073	1.076	1.078	1.081	1.084	1.087	1.090
28	0	1.063	1.066	1.069	1.072	1.075	1.078	1.081	1.084	1.087	1.090	1.093
29	0	1.065	1.068	1.072	1.075	1.078	1.081	1.084	1.087	1.090	1.094	1.097
30	0	1.067	1.071	1.074	1.077	1.081	1.084	1.087	1.090	1.094	1.097	1.100
31	0	1.069	1.073	1.076	1.080	1.083	1.087	1.090	1.093	1.097	1.100	1.103
32	0	1.072	1.075	1.079	1.082	1.086	1.090	1.093	1.096	1.100	1.103	1.107
33	0	1.074	1.077	1.081	1.085	1.089	1.092	1.096	1.099	1.103	1.106	1.110
34	0	1.076	1.080	1.084	1.087	1.091	1.095	1.099	1.102	1.106	1.110	1.113

(continues)

Table 21—Area Factor Increase Due to Frontage, I_f, for Multistory Buildings—continued

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
35	0	1.078	1.082	1.086	1.090	1.094	1.098	1.102	1.105	1.109	1.113	1.117
36	0	1.080	1.084	1.088	1.093	1.097	1.101	1.105	1.108	1.112	1.116	1.120
37	0	1.082	1.087	1.091	1.095	1.099	1.104	1.108	1.111	1.115	1.119	1.123
38	0	1.084	1.089	1.093	1.098	1.102	1.106	1.110	1.115	1.119	1.123	1.127
39	0	1.087	1.091	1.096	1.100	1.105	1.109	1.113	1.118	1.122	1.126	1.130
40	0	1.089	1.093	1.098	1.103	1.107	1.112	1.116	1.121	1.125	1.129	1.133
41	0	1.091	1.096	1.100	1.105	1.110	1.115	1.119	1.124	1.128	1.132	1.137
42	0	1.093	1.098	1.103	1.108	1.113	1.118	1.122	1.127	1.131	1.136	1.140
43	0	1.095	1.100	1.105	1.110	1.115	1.120	1.125	1.130	1.134	1.139	1.143
44	0	1.097	1.102	1.108	1.113	1.118	1.123	1.128	1.133	1.137	1.142	1.147
45	0	1.099	1.105	1.110	1.115	1.121	1.126	1.131	1.136	1.140	1.145	1.150
46	0	1.101	1.107	1.112	1.118	1.123	1.129	1.134	1.139	1.144	1.148	1.153
47	0	1.104	1.109	1.115	1.120	1.126	1.132	1.137	1.142	1.147	1.152	1.157
48	0	1.106	1.111	1.117	1.123	1.129	1.134	1.140	1.145	1.150	1.155	1.160
49	0	1.108	1.114	1.120	1.125	1.131	1.137	1.142	1.148	1.153	1.158	1.163
50	0	1.110	1.116	1.122	1.128	1.134	1.140	1.145	1.151	1.156	1.161	1.167
51	0	1.112	1.118	1.124	1.131	1.137	1.143	1.148	1.154	1.159	1.165	1.170
52	0	1.115	1.121	1.127	1.133	1.139	1.146	1.151	1.157	1.162	1.168	1.173
53	0	1.117	1.123	1.129	1.136	1.142	1.148	1.154	1.160	1.165	1.171	1.177
54	0	1.119	1.125	1.132	1.138	1.145	1.151	1.157	1.163	1.168	1.174	1.180
55	0	1.121	1.128	1.134	1.141	1.147	1.154	1.160	1.166	1.172	1.177	1.183
56	0	1.124	1.130	1.137	1.144	1.150	1.157	1.163	1.169	1.175	1.181	1.187
57	0	1.126	1.133	1.139	1.146	1.153	1.160	1.166	1.172	1.178	1.184	1.190
58	0	1.128	1.135	1.142	1.149	1.156	1.162	1.169	1.175	1.181	1.187	1.193
59	0	1.130	1.137	1.144	1.151	1.158	1.165	1.171	1.178	1.184	1.190	1.197
60	0	1.133	1.140	1.147	1.154	1.161	1.168	1.174	1.181	1.187	1.194	1.200
61	0	1.135	1.142	1.149	1.156	1.164	1.171	1.177	1.184	1.190	1.197	1.203
62	0	1.137	1.144	1.152	1.159	1.166	1.174	1.180	1.187	1.193	1.200	1.207
63	0	1.139	1.147	1.154	1.162	1.169	1.176	1.183	1.190	1.197	1.203	1.210
64	0	1.142	1.149	1.157	1.164	1.172	1.179	1.186	1.193	1.200	1.207	1.213
65	0	1.144	1.152	1.159	1.167	1.174	1.182	1.189	1.196	1.203	1.210	1.217

(continues)

Table 21—Area Factor Increase Due to Frontage, I_f, for Multistory Buildings—continued

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
66	0	1.146	1.154	1.162	1.169	1.177	1.185	1.192	1.199	1.206	1.213	1.220
67	0	1.149	1.156	1.164	1.172	1.180	1.188	1.195	1.202	1.209	1.216	1.223
68	0	1.151	1.159	1.167	1.175	1.182	1.190	1.198	1.205	1.212	1.219	1.227
69	0	1.153	1.161	1.169	1.177	1.185	1.193	1.201	1.208	1.215	1.223	1.230
70	0	1.155	1.163	1.172	1.180	1.188	1.196	1.203	1.211	1.218	1.226	1.233
71	0	1.158	1.166	1.174	1.182	1.191	1.199	1.206	1.214	1.222	1.229	1.237
72	0	1.160	1.168	1.177	1.185	1.193	1.202	1.209	1.217	1.225	1.232	1.240
73	0	1.162	1.171	1.179	1.187	1.196	1.204	1.212	1.220	1.228	1.236	1.243
74	0	1.164	1.173	1.182	1.190	1.199	1.207	1.215	1.223	1.231	1.239	1.247
75	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
76	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
77	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
78	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
79	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
80	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
81	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
82	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
83	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
84	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
85	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
86	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
87	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
88	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
89	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
90	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
91	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
92	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
93	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
94	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
95	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
96	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250

(continues)

Table 21—Area Factor Increase Due to Frontage, I_f, for Multistory Buildings—continued

% Frontage	Minimum Frontage Distance (ft) per IBC Section 506.3.2											
	0	20	21	22	23	24	25	26	27	28	29	30
97	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
98	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
99	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250
100	0	1.167	1.175	1.184	1.193	1.201	1.210	1.218	1.226	1.234	1.242	1.250

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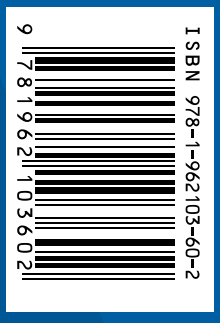

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