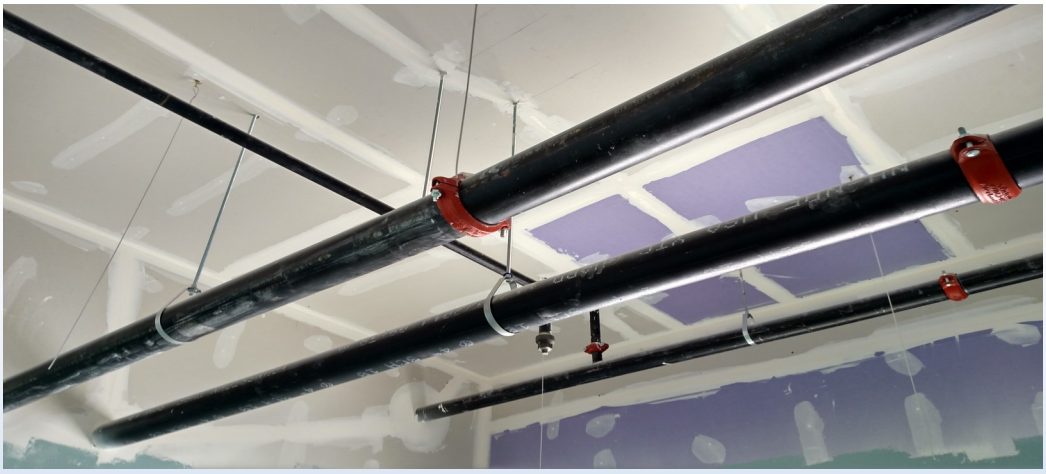
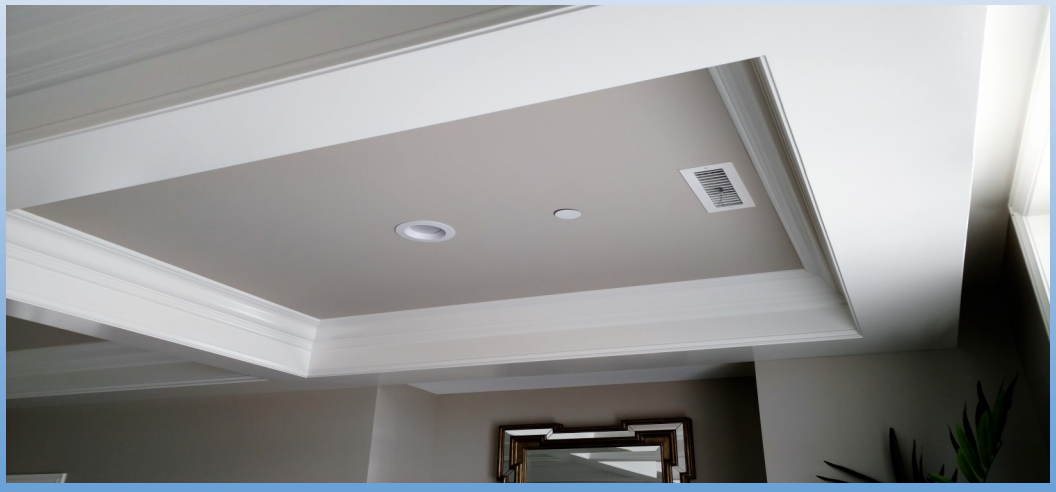
NFSA
NATIONAL FIRE SPRINKLER ASSOCIATION
The Voice of the Fire Sprinkler Industry

Fire Sprinkler Guide to Fire Sprinklers in the International Building Code® 2015 Edition





NFSA Fire Sprinkler Guide to Fire Sprinklers in the International Building Code® 2015 Edition

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I - Sprinkler Design Advantages

The following sprinkler advantages are applicable to all occupancy classifications wherever approved fire sprinkler systems are installed in buildings. They are applicable only to the fire areas or where the fire sprinklers are installed throughout. They are also applicable even though sprinklers are required by other sections of the building code. Additional occupancy group specific sprinkler design advantages are listed in Part D for each individual group.

High-Rise Buildings (up to 420 feet in height)
Sprinklers permit the required fire resistance rating of the fire barrier walls enclosing vertical shafts, other than exit enclosures and elevator hoistway enclosures, to be reduced to 1-hour where automatic sprinklers are installed within the shafts at the top and at alternate floor levels. 403.2.1.1– NFPA 13

Sprinklers permit the fire resistance rating of vertical shafts reduced to 1-hour fire barriers in high-rise buildings where sprinklers are installed at the top of the shaft and alternate floor levels. 403.2.1.2– NFPA 13

High-Rise Buildings
Sprinklers reduce generator fuel line protection to 1-hour. 403.4.8.2– NFPA 13

Atrium Floor Areas
Sprinklers permit the atrium floor area to be used for any approved use where the individual space is provided with an automatic sprinkler system. 404.2– NFPA 13

Atriums
Sprinklers permit a glass wall forming a smoke partition where automatic closely spaced sprinklers are provided along both sides of the separation wall. 404.6– NFPA 13, NFPA 13R, NFPA 13D

Stages
Sprinklers installed in the space below the stage eliminate the requirement for a fire resistance rated floor. 410.3.1 (2) - NFPA 13, NFPA 13R, NFPA 13D

Proscenium wall water curtains may be used in lieu of fire curtains for proscenium openings. 410.3.5 – NFPA 13

Sprinklers allow 1 ½” hose connections instead of 2 ½” hose connections installed near stages. 905.3.4 – NFPA 13

Sprinklers increase travel distance for technical production areas to 400 feet. 410.6.3.2 – NFPA 13

Attics and Crawl Spaces
Sprinklers delete the 1-hour fire resistance rating for attics and under-floor concealed spaces used for storage of combustible materials. 413.2- NFPA 13, NFPA 13R, NFPA 13D

Mezzanines
Sprinklers increase mezzanine area up to one half of the floor area in construction Types I and II. 505.2.1(2) – NFPA 13

Sprinkled mezzanines in 2 story buildings, other than H and I use, having two or more means of egress are not required to exit into the area of the mezzanine 505.2.3(5) – NFPA 13

Height Increases
Sprinklers permit a height increase of 20 feet. Table 504.3 – NFPA 13 and NFPA 13R

Sprinklers increase stories by one-story. Table 504.4 – NFPA 13 and NFPA 13R

Area Increase
Sprinklers add 300% for one story and 200% for multiple stories in building area. Table 506.2 – NFPA 13

Occupancy Separations
Sprinklers permit up to a 1-hour reduction in the fire resistance rating of fire separation walls. Table 508.4 – NFPA 13

Furnace Rooms
Sprinklers eliminate the 1-hour wall requirement around furnace rooms having equipment with over 400,000 BTU per hour input. Table 509- NFPA 13, NFPA 13R, NFPA 13D

Boiler Rooms
Sprinklers eliminate the 1-hour wall requirement around boiler rooms having boilers over 15 psi and 10 horsepower. Table 509- NFPA 13, NFPA 13R, NFPA 13D

Laundry Rooms
Sprinklers eliminate the 1 hour wall requirement for laundry, waste and linen collection rooms. Table 509- NFPA 13, NFPA 13R, NFPA 13D

Paint Shops
Sprinklers eliminate the 1 hour wall requirement for paint shops. Table 509- NFPA 13, NFPA 13R, NFPA 13D

Labs and Shops in Group E
Sprinklers eliminate the 1 hour wall requirement for laboratories and vocational shops in Group E. Table 509- NFPA 13

Refrigerant Machinery
Sprinklers eliminate the 1-hour wall requirement around refrigerant machinery rooms. Table 509- NFPA 13, NFPA 13R, NFPA 13D

Heavy Timber
Sprinklers permit a reduction of lumber width to 3 inches for Type IV construction 602.4.5 - NFPA 13, NFPA 13R, NFPA 13D

Freezers
Sprinklers permit combustible freezer and cooler walls in Type I and II construction up to 1,000 sq.ft. 603.1(26) – NFPA 13

Exterior Wall Opening
Sprinkled maximum allowable area of unprotected opening to be the same as for protected opening. Table 705.8 – NFPA 13

Sprinklers eliminate the requirements for flame barriers protecting window separations, separated by five feet or less. 705.8.5 – NFPA 13 and NFPA 13R

Sprinklers delete the protection requirements of openings in an exterior wall where buildings are equipped with sprinklers and water curtains are installed on the exterior. 705.8.2 – NFPA 13

Fire Walls
Sprinklers allow the firewall to terminate to the inside surface of the non-combustible exterior wall. 706.5 (3) – NFPA 13 and NFPA 13R

Sprinklers permit openings in firewalls to exceed the 156 sq ft limit where both buildings are sprinklered. 706.8 – NFPA 13

Fire Barriers
Sprinklers permit openings in fire barriers to exceed the 156 sq ft. where both fire areas are sprinkled. 707.6 – NFPA 13

Vertical Openings for Escalator
Sprinklers modify enclosure requirements for escalators. 712.1.3 – NFPA 13

Shaft Enclosure
The bottom of a shaft is not required to be closed off provided it terminates in room protected by sprinklers. 713.11- NFPA 13, NFPA 13R, NFPA 13D

Sprinkler Penetration
The annular space created by the penetration fire sprinkler covered by a metal escutcheon plate requires no additional firestopping. 714.3.2 and 714.4.2- NFPA 13, NFPA 13R, NFPA 13D

Draftstopping and Fireblocking
Sprinklers eliminate fireblocking and draftstopping at the partition line where sprinklers are installed in concealed combustible spaces. 708.4 (6) – NFPA 13 and NFPA 13R

Sprinklers eliminate the requirement for draftstopping at 1,000 sq ft in floor ceiling assembly.718.3.3 – NFPA 13

Sprinklers eliminate the requirement for draftstopping in attics and concealed spaces at 3,000 sq ft. 718.4.3 – NFPA 13

Exit Enclosure Doors
Sprinklers delete the maximum transmitted temperature end point for door assemblies in interior exit enclosures, ramps and exit passageways. 716.5.5 – NFPA 13 and NFPA 13R

Fire Dampers
Sprinklers eliminate the required fire dampers in ducts for HVAC systems, fire barrier walls that have a required fire resistance rating of 1-hour or less. 717.5.2 – NFPA 13 and NFPA 13R

Set Out Construction
Sprinklers permit a reduction in the class finish requirements for walls or ceilings that are set out or dropped. 803.13.2 – NFPA 13 and NFPA 13R

Interior Wall and Ceiling Finishes
Sprinklers reduce the wall and ceiling finishes to a lower category. Table 803.11 – NFPA 13 and NFPA 13R

Textile Wall Covering
Sprinklers eliminate the requirement of materials to pass ASTM E-84 requirements for class A materials. 803.1.4 – NFPA 13 and NFPA 13R

Interior Floor Finish
Sprinklers reduce the requirements for floor finish materials in vertical exits and exit passageways and exit access corridors. 804.4.1 – NFPA 13 and NFPA 13R

Standpipes
Sprinklers allow Class I standpipes where Class III standpipes are required. 905.3.1 – NFPA 13 and NFPA 13R

Sprinklers allow Class I standpipes in basements. 905.3.1- NFPA 13, NFPA 13R, NFPA 13D

Sprinklers allow Class I standpipes to have 50’ more travel. 905.4- NFPA 13, NFPA 13R, NFPA 13D

Sprinklers allow the risers and laterals of standpipes not to be covered by fire resistive material. 905.4.1- NFPA 13, NFPA 13R, NFPA 13D

Fire Alarm
Manual pull stations in sprinklered buildings are permitted to have 200 feet of travel distance between. 907.4.2.1 – NFPA 13 and NFPA 13R

Heat detectors are not required when sprinklers are present. 907.4.3.1 – NFPA 13 and NFPA 13R

Multiple manual pull stations not required when sprinklers are present in A, B, E, F, M, R-1, R-2 occupancies. 907.2.1 thru 907.2.4, 907.2.7, 907.2.8.1, 907.2.9- NFPA 13 and NFPA 13R

Fire sprinkler zones are not limited to fire alarm zones. 907.6.4 – NFPA 13

Fire Pump Rooms
Sprinklers permit 1-hour fire barrier and horizontal assemblies for fire pump rooms. 913.2.1 – NFPA 13 and NFPA 13R

Means of Egress Sizing
Sprinklers lower egress capacity factor to 0.2 inches per occupant. 1005.3.1 and 1005.3.2 – NFPA 13 and NFPA 13R

Elevators
Elevators are not required to serve as the means of egress as required by ADA in sprinkled buildings. 1009.2.1 – NFPA 13 and NFPA 13R

Accessibility Stairs
Sprinklers delete the accessibility requirement for 48” egress stairs.1009.3 – NFPA 13 and NFPA 13R

Sprinklers eliminate areas of refuge in stairs. 1009.4 – NFPA 13 and NFPA 13R

Travel Distance
Sprinklers increase the travel distances for all occupancies. Table 1006.2.1 and Table 1017.2 – NFPA 13 and NFPA 13R

Egress Separations
Sprinklers reduced the required egress separation distance to 1/3 the diagonal of the building or space. 1007.1.1 – NFPA 13 and NFPA 13R

Revolving Doors
Sprinklers permit a higher breakout force for revolving doors not used in means of egress. 1010.1.4.1.2- NFPA 13, NFPA 13R, NFPA 13D

Exit Enclosures
Sprinklers provide open stairs, where the vertical opening is limited and is protected by a draft curtain and closely spaced sprinklers. In Group B and M, this is limited to four stories. 1019.3 – NFPA 13

Corridor Rating
Sprinklers delete the corridor fire resistance rating. Table 1020.1 – NFPA 13 and NFPA 13R

Dead End Corridors
Sprinklers allow dead end corridors up to 50 ft. in the following occupancies: B, E, F, I-1, M, R-1, R-2, R-4, S and U. 1020.4 – NFPA 13

Sprinklers allow the space between the corridor ceiling and the floor or roof structure above corridors to serve as return air. 1020.5.1 - NFPA 13, NFPA 13R, NFPA 13D

Sprinklers permit of maximum of 50 percent of the occupants to exit through exit enclosures. 1028.1- NFPA 13, NFPA 13R, NFPA 13D

Open Corridors and Exit Enclosures
Sprinklers permit an open corridor connected to an open exit enclosure (stair).1027.6 – NFPA 13 and NFPA 13R

Balcony Fire Rating
Sprinklers permit balconies and similar appendages on buildings of Types III, IV and V to be of Type V construction without a fire resistance rating. 1406.3 (3) - NFPA 13, NFPA 13R, NFPA 13D

Sprinklers eliminate the aggregate width requirement of balconies. 1406.3 (4) - NFPA 13, NFPA 13R, NFPA 13D

MCM Installation
MCM panels are not limited in height where the building is sprinklered. 1407.11.3 and 1407.11.4 – NFPA 13

Sprinklers increase the area of MCM panels. 1407.11.3.5 and 1407.11.4.3 – NFPA 13

Foam Plastic Insulation
Sprinklers allow foam plastic insulation to increase from 4” to 10” in thickness. 2603.3 – NFPA 13

Light Diffusing Systems
Sprinklers permit the use of light-diffusing systems with an occupant load of 1,000 or more, theaters with the stage and proscenium opening and an occupant load of 700 or more, group I-2, group I-3 exit stairways and exit passageways. 2606.7 – NFPA 13

Areas of light diffusing systems that are protected with fire sprinkler systems shall not be limited. 2606.7.4 – NFPA 13

Sprinklers permit a 100 percent increase in the maximum percentage area for light transmitting plastic wall panels. 2607.5 – NFPA 13

Plastic Glazing
Sprinklers permit the allowable area of glazing to 50 percent of the wall face. 2608.2 (1) – NFPA 13

Light Transmitting Roof Panels
Sprinklers eliminate flame barriers for adjacent stories. 2608.2 (2) – NFPA 13

Sprinklers permit unlimited height for light transmitting plastics. 2608.2 (3) – NFPA 13

Sprinklers permit light transmitting plastic roof panels in buildings required to be of fire rated construction without complying with the roof covering requirements. 2609.1 – NFPA 13

Sprinklers permit a 100 percent increase in an aggregate area of plastic roof panels.2609.4 (1) – NFPA 13

Light Transmitting Roof Panels
Sprinklers eliminate the 4-ft. minimum separation requirement between individual plastic roof panels. 2609.2 (1) – NFPA 13

Plastic Skylights
Sprinklers eliminate the 100-sq. ft. maximum area for skylights. 2610.4 – NFPA 13

Sprinklers permit an increase to 2/3 of the floor area of the room or space. 2610.5 – NFPA 13

Skylight Separation
Sprinklers eliminate the minimum separation distance of 4-ft. between skylights. 2610.6 – NFPA 13

Hoistway Opening Protection
Sprinklers eliminated elevator hoistway opening protection. 3006.2 – NFPA 13 and NFPA 13R

Pedestrian Walkways
Sprinklers eliminate the requirement for fire barriers between pedestrian walkways and buildings. 3104.5.2 and 3104.5.4 – NFPA 13

Sprinklers permit increased height and stories for pedestrian walkways and buildings. 3104.5 – NFPA 13

Sprinklers permit an increase from 200 ft to 250 ft for exit access travel distance in pedestrian walkways. 3104.9 – NFPA 13

Sprinklers allow any increase from 200 ft to 400 ft of exit access travel systems in a pedestrian walkway constructed with both sides at least 50 percent open. 3104.9 – NFPA 13

II – Special Occupancy Sprinkler Requirements

The following special uses and occupancies require fire sprinkler systems installed throughout the building or spaces where otherwise not indicated in the specific occupancy chapters. The code may provide height, area, and material exceptions to exempt sprinklers in some locations or occupancies.

Covered and open mall buildings. 402.5

High-rise buildings. 403.3

Buildings with unseparated atriums, and all atrium areas in buildings. 404.3

Underground buildings. 405.3

Enclosed parking garages. 406.6.3

Repair garages. 903.2.9.1

Stages. 410.7

Special amusement buildings. 411.4

Airport traffic control towers. 412.3.6

Aircraft paint hangers. 412.6.5

High-piled and rack storage. 413.1

Live/work unit. 419.5

In buildings where mechanical smoke removal systems are installed. 910.4

III – Partial Sprinkler Requirements

The International Building Codes require certain areas of the building to be sprinklered regardless of use, construction type, or whether the rest of the building is sprinklered. These requirements can be satisfied with partial or limited area sprinkler systems if they comply with the installation standard. The list of partial sprinkler requirements is as follows:

Stories without openings and basements. An automatic sprinkler system shall be installed throughout all stories, of all buildings where the floor area exceeds 1,500 square feet and where there is not provided at least one of the following types of exterior wall openings. See Section 903.2.11.1 for specific dimensions.

Rubbish and linen chutes. An automatic sprinkler system shall be installed at the top of rubbish and linen chutes and in their terminal rooms. Fire sprinklers shall be installed within such chutes at alternate floors. Chute sprinklers shall be accessible for servicing. 903.2.11.2

Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout buildings with a floor level having an occupant load of 30 or more that is located 55 feet or more above the lowest level of fire department vehicle access. 903.2.11.3

Ducts conveying hazardous exhausts. Where required by the International Mechanical Code, automatic sprinklers shall be provided in ducts conveying hazardous exhaust, or flammable or combustible materials. 415.11.11 and 903.2.11.4

Commercial cooking operations. An automatic sprinkler system shall be installed in commercial kitchen exhaust hood and duct system where an automatic sprinkler system is used to comply with Section 904. 903.2.11.5

Flammable finishes. Spray, dip, immersing spaces and storage rooms are required to have a fire sprinkler system or other suppression system. 416.5

Other required suppression systems. In addition to the requirements above, Table 903.2.11.6 of the IBC and IFC also requires the installation of a fire sprinkler system for certain buildings and uses. 903.2.11.6

IV - Assembly Occupancies

A. Complete Sprinkler Requirements
The following paragraphs outline where complete sprinkler systems are required:

Group A.
An automatic sprinkler system shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this section. For Group A-1, A-2, A-3 and A-4 occupancies, the automatic sprinkler system shall be provided throughout the story where the Group A-1, A-2, A-3 or A-4 occupancy is located and in all floors from the Group A occupancy to, and including, all levels of exit discharge serving the Group A occupancy. For Group A-5 occupancies, the automatic sprinkler system shall be provided in the spaces indicated in Section 903.2.1.5.1

Group A-1, 903.2.1.1: An automatic sprinkler system shall be provided for all fire areas containing and intervening floors of Group A-1 occupancies where one of the following conditions exists:

- The fire area exceeds 12,000 square feet;
- The fire area has an occupant load of 300 or more;
- The fire area is located on a floor other than a level of exit discharge serving such occupancies; or
- The fire area contains a multi-theater complex.

Group A-2, 903.2.1.2: An automatic sprinkler system shall be provided for all fire areas containing and intervening floors of Group A-2 occupancies where one of the following conditions exists:

- The fire area exceeds 5,000 square feet;
- The fire area has an occupant load of 100 or more; or
- The fire area is located on a floor other than a level of exit discharge serving such occupancies.

Group A-3, 903.2.1.3: An automatic sprinkler system shall be provided for all fire areas containing and intervening floors of Group A-3 occupancies where one of the following conditions exists:

- The fire area exceeds 12,000 square feet;
- The fire area has an occupant load of 300 or more; or
- The fire area is located on a floor other than a level of exit discharge serving such occupancies.

Group A-4, 903.2.1.4: An automatic sprinkler system shall be provided for all fire areas containing and intervening floors of Group A-4 occupancies where one of the following conditions exists:

- The fire area exceeds 12,000 square feet;
- The fire area has an occupant load of 300 or more; or
- The fire area is located on a floor other than a level of exit discharge serving such occupancies.

Group A-5, 903.2.1.5: An automatic sprinkler system shall be provided for Group A-5 occupancies in the following areas: concession stands, retail areas, press boxes and other accessory use areas more than 1,000 square feet.

Multiple Assembly Occupancies, 903.2.1.7: An automatic sprinkler system shall be provided where multiple fire areas of Group A-1, A-2, A-3 or A-4 occupancies share exit or exit access components and the combined occupant load of theses fire areas is 300 or more.

Assembly on Roof Tops, 903.2.1.6: Where an occupied roof has an assembly occupancy with an occupant load exceeding 100 for Group A-2 and 300 for other Group A occupancies, all floors between the occupied roof and the level of exit discharge shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Exception: Open parking garages of Type I or Type II construction.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group A-1 Allowable Areas

A-1		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	5	3	2	3	2	3	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
S	STORIES	UL	6	4	3	4	3	4	3	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	MULTI STORY AREA	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500

Group A-2 Allowable Areas

A-2		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	3	2	3	2	3	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
S	STORIES	UL	12	4	3	4	3	4	3	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	MULTI-STORY AREA	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000

Group A-3 Allowable Areas

A-3		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	3	2	3	2	3	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
S	STORIES	UL	12	4	3	4	3	4	3	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	MULTI-STORY AREA	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000

Group A-4 Allowable Areas

A-4		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	3	2	3	2	3	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
S	STORIES	UL	12	4	3	4	3	4	3	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	MULTI-STORY AREA	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000

Group A-5 Allowable Areas

A-5		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	UL	UL	UL	UL	UL	UL	UL	UL
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	UL	UL	UL	UL	UL	UL	UL
S	STORIES	UL	UL	UL	UL	UL	UL	UL	UL	UL
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	UL	UL	UL	UL	UL	UL	UL
	MULTI-STORY AREA	UL	UL	UL	UL	UL	UL	UL	UL	UL

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see section I):

Assembly Specific Sprinkler Advantages

Unlimited Areas
Sprinklers permit unlimited areas for one-story Group A-4, B, F, M, or S buildings. 507.4 – NFPA 13

Sprinklers permit unlimited areas for Group A-3 of Type II, III, and IV construction. 507.6 and 507.7. – NFPA 13

Sprinklers permit unlimited areas for motion picture theaters of one story and Type II construction. 507.12 – NFPA 13

Combustible Decorative Materials
Sprinklers increase the amount of combustible decorations in auditoriums in Group A up to 75% (versus 10%) in assembly occupancies. 806.3 – NFPA 13

Fire Alarms
Multiple manual pull stations not required when sprinklers are present in A occupancies. 907.2.1 – NFPA 13

Sensor Door Lock Release
Sprinklers permit sensor released doors. 1010.1.9.8 – NFPA 13

Assembly Travel Distance
Sprinklers permit an increase from 200 ft to 250 ft in assembly buildings. Table 1017.2 – NFPA 13

V - Business Occupancies

A. Complete Sprinkler Requirements

The following paragraphs outline where complete sprinkler systems are required:

Sprinklers are required whenever the floor areas exceed the permitted allowable areas for a non-sprinklered building based on the occupancy classification and the type of construction.

Group B ambulatory health care facilities, 903.2.2: An automatic sprinkler system shall be installed throughout the entire floor containing an ambulatory health care facility occupancy when either of the following conditions exists at any time:

- Four or more care recipients are incapable of self-preservation, whether rendered incapable by staff or staff has accepted responsibility for care recipients already incapable.
- One or more care recipients who are incapable of self-preservation are located at other than the level of exit discharge serving such an occupancy.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided as well as all floors below, and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group B Allowable Areas

B		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	5	3	5	3	5	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
S	STORIES	UL	12	6	4	6	4	6	4	3
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	MULTI-STORY AREA	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see section I):

Business Specific Sprinkler Advantages

Unlimited Areas
Sprinklers permit unlimited areas for one-story Group A-4, B, F, M, or S buildings. 507.4 – NFPA 13

Sprinklers permit unlimited areas for two-story Group B, F, M, or S buildings. 507.5– NFPA 13

Sprinklers permit unlimited areas for two-story mixed Group B, F, H-5, M and S buildings. 507.9. – NFPA 13

Smoke Dampers
Sprinklers eliminate smoke dampers at shafts in groups B and R buildings. 717.5.3– NFPA 13 and NFPA 13R

Sprinklers eliminate fire dampers in corridor walls constructed as fire partitions. 717.5.4– NFPA 13

Fire Alarms
Multiple manual pull stations not required when sprinklers are present in B occupancies. 907.2.2 – NFPA 13

Sprinklers eliminate supervised smoke detection system in ambulatory care facilities. 907.2.2.1– NFPA 13

Bolt Locks
Sprinklers permit bolt locks on inactive door leafs in Groups B, F, S. 1010.1.9.4– NFPA 13

Delayed Egress
Sprinklers permit delayed egress locking systems. 1010.1.9.7– NFPA 13

Sensor Door Lock Release
Sprinklers permit sensor released doors. 1010.1.9.8– NFPA 13

Exit Enclosures
Sprinklers provide open stairs, where the vertical opening is limited and is protected by a draft curtain and closely spaced sprinklers. In Group B and M, this is limited to four stories. 1019.3– NFPA 13

Dead End Corridors
Sprinklers allow dead end corridors up to 50 ft. in the following occupancies: B, E, F, I-1, M, R-1, R-2, R-4, S and U. 1020.4– NFPA 13

VI - Educational Occupancies

A. Complete Sprinkler Requirements
The following paragraphs outline where complete sprinkler systems are required.

Group E, 903.2.3: An automatic sprinkler system shall be provided for Group E occupancies as follows:

- Throughout all Group E fire areas greater than 12,000 square feet in area.
- Throughout every portion of educational buildings below the lowest level of exit discharge serving that portion of the building.

  Exception: An automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area where every classroom throughout the building has at least one exterior exit door at ground level.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group-E Allowable Areas

E		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	5	3	2	3	2	3	1	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
S	STORIES	UL	6	4	3	4	3	4	2	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	106,000	58,000	94,000	58,000	102,000	74,000	38,000
	MULTI-STORY AREA	UL	UL	79,500	43,500	76,500	43,500	76,500	55,500	28,500

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see section I):

Educational Specific Sprinkler Advantages

Unlimited Areas
Sprinklers permit unlimited areas for one-story Group E of Type II. IIIA or IV construction. 507.11– NFPA 13

Fire Alarms
Multiple manual pull stations not required when sprinklers are present in E occupancies. 907.2.3 – NFPA 13

Sensor Door Lock Release
Sprinklers permit sensor released doors. 1010.1.9.8– NFPA 13

Dead End Corridors
Sprinklers allow dead end corridors up to 50 ft. in the following occupancies: B, E, F, I-1, M, R-1, R-2, R-4, S and U. 1020.4– NFPA 13

VII - Factory and Industrial Occupancies

A. Complete Sprinkler Requirements
The following paragraphs outline where complete sprinkler systems are required.

Group F-1, 903.2.4: An automatic sprinkler system shall be provided throughout all buildings containing Group F-1 occupancy where one of the following conditions exists:

- A Group F-1 fire area exceeds 12,000 square feet
- A Group F-1 fire area is located more than three stories above grade plane.
- The combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet.
- A Group F-1 occupancy used for the manufacture of upholstered furniture or mattresses exceeds 2,500 square feet.

Woodworking Operations, 903.2.4.1; An automatic sprinkler system shall be provided throughout all Group F-1 occupancy fire areas that contain woodworking operations more than 2,500 square feet in area which generate finely divided combustible waste or use finely divided combustible materials.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group-F-1 Allowable Areas

F-1		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	4	2	3	2	4	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	25,000	15,500	19,000	12,000	33,500	14,000	8,500
S	STORIES	UL	12	5	3	4	3	5	3	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	100,000	62,000	76,000	48,000	134,000	56,000	34,000
	MULTI-STORY AREA	UL	UL	75,000	46,500	57,000	36,000	100,500	42,000	25,500

Group-F-2 Allowable Areas

F-2		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	5	3	4	3	5	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	37,500	23,000	28,500	18,000	50,500	21,000	13,000
S	STORIES	UL	12	6	4	5	4	6	4	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	150,000	92,000	114,000	72,000	202,000	84,000	52,000
	MULTI-STORY AREA	UL	UL	112,500	69,000	85,500	54,000	151,000	63,000	39,000

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see section I):

Factory Specific Sprinkler Advantages

Unlimited Areas
Sprinklers permit unlimited areas for one-story Group A-4, B, F, M, or S buildings. 507.4– NFPA 13

Sprinklers permit unlimited areas for two-story Group B, F, M, or S buildings. 507.5– NFPA 13

Sprinklers permit unlimited areas for two-story mixed Group B, F, H-5, M and S buildings. 507.9– NFPA 13

Fire Alarms
Multiple manual pull stations not required when sprinklers are present in F occupancies. 907.2.4 – NFPA 13

Bolt Locks
Sprinklers permit bolt locks on inactive door leafs in Groups B, F, S. 1010.1.9.4– NFPA 13

Delayed Egress
Sprinklers permit delayed egress locking systems. 1010.1.9.7– NFPA 13

Travel Distance
Sprinklers allow up to 400 ft of travel distance in single story groups F-1 and S-1.1017.2.2– NFPA 13

Sprinkler allow up to 400 ft of travel distance in groups F-2 and S-2. Table 1017.2– NFPA 13

Dead End Corridors
Sprinklers allow dead end corridors up to 50 ft. in the following occupancies: B, E, F, I-1, M, R-1, R-2, R-4, S and U. 1020.4– NFPA 13

VIII - High Hazard Occupancies

A. Complete Sprinkler Requirements

The following paragraphs outline where complete sprinkler systems are required:

Group H, 903.2.5: Automatic sprinkler systems shall be provided in high-hazard occupancies.

Group H-5, 903.2.5.2: An automatic sprinkler system shall be installed throughout buildings containing Group H-5 occupancies. The design of the sprinkler system shall not be less than that required by this code for the fire sprinkler occupancy hazard classifications in accordance with the following:

- Fabrication areas, service corridors, storage room without dispensing, and other corridors a minimum hazard category of Ordinary Hazard Group II
- Storage rooms with dispensing a minimum hazard category of Extra Hazard Group II.

If the design area of the sprinkler system consists of a corridor protected by one row of sprinklers, the maximum number of sprinklers required to be calculated is 13.

Pyroxylin plastics, 903.2.5.3: An automatic sprinkler system shall be provided in buildings, or portions thereof, where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group H-1 Allowable Areas

H-1		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	1	1	1	1	1	1	1	1	NP
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	NP
S	STORIES	1	1	1	1	1	1	1	1	NP
	HEIGHT	UL	160	65	55	65	55	65	50	40
	1-STORY, AREA	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	NP
	MULTI-STORY AREA	NP	NP	NP	NP	NP	NP	NP	NP	NP

Group H-2 Allowable Areas

H-2		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	3	2	1	2	1	2	1	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000
S	STORIES	UL	3	2	1	2	1	2	1	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	1-STORY, AREA	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000
	MULTI-STORY AREA	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000

Group H-3 Allowable Areas

H-3		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	6	4	2	4	2	4	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000
S	STORIES	UL	6	4	2	4	2	4	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	1-STORY, AREA	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000
	MULTI-STORY AREA	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000

Group H-4 Allowable Areas

H-4		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	7	5	3	5	3	5	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	37,500	17,500	28,500	17,500	36,000	18,000	6,500
S	STORIES	UL	8	6	4	6	4	6	4	3
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	150,000	70,000	114,000	70,000	25,500	72,000	26,000
	MULTI-STORY AREA	UL	UL	112,500	52,500	85,500	52,500	108,000	54,000	19,500

Group H-5 Allowable Areas

H-5		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	4	4	3	3	3	3	3	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
S	STORIES	4	4	3	3	3	3	3	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	1-STORY, AREA	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	MULTI-STORY AREA	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000

C. Sprinkler Advantages

High Hazard Sprinkler Advantages

See Section I for general advantages and verify by stated code section. Most may not apply to Group H buildings.

Sprinklers permit unlimited areas for two-story mixed Group B, F, H-5, M and S buildings. 507.9 – NFPA 13

IX - Institutional Occupancies

A. Complete Sprinkler Requirements

The following paragraphs outline where complete sprinkler systems are required.

Group I, 903.2.6: An automatic sprinkler system shall be provided throughout buildings with a Group I fire area.

Exceptions:

1. An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group I-1 Condition 1 facilities.
2. An automatic sprinkler system is not required where Group I-4 day care facilities are at the level of exit discharge and where every room where care is provided has not fewer than one exterior exit door.
3. In buildings where Group I-4 day care is provided on levels other than the level of exit discharge, an automatic sprinkler system in accordance with Section 903.3.1.1 shall be installed on the entire floor where care is provided, all floors between the level of care and the level of exit discharge, and all floors below the level of exit discharge other than areas classified as an open parking garage.

Group I-1 and I-2, 308.3.1 and 308.4.1: Providing care to five or fewer persons shall be classified as Group R-3 or comply with the IRC, provided automatic sprinklers are installed per Section 903.3.1.3 or P2904 of the IRC.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group I-1 Allowable Areas

I-1 CONDITION 2		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS*	STORIES	UL	9	4	3	4	3	4	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
S*	STORIES	UL	9	4	3	4	3	4	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	1-STORY, AREA	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	MULTI-STORY AREA	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500

*NFPA 13 and NFPA 13R give height increases. NFPA 13R, NFPA 13D, and IRC P2904 do not increase area, use non-sprinklered.

Group I-2 Allowable Areas

I-2		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	4	2	1	1	NP	1	1	NP
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	15,000	11,000	12,000	NP	12,000	9,500	NP
S	STORIES	UL	5	3	1	1	NP	1	1	NP
	HEIGHT	UL	180	85	55	65	55	65	50	40
	1-STORY, AREA	UL	UL	60,000	44,000	48,000	NP	48,000	38,000	NP
	MULTI-STORY AREA	UL	UL	45,000	33,000	36,000	NP	36,000	28,500	NP

Group I-3 Allowable Areas

I-3		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	4	2	1	2	1	2	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	15,000	10,000	10,500	7,500	12,000	7,500	5,000
S	STORIES	UL	5	3	2	3	2	3	3	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	45,000	40,000	42,000	30,000	48,000	30,000	20,000
	MULTI-STORY AREA	UL	UL	45,000	30,000	31,500	22,500	36,000	22,500	15,000

Group I-4 Allowable Areas

I-4		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	5	3	2	3	2	3	1	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	60,500	26,500	13,000	23,500	13,000	25,500	18,500	9,000
S	STORIES	UL	6	4	3	4	3	4	2	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	121,000	106,000	52,000	94,000	52,000	102,000	74,000	36,000
	MULTI-STORY AREA	UL	181,500	79,500	39,000	70,500	39,000	76,500	55,500	27,000

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see Section I):

Institutional Specific Sprinkler Advantages

Fire Alarms
Sprinklers eliminate the need for smoke detectors in habitable areas in group's I-1 and I-3. 907.2.6.1 and 907.2.6.3.3– NFPA 13

Open Waiting Areas
Sprinkler systems in I-2 occupancies, using quick-response sprinklers, permit waiting areas similar spaces to be open to the corridor. 407.2.1 – NFPA 13

Sprinkler systems in I-2 Condition 1 occupancies, using quick-response sprinklers, permit shared living spaces, group and therapeutic spaces open to the corridor. 407.2.5 – NFPA 13

Glazing for Interior Stairs and Ramps
Sprinklers permit glazing in interior stair and ramp doors and walls in I-3 occupancies where glazing has sprinkler protection. 408.3.8 – NFPA 13

Security Glazing
Sprinklers permit I-3 occupancies security glazing in 1-hour fire barriers, fire partitions and smoke barriers when protected by sprinklers. 408.7 – NFPA 13

Smoke Dampers
Sprinklers eliminate smoke dampers in smoke barriers where fully ducted in Group I-2 Condition 2. 717.5.5 – NFPA 13

Electric Door Locking
Sprinklers permit controlled locking egress doors in I-1 and I-3. 1010.1.9.6 – NFPA 13

Delayed Egress
Sprinklers permit delayed egress locking systems. 1010.1.9.7 – NFPA 13

Sensor Door Lock Release
Sprinklers permit sensor released doors in I-1, I-2, I-4 occupancies. 1010.1.9.8 – NFPA 13

Dead End Corridors
Sprinklers allow dead end corridors up to 50 ft. in the following occupancies: B, E, F, I-1, M, R-1, R-2, R-4, S and U. 1020.4 – NFPA 13

Elevator Lobbies
Sprinklers permit enclosed elevator lobbies in I-1 Condition 2, I-2, I-3, to be protected as smoke partitions. 3006.3 – NFPA 13

X - Mercantile Occupancies

A. Complete Sprinkler Requirements

The following paragraphs outline where complete sprinkler systems are required.

Group M, 903.2.7: An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

- A Group M fire area exceeds 12,000 square feet.
- A Group M fire area is located more than three stories above grade plane.
- The combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet.
- A Group M occupancy is used for the display and sale of upholstered furniture exceeds 5,000 square feet.

High-piled storage, 903.2.7.1: An automatic sprinkler system shall be provided in accordance with the International Fire Code in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group M Allowable Areas

M		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	4	2	4	2	4	3	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	UL	21,500	12,500	18,500	12,500	20,500	14,000	9,000
S	STORIES	UL	12	5	3	5	3	5	4	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	UL	86,000	50,000	74,000	50,000	82,000	56,000	36,000
	MULTI-STORY AREA	UL	UL	64,500	37,500	55,500	37,500	61,500	42,000	27,000

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see section I):

Mercantile Specific Sprinkler Advantages

Unlimited Areas
Sprinklers permit unlimited areas for one-story Group A-4, B, F, M, or S buildings. 507.4 – NFPA 13

Sprinklers permit unlimited areas for two-story Group B, F, M, or S buildings. 507.5 – NFPA 13

Sprinklers permit unlimited areas for two-story mixed Group B, F, H-5, M and S buildings. 507.9 – NFPA 13

Covered and open malls, and anchor buildings up to three-stories are unlimited in area. 507.13 – NFPA 13

Indoor and Outdoor Control Areas (Non-flammable liquids, Non-combustible Solids)
Sprinklers permit unlimited or increase of 100% in groups M and S control areas. Table 414.2.5(1) sub (b) and (i) – NFPA 13

Flammable and Combustible Liquids
Sprinklers permit increase in control areas of group M per Table 414.2.5(2) – NFPA 13

Fire Alarms
Multiple manual pull stations not required when sprinklers are present in M occupancies. 907.2.7 – NFPA 13

Delayed Egress
Sprinklers permit delayed egress locking systems. 1010.1.9.7 – NFPA 13

Sensor Door Lock Release
Sprinklers permit sensor released doors. 1010.1.9.8 – NFPA 13

Exit Enclosures
Sprinklers provide open stairs, where the vertical opening is limited and is protected by a draft curtain and closely spaced sprinklers. In Group B and M, this is limited to four stories. 1019.3 – NFPA 13

XI - Residential Occupancies

A. Complete Sprinkler Requirements

The following paragraphs outline where complete sprinkler systems are required.

Group R-3, 903.2.8.1: An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.

Group R-4 Condition 1, 903.2.8.2: An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4 Condition 1 occupancies.

Group R-4 Condition 2, 903.2.8.3: An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4 Condition 2 occupancies. Attics shall be protected in accordance with Section 903.2.8.3.1 or 903.2.8.3.2.

> 903.2.8.3.1 Attics used for living purposes, storage or fuel-fired equipment. Attics used for living purposes, storage or fuel-fired equipment shall be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2.
>
> 903.2.8.3.2 Attics not used for living purposes, storage or fuel-fired equipment. Attics not used for living purposes, storage or fuel-fired equipment shall be protected in accordance with one of the following:
>
> > 1. Attics protected throughout by a heat detector system arranged to activate the building fire alarm system in accordance with Section 907.2.10.
> > 2. Attics constructed of noncombustible materials.
> > 3. Attics constructed of fire-retardant-treated wood framing complying with Section 2303.2.
> > 4. The automatic sprinkler system shall be extended to provide protection throughout the attic space.

Care facilities, 903.2.8.4: An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family dwelling.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For

more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group R-1 Allowable Areas

R-1		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	4	4	4	4	4	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	13R AREA	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	AREA	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
S	STORIES	UL	12	5	5	5	5	5	4	3
	13R STORIES	4	4	4	4	4	4	4	4	3
	13 HEIGHT	UL	180	85	75	85	75	85	70	60
	13R HEIGHT	60	60	60	60	60	60	60	60	60
	13 1-ST. AREA	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	13 MULTI-ST AREA	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000

Group R-2 Allowable Areas

R-2		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	4	4	4	4	4	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	13R AREA	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	AREA	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
S	STORIES	UL	12	5	5	5	5	5	4	3
	13R STORIES	4	4	4	4	4	4	4	4	3
	13 HEIGHT	UL	180	85	75	85	75	85	70	60
	13R HEIGHT	60	60	60	60	60	60	60	60	60
	13 1-ST. AREA	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	13 MULTI-ST AREA	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000

Group R-3 Allowable Areas

R-3		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	4	4	4	4	4	3	3
	HEIGHT	UL	160	65	55	65	55	65	50	40
	13R 13D AREA	UL	UL	UL	UL	UL	UL	UL	UL	UL
	AREA	UL	UL	UL	UL	UL	UL	UL	UL	UL
S	STORIES	UL	12	5	5	5	5	5	4	4
	13R STORIES	4	4	4	4	4	4	4	4	4
	13D STORIES	4	4	4	4	4	4	4	3	3
	13 HEIGHT	UL	180	85	75	85	75	85	70	60
	13R HEIGHT	60	60	60	60	60	60	60	60	60
	13D HEIGHT	60	60	60	60	60	60	60	50	40
	13 1-ST. AREA	UL	UL	UL	UL	UL	UL	UL	UL	UL
	13 MULTI-ST AREA	UL	UL	UL	UL	UL	UL	UL	UL	UL

Group R-4 Allowable Areas

R-4		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	4	4	4	4	4	3	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	13R 13D AREA	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	AREA	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
S	STORIES	UL	12	5	5	5	5	5	4	3
	13R STORIES	4	4	4	4	4	4	4	4	3
	13D STORIES	4	4	4	4	4	4	4	3	2
	13 HEIGHT	UL	180	85	75	85	75	85	70	60
	13R HEIGHT	60	60	60	60	60	60	60	60	60
	13D HEIGHT	60	60	60	60	60	60	60	50	40
	13 1-ST. AREA	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	13 MULTI-ST AREA	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see section I):

Residential Specific Sprinkler Advantages

Fire Partition
Sprinklers reduce the fire resistance rating of fire partitions between dwelling/sleeping units to ½ hour. 708.3 – NFPA 13

Horizontal Assemblies
Sprinklers reduce the fire resistance rating of horizontal assemblies between dwelling/sleeping units to ½ hour. 711.2.4.3 – NFPA 13

Smoke Dampers
Sprinklers eliminate smoke dampers at shafts in groups B and R buildings. 717.5.3 – NFPA 13

Draftstopping
Sprinklers eliminate draftstopping in floors of all R groups. 718.3.2 – NFPA 13

Sprinklers eliminate draftstopping in attics of groups R-1 and R-2. 718.4.2 – NFPA 13

Combustible Decorative Materials
Sprinklers increase the amount of combustible decorations in Group R-2 up to 50% (versus 10%). 806.3 – NFPA 13

Fire Alarms
Multiple manual pull stations not required when sprinklers are present in R-1, R-2 and R-4 occupancies. 907.2.8.1, 907.2.9 and 907.2.10.1 – NFPA 13 and NFPA 13

Sprinklers eliminate smoke detection in habitable spaces in Group R-4. 907.2.10.2 – NFPA 13

Egress from Spaces
Sprinklers permit one means of egress from R-2 and R-3 dwelling units. 1006.2.1 and Table 1006.3.2(1) – NFPA 13 and NFPA 13R

Delayed Egress
Sprinklers permit delayed egress locking systems. 1010.1.9.7 – NFPA 13

Sensor Door Lock Release
Sprinklers permit sensor released doors in R-1 and R-2 occupancies. 1010.1.9.8 – NFPA 13, NFPA 13R and NFPA 13D

Dead End Corridors

Sprinklers allow dead end corridors up to 50 ft. in the following occupancies: B, E, F, I-1, M, R-1, R-2, R-4, S and U. 1020.4 – NFPA 13

XII – Storage Occupancies

A. Complete Sprinkler Requirements

The following paragraphs outline where complete sprinkler systems are required.

Group S-1, 903.2.9: An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

- A Group S-1 fire area exceeds 12,000 square feet
- A Group S-1 fire area is located more than three stories above grade plane.
- The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet.
- A Group S-1 fire area used for the storage of commercial trucks or buses where the fire area exceeds 5,000 square feet.
- A Group S-1 occupancy used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet.

Repair garages, 903.2.9.1: An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with Section 406, as shown:

- Buildings having two or more stories above grade plane, including basements, with a fire area containing a repair garage exceeding 10,000 square feet.
- Buildings no more than one story above grade plane, with a fire area containing a repair garage exceeding 12,000 square feet.
- Buildings with repair garages servicing vehicles parked in basements.
- A Group S-1 fire area used for the repair of commercial trucks or buses where the fire area exceeds 5,000 square feet

Bulk storage of tires, 903.2.9.2: Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

Group S-2, enclosed parking garages, 903.2.10: An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages in accordance with Section 406.4 as follows:

- Where the fire area of the enclosed parking garage exceeds 12,000 square feet; or
- Where the enclosed parking garage is located beneath other groups.
  Exception: Enclosed parking garages located beneath Group R-3 occupancies.

Commercial parking garages, 903.2.10.1: An automatic sprinkler system shall be provided throughout buildings used for storage of commercial trucks or buses where the fire area exceeds 5,000 square feet.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group S-1 Allowable Areas

S-1		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	4	2	3	2	4	3	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	48,000	26,000	17,500	26,000	17,500	25,500	14,000	9,000
S	STORIES	UL	12	5	3	4	3	5	4	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	192,000	104,000	70,000	104,000	70,000	102,000	56,000	36,000
	MULTI-STORY AREA	UL	144,000	78,000	52,500	78,000	52,500	76,500	42,000	27,000

Group S-2 Allowable Areas

S-2		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	11	5	3	44	3	4	4	2
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	79,000	39,000	26,000	39,000	26,000	38,500	21,000	13,500
S	STORIES	UL	12	6	4	5	4	5	5	3
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY, AREA	UL	316,000	156,000	104,000	156,000	104,000	154,000	84,000	54,000
	MULTI-STORY AREA	UL	237,000	117,000	78,000	117,000	78,000	115,000	63,000	40,500

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see section I):

Storage Specific Sprinkler Advantages
Indoor and Outdoor Control Areas (Non-flammable liquids, Non-combustible Solids) Sprinklers permit unlimited or increase of 100% in groups M and S control areas. Table 414.2.5(1) sub (b) and (i) – NFPA 13

Unlimited Areas
Sprinklers permit unlimited areas for one-story Group A-4, B, F, M, or S buildings. 507.4 – NFPA 13

Sprinklers permit unlimited areas for two-story Group B, F, M, or S buildings. 507.5 – NFPA 13

Sprinklers permit unlimited areas for two-story mixed Group B, F, H-5, M and S buildings. 507.9 – NFPA 13

Open Parking with Mechanical Access
Sprinklers allow additional building height of open parking garages with mechanical access. Table 406.5.4 – NFPA 13

Smoke and Heat Vents
Where ESFR and CMSA sprinklers are provided, smoke and heat vents are not required. 910.1 – NFPA 13

Frozen food warehouses of Class I and II commodities are exempt from smoke and heat vents. 910.1 – NFPA 13

Sprinklers provide an 89% reduction over unsprinklered buildings for aggregate area of smoke and heat vents. 910.3.3. – NFPA 13

Bolt Locks
Sprinklers permit bolt locks on inactive door leafs in Groups B, F, S. 1010.1.9.4 – NFPA 13

Delayed Egress
Sprinklers permit delayed egress locking systems. 1010.1.9.7 – NFPA 13

Travel Distance
Sprinklers allow up to 400 ft of travel distance in single story groups F-1 and S-1. 1017.2.2 – NFPA 13

Sprinklers allow up to 400 ft of travel distance in groups F-2 and S-2. Table 1017.2 – NFPA 13

Dead End Corridors
Sprinklers allow dead end corridors up to 50 ft. in the following occupancies: B, E, F, I-1, M, R-1, R-2, R-4, S and U. 1020.4 – NFPA 13

Maximum Quantity Control Area (Physical Hazard)
Quantities can be increased in a control area 100% when sprinkled. Table 307.1(1) – NFPA 13

Maximum Quantity Control Area (Health Hazard)
Quantities can be increased in a control area 100% when sprinkled. Table 307.1(2) – NFPA 13

Sprinklers eliminate control area floor fire rating in Type II-A, III-A, and V-A. 414.2.4 – NFPA 13

Sprinklers increase Group III aircraft hangars total fuel capacity in a single fire area to 7,500 gallons. 412.4.6.1 – NFPA 13

XII - Utility

A. Complete Sprinkler Requirements

The following outlines where complete sprinkler systems are required.

B. Allowable Heights and Areas

The allowable heights, areas and stories illustrated in the following tables represent the information found in Chapter 5 of the IBC.

The maximum area of multi-story buildings depends on single occupancy, nonseparated occupancies or mixed occupancies. For multi-story, single or nonseparated occupancies, the allowable area, sprinklered or unsprinklered, is multiplied by three. For more information, see IBC Section 506.2.3 for single or nonseparated occupancies and Section 506.2.4 for mixed occupancies.

The areas shown in the following tables may be further increased by using the frontage increases per Section 506.3 of the IBC.

Group U Allowable Areas

U		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B		A	B
NS	STORIES	UL	5	4	2	3	2	4	2	1
	HEIGHT	UL	160	65	55	65	55	65	50	40
	AREA	UL	35,500	19,000	8,500	14,000	8,500	18,000	9,000	5,500
S	STORIES	UL	6	5	3	4	3	5	3	2
	HEIGHT	UL	180	85	75	85	75	85	70	60
	1-STORY,AREA	UL	142,000	76,000	34,000	56,000	34,000	72,000	36,000	22,000
	MULTI-STORY AREA	UL	106,500	57,000	25,500	42,000	25,500	54,000	27,000	16,500

C. Sprinkler Advantages

The following occupancy specific sprinkler design advantages permitted when a complete automatic sprinkler system is installed (for additional sprinkler advantages applicable to all use groups, see section I):

Delayed Egress
Sprinklers permit delayed egress locking systems. 1010.1.9.7 – NFPA 13

Dead End Corridors
Sprinklers allow dead end corridors up to 50 ft. in the following occupancies: B, E, F, I-1, M, R-1, R-2, R-4, S and U. 1020.4 – NFPA 13