# BUILDING CODE OF THE CITY OF NEW YORK 

# New York City Department of Buildings 20 September 2007 

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## Learning Objectives

## This forum will discuss in general the differences between the current New York City Building Code and the proposed amended International Building Code in the following areas:

- Participants will be able to classify buildings as separated, incidental, or mixed occupancy.
- Participants will be able to identify occupancy classification for construction projects, including complex multi-use facilities.
- Participants will be able compare the current New York City Building Code occupancy classifications into the new designations under the new New York City Construction Code.
- Participants will identify the differences between the occupancy classifications in the current New York City Building Code occupancy classifications into the new designations under the new New York City Construction Code.
- Participants will be able to calculate maximum building heights based on the occupancy classification and construction group.
- Participants will be able to apply the frontage increase factors to the maximum building area Table 503.
- Participants will be able to apply the sprinkler increase factors to the maximum building height and area Table 503.
- Participants will be able to classify buildings into the respective construction groups.
- Participants will be able to identify the combustible materials permitted in noncombustible construction groups.
- Participants will the able to calculate the minimum separation distances for buildings depending on the occupancy classification and construction group.


## Chapter 3 <br> Use and Occupancy Classifications

## Occupancy Classifications

1968 Code classification

| A | Assembly: Groups A-1, A-2, A-3, A-4, and A-5 | F |
| :---: | :---: | :---: |
| A-1 | with fixed seating, intended for production and viewing of the performance arts or motion pictures. | F-1a |
| A-2 | food and/or drink consumption. | F-4 |
| A-3 | worship, recreation or amusement (physically active), and other assembly uses not classified elsewhere in Group A. | F-3, F-1b, F-4 |
| A-4 | indoor sporting events with spectator seating. | F-1b |
| A-5 | participation in or viewing outdoor activities. | F-2 |
| B | Business: office, professional, service-type transaction, public or civic services. | E |
| E | Educational: <br> 5 or more persons at any time for educational purposes. | G |
| F | Factory and industrial: Groups F-1 and F-2 | D |
| F-1 | moderate-hazard. | D-1 |
| F-2 | involve non-combustible, non-flammable materials, or low-hazardous production. | D-2 |
| H | High Hazard: Groups H-1, H-2, H-3, H-4, and H-5 | A |
| H-1 | materials that present a detonation hazard. | A |
| H-2 | uses present a deflagration hazard or a hazard from accelerated burning. | A |
| H-3 | materials that readily support combustion or present a physical hazard. | A |
| H-4 | materials that are health hazards. | none |
| H-5 | semiconductor fabrication facilities using hazardous production materials (HPM) in excess of the permitted aggregate quantity. | D-1 |

## Occupancy Classifications

| I | Institutional: Groups $\mathrm{I}-1, \mathrm{I}-2, \mathrm{I}-3$, and $\mathrm{I}-4$ | H, J-2 |
| :---: | :---: | :---: |
| 1-1 | housing persons, on a 24-hour basis, capable of self-preservation and responding to an emergency situation without physical assistance from staff. | J-2 |
| I-2 | medical, surgical, nursing or custodial care, on a 24-hour basis, of more than 3 persons, who are not capable of self-preservation or responding to an emergency situation without physical assistance from staff. | H-2 |
| I-3 | more than 5 persons who are detained under restraint or security reason. | H-1 |
| I-4 | day care facilities, occupied by persons of any age who receive custodial care (without overnight) by individuals other than parents, guardians, or relatives in a place other than at the home. | H-2 |
| M | Mercantile: display and sale of merchandise. | C |
| R | Residential: Groups R-1, R-2, and R-3 | J |
| R-1 | occupied transiently (for less than one month) and student dormitories. | J-1 |
| R-2 | more than 2 dwelling units on a long term basis (for a month or more). | J-2 |
| R-3 | not more than 2 apartments on a long term basis (for a month or more). | J-3 |
| S | Storage: Groups S-1, and S-2 | B |
| S-1 | moderate-hazard storage occupancy for any flammable or combustible materials. | B-1 |
| S-2 | low-hazard storage occupancy for non-combustible materials. | B-2 |
| U | Utility and Miscellaneous: <br> structures of an accessory character, or not classified in any specific occupancy. | K |

## Occupancy Classifications

- Assembly spaces occupied by fewer than 75 persons are classified as Group B (Business), not as an assembly occupancy.
- Educational uses for adults beyond the 12th grade, including universities, are classified as Group B (Business), not as an educational occupancy
- Non-production chemical laboratories are classified as Group B (Business), not as a factory/industrial occupancy
- Student Dormitories are classified as Group R-1 transient occupancy, as opposed to a J-2 non-transient occupancy.
- New concept of Student Apartments (Group R-2) introduced


## Occupancy Classifications Student Apartments (Group R-2)

- An apartment occupied or arranged to be occupied by students enrolled at a single accredited college or university and maintaining a common household pursuant to a lease, sublease, or occupancy agreement directly with such college or university.
- Up to 7 students permitted within a single dwelling unit
- The building must be fully sprinklered
- The maximum number of occupants in a given space within a dwelling unit as outlined in the Housing Maintenance Code cannot be exceeded


## Occupancy Classifications

- Photocopying and printing shops using only electronic printing equipment are classified as Group B (Business).
- Libraries are classified as Group B (Business)
- Libraries are classified as Group E (Educational) when accessory to a Group E occupancy
- Motor fuel dispensing facilities (i.e. gas stations) are classified as Group M (Mercantile)
- Custodial care facilities (e.g. daycare) are classified in Group A, B, $\mathrm{E}, \mathrm{I}$, or R , depending upon the occupant mix and facility arrangement
- Occupant mix also dependent upon the occupants' capability for selfpreservation


## Occupancy Classifications Custodial Care Facilities

| Occupancy Group | Criteria | Building Code section |
| :---: | :---: | :---: |
| A-3 | More than 75 occupants including kids*, no babies** | BC 303.1 |
| B | Maximum 75 occupants including kids, no babies | BC 304.1 |
| E | 5 or more kids, with maximum 2 babies | BC 305.1 |
| E | 5 or more kids, with maximum 30 babies, and all babies on level of exit discharge. (If even 1 baby is on $2^{\text {nd }}$ floor, then must be l-4) | BC 305.1 Exception 3 |
| $\mathrm{l}-1$ | Any number of kids, maximum 2 babies, occupied for more than 24 hrs. | BC 308.2 |
| I-2 | Any number of kids, more than 2 babies or more than 3 kids incapable of selfpreservation, occupied overnight or more than 24 hrs. | BC 308.3 |
| I-4 custodial care facility | Any number of kids, any number of babies, occupied only during the day | BC 308.5.2 |
| $\mathrm{R}-2$ or R-3 | Maximum 6 kids (up to age 13), no babies, in dwelling unit, occupied only during the day, DoH registered | BC 310.1.2, 310.1.3 |
| $\mathrm{R}-2$ or R-3 | Maximum 5 babies and kids, in dwelling unit occupied only during the day, DoH registered | BC 310.1.2, 310.1.3 |

* Kid = older than 2 yrs, but younger than 18 yrs.
** Baby = younger than 2 yrs.
Note: the terms 'kid' and 'baby' are not technical in nature and are being used here for illustrative purposes only


## Chapter 5 Height and Area Limitations

## Chapter 5: Height and Area Limitations

 503.1 General:"The height and area for buildings of different construction types shall be governed by the intended use of the building and shall not exceed the limits in Table 503 except as modified hereafter..."

Height and area-Chapter 5
Construction Types-Chapter 6
Use and Occupancy-Chapter 3 and 5

## Chapter 5: Height and Area Limitations



## Chapter 5: Height and Area Limitations

## RISKS

Occupancy Group (Chapter 3 and 5)
Height (Table 503)
Area (Table 503)
No. of stories (Table 503)

## SAFETY

Construction Type (Chapter 6)<br>Open Space (\$506)

Sprinkler System (\$506)

## Height and Area Limitations

TABLE 503 ALLOWABLE HEIGHT AND BUILDING AREAS
-Height and area limitations in Table 503 are based on buildings without sprinklers. The figures are further subject to max. building area per Section 506.4. (See Slide 56-60) -Height limitations are shown as stories and feet above grade plane (defined in Section 502.1) (See Slide 22)
-Area limitations are shown as per floor and are based on the definition of "Area, building" (defined in Section 502.1) (See Slide 25)

## Height and Area Limitations

## TABLE 503

## ALLOWABLE HEIGHT AND BUILDING AREAS ${ }^{\text {a }}$

Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per floor.

| GROUP |  | TYPE OF CONSTRUCTION |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | TYPE I |  | TYPE II |  | TYPE III |  | $\begin{gathered} \text { TYPE } \\ \text { IV } \end{gathered}$ | TYPE V |  |
|  |  | A | B | A | B | A | B |  | A | B |
|  | $\mathrm{Hgt}(\mathrm{S})$ | UL | $160^{\text {e }}$ | 65 | 55 | 65 | 55 | 65 | 50 | 40 |
| A-1 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 10,500 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 14,700 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-2 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \\ & \hline \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & 6 \\ & 14,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & 2 \\ & 5,500 \end{aligned}$ |
| A-3 | $\begin{aligned} & \hline \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & 6 \\ & 14,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-4 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \hline \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 14,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-5 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & \mathrm{UL} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ |
| B | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\mathrm{UL}$ | $\begin{aligned} & \mathrm{UL} \\ & \mathrm{UL} \end{aligned}$ | $\begin{aligned} & 6 \\ & 37,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 10,500 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 28,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & 6 \\ & 36,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| E | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 4 \\ & 26,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 10,500 \end{aligned}$ | $\begin{aligned} & 4 \\ & 23,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & 6 \\ & 25,500 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| F-1 | $\begin{aligned} & \hline \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \hline 5 \\ & 12,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 7,500 \end{aligned}$ | $\begin{aligned} & \hline 5 \\ & 7,500 \end{aligned}$ | $\begin{aligned} & 2 \\ & 3,000 \end{aligned}$ | $\begin{aligned} & 5 \\ & 10,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 3,000 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 1,000 \end{aligned}$ |
| F-2 | $\begin{aligned} & \hline \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \\ & \hline \end{aligned}$ | $\begin{aligned} & 6 \\ & 37,500 \end{aligned}$ | $\begin{aligned} & 3 \\ & 10,500 \end{aligned}$ | $\begin{aligned} & 6 \\ & 28,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & 6 \\ & 30,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |

Not permitted in Fire District
Not permitted in Fire District without sprinklers

# Exceptions to Height and Area Limitations 

Exemption from Table 503 (Section 503.1.2):
Special industrial occupancies such as rolling mills, structural metal fabricating shops and foundries, or the production and distribution of electric, gas or steam power, provided they: - are of construction Type I and II, and - house low-hazard industrial processes that require large areas and unusual height

## Buildings on the same tax lot

When two or more buildings are on the same tax lot, under the same ownership and control, they may either be:

- regulated as separate buildings, or
- considered as portions of one building if the height of each building and the aggregate area of all buildings are within the limitations of Table 503 as modified by Sections 504 and 506


## Elements of Table 503 Type of Construction

Buildings must be classified in 1 of 9 construction types in accordance with Chapter 6

|  | Classification | Subclassification | Description of building elements |
| :---: | :---: | :---: | :---: |
| 00.00.00000000 | TYPE I | TYPE IA | Noncombustible building elements |
|  |  | TYPE IB |  |
|  | TYPE II | TYPE IIA |  |
|  |  | TYPE IIB |  |
|  | TYPE III | TYPE IIIA | Noncombustible exterior walls Combustible or noncombustible interior elements |
|  |  | TYPE IIIB |  |
|  | TYPE IV | TYPE IV | Noncombustible exterior walls Heavy timber interior elements |
|  | TYPE V | TYPE VA | Combustible building elements permitted by the code |
|  |  | TYPE VB |  |

## Elements of Table 503

## Occupancy Group

-Classify the use or occupancy of the space(s) in accordance with Chapter 3
-Where there is more than 1 use or occupancy in a building or a space, compliance with Section 508 (Incidental Use Areas and Mixed Occupancies) is required

## Elements of Table 503

## Height

Building Height. The vertical distance from grade plane to the average height of the highest roof surfaces.


## Elements of Table 503

## Height

Building Height. The vertical distance from grade plane to the average height of the highest roof surfaces.

GRADE PLANE. A reference plane representing the level of the curb as established by the city engineer in the Borough President's office, measured at the center of the front of a building. Where a building faces on more than one street, the grade plane shall be the average of the levels of the curbs at the center of each front.

Exception: The grade plane shall not be referenced to the level of the curb, but shall be considered the average elevation of the final grade adjoining all exterior walls of a building, calculated from final grade elevations taken at intervals of 10 feet ( 3048 mm ) around the perimeter of the building where: 1. No curb elevation has been legally established on the city map; or
2. Every part of the building is set back more than 25 feet ( 7620 mm ) from a street line.

## Elements of Table 503

## Number of Stories

Basement. A story partly below the grade plane and having less than one-half its clear height (measured from finished floor to finished ceiling) below the grade plane.

Story above grade plane. Any story having its finished floor surface entirely above grade plane, except that a basement shall also be considered a story above grade plane


A 3-story building

## Elements of Table 503

## Number of Stories

CELLAR. That portion of a building that is partly or wholly underground, and having one-half or more of its clear height (measured from finished floor to finished ceiling) below the grade plane. Cellars shall not be counted as stories in measuring the height of the buildings.


A 2-story building

## Elements of Table 503

## Area

AREA, BUILDING. The area included within surrounding exterior walls (or exterior walls and firewalls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the building area if such areas are included within the horizontal projection of the roof or floor above.


## Elements of Table 503 Height, Area, and Number of stories



A 3-story building

= total allowable area of the building per
Section 506.4

## Determining Tabular Height and Area



## Determining Tabular Height and Area

| GROUP |  | TYPE OF CONSTRUCTION |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | TYPE I |  | TYPE II |  | TYPE III |  | $\begin{gathered} \text { TYPE } \\ \text { IV } \\ \hline \text { HT } \\ \hline \end{gathered}$ | TYPE V |  |
|  |  | A | B | A | B | A | B |  | A | B |
|  | $\begin{aligned} & \mathrm{Hgt}(\text { feet }) \\ & \mathrm{Hgt}(\mathrm{~S}) \end{aligned}$ | UL | 160 | 65 | 55 |  | 55 | 65 | 50 | 40 |
| A-1 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 10,500 \end{aligned}$ | $\begin{aligned} & 6 \\ & 14,700 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-2 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 14,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 5,600 \\ & \hline \end{aligned}$ | $\begin{aligned} & 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-3 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & 6 \\ & 14,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & 2 \\ & 5,500 \end{aligned}$ |
| A-4 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 14,000 \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-5 | $\begin{aligned} & \hline \mathrm{S} \\ & \mathrm{~A} \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \hline \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \\ & \hline \end{aligned}$ | $\begin{array}{\|l\|} \hline \text { UL } \\ \text { UT } \end{array}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ |
| B | S | UL | UL | 6 37,500 | $\frac{3}{10,500}$ | $\begin{array}{\|l\|} \hline 6 \\ 28,500 \\ \hline \end{array}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 36,000 \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 8,400 \\ & \hline \end{aligned}$ | $\begin{aligned} & 2 \\ & 5,500 \end{aligned}$ |

Example:
Group B (Single Occupancy)
4 Stories
10,000 SF/Story
40 feet in height

Not permitted in Fire District
Not permitted in Fire District without sprinklers
May be OK; may be not
Must also consider height increase (if eligible) and area increase (if eligible). Also must verify max. building area per Section 506.4

## Determining Tabular Height and Area

| GROUP |  | TYPE OF CONSTRUCTION |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | TYPE I |  | TYPE II |  | TYPE III |  | $\begin{gathered} \hline \text { TYPE } \\ \text { IV } \\ \hline \text { HT } \\ \hline \end{gathered}$ | TYPE V |  |
|  |  | A | B | A | B | A | B |  | A | B |
|  | $\begin{aligned} & \mathrm{Hgt}(\text { feet }) \\ & \mathrm{Hgt}(\mathrm{~S}) \end{aligned}$ | UL | 160 | 65 | 55 | 65 |  | 65 | 50 | 40 |
| A-1 | $\begin{aligned} & \hline \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | UL | $\begin{aligned} & 6 \\ & 17,500 \\ & \hline \end{aligned}$ | $\begin{aligned} & 3 \\ & 10,500 \\ & \hline \end{aligned}$ | $\begin{aligned} & 6 \\ & 14,700 \end{aligned}$ | 3 5,600 | $\begin{aligned} & \hline 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-2 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & 6 \\ & 14,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & 2 \\ & 5,500 \end{aligned}$ |
| A-3 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | UL | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \end{aligned}$ | $\begin{aligned} & 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 14,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & 6 \\ & 15,000 \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-4 | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 17,500 \\ & \hline \end{aligned}$ | $\begin{aligned} & 3 \\ & 9,500 \end{aligned}$ | $\begin{aligned} & 6 \\ & 14,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 15,000 \\ & \hline \end{aligned}$ | $\begin{aligned} & 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| A-5 | S | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{array}{\|l\|} \hline \mathrm{UL} \\ \mathrm{UL} \end{array}$ | $\begin{aligned} & \hline 6 \\ & \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ |
| $\overline{\mathrm{B}}$ | S | UL | UL | 6 | 3 | 6 | 3 | 6 | 3 |  |
|  | A | UL | UL | 37,500 | 10,500 | 28,500 | 5,600 | 36,000 | 8,400 | 5,500 |

Example:
Group B (Single Occupancy)
4 Stories
10,000 SF/Story
40 feet in height

Not permitted in Fire District
Not permitted in Fire District without sprinklers
May be OK; may be not
Must also consider height increase (if eligible) and area increase (if eligible). Also must verify max. building area per Section 506.4

## Height Increase by Sprinklers



Tabular height modified using automatic sprinkler systems* (Section 504)

* Where an automatic sprinkler system is installed to reduce the required fire-resistance rating by 1 hour as per Table 601, Note d, it may not be used again for height and area increase purposes in Chapter 5


## Area Increase by Sprinklers



Tabular area modified through the use of automatic sprinkler systems* (Section 506)

* Where an automatic sprinkler system is installed to reduce the required fireresistance rating by 1 hour as per Table 601, Note d, it may not be used again for height and area increase purposes in Chapter 5


## Area Increase by Frontage



A building with tabular area as permitted by Table 503

## Area Increase by Frontage



Tabular area modified through the use of frontage increase (Section 506.2)

## Increase Height and Area using Higher Construction Type



## Modifying Tabular Height



## Modifying Tabular Height

## Section 504 Height Modifications

Where a building is equipped throughout with an automatic sprinkler system*, such building is allowed to have:

- 20 feet additional height
- 1 additional story
* Where an automatic sprinkler system is installed to reduce the required fire-resistance rating by 1 hour as per Table 601, Note d, it may not be used again for height and area increase purposes in Chapter 5


## Modifying Tabular Height

## Section 504 Height Modifications

However, there is no height increase for:

1. Group I-2 of Type IIB, III, IV or V construction
2. Group H-1, H-2, H-3 or H-5
3. Fire-resistance rating substitution per Table 601, Note d

For example, Table 601, Note d permits a building constructed with Type IIA construction to be reduced from the required 1hour construction to zero hour if the building were equipped with automatic sprinkler system. If the sprinkler system is provided for this reason, it cannot be used again to take advantage of height modification in Section 504.

## Modifying Tabular Height

## Section 504 Height Modifications

Roof top structures such as roof tanks and their supports, HVAC, building service equipment, bulkheads, penthouses, chimneys, and parapet walls 4 feet or less in height shall not be included in the height of the building or counted as a story provided the aggregate area does not exceed $331 / 3 \%$ of the roof top area.

## Modifying Tabular Area



## Modifying Tabular Area Section 506 Area Modifications

Equation 5-1:

$$
A_{0}=\left\{a_{t}+\left[a_{1}, x_{1}\right]+\left[a_{A}, x_{]}\right]\right\}
$$

| Allowable | Tabular | Area |  | Area |
| :---: | :---: | :---: | :---: | :---: |
|  | Area + | increase | + | increase |
| Area (SF) Per = Story | per | through |  | through |
|  | Table | Frontage |  | Sprinkler |
|  | 503 | (Section |  | Protection |
|  |  | 506.2) |  | (Section |
| Allowable area per story (SF) |  |  |  | 506.3) |

$A_{t}=$ Tabular area per story in accordance with Table 503 (SF)
$I_{f}=$ Area increase factor due to frontage as calculated in accordance with Section 506.2
$I_{s}=$ Area increase factor due to sprinkler protection as calculated in accordance with Section 506.3

## Determining Frontage Increase

 Section 506.2 Frontage Increase$\boldsymbol{A}_{\mathrm{a}}=\left\{\boldsymbol{A}_{t}+\left[\boldsymbol{A}_{t} \mathrm{X} I_{f}\right]+\left[\boldsymbol{A}_{\mathrm{t}} \times I_{s}\right]\right\}$
Conditions for frontage increase:

- The building must have more than $25 \%$ of its perimeter adjoining a public way or open space having a minimum width of 20 feet
-The open space must be either on the same zoning lot or dedicated for public use
-The open space must be accessible from a street or approved fire lane


## Determining Frontage Increase



STREET

South Side: Can be considered for frontage increase provided > $25 \%$ of building perimeter is adjoining a public way or open space having at least 20 feet in width

North Side: Even though it is more than 20 feet in width, it cannot be considered for frontage increase because it is not accessible from the street or a fire lane

## Determining Frontage Increase



## Determining Frontage Increase

## Section 506.2 Frontage Increase

The max. area increase factor that could be obtained through frontage is 0.75 by the equation:

$$
\boldsymbol{I}_{f}=[F / P-0.25] W / 30
$$

Where W varies: take the weighted average of each portion of exterior wall and open space where the value of W is greater than 20 feet

Where W exceeds 30 feet: a value of 30 feet shall be used, regardless of the actual width of the open space
$I_{f}=$ Area increase due to frontage
$F=$ Building perimeter that fronts on a public way or open space having
20 feet open minimum width
$P=$ Perimeter of entire building
W= Width of public way or open space per Section 506.2.1

## Determining Frontage Increase Section 506.2 Frontage Increase



Note: The open spaces must be accessible from a street or approved fire lane

- Must have more than 25\% qualifying frontage (min. 20' in width)
- $F=\left(150^{\prime}+100^{\prime}+150^{\prime}+100^{\prime}\right)=500^{\prime}$
- $P=\left(150^{\prime}+100^{\prime}+150^{\prime}+100^{\prime}\right)=500^{\prime}$
- $W=\left[\left(100^{\prime} \times 20^{\prime}\right)+\left(150^{\prime} \times 30^{\prime}\right)+\left(100^{\prime}\right.\right.$ X30')+(150'X30']/500=28'
$\cdot /_{f}=[(500 / 500)-0.25](28 / 30)=0.70$


## Determining Frontage Increase Section 506.2 Frontage Increase



Note: The open spaces must be accessible from a street or approved fire lane

## Determining Frontage Increase



$$
\begin{aligned}
& F=\left(75^{\prime}+23^{\prime}+25^{\prime}+20^{\prime}+25^{\prime}+27^{\prime}\right)=195^{\prime} \\
& P=\left(75^{\prime}+23^{\prime}+25^{\prime}+20^{\prime}+25^{\prime}+27^{\prime}+75^{\prime}+\right. \\
& \left.70^{\prime}\right)=240^{\prime} \\
& \boldsymbol{W}=\left[\left(75^{\prime} \times 30^{\prime}\right)+\left(23^{\prime} \times 30^{\prime}\right)\right. \\
& +\left(25^{\prime} \times 20^{\prime}\right)+\left(20^{\prime} \times 30^{\prime}\right)+\left(25^{\prime} \times 20^{\prime}\right)+(2 \\
& \left.\left.7^{\prime} \times 30^{\prime}\right)\right] / 195^{\prime}=27^{\prime} \\
& I_{f}=[(195 / 240)-0.25] 27 / 30 \\
& I_{f}=0.5
\end{aligned}
$$

Note: The open spaces must be accessible from a street or approved fire lane

## Modifying Tabular Area



## Determining Sprinkler Increase

## Section 506.3 Sprinkler Increase

$$
A_{a}=\left\{A_{t}+\left[A_{t} \times I_{f}\right]+\left[A_{t} \times I_{s}\right]\right\}
$$

Where a building is equipped throughout with an automatic sprinkler system, the area limited by Table 503 may be:

- Doubled for multistory building $\left(200 \%, I_{s}=2\right)$
- Tripled for single story building $\left(300 \%, I_{s}=3\right)$

However, there is no area increase for:

- Group H-1, H-2, H-3 or H-5
- Fire-resistance rating substitution per Table 601, Note d


## Modifying Tabular Area Section 506 Area Modifications



$$
\begin{aligned}
& \boldsymbol{A}_{a}=\left\{\boldsymbol{A}_{t}+\left[\boldsymbol{A}_{t} \times \mathrm{I}_{f}\right]+\left[\boldsymbol{A}_{t} \times \mathbf{I}_{s}\right]\right\} \\
& \boldsymbol{A}_{a}=\left\{\boldsymbol{A}_{t}+\left[A_{t} \times I_{f}\right]+\left[A_{t} \times I_{s}\right]\right\} \\
& \boldsymbol{A}_{a}=\left\{A_{t}+\left[A_{t} \times I_{f}\right]+\left[A_{t} \times I_{s}\right]\right\} \\
& A_{a}=\left\{A_{t}+\left[A_{t} \times I_{f}\right]+\left[A_{t} \times I_{I}\right]\right\} \\
& A_{a}=\left\{A_{t}+\left[A_{t} \times I_{f}\right]+\left[A_{t} \times I_{s}\right]\right\}
\end{aligned}
$$

The long way

## Modifying Tabular Area Section 506 Area Modifications


$\boldsymbol{A}_{a}=\boldsymbol{A}_{t} \times$ Conversion Factor
$\boldsymbol{A}_{a}=\boldsymbol{A}_{t} \times$ Conversion Factor
$\boldsymbol{A}_{a}=\boldsymbol{A}_{t} \times$ Conversion Factor
$\boldsymbol{A}_{a}=\boldsymbol{A}_{t} \times$ Conversion Factor
$\boldsymbol{A}_{a}=\boldsymbol{A}_{t} \times$ Conversion Factor

The short way:


## Determining Allowable Area



## Determining Allowable Area



## Determining Allowable Area



Actual Area per floor $\leq$ Allowable Area per floor $\left(A_{\mathrm{a}}\right)$

## Determining Building Area



## Determining Building Area

Section 506.4 Building Area Determination
Check the actual area per floor against the allowable area per floor

For a single story building:
Actual Area per floor $\leq$ Allowable Area per floor $\left(A_{a}\right)$

## Determining Building Area

For buildings with 2 stories above grade plane, multiply the allowable area per story by 2 :
Actual area ( $1^{\text {st }}+$
$\left.2^{\text {nd }}\right) \leq A_{a} \times 2.0$
(Max. building
area)

ACTUAL AREA $\leq \mathrm{A}_{\mathrm{a}}$

ACTUAL AREA $\leq \mathrm{A}_{\mathrm{a}}$

## Determining Building Area

For buildings with 3 stories above grade plane, multiply the allowable area per story by 3 :

> Actual area $\left(1^{\text {st }}\right.$ $\left.+2^{\text {nd }}+3^{\text {rd }}\right) \leq A_{a}$ $\times 3.0$
(Max. building area)


## Determining Building Area

For buildings with more than 3 stories above grade plane, the max. multiplier remains as 3.0. This in effect is reducing the allowable area per story:
 of SF) is acceptable provided that each story does not exceed the allowable area per story

## Determining Building Area



## Basements

503.1.1 Basements. Basements need not be included in the total allowable area provided:

1. They do not exceed the area permitted for a one-story building; and
2. The finished surface of the floor above the basement does not exceed 6 feet ( 1829 mm ) above grade plane.

## Basements



## Basements


= total allowable area of the building per
Section 506.4

## Basements


= total allowable area of the building per Section 506.4

## Section 505 Mezzanines

- The aggregate area of all mezzanines in a room cannot exceed $1 / 3$ of the floor area of the room in which the mezzanines are located
- In a dwelling unit the aggregate area of all mezzanines cannot exceed $1 / 3$ of the net floor area of the dwelling unit
- Exception provided for special industrial occupancies as per 503.1.2
- The clear height above and below the mezzanine must be at least 7 feet
- In dwelling units, the clear height of habitable rooms must be at least 8 feet above and below the mezzanine
- A mezzanine must be open and unobstructed to the room in which the mezzanine is located, except for columns, railings, and walls $42^{\prime \prime}$ in height
Exceptions for:
- Mezzanines with 10 or fewer occupants
- Mezzanines with $10 \%$ or less of the floor area of the room in which the mezzanine is located
- Mezzanines with 2 or more means of egress and 1 means of egress leads directly to an exit
- Mezzanines in Factory buildings of unlimited area provided with a fire alarm system
- Mezzanines used for control equipment in industrial facilities where the mezzanine is glazed on all sides


## Section 505 Mezzanines

- The floor area of a mezzanine does not need to be included in the floor area of the room in which the mezzanine is located for the purposes of determining height and area limitations.
- The floor area of a mezzanine must be included in the floor area of the room in which the mezzanine is located for the purposes of determining fire area for the applicability of all other code provisions.


## Section 505 Mezzanines



For fire area, floor area $=4,000$ sq.ft.

- The floor area of the mezzanine is not included in the floor area of the room below for the purposes of determining height and area limitations.
- The mezzanine is not considered an additional story.
- The area of the mezzanine is included in the area of the room below for calculating the size of the fire area.


## Section 505 Mezzanines



FIRE AREA $=10,000 \mathrm{SqFt}$


FIRE AREA $=12,000 \mathrm{SqFt}$

- The enclosed portions of a room or space shall not be included in determining the permissible floor area of the mezzanine.


## EXCEPT:

- The aggregate area of a mezzanine or mezzanines within a dwelling unit shall not exceed one-third of the net floor area of such dwelling unit, whether or not portions of such dwelling unit are enclosed.


## Height and Area Calculations

## Determining Use and Occupancy

* Single Use
* Incidental Use
* Mixed Use

DAccessory

- Nonseparated
-Separated
* Separated Buildings


## Incidental Use Areas

Table 508.2

| ROOM OR AREA | SEPARATION ${ }^{\text {a }}$ |
| :--- | :--- |
| Furnace room where any piece of equipment is over 400,000 Btu <br> per hour input | 2 hour; or 1 hour and provide automatic fire-extinguishing <br> system |
| Furnace room where any piece of equipment is 400,000 Btu per <br> hour input or less, except in R-3 occupancy | 1 hour or provide automatic sprinkler system |
| Rooms with any boiler over 15 psi and 10 horsepower | 2 hour; or 1 hour and provide automatic fire-extinguishing <br> system |
| Rooms with any boiler 15 psi or less and 10 horsepower or less, <br> except in R-3 occupancy | 1 hour or provide automatic sprinkler system |
| Mechanical and/or electrical equipment room, except in R-3 <br> occupancy | 1 hour or provide automatic sprinkler system |
| Refrigerant machinery rooms | 1 hour or provide automatic sprinkler system |
| Parking garage (Section 406.2) | 2 hours; or 1 hour and provide automatic fire-extinguishing <br> system |
| Hydrogen cut-off rooms | 2 -hour fire barriers and floor/ceiling assemblies in all occupancy <br> groups. |
| Incinerator rooms | 2 hours and automatic sprinkler system |
| Paint shops, not classified as Group H, located in occupancies <br> other than Group F | 2 hours; or 1 hour and provide automatic fire-extinguishing <br> system |
| Laboratories and vocational shops, not classified as Group H, <br> located in Group E or I-2 occupancies | 2 hour; or 1 hour and provide automatic fire-extinguishing <br> system |
| Laundry rooms over 100 square feet, except within dwelling <br> units | 1 hour or provide automatic fire-extinguishing system |
| Storage rooms over 100 square feet, except in R-3 occupancy | 1 hour or provide automatic fire-extinguishing system |
| Group I-3 cells equipped with padded surfaces | 1 hour |
| Group I-2 waste and linen collection rooms | 1 hour |
| Waste and linen collection rooms over 100 square feet | 1 hour or provide automatic fire-extinguishing system |
| Stationary lead-acid battery systems having a liquid capacity of <br> more than 100 gallons used for facility standby power, <br> emergency power or uninterrupted power supplies | 2 -hour fire barriers and floor/ceiling assemblies in all occupancy <br> groups |
| Rooms utilizing the electrical installation standards for <br> "information technology rooms" as per Section 645.1 of the New <br> York City Electrical Code | As may be required by the New York City Electrical Code |

For SI: 1 square foot $=0.0929 \mathrm{~m} 2,1$ pound per square $i n c h=6.9 \mathrm{kPa}$,
1 British thermal unit $=0.293$ watts, 1 horsepower $=746$ watts,
1 gallon $=3.785 \mathrm{~L}$.
a. Where an automatic fire-extinguishing system is provided, it need only be provided in the incidental use room or area,

## Incidental Use Areas

- A space listed on Table 508.2 and incidental to the main occupancy is considered an Incidental Use Area
- Otherwise, the spaces are treated as a mixed occupancy
- The Incidental Use Area need only be separated and/or protected as indicated on Table 508.2
- Any additional fire protection requirements in Chapter 9, such as fire alarms, are based on the main occupancy classification
- The floor area of the Incidental Use Area is included in the floor area of the main occupancy
- The actual floor area of an Incidental Use Area shall be treated as being in the same occupancy group as its main occupancy for the purposes of calculating allowable height and area


## Mixed Occupancies

- Accessory occupancies
- A room or a space that is of a different occupancy classification than the main occupancy, and that is subordinate and secondary to the main occupancy and necessary for the main occupancy to properly function
- Nonseparated occupancies
- Separated occupancies


## Accessory Uses

An accessory use area need not be separated by a fire barrier from its main occupancy provided that the following conditions are met:

- The accessory occupancy is classified according to its actual use, not the main occupancy which it serves
- The accessory use area is subject to all other code requirements, such as egress and fire protection systems, independent of its main occupancy.
- The aggregate floor area of all accessory occupancies located on a single story cannot exceed $10 \%$ of the floor area of the story
- Exceptions include Assembly uses not exceeding 750 square feet, Assembly uses accessory to a Group E occupancy, and Assembly uses accessory to a house of worship with occupant loads less than 100
- Each accessory occupancy cannot exceed the tabular values of Table 503
- Height and area increases for frontages and sprinklers are not to be factored


## Accessory Uses



## Accessory Uses



TOTAL FLOOR AREA $=10,000 \mathrm{SqFt}$

## Nonseparated Occupancies

## In a building containing nonseparated occupancies, the different occupancies need not be separated by fire barriers provided that the following conditions are met:

- The allowable area and height of the building or portion thereof is based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building
- Each space in the building is classified in accordance with its occupancy and all other Code provisions shall apply to each occupancy.
- The most restrictive provisions of Chapter 4 (Special Use and Occupancy Requirements) and Chapter 9 (Fire Protection Systems) shall apply.


## Mixed Occupancies Nonseparated Occupancies



## Separated Occupancies

## In a building containing separated occupancies, each individual occupancy must be separated by a fire barrier from all other adjacent occupancies in accordance with Table 508.3.3

- Each separated occupancy shall be individually classified and all other Code provisions shall apply to each fire area
- In each story, the building area shall be such that the sum of the ratios of the actual floor area of each occupancy divided by the allowable area of each occupancy shall not exceed one.
- Each separated occupancy shall comply with the height limitations based on the type of construction of the building


## Separated Occupancies Table 508.3.3

## REOUIRED SEPARATION OF OCCUPARCIES (HOURS)

| UsE | A-1 | A-2 | 4.3 | A.4 | A-5 | $\mathrm{E}^{\text {b }}$ | E | F-1 | F-2 | H-1 | H-2 | H-s | H-4 | H-5 | I-1 | 12 | L-3 | 1-4 | 目 ${ }^{\text {b }}$ | R-1 | F-2 | F-S, $\mathrm{P}-4$ | $8-1$ | $8.4{ }^{\text {a }}$ | $\underline{\square}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A-1 | - | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | sp | 4 | 3 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| A $-z^{\text {a }}$ | - | - | 2 | 2 | 2 | 2 | 2 | 3 | 2 | m | 4 | 3 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| A-3 | - | - | - | 2 | 2 | 2 | 2 | 3 | 2 | P | 4 | 3 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| A-4 | - | - | - | - | 2 | 2 | 2 | 3 | 2 | sp | 4 | 3 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| A-5 | - | - | - | - | - | 2 | 2 | 3 | 2 | MP | 4 | 3 | 2 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| $\mathrm{E}^{\text {b }}$ | - | - | - | - | - | - | 2 | 3 | 2 | NP | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| E | - | - | - | - | - | - | - | 3 | 2 | p | 4 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| E-1 | - | - | - | - | - | - | - | - | 3 | P | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| F2 | - | - | - | - | - | - | - | - | - | P | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| H-1 | - | - | - | - | - | - | - | - | - | - | NP | SP | N | sP | NP | SP | NP | PP | SP | NP | SP | MP | NP | NP | NP |
| H-2 | - | - | - | - | - | - | - | - | - | - | - | 1 | 2 | 2 | 4 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 2 | 2 | 1 |
| H-3 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 4 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 1 | 1 | 1 |
| H-4 | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 4 | 4 | 4 | 4 | 1 | 4 | 4 | 4 | 1 | 1 | 1 |
| H-5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 | 4 | 4 | 3 | 1 | 4 | 4 | 4 | 1 | 1 | 3 |
| I-1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 | 2 |
| 1-2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| I-3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| I-4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 2 | 2 | 3 | 2 | 1 |
| $\mathrm{M}^{\text {b }}$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 2 | 3 | 2 | 1 |
| E-1 | - | - | - | - | = | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 3 | 2 | 1 |
| R-2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 3 | 2 | 1 |
| E-3, $\mathrm{E}-4$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | s | $1^{\text {d }}$ |
| S-1 | - | - | - | - | - | - | - | 二 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| Sx | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| U | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

## Mixed Occupancies Separated Occupancies



# Determining Building Area in Mixed Occupancies 

Mixed nonseparated occupancies shall follow the same procedures as those for single occupancies except that the allowable area per story $\left(A_{a}\right)$ shall be based on the most restrictive provisions for each occupancy (See Section 508.3.2)

In Mixed separated occupancies:
Step 1: In each story, the building area shall be such that the sum of the ratios of the actual floor area of each occupancy divided by the allowable area of each occupancy shall not exceed one. (See Section 508.3.3.2)

Step 2: The sum of the ratios for each such area on all floors shall not exceed 2 for buildings with 2 stories above grade plane and 3 for buildings with 3 or more stories above grade plane. (Also known as Unity Formula; See Section 506.4.1)

# Height and Area Calculations Occupancy with Incidental Use Areas 

Example 1:
Main Occupancy=B
Incidental Use=S-1 (to be treated as part of the main use for height and area calculations)

Proposed SF=82,000SF/floor
B Occupancy=80,000 SF
S-1 Occupancy=2,000 SF
Proposed Height \& Story=5 stories/60 feet
Proposed Construction Type=IIA Noncombustible

Frontage=at least 30' all around
Sprinklers=Automatic Sprinklers throughout

## Height and Area Calculations Occupancy with Incidental Use Areas



In applying Table 503, B occupancy is used here because the incidental use is treated as part the main use in calculating height and area

## Height and Area Calculations Occupancy with Incidental Use Areas

S-1 occupancy is considered part of the main occupancy Group B for height and area calculation

Therefore, actual floor area for each floor is: $(80,000+2,000)$ SF $=82,000$ SF

$82,000 \mathrm{SF}<140,625 \mathrm{SF}\left(A_{a}\right)$
(check against allowable per floor)
$82,000 \mathrm{SF}<140,625 \mathrm{SF}\left(\mathrm{A}_{a}\right)$
$82,000 \mathrm{SF}<140,625 \mathrm{SF}\left(\mathrm{A}_{a}\right)$
$82,000 \mathrm{SF}<140,625 \mathrm{SF}\left(\mathrm{A}_{a}\right)$
$82,000 \mathrm{SF}<140,625 \mathrm{SF}\left(\mathrm{A}_{a}\right)$

Check
max. building area:
Max. allowable building area=
140,625 SF x $3=421,875$ SF Actual building area=
82,000 SF $\times 5=410,000$ SF
410,000 SF < 421,875 SF OK

Check Height:
B Occupancy Tabular = 6 stories/65 feet (Table 503)
B Occupancy Allowable=7 stories/85 feet (Section 504)
Actual=5 stories/60 feet OK

## Height and Area Calculations <br> Accessory Occupancies



Example 2:
Main Occupancy=B
Accessory Use=S-1 (to be treated as part of the main use for height and area calculations)

Proposed SF=82,000SF/floor
B Occupancy=80,000 SF
S-1 Occupancy=2,000 SF
Proposed Height \& Story=5 stories/60 feet
Proposed Construction Type=IIA Non-combustible
Frontage=at least 30' all around
Sprinklers=Automatic Sprinklers throughout

## Height and Area Calculations <br> Accessory Occupancies



In applying Table 503, B occupancy is used here because the accessory occupancy is treated as part of the main use in calculating height and area

## Height and Area Calculations Accessory Occupancies

First, on each floor:
The actual floor area of the main occupancy and its accessory occupancy combined cannot exceed the allowable area $\left(A_{a}\right)$ for the main occupancy:
Total actual floor area per floor:
( $80,000+2,000$ )SF=82,000SF


## Height and Area Calculations Accessory Occupancies

Second, S-1 occupancy is limited to Table 503's tabular area $\left(A_{t}\right)$ for S-1 occupancy (Height and area increase not permitted):
From Table 503, up to 12,000 SF is allowed.


2,000 SF < 12,000 SF $\left(A_{t}\right)$
(check against allowalle per floor)
$2,000 \mathrm{SF}<12,000 \mathrm{SF}\left(A_{t}\right)$
$2,000 \mathrm{SF}<12,000 \mathrm{SF}\left(A_{t}\right)$
$2,000 \mathrm{SF}<12,000 \mathrm{SF}\left(A_{t}\right)$
$2,000 \mathrm{SF}<12,000 \mathrm{SF}\left(A_{t}\right)$
Check Height of S-1 Occupancy:
S-1 Occupancy Tabular = 5 stories/65 feet (Table 503, no increase permitted, and therefore S-1 cannot be located more than 5 stories or 65 feet high) S-1 actual height= 5 stories/ 60 feet OK

## Height and Area Calculations Accessory Occupancies

Third, S-1 occupancy is limited to 10\% of the floor area of the story: $10 \%(80,000$ SF $+2,000$ SF $)=8,200$ SF


## Height and Area Calculations Accessory Occupancies

Finally, check max. building area

Max. allowable building area= 140,625 SF x $3=421,875$ SF

Actual building area= 82,000 SF $\times 5=410,000$ SF 410,000 SF $<421,875$ SF OK
Check Height of building based on B
 occupancy:
B Occupancy Tabular $=6$ stories/65 feet (Table 503)

B Occupancy Allowable=7 stories/85 feet (Section 504)
B actual height=5 stories/60 feet
OK

## Height and Area Calculations Mixed-Nonseparated Occupancies



Example 3:
Occupancies=B and S-1
Proposed SF=82,000SF/floor
B Occupancy=80,000 SF
S-1 Occupancy=2,000 SF
Proposed Height \& Story=5 stories/60 feet
Proposed Construction Type=IIA Non-combustible
Frontage=at least 30' all around
Sprinklers=Automatic Sprinklers throughout

## Height and Area Calculations Mixed-Nonseparated Occupancies



The allowable height and area of the building is based on the most restrictive allowances for the occupancies under consideration:
Table 503 allows the B occupancy with Construction Type IIA to be 6 stories and to have $37,500 \mathrm{SF} / f l o o r$

Table 503 allows the S-1 occupancy with Construction Type IIA to be 5 stories and to have 12,000 SF/floor

Because the allowance for S-1 is more restrictive, the allowable height and area of the building will be based on occupancy group S-1; the actual area per floor will include both the B occupancy and the S-1 occupancy

## Height and Area Calculations Mixed-Nonseparated Occupancies

Because the actual area on each story is $82,000 \mathrm{SF}$, which exceeds the allowable area of 45,000 SF for Group S-1, a higher construction type must be used or the actual floor area must be reduced.


In applying Table 503, since S-1 occupancy is subject to the more restrictive requirements, the height and area limitations are based on S-1 occupancy

## Height and Area Calculations Mixed-Nonseparated Occupancies

Upgrade to Construction Type I-B:


## Height and Area Calculations

Mixed-Nonseparated Occupancies

Check max. building area:

Max. allowable building area= 180,000 SF x $3=540,000$ SF

Actual building area= 82,000 SF $\times 5=410,000 \mathrm{SF}$
 410,000 SF < 540,000 SF OK

Check Height of building based on S-1 occupancy:
S-1 Occupancy Tabular $=6$ stories/160 feet (Table 503)
S-1 Occupancy Allowable=7 stories/180 feet (Section 504)
Actual Building=5 stories/ 60 feet OK

## Height and Area Calculations <br> Mixed-separated Occupancies



Example 5:
Occupancies=B and S-1
Occupancies must be separated per Table 508.3.3
Proposed SF=82,000SF/floor
B Occupancy=80,000 SF
S-1 Occupancy=2,000 SF
Proposed Height \& Story=5 stories/60 feet
Proposed Construction Type=IIA Non-combustible
Frontage=at least 30 ' all around
Sprinklers=Automatic Sprinklers throughout

## Height and Area Calculations <br> Mixed-separated Occupancies

The height and area limitations for this building must be done separately for each occupancy.

First, determine the allowable area for B occupancy:
 occupancy perimeter.

For sprinkler increase, the entire building must be sprinklered, not just particular occupancies.

## Height and Area Calculations <br> Mixed-separated Occupancies

Next, determine the allowable area for S-1 occupancy:


For sprinkler increase, the entire building must be sprinklered, not just particular occupancies.

## Height and Area Calculations <br> Mixed-separated Occupancies

In each story, the building area shall be:
$\left(B_{\text {actual }} B_{\text {allowable }}\right)+(S-1$ actual $/ S-1$ allowable $) \leq 1.0$
(Section 508.3.3.2)

check
max. building area (Section 506.4.1): $0.6 \times 5=3 \leq 3.0$ OK

## Height and Area Calculations <br> Mixed-separated Occupancies

Each occupancy must comply with its own height limitation
Check Height of B occupancy:
B Occupancy Tabular $=6$ stories/65 feet (Table 503)
B Occupancy Allowable=7 stories/85 feet (Section 504)


Actual=5 stories/60 feet
OK

Check Height of S-1 occupancy:
S-1 Occupancy Tabular $=6$ stories/65 feet (Table 503)
S-1 Occupancy Allowable=7 stories/85 feet (Section 504)
Actual=5 stories/60 feet
OK

## Height and Area Calculations Mixed-separated Occupancies



Separation is required per
Section 508.3.3.4
3-hour separation per
Table 508.3.3

Example 6:
Occupancies=B and S-1
Occupancies must be separated per Table 508.3.3
Proposed SF=82,000SF/floor
Floor 1: S-1 Occupancy=82,000 SF
Floor 2 through 5: B Occupancy=82,000 SF/floor
Proposed Height \& Story=5 stories/60 feet
Proposed Construction Type=IIA Non-combustible
Frontage=at least 30' all around
Sprinklers=Automatic Sprinklers throughout

## Height and Area Calculations Mixed-separated Occupancies

Assumed Construction Type: IIA

| GROUP |  | TYPE OF CONSTRUCTION |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | TYPE I |  | TYPE II |  | TYPE III |  | $\begin{gathered} \hline \text { TYPE } \\ \text { IV } \\ \hline \text { HT } \end{gathered}$ | TYPE V |  |
|  |  | A | B | A | B | A | B |  | A | B |
|  | $\begin{aligned} & \mathrm{Hgt}(\text { feet }) \\ & \mathrm{Hgt}(\mathrm{~S}) \end{aligned}$ | UL | 160 | 65 | 55 | 65 | 55 | 65 | 50 | 40 |
| B | $\begin{aligned} & \mathrm{S} \\ & \mathrm{~A} \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 37,500 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 10,500 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 28,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 5,600 \end{aligned}$ | $\begin{aligned} & \hline 6 \\ & 36,000 \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 8,400 \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & 5,500 \end{aligned}$ |
| S-1 | S | $\begin{aligned} & \text { UL } \\ & \text { UL } \end{aligned}$ | $\begin{aligned} & 6 \\ & 48,000 \\ & \hline \end{aligned}$ | $\begin{aligned} & 5 \\ & 12.000 \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 7,500 \\ & \hline \end{aligned}$ | $\begin{aligned} & 4 \\ & 7,500 \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & 7,500 \\ & \hline \end{aligned}$ | $\begin{aligned} & 4 \\ & 7,500 \\ & \hline \end{aligned}$ | $\begin{aligned} & 3 \\ & 5,000 \\ & \hline \end{aligned}$ | $\begin{aligned} & 1 \\ & 1,000 \end{aligned}$ |

## Height and Area Calculations <br> Mixed-separated Occupancies

Determine allowable area for S-1 occupancy:


Not Acceptable

## Height and Area Calculations <br> Mixed-separated Occupancies

Upgrade to Construction Type IB:


OK

## Height and Area Calculations <br> Mixed-separated Occupancies

Determine allowable area for B occupancy using Construction Type IB:


For sprinkler increase, the entire building must be sprinklered, not just particular occupancies.

## Height and Area Calculations <br> Mixed-separated Occupancies



Check Height of B occupancies:
B Occupancy Tabular = UL stories/feet (Table 503)
B Occupancy Allowable=UL stories/feet (Section 504)
B actual $=5$ stories/60 feet
OK

Check Height of S-1 Occupancy:
S-1 Occupancy Tabular $=6$ stories/160 feet
S-1 Occupancy Allowable=7 stories/180 feet
S-1 actual $=1$ story $/ 10$ feet
OK

## Specific Requirements beyond Table 503

The following occupancies and structures must further comply with other provisions in the code:

1. Section 406.1

Private Garages
2. Section 406.3

Open Parking Structures
3. Section 415.5

Group H-2 and H-3 Occupancies

## General Exceptions to Table 503

The following sections are exempt from, or modify,
Table 503 to allow more height and area:

1. Section 504.2

Allowable height increase due to automatic sprinkler system installation
2. Section 506.2

Allowable area increase due to frontage
3. Section 506.3

Allowable area increase due to automatic sprinkler system installation
4. Section 507

Unlimited area buildings
5. Section 509

Special Provisions (for parking garages, Group R-2 buildings in Construction Type IIA, Group F in Group R-1 and $\mathrm{R}-2$ buildings)

# Section 507 Unlimited Area Buildings General Concepts 

Section 507 outlines 12 instances under which a building would be allowed to have unlimited floor area.

Most of the instances require the building to have either an automatic sprinkler system or 60-feet open spaces, or both.

Where an occupancy is permitted an unlimited area in Table 503, there is no need for such occupancy to further comply with Section 507 for unlimited area.

## Section 507 Unlimited Area Buildings Examples of Unlimited Area Buildings



Construction Types I through IV
1-story maximum


60-feet open space or public ways all around*

* The required 60 -feet open space may be reduced to 40-feet with conditions established in Section 507.4


# Section 507 Unlimited Area Buildings Examples of Unlimited Area Buildings 

Group B, F-2, M or S-2


Group B, F-2 and M:
Construction Type IIA, IIIA, or IV
Group S-2: Construction Type IB, IIA, IIIA, or IV
Section 507.10 Group B Buildings
Section 507.11 Group F-2 Buildings
Section 507.12 Group M Buildings
Section 507.14 Group S-2 Buildings

## Section 509 Special Provisions An Example from Section 509



Max. building height not to exceed Table 503 for the least restrictive type of construction involved

Section 509.2 Group S-2 enclosed parking garage with Group A, B, M or R above

## Chapter 6: Types of Construction

## CONSTRUCTION CLASSIFICATION IN CHAPTER 6

## Chapter 6: Types of Construction General Concepts

| Chapter 6 Types of Construction |  |  |
| :---: | :---: | :---: |
| Table 601: Building elements including exterior walls | Table 602: exterior walls |  |
|  | High <br> Fire-resistance rating of exterior walls based on fire separation distance and occupancy group <br> Low | Chapter 3 Occupancy Classification |

Chapter 5 Height and Area Limitations

## Chapter 6: Types of Construction General Concepts

Buildings must be classified in 1 of 9 construction types

|  | Classification | Subclassification | Description of building elements |
| :---: | :---: | :---: | :---: |
|  | TYPE I | TYPE IA | Noncombustible building elements |
|  |  | TYPE IB |  |
|  | TYPE II | TYPE IIA |  |
|  |  | TYPE IIB |  |
| $\begin{aligned} & \frac{0}{0} \\ & 0=0 \\ & 0 \\ & 0 \\ & \frac{0}{5} \\ & 0 \end{aligned}$ | TYPE III | TYPE IIIA | Noncombustible exterior walls Combustible or noncombustible interior elements |
|  |  | TYPE IIIB |  |
|  | TYPE IV | TYPE IV | Noncombustible exterior walls Heavy timber interior elements |
|  | TYPE V | TYPE VA | Combustible building elements permitted by the code |
|  |  | TYPE VB |  |

## Chapter 6: Types of Construction TABLE 601-CONSTRUCTION TYPES

| New Code <br> construction types | Similar current <br> code construction <br> classes |
| :--- | :--- |
| Type IA | Class I-B |
| Type IB | Class I-C |
| Type IIA | Class I-D |
| Type IIB | Class I-E |
| Type IIIA | Class II-B |
| Type IIIB | Class II-C |
| Type IV | Class II-A |
| Type VA | Class II-D |
| Type VB | Class II-E |

## Chapter 6: Types of Construction

## General Concepts

Building elements, including structural frame, bearing walls, nonbearing walls, floor construction, and roof construction must comply with Table 601

Table 601
Fire Resistance Rating Requirement for Building Element (hours)

| BUILDING ELEMENT | TYPE I |  | TYPE II |  | TYPE III |  | TYPE IV | TYPE V ${ }^{\text {i }}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | A | B | $\mathrm{A}^{\text {d }}$ | B | $\mathrm{A}^{\text {d }}$ | B | HT | $\mathrm{A}^{\text {d }}$ | B |
| Structural frame ${ }^{2}$ Including columms, girders, trusses | $3^{\text {b }}$ | $2^{\text {b }}$ | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Bearing walls Exterior ${ }^{\text {f/ }}$ Interior | $\begin{aligned} & 3 \\ & 3^{b} \end{aligned}$ | ${ }_{2}{ }^{\text {b }}$ | 1 | 0 | 2 1 | 2 | $\stackrel{2}{1 / \mathrm{HT}}$ | 1 | 0 0 |
| Nonbearing walls and partitions    |  |  |  |  |  |  |  |  |  |
| Nonbearing walls and partitions Interior ${ }^{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | See Section 602.4.6 | 0 | 0 |
| Floor construction ${ }^{5}$ Including supporting beams and joists | 2 | 2 | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Roof construction Including supporting beams and joists | $1 \mathrm{t} \mathrm{c}^{\mathrm{c}}$ | $1^{\text {c }}$ | $1^{\text {c }}$ | 0 | $1^{\text {c }}$ | 0 | HT | $1{ }^{\text {e }}$ | 0 |

## Chapter 6: Types of Construction

## General Concepts

Exterior Walls must comply with Table 602

- Load-bearing exterior walls must comply with the more restrictive number of Table 601 and 602

Table 602
Fire Resistance Rating Requirement for Exterior Walls Based on Separation Distance

| FIRE SEPARATION DISTANCE <br> (feet) | TYPE OF CONSTRUCTION | GROUP H | GROUP F-1, M, S-1 | GROUP A, B, E, F-2, I, R ${ }^{\text {b }}, \mathrm{S}-2, \mathrm{U}$ |
| :---: | :---: | :---: | :---: | :---: |
| $<5^{\mathrm{c}}$ | All | 3 | 2 | 1 |
| $\geq 5$ | IA | 3 | 2 | 1 |
| $<10$ | Others | 2 | 1 | 1 |
| $\geq 10$ | IA, IB | 2 | 1 | 1 |
| 30 | IIB, VB | 1 | 0 | 0 |
| $\geq 30$ | Others | 1 | 1 | 1 |

## Chapter 6: Types of Construction

 General Concepts
## FIRE DISTRICT:

In addition, buildings constructed or altered inside the fire district must comply with both Chapter 6 and Appendix D-Fire Districts, whichever is more restrictive

## Chapter 6: Types of Construction Terminologies

## FIRE-RESISTANCE RATING

The period of time a building element, component or assembly maintains the ability to withstand fire exposure, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in Section 703. (Section 702)

NONCOMBUSTIBLE MATERIALS (Construction Types I and II) Materials required to be noncombustible shall be tested in accordance with ASTM E136 (Section 703.4.1)

COMBUSTIBLE MATERIALS (Construction Types III, IV, and V) Those that are permitted by the code but do not comply with ASTM E136 (See Section 603.1)

## Chapter 6: Types of Construction TABLE 601-CONSTRUCTION TYPES I \& II

Section 603 contains a list of combustible materials that may be used in Construction Type I and II; examples include:
-Fire-retardant-treated wood in:
-Nonbearing interior partitions with fire-resistance rating $\leq$ 1 hour (however, public corridors and exits must be of noncombustible materials)
-certain roof construction as permitted in Table 601, Note
c, Item 3
-Thermal and acoustical insulation with limited flame spread
-Foam plastics per Chapter 26
-Class A or B roof coverings
-Combustible exterior wall coverings in accordance with Chapter 14
-Interior finishes as permitted by Chapter 8, and

- Other applications as permitted by Section 603


## Chapter 6: Types of Construction TABLE 601-CONSTRUCTION TYPE III

Fire-retardant-treated wood (FRTW) may be used in exterior wall assemblies of a 2-hour rating or less, but:

| Outside fire districts | Inside fire district |
| :--- | :--- |
| Exterior walls, fire walls, exit passageways, and shaft enclosures in I-1, R-1, R-2 <br> occupancies must be of noncombustible materials (No FRTW) |  |
| Group F subject to Section 270(1) of NYS Labor Law must be "fireproof" (No FRTW) |  |
| Exterior load-bearing walls may be FRTW <br> (where the walls have a 2-hour rating or <br> less. Section 602.3) | Exterior load-bearing walls must be <br> noncombustible (No FRTW. Section <br> 602.3, exception 3) |
| Exterior nonload-bearing walls may be <br> FRTW (where the walls have a 2-hour <br> rating or less. Section 602.3) | Exterior nonload-bearing walls may be <br> FRTW only if sprinkler system is equipped <br> throughout (FRTW ok with condition. <br> Section 602.3, exception 4) |

## Chapter 6: Types of Construction Construction Classification Matrix

|  |  |  | Protected |  | Unprotected |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Noncombustible | Exterior and interior <br> (bearing or nonbearing) <br> walls, floors, roofs and <br> structural elements are of <br> noncombustible <br> materials* | I | A | B |  |
|  | II | A | B |  |  |
| Combustible | Exterior walls are of <br> noncombustible <br> materials** | III | A | B |  |
|  |  | IV |  | HT |  |
|  |  | V | A | B |  |

* Except where permitted in Section 603 $\square$ Not permitted in fire districts, See D105.1 for exceptions
** Except where permitted in Section 602.3


## Chapter 6: Types of Construction

## TABLE 601-Building Elements-Exterior walls

| BUILDING ELEMENT | TYPE I |  | TYPE II |  | TYPE III |  | TYPE IV | TYPE Vi |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | A | B | $\mathrm{A}^{\text {d }}$ | B | $\mathrm{A}^{\text {d }}$ | B | HT | $\mathrm{A}^{\text {d }}$ | B |
| Structural frame ${ }^{2}$ Including columms, girders, trusses | $3^{\text {b }}$ | $2^{\text {b }}$ | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Bearing walls Exterior ${ }^{f^{2}}$ Interior | $3^{\text {b }}$ | $\underset{2^{b}}{2}$ | 1 | 0 | 2 1 | 2 0 | $\stackrel{2}{1 / \mathrm{HT}}$ | 1 1 | 0 0 |
| Nonbearing walls and partitions Exterior | See Table 602 |  |  |  |  |  |  |  |  |
| Nonbearing walls and partitions Interior ${ }^{\text {b }}$ | 0 | 0 | 0 | 0 | 0 | 0 | See Section 602.4.6 | 0 | 0 |
| Floor construction ${ }^{\text {² }}$ Including supporting beams and joists | 2 | 2 | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Roof construction Including supporting beams and joists | $11 / 2^{c}$ | $1{ }^{\text {c }}$ | $1{ }^{\text {c }}$ | 0 | $1^{\text {c }}$ | 0 | HT | $1{ }^{\text {c }}$ | 0 |

Exterior Walls must comply with Table 602
Load-bearing exterior walls must comply with the more restrictive numbers of Table 601 and 602

## Chapter 6: Types of Construction

 TABLE 601-Building Elements-Interior wallsLoad-bearing interior walls must comply with Table 601
Nonload-bearing interior walls are generally not required to be fire-resistance rated in Table 601, however, they may be required to be fire-resistance rated by Section 508.3.3 (Separated Occupancies), 706 (Fire Barriers), 708 (Fire Partitions), or 1016 (Corridors) when they separate mixed occupancies, dwelling units, tenant spaces, guestrooms, or served as corridor walls

# Chapter 6: Types of Construction TABLE 601 - Building Elements - Footnotes 

Exterior load-bearing and nonload-bearing walls must comply with Tables 601, 602, Section 704, Chapter 14, and Section 1019.4

Table 601, Note a: The structural frame shall be considered to be the columns and the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads.

Table 601, Note b: In Type I Construction, the fire-resistance ratings of Interior load-bearing walls are permitted to be reduced by 1 hour where supporting roof only

Table 601, Note c: Lists of conditions where fire protection of structural members are not required and where fire-retardant-treated wood or heavy timber can be used as building elements

Table 601, Note f: Exterior load-bearing walls must also comply with Table 602 based on fire separation distance

Table 601, Note g: Additional requirements in fire district for Construction Type II exterior load-bearing walls (See Table 602, Note d)

Table 602, Note e: Additional requirements in fire district for Construction Type II exterior non load-bearing walls

# Chapter 6: Types of Construction TABLE 601-fire-resistance rating reduction 

| BUILDING ELEMENT | TYPE I |  | TYPE II |  | TYPE III |  | TYPE IV | TYPE V ${ }^{\text {i }}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | A | B | $\mathrm{A}^{\text {d }}$ | B | $\mathrm{A}^{\text {d }}$ | B | HT | $\mathrm{A}^{\text {d }}$ | B |
| Structural frame Including columns, girders, trusses | $3^{\text {b }}$ | $2^{\text {b }}$ | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| Bearing walls Exterior ${ }^{\text {f }}$ Interior | $3^{3}$ | ${ }_{2}{ }^{\text {b }}$ | 1 | 0 | 2 | 0 | $\stackrel{2}{1 / \mathrm{HT}}$ | 1 | 0 |
| Nonbearing walls and partitions Exterior | See Table 602 |  |  |  |  |  |  |  |  |
| Nonbearing walls and partitions Interior ${ }^{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | See Section 602.4.6 | 0 | 0 |
| Floor construction ${ }^{\text {B }}$ <br> Including supporting beams and joists | 2 | 2 | 1 | 0 | 1 | 0 | HT | 1 | 0 |
| $\begin{aligned} & \text { Roof construction } \\ & \text { Including supporting beams and joists } \\ & \hline \end{aligned}$ | $1^{1 / 2}$ | $1^{\text {c }}$ | $1^{\text {c }}$ | 0 | $1{ }^{\text {c }}$ | 0 | HT | $1^{\text {e }}$ | 0 |

Table 601, Note d: The fire-resistance rating may be reduced by 1 hour by installing an automatic sprinkler system, provided such system is not:
-required by other provisions of the code
-used for an allowable area increase per Section 506.3
-used for an allowable height increase per Section 504.2

* This 1-hour substitution cannot be applied to exterior wall fire rating


## Chapter 6: Types of Construction

 TABLE 602-Fire-resistance rating for exterior walls based on fire separation distance-Exterior load-bearing walls: Table 601 + Table 602
-Exterior nonload-bearing walls: Table 602 only
-Additional requirements for exterior walls in fire district (Note d and e)
-Additional provisions for exterior walls and openings in Section 704


Occupancy Groups

| FIRE SEPARATION DISTANCE <br> (feet) | TYPE OF CONSTRUCTION | GROUP H | GROUP F-1, M, S-1 | GROUP A, B, E, F-2, I, R $\mathbf{b}, \mathrm{S}-2, \mathbf{U}$ |
| :---: | :---: | :---: | :---: | :---: |
| $<5^{\mathrm{c}}$ | All | 3 | 2 | 1 |
| $\geq 5$ | IA | 3 | 2 | 1 |
| $<10$ | Others | 2 | 1 | 1 |
| $\geq 10$ | IA, IB | 2 | 1 | 1 |
| 30 | IIB, VB | 1 | 0 | 0 |
| 20 | Others | 1 | 1 | 1 |
| 20 | All | 0 | 0 | 0 |

Table 602

## Chapter 6: Types of Construction

 TABLE 602-Fire-resistance rating for exterior walls based on fire separation distance
## Section 702:

FIRE SEPARATION DISTANCE. The distance measured from the building face to the closest interior tax lot line, to the centerline of a street or other public space, or to an imaginary line between two buildings on the same tax lot. The distance shall be measured at right angles from the face of the wall.

## Chapter 6: Types of Construction TABLE 602-Fire-resistance rating for exterior walls based on fire separation distance



Figure 702.1(6)
FIRE SEPARATION DISTANCE MEASURED TO AN INTERIOR LOT LINE

## Chapter 6: Types of Construction TABLE 602-Fire-resistance rating for exterior walls based on fire separation distance



Figure 702.1(7)
FIRE SEPARATION DISTANCE MEASURED TO THE CENTERLINE OF A STREET

## Chapter 6: Types of Construction TABLE 602-Fire-resistance rating for exterior walls based on fire separation distance



STREET
*FSD: FIRE SEPARATION DISTANCE
Fire separation distance measured to an imaginary line between two buildings on the same tax lot

## Chapter 6: Types of Construction

 TABLE 602-Fire-resistance rating for exterior walls based on fire separation distance

## Chapter 6: Types of Construction

## ADDITIONAL REQUIREMENTS

IN FIRE DISTRICT
Appendix D

## Chapter 6: Types of Construction TABLE 602-Fire-resistance rating for exterior walls based on fire separation distance

Inside the FIRE DISTRICT:
Table 602, Note d prescribes the fire-resistance rating of exterior load-bearing walls of Construction Type II buildings:

Fire-resistance rating requirements for exterior load-bearing walls in fire district based on fire separation distance

| FIRE SEPARATION DISTANCE (FEET) | TYPE OF CONSTRUCTION | ALL OCCUPANCY GROUPS |
| :---: | :---: | :---: |
| < 5 | II | $2^{\text {a }}$ |
| $\geq 5$ |  | $2^{\text {a }}$ |
| $<10$ |  |  |
| $\geq 10$ |  | 1 |
| $<30$ |  |  |
| $\geq 30$ |  | Per Table 602 |

a. Occupancy Group H shall comply with Table 602

## Chapter 6: Types of Construction TABLE 602-Fire-resistance rating for exterior walls based on fire separation distance

Inside the FIRE DISTRICT:
For exterior nonload-bearing walls of Construction Type II buildings:

Fire-resistance rating requirements for exterior non load-bearing walls in fire district based on fire separation distance

| FIRE SEPARATION <br> DISTANCE (FEET) | TYPE OF <br> CONSTRUCTION | ALL OCCUPANCY <br> GROUPS |
| :---: | :---: | :---: |
| $<5$ |  | II |

## Chapter 6: Types of Construction FIRE DISTRICT

Section D102.2.4 of Appendix D:
In fire district, the fire-resistance rating of bearing walls, floors, roofs and their supporting structural members must comply with Table 601 but such fire rating must be no less than 1hour.

There are 5 exceptions where compliance with Table 601 is sufficient. Buildings with automatic sprinkler system and buildings with 30 feet open space are among the 5 exceptions.

## Chapter 6: Types of Construction FIRE DISTRICT

Construction Type V are generally not permitted in fire district, however, Section D 105.1 of Appendix D provides a number of exceptions:
Detached or semi-detached 1- and 2-family of Type VA construction is permitted in fire district where such building is (See Section D 105.1, Item 9) :
-2 stories or less in height
$\cdot 2,500$ SF or less in area, and
-Located in Zoning District R-2 through R-5
Or if the building is damaged, damaged portion may be constructed of Construction Type VA

## Chapter 6: Types of Construction FIRE DISTRICT

Exceptions for Construction Type V in fire district
1-family dwellings may be constructed of Type VB construction in fire district provided such building is (See Section D 105.1, Item 9) :

- Located in Zoning District R-1
- In conformance with height and area limitations set forth in Table 503


## Chapter 6: Types of Construction FIRE DISTRICT

Exceptions for Construction Type V in fire district
Existing 1- and 2-family dwellings of a type of construction otherwise not permitted in the fire district (See Section D 105.1, Item 7):

May be extended $25 \%$ of the floor area existing at the time of inclusion in the fire district by any type of construction permitted by this code.

# This concludes The American Institute of Architects Continuing Education Systems Program 

