2019
CHANGES MADE TO THE OREGON STRUCTURAL SPECIALTY CODE.

ICC
INTERNATIONAL CODE COUNCIL®
CHAPTER

BEND
CROOK COUNTY
DESCHUTES COUNTY
JEFFERSON COUNTY OREGON
REDMOND THE HUB

PRESENTERS

Lisa Weishoff	City of Bend
Sean Quinlivan	City of Bend
Donna Hamilton	City of Bend
Alex Sabin	City of Redmond

Model code revisions from the 2012 IBC in either the 2015 Or 2016 IBC are shown as red underline for additions and as Red double ~~strikethorugh~~ for deletions.

Oregon amendments are shown as blue underline for additions And blue double ~~strikethrough~~ for deletions.

CHAPTER 3 – OCCUPIED ROOFS

Change: 2018 provided multiple clarifications regrading occupied roof spaces. The first clarification specifies the required classification of the space based on The life safety and relative hazard associated with the rooftop activities.

302.1 Occupancy classification. Occupancy classification is the formal designation of the primary purpose of the building, structure or portion thereof. Structures shall be classified into one or more of the occupancy groups listed in this section based on the nature of the hazards and risks to building occupants generally associated with the intended purpose of the building or structure. An area, room or space that is intended to be occupied at different times for different purposes shall comply with all applicable requirements associated with such potential multipurpose. Structures containing multiple occupancy groups shall comply with Section 508. Where a structure is proposed for a purpose that is not specifically listed in this section, such structure shall be classified in the occupancy it most nearly resembles based on the fire safety and relative hazard. Occupied roofs shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard, and shall comply with Section 503.1.4.

CHAPTER 3 - GREENHOUSES

Change: 2018 IBC provided two clarifications regarding occupied greenhouses And the distinct differences between the classifications and the intended uses.

303.4 Assembly Group A-3. Group A-3 occupancy includes assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A including, but not limited to:

303.4 Assembly Group A-3
Greenhouses for the conservation and exhibition of plants that provide public access.

309.1 Mercantile Group M
Greenhouses for display and sale of plants that provide public access.

CHAPTER 3 - TRAINING AND SKILL DEVELOPMENT

Change: 2015 IBC provided clarification regarding Group B training And skill development applications by expanding the description in Section 304.

304.1 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Training and skill development not in a school or academic program (this shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, **and where not classified as a Group A occupancy).**

CHAPTER 3 –DHS OHA LICENSED FACILITY

Change: The model code language was adopted early in Oregon Under the 2014 OSSC. As such, under the new code, many previous Oregon Amendments now align and have been removed throughout the code.

308.2 Institutional Group I-1. Institutional Group I-1 occupancy shall include buildings, structures or portions thereof for more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised environment and receive custodial care. Buildings of Group I-1 shall be classified as one of the occupancy conditions specified in Section 308.2.1 or 308.2.2.

308.2.1 Condition 1. This occupancy condition shall include buildings in which all persons receiving custodial care who, without any assistance, are capable of responding to an emergency situation to complete building evacuation. This group shall include, but not be limited to, the following:

Congregate living facilities ***NOT SUBJECT TO LICENSURE BY DHS/OHA***
Halfway houses
Social rehabilitation facilities

308.2.2 Condition 2. This occupancy condition shall include buildings subject to licensure by the Oregon Department of Human Services in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities with or without a Memory Care Endorsement
Residential care facilities with or without a Memory Care Endorsement
Residential treatment facilities **SUBJECT TO LICENSURE BY DHS/OHA**
Group homes and facilities

CHAPTER 3 – DHS/OHA LICENSED FACILITIES

Change: The model code language was adopted early in Oregon under The 2014 OSSC. As such, under the new code, many previous Oregon Amendments now align and have been removed.

310.5.1 Condition 1. This occupancy condition shall include buildings in which all persons receiving custodial care, without any assistance, are capable of responding to an emergency situation to complete building evacuation. This group shall include, but not be limited to, the following:

Congregate living facilities ***NOT SUBJECT TO LICENSURE BY DHS/OHA***
Halfway houses
Social rehabilitation facilities

310.5.2 Condition 2. This occupancy condition shall include buildings subject to licensure by the Oregon Department of Human Services in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation. This group shall include, but not be limited to, the following:

Alcohol and drug centers
Assisted living facilities with or without a Memory Care Endorsement
Residential care facilities with or without a Memory Care Endorsement
Residential treatment facilities
Group homes and facilities **SUBJECT TO LICENSURE BY DHS/OHA**

CHAPTER 3 – ACCESSORY STORAGE SPACES

Change: This modification specifies that all accessory storage spaces Are permitted to be classified as the same occupancy classification as The primary occupancy. This was modified in the 2015 iteration and further Modified in the 2018 iteration. A public code proposal changed the "shall" to "may" to provide the designer/customer options.

311.1 Storage Group S. Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

311.1.1 Accessory storage spaces. A room or space used for storage purposes that is accessory to another occupancy ~~shall~~ may be classified as part of that occupancy.

NOTE: The approach to properly classify these accessory storage spaces has now been formalized in the code. Previously, the proper classification was often questioned, and was only directly addressed in ICC Committee interpretation at the model level. This path helps clarify the appropriate designation for the code user.

FIRE CODE INTERGRATION

Change: Integration of Fire Code provisions into the 2019 OSSC

Appendix N
Adhoc Committee Process
Resources:
Cross Reference Doc
https://www.oregon.gov/bcd/codes-stand/code-adoption/Documents/19ossc-18ifc-guide.pdf
Tank Authority Interp.
https://www.oregon.gov/bcd/codes-stand/documents/interp-19-01-tanks.pdf
BPV Authority White Paper
https://www.Oregon.gov/bcd/codes-stand/Documents/whitepaper-obpvsc-authority-pressure-piping.pdf

101.2 Scope
The *Oregon Structural Specialty Code* as adopted by the State of Oregon, Building Codes Division, includes portions of the *International Building Code,* the *International Fire Code* and other nationally adopted codes. It does not include provisions of the "State Fire Code" adopted under the State Fire Marshal's statutory authority. Unlike the "State Fire Code," the provisions of the *Oregon Structural Specialty Code* shall apply to the construction, reconstruction, *alteration*, *repair* and installation of materials and equipment in or a part of buildings and structures covered under the *state building code.*

CHAPTER 4 – 406.3 PRIVATE GARAGES

Change: Change includes new private garage definition, size reduction and Option to be constructed as public garage.

PRIVATE GARAGE. A building or portion of a building in which motor vehicles used by the owner or tenants of the building or buildings on the premises are stored or kept, without provisions for repairing or servicing such vehicles for profit.

406.3 Private garages and carports. Private garages and carports shall comply with Sections 406.2 and 406.3, **or** they shall comply with Sections 406.2 and 406.4.

Public garage provisions

Notes:
Group U private garages now limited to 1,000 sq. ft.
Previous increase allowance to 3,000 sq. ft. removed
Multiple private garages allowed separated with 1 hour fire barriers
Or construct as public garage.

Chapter 4 – 407.5 Smoke Barriers

Change: Modification to hospital smoke compartment size

407.5.1 Smoke compartment size. Stories shall be divided into smoke compartments with an area of not more than 22,500 square feet (2092 m2) in Group I-2 occupancies.

Exceptions:

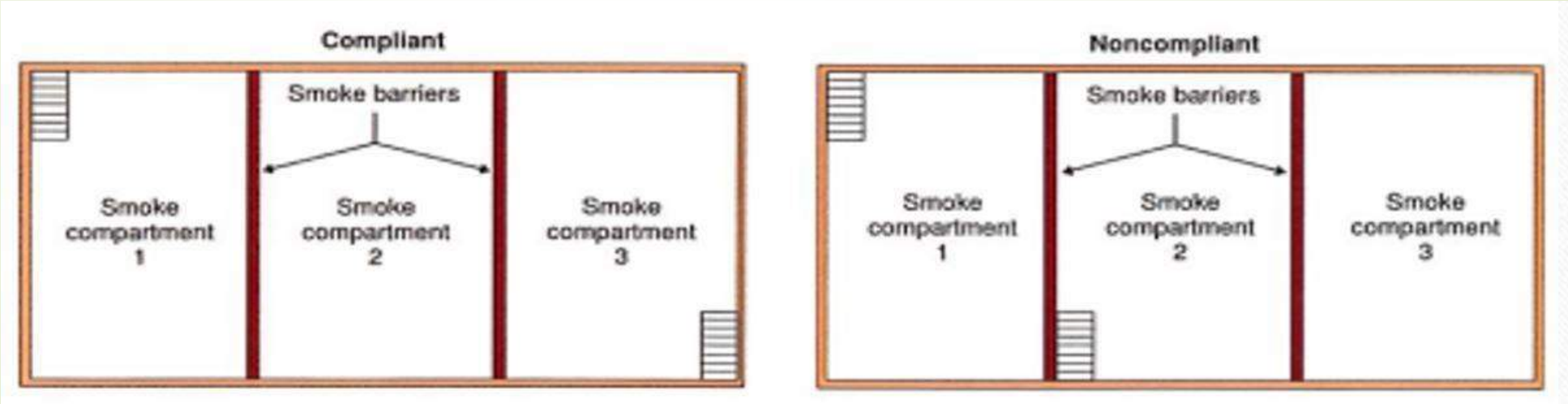
1. A smoke compartment in Group I-2, Condition 2 is permitted to have an area of not more than 40,000 square feet (3716 m2) provided that all patient sleeping rooms within that smoke compartment are configured for single patient occupancy and any suite within the smoke compartment complies with Section 407.4.4.
2. A smoke compartment in Group I-2, Condition 2 without patient sleeping rooms is permitted to have an area of not more than 40,000 square feet

308.3.1.2 Condition 2. This occupancy condition shall include facilities that provide nursing and medical care and could provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to hospitals

CHAPTER 4 – 407.5.4 INDEPENDENT EGRESS

Change: Modification to Smoke Compartment Egress

407.5.4 Independent egress. A *means of egress* shall be provided from each *smoke compartment* created by *smoke barriers* without having to return through the smoke compartment from which *means of egress* originated. Smoke compartments that do not contain an exit shall be provided with direct access to not less than two adjacent smoke compartments.



CHAPTER 4 – 412.3.6 HANGAR FIRE SUPPRESSION

Change: New Oregon Amendment to an existing Oregon Amendment
For aircraft hangar fire suppression.

412.3.6 Fire suppression… No Change

1. No change…
2. Aircraft hangars that have an aircraft access door height less than 28 feet (8534 mm), and do not have provisions for housing aircraft with a tail height over 28 feet (8534 mm), are exempt from foam requirements, provided that the building complies with all of the following criteria:

2.1. The building is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width or shall be provided with *fire-resistance-rated exterior walls* and separation distances in accordance with NFPA 409, Section 5.3.

2.2. The building is provided with an *automatic sprinkler system* throughout with a minimum sprinkler design density of ~~0.25 gallons per minute~~, Extra Hazard Group 1.

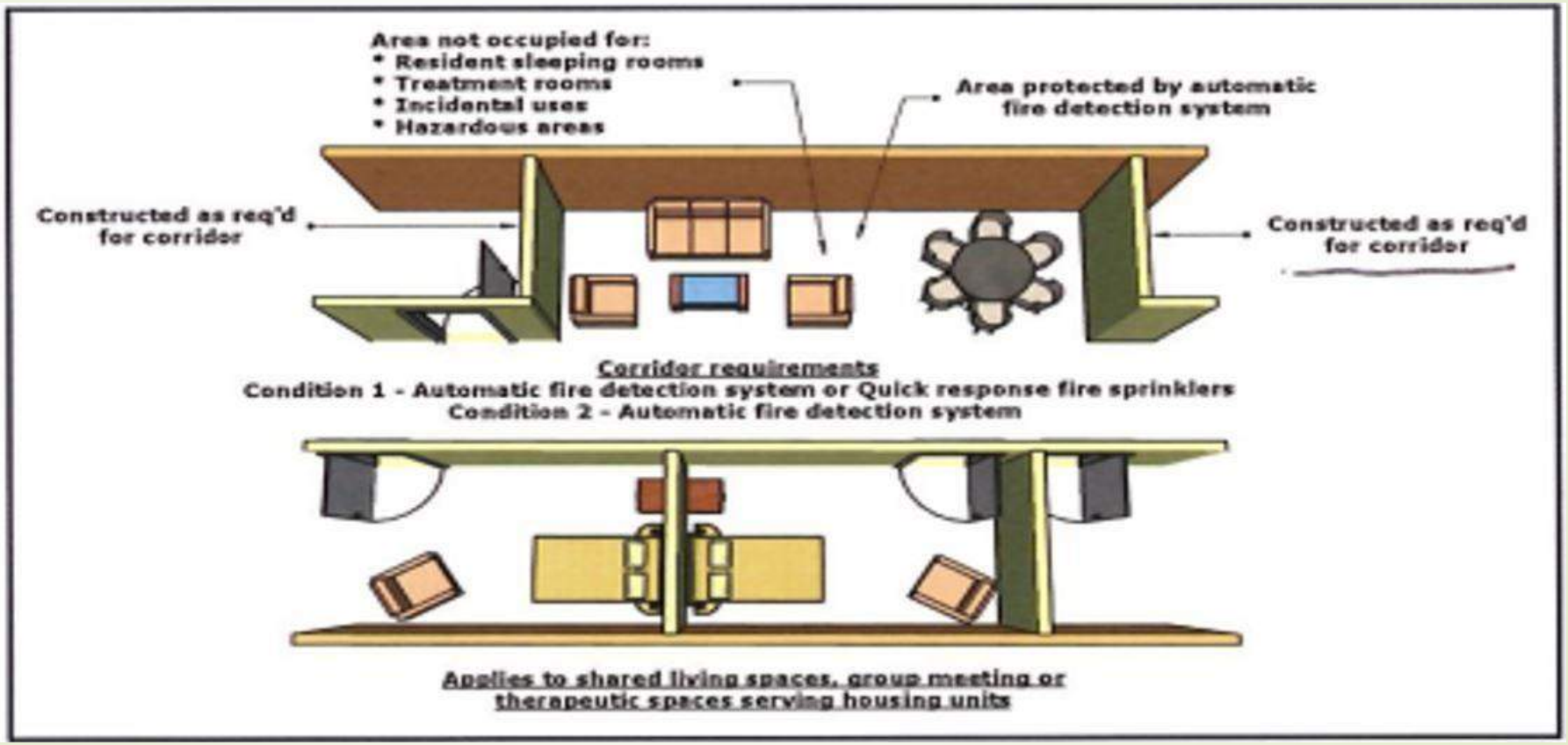
2.3. The total ~~fuel capacity~~ of contained in all aircraft located within a single fire area does not exceed 5,000 gallons (18 927 L).

2.4. No single fire area exceeds 65,000 square feet (3716 m2).

2.5. The gross building area does not exceed 75,000 square feet (4288 m2)

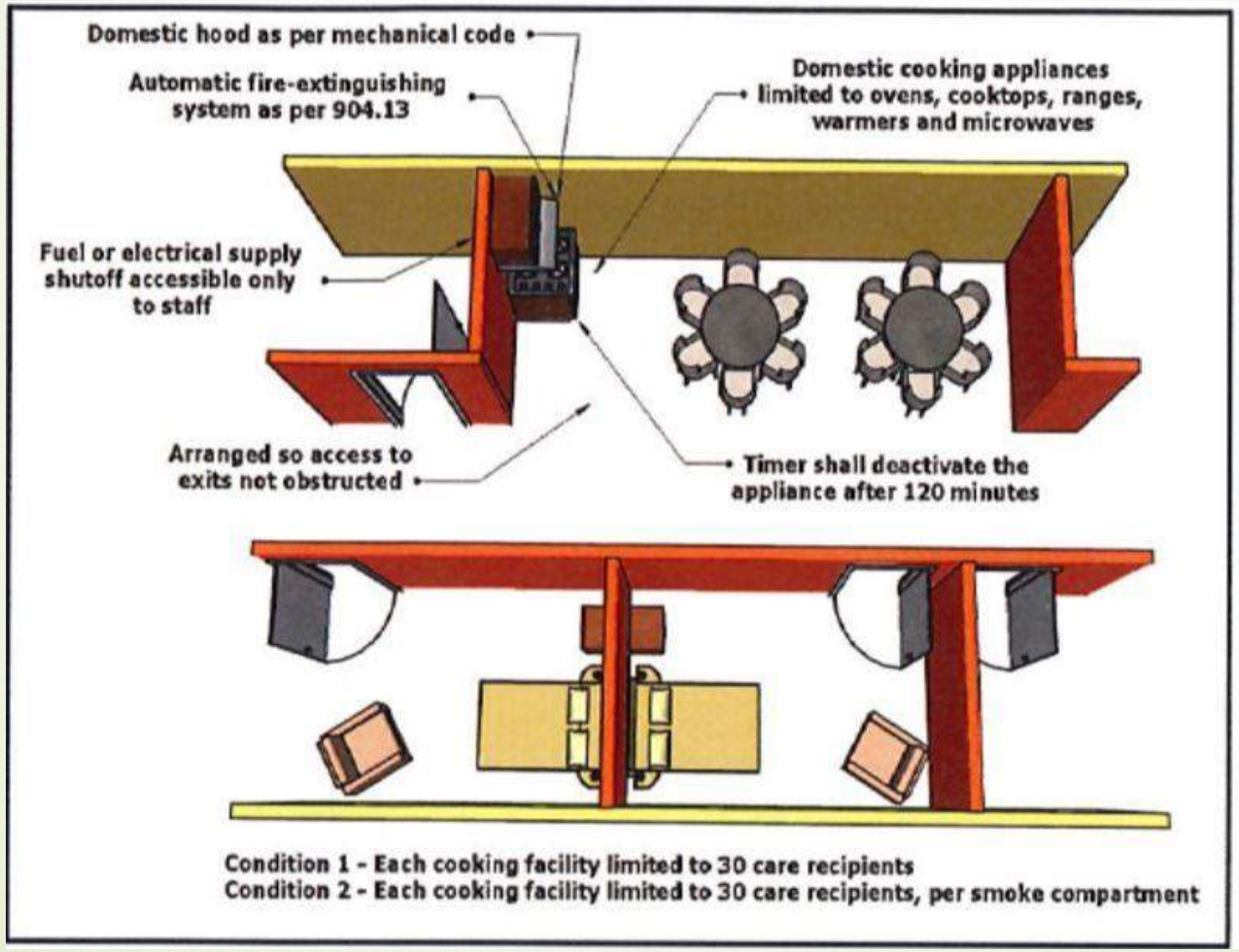
CHAPTER 4 – 420.7 GROUP I-1 CORRIDORS

CHANGE: Modification adding provisions for areas open to rated corridors In Group I-1 occupancies.



CHAPTER 4 – 420.8 GROUP I-1 COOKING FACILITIES

CHANGE: New provisions for areas open to rated corridors
With cooking facilities.



CHAPTER 4 -420.10 DORMITORY COOKING FACILITIES

CHANGE : New provisions added for Group R-2 dormitory Cooking facilities.

420.10 Group R-2 dormitory cooking facilities. Domestic cooking appliances for use by residents of Group R-2 college Dormitories operated by a college or university for student housing, shall be in accordance with Sections 420.10.1 and 420.10.2.

NOTES:

- APPLIES TO SLEEPING ROOMS AND COMMON AREAS
- LIMITED TO OVENS, COOKTOPS, RANGES AND OVENS
- COFFEE MAKERS AND MICROWAVES.
- APPROVED LOCATIONS ONLY.

Protected in accordance with 904.13.
Domestic cooking hood required as per the OMSC

CHAPTER 4 – 426 COMBUSTIBLE DUST

Change: New provisions adding a reference to NFPA 652 Standard on the fundamentals of combustible dust.

NOTES:

New reference to NFPA 652.

- New requirement for a dust hazard analysis. in chapter 7, including analysis criteria.
- Correlates with Table 307.1(1) footnote q.

TABLE 307.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, j, m, n, p]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note q	NA	NA	See Note q	NA	NA	See Note q	NA

q. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

CHAPTER 4 – 428 HIGHER EDUCATION LABS

CHANGE: New 2018 IFC Chapter specific to college and universities laboratories.

HIGHER EDUCATION LABATORY. Laboratories in Group B occupancies used for Educational purposes used above 12th grade. Storage, use and handling of Chemicals in such laboratories shall be limited to purposes related to testing, Analysis, teaching, research or developmental activities on a nonproduction Basis.

Notes: Regulates hazardous materials in specialized academic labortory Settings as follows:

- Increases MAQs in large or multistory labs.
- Allows small quantities of previously prohibited materials.
- Introduces lab suites for use with or without control areas.
- Limits the size of containers.

CHAPTER 4 – ELECTRICAL ENERGY STORAGE SYSTEMS

Change: 2018 IFC addition including provisions for new battery Technologies and safety features.

TABLE 430.2
BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES

BATTERY TECHNOLOGY	CAPACITY[a]
Flow batteries[b]	20 kWh
Lead acid, all types	70 kWh
Lithium, all types	20 kWh
Nickel cadmium (Ni-Cd)	70 kWh
Sodium, all types	20 kWh[c]
Other battery technologies	10 kWh

TABLE 430.2.6
MAXIMUM ALLOWABLE BATTERY QUANTITIES

BATTERY TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES[a]	GROUP H OCCUPANCY
Flow batteries[b]	600 kWh	Group H-2
Lead acid, all types	Unlimited	Not Applicable
Lithium, all types	600 kWh	Group H-2
Nickel cadmium (Ni-Cd)	Unlimited	Not Applicable
Sodium, all types	600 kWh	Group H-2
Other battery technologies	200 kWh	Group H-2[c]

Notes: <u>New battery technologies include:</u>

- Flow Batteries, sodium-beta batteries, and an open category

<u>Threshold measurement method changed</u>

- Old- Number of batteries, or amp-hours, or pounds
- New – Kilowatt hours (kWh).

<u>New MAQ Table</u>

CHAPTER 4 – 435 HIGH – PILED COMBUSTIBLE STORAGE

Change: Modification to align provisions with NFPA 13 and FM Global.

Previous provisions with virtually unchanged since 2000.

Major revisions include the following:

- Commodity classifications reworked.
- New extensive commodity classification tables.
- Group A plastic mixtures now two fixtures and new equations added.
- Plastic pallets now addressed.
- Storage area clarified to include required aisles around storage. (44" or 96").
- Separation of storage areas revised to allow 1-hour fire barriers or 100' separation, Non-high piled storage can occur within the 100'
- Fire department access door distance increased to 125' to accommodate Common 54' wide concrete tilt-up panels.
- Flue space provisions reformatted to clarify application only when protected by an automatic sprinkler system.

CHAPTER 4 – 438 PROCESSING AND EXTRACTION FACILITIES

Change: New chapter specific to extraction of oils from plant material.

- Applies to all extraction processes not limited to cannabis.
- Prohibits extraction in certain occupancies and locations.
- Addresses extraction using flammable or combustible liquids, flammable gases & cryogenic fluids
- Gas detection system required when flammable gas used.
- Equipment is not regulated under the OSSC.

CHAPTER 4 – 439.11 AEROSOL COOKING

Change: New provisions specific to aerosol cooking spray products.

AEROSOL COOKING SPRAY PRODUCTS. *Aerosol cooking spray products* are those *aerosol products* designed to deliver a vegetable oil or a solid or nonflammable liquid to reduce sticking on cooking and baking surfaces, or to be applied to food, or both. These products have a chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g) and contain not more than 18 percent by weight of flammable propellant.

Notes:

- **New section based on FM Large-Scale fire test.**
- **Previously protected as a Class III Commodity, now level Class I aerosol**
- **New definition added to limit scope of provisions based on Btu/lb and percentage of flammable propellant.**

CHAPTER 4 – 440.11.1 CARBON DIOXIDE ENRICHMENT SYTEMS

Change: New provisions specific to carbon dioxide enrichment systems.

- **NOTES:**
- Applies to facilities tha introduce carbon dioxide to stimulate plant growth.
- Applies to more than 100 pounds or any amount with a remot refill.
- Gas detection system.
- Mechanical Ventilation or Negative Pressure.
- Signage at room entrance.
- Remote refill of indoor containers.

CHAPTER 5 – FIRE WALL SCOPE

Change: The scope of fire wall use has been modified and added to Both sections 503.1 and 706.1. Now the code clarifies that fire walls only Create separate buildings for the purposes of allowable height, allowable Area and type of construction.

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

Note: Through the longstanding first sentence in Section 706.1, some code Readers incorrectly interpreted the language to require that the portions of the Various elements and systems on each side of a fire wall be completely self-Contained. There are no requirements in the OSSC that mandate that the Placement of fire walls to create separate building such that its building features Need to be separated from other like building features, like sprinkler systems, in Adjacent buildings.

CHAPTER 5 – FIRE WALL SCOPE (CONTINUED)

Change: The scope of fire wall use has been modified and added to both Section 503.1 and 706.1. Now, the code clarifies that fire walls only create Separate buildings for the purposes of allowable height, allowable area, and Type of construction.

706.1 General. ~~**Each portion of a building separated by one or more fire**~~ **Fire Walls** ~~**that comply with the provisions of this section**~~ **shall be** ~~**considered a separate Building**~~ **constructed in accordance with Sections 706.2 through 706.11.** The extent and location of such fire walls shall provide a complete separation. Where a fire wall also separates occupancies that are required to be separated By a fire barrier wall, the most restrictive requirements of each separation shall apply.

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANEa

TABLE 506.2
ALLOWABLE AREA FACTOR (*At* = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEETa, b

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

CHAPTER 5 – OCCUPIED ROOF HEIGHT AND AREA

Change: The code now provides the appropriate way to determine Allowable height above grade plane and area of occupancies located On roof spaces.

503.1.4 Occupied roofs. A roof level or portion thereof shall be permitted to be used as an occupied roof provided the occupancy of the roof is an occupancy that is permitted by Table 504.4 for the story immediately below the roof. The area of the occupied roofs shall not be included in the building area as regulated by Section 506.

Exceptions:

1. The occupancy located on an occupied roof shall not be limited to the occupancies allowed on the *story* immediately below the roof where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 and occupant notification in accordance with Section 907.5 is provided in the area of the occupied roof.

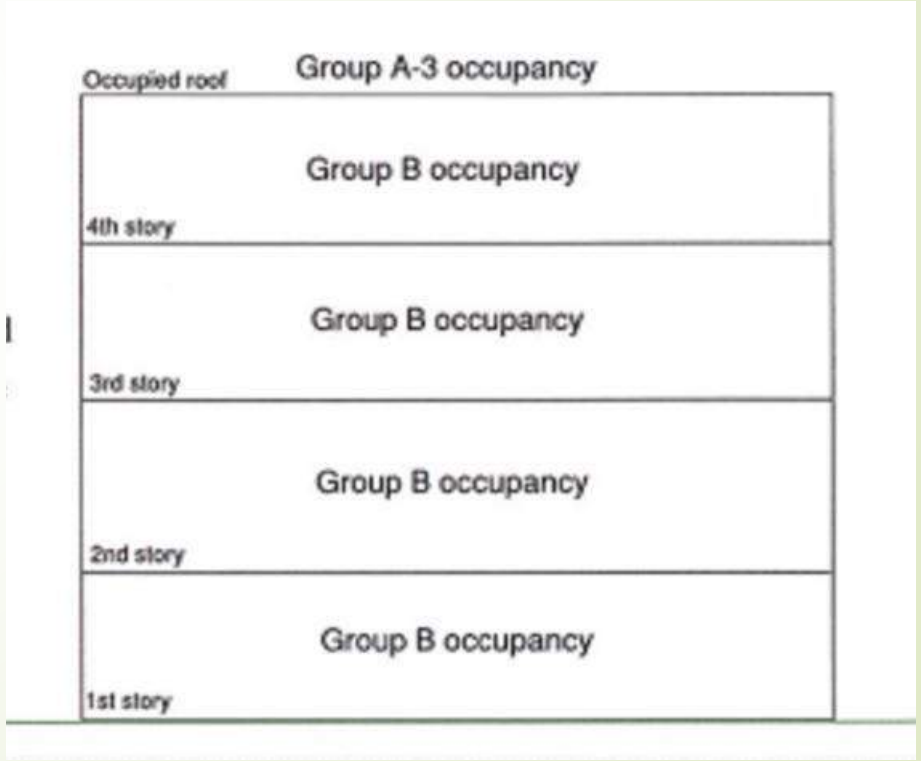
2. Assembly occupancies shall be permitted on roofs of open parking garages of Type I or Type II construction, in accordance with the exception to Section 903.2.1.6.

CHAPTER 5 – OCCUPIED ROOF HEIGHT & AREA

Change: The code now provides the appropriate way to determine Allowable height above grade plane and area of occupancies Located on roof spaces.

EXAMPLES:
-Type VA Buildings
-Fully Sprinkled
-Group B (limited to 4 stories)
-Group A-3 on roof.

Typically the A-3 is not permitted Above 3 stories for sprinkled type VA buildings. However, as long as Notification is provided on the roof Per the governing language, it is Permitted an occupied roof use.



CHAPTER 5 – OCCUPIED ROOF HEIGHT & AREA

Change: (cont…) The code now provides the appropriate way to determine Allowable height above grade plane and area of occupancies located on roof Spaces. This subsection limits the allowable height of any enclosing elements.

503.1.4.1. Enclosures over occupied roof areas. Elements or structures enclosing The occupied roof areas shall not extend more than 48 inches above the surface Of the occupied roof.
Exception: Penthouses constructed in accordance with Section 1510.2 and towers, domes, spires and cupolas constructed in accordance with Section 1510.5.

NOTE: The limitation of surrounding elements is intended to reduce the allowable Height of any potential barriers or obstacles around the occupied roof space. This Limitation also ensures that the occupied roof space does not act as an story.

CHAPTER 5 – ALLOWABLE BUILDING HEIGHT

Change: The method of determining allowable building height for buildings That have sprinklers and do not have sprinklers, has been simplified.

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE[a]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A, B, E, F, M, S, U	NS[b]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
H-1, H-2, H-3, H-5	NS[c, d]	UL	160	65	55	65	55	65	50	40
	S									

UL = Unlimited; NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.

b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.

c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5

CHAPTER 5 – ALLOWABLE NUMBER OF STORIES

Change: The method for determining the allowable number of stories for Buildings with sprinklers and without sprinklers has been simplified.

TABLE 504.4
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE[a, b]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	2	1
	S	UL	6	4	3	4	3	4	3	2
A-2	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-3	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2

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

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.

b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.

c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.

d. The NS value is only for use in evaluation of existing building height in accordance with Chapter 34.

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: The method of determining the allowable areas has been Simplified for sprinkler conditions, stories and single and mixed occupancies.

Allowable Area – Quick Summary List

Section 506.2.1
SINGLE Occupancy, **One-Story** buildings = USE EQUATION 5-1

Section 506.2.2.
MIXED Occupancy, **One-story** = USE EQUATION 5-1 **as modified by 508.**

Section 506.2.3,
SINGLE Occupancy, **Multistory** Buildings = USE EQUATION 5-2

Section 506.2.4
MIXED Occupancy, **Multistory** = USE EQUATION 5-3 as modified by 508

Section 506.3
FRONTAGE Increase for all scenarios above = USE EQUATIONS 5-4 & 5-5

CHAPTER 5-ALLOWABLE AREA DETERMINATIONS

Change: For single Occupancy, One-Story Buildings Use Equation 5-1

506.2.1 Single-occupancy, one-story buildings. The allowable area of a single-occupancy building with no more than one *story above grade plane* shall be determined in accordance with Equation 5-1:

$A_a = A_t + (N_S \times I_f)$ **(Equation 5-1)**

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

A_a = Allowable area (square feet).

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

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

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

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: Revised Table 506.2.

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

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000

For SI: 1 square foot = 0.0929 m².

UL = Unlimited; NP = Not Permitted; NS = Buildings not equipped throughout with an automatic sprinkler system; S1 = Buildings a maximum of one story above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; SM = Buildings two or more stories above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.

b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.

c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: Designations for the Revised Table 506.2.

Allowable Area - Designations

UL = Unlimited

NP = Not Permitted

NS = Buildings without sprinklers

S1 = (1) Maximum one story above grade plan with NFPA 13 System

SM = (Multiple) Two or more stories above grade plane with NFPA 13 System

S13R = Buildings equipped with a 13R System

S13D = Buildings equipped with a 13D System

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: See Example Below using Equation 5-1

Single story, Type IIIB building, no sprinklers and a Group B

$Aa = At + (NS \times If)$ **(Equation 5-1)**

Table 506.2

B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000

$Aa = 19{,}000 + (19{,}000 \times If)$

We must now determine the frontage increase to complete the equation as usual under The prior code iterations.

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: For Single Occupancy, Multi-Story Buildings, Use equation 5-2

506.2.3 Single-occupancy, multistory buildings. The allowable area of a single-occupancy building with more than one *story above grade plane* shall be determined in accordance with Equation 5-2:

$Aa = [At + (NS \times If)] \times Sa$ **(Equation 5-2)**

Aa = Allowable area (square feet).
At = Tabular allowable area factor (NS, S13R, S13D or SM value, as applicable) in accordance with Table 506.2.
NS = Tabular allowable area factor in accordance with Table 506.2 for a nonsprinklered building (regardless of whether the building is sprinklered).
If = Area factor increase due to frontage (percent) as calculated in accordance with Section 506.3.
Sa = Actual number of building *stories* above grade plane, not to exceed three. For buildings equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.2, use the actual number of building *stories above grade plane*, not to exceed four.
No individual story shall exceed the allowable area (Aa) as determined by Equation 5 -2 using the value of Sa = 1.

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: Example number 2 using Equation 5-2

3 Story, Group B Occupancy, Type IIIB Building with Sprinklers

$Aa = [At + (NS \times If)] \times Sa$ **(Equation 5-2)**

B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000

Aa + (57,000 + (19,000 X If)) X 3

We must now determine the frontage increases (If) to complete the equation, as Usual under prior code iterations.

Please Note: The Sa Value is either a maximum of 3, or a maximum of 4 for an 13R System, even if we have more than 3 (4) stories, respectively.

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: Below is additional Model Code Opinion that was taken from the commentary regarding Section 506.2.3.

"Basically, the code requirements are as follows:
The total allowable area of a multiple-story building is
Based on the tabular area of Table 506.2, multiplied by the
Perimeter frontage increase and multiplied by the total number
Of stories, but not more than three (or four.)

Finally, no one story can be greater than the allowable area of a one-story Building. This does not mean that buildings are limited to three stories in Height. This means that the total allowable area of a building three or more Stories in height is the same, regardless of the number of stories above Three or (four.)

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: Below are examples using Mixed Occupancies

Example 3: One story, Group B occupancy without Sprinklers. Group B area is 2,000 sq. Ft.; Group M occupancy is 10,000 sq. ft. No frontage Increases. Separated.

506.2.2 Mixed-occupancy, one-story buildings. The allowable area of a mixed-occupancy building with no more than one *story above grade plane* shall be determined in accordance with the applicable provisions of Section 508.1 based on Equation 5-1 for each applicable occupancy.

Note: For separated uses, you will need to go to Section 508.4.2. and our Standard ratio path.

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

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Change: Below are examples using mixed occupancies – Single story

Example 3: One story building, Group B 2,000 sq. ft., Type IIIB, with an Group M 10,000 sq. ft. without sprinklers. No frontage Increases. Separated.

$$\frac{\text{Group B Proposed/Actual}}{\text{Group B Allowable}} + \frac{\text{Group M Proposed, Actual}}{\text{Group M Allowable}}$$

Group B area proposed = 2,000 sq. ft.
Group B area allowed (per details above) = 23,000 sq. ft. (tabular value NS)
Group M area proposed = 10,000 sq. ft.
Group M area allowed (per details above) = 12,500 sq. ft. (tabular value NS)

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

B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000
M	NS	UL	UL	21,500	12,500	18,500	12,500	20,500	14,000	9,000
	S1	UL	UL	86,000	50,000	74,000	50,000	82,000	56,000	36,000
	SM	UL	UL	64,500	37,500	55,500	37,500	61,500	42,000	27,000

CHAPTER 5 – ALLOWABLE AREA DETRMINATIONS

Change: Examples using mixed occupancies with single story building

$$= \frac{\text{Group B Proposed/Actual}}{\text{Group B Allowable}} + \frac{\text{Group M Proposed/Actual}}{\text{Group M Allowable}}$$

$$= \frac{\text{Group B 2,000}}{\text{Group B 23,000}} + \frac{\text{Group M 10,000}}{\text{Group M 12,500}}$$

Group B 0.0869 + Group M 0.8 = 0.8869

RATIO IS LESS THAN 1, SO WE ARE GOOD.

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Example 4 – Two Story, Group R-2, Group B, Type VB, Sprinklers, No frontage Increase – Separated. L1 = 5,000 R-2, + 15,000 B, L2 = 20,000 R-2.

When having 3 stories or less of proposed mixed use, we don't need to use Equation 5-3 unless we have frontage increase(s).

506.2.4 Mixed-occupancy, multistory buildings. Each story of a mixed-occupancy building with more than one *story above grade plane* shall individually comply with the applicable requirements of Section 508.1. For buildings with more than three *stories above grade plane*, the total building area shall be such that the aggregate sum of the ratios of the actual area of each *story* divided by the allowable area of such stories, determined in accordance with Equation 5-3 based on the applicable provisions of Section 508.1, shall not exceed three.

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

Note: This will then lead us back to our ratio, per story and the associated tabular values…

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Example 4 – Two story, Group R-2, Group B, Type VB, Sprinklers, No Frontage increases – SEPARATED.
L1 = 5,000 R-2, + 15,000 B, L2 = 20,000 R-2.

L1 $\frac{\text{Proposed/Actual R-2}}{\text{Allowable R-2}}$ + $\frac{\text{Proposed/Actual B}}{\text{Allowable B}}$

L2 $\frac{\text{Proposed/Actual R2}}{\text{Allowable R-2}}$

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

B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000
R-2[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13R									
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000

CHAPTER 5 – ALLOWABLE AREA DETERMINATIONS

Example 4 – Two Story, Group R-2, Group B, Type VB, Sprinklers,
No frontage increase – SEPARATED. L1= 5,000 R-2, + 15,000 B, L2 =20,000 R-2.

L1 $\frac{5{,}000 \text{ R-2}}{21{,}000 \text{ R-2}} + \frac{15{,}000 \text{ B}}{27{,}000 \text{ B}} = 0.238 \text{ R-2} + 0.555 \text{ B} = \text{OK}$

L2 $\frac{\text{Proposed/Actual R-2}}{\text{Allowable R-2}} = \frac{20{,}000 \text{ R-2}}{21{,}000 \text{ R-2}} = \text{OK}$

B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000
R-2[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13R									
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000

CHAPTER 5 – UNLIMITED AREA BASEMENTS

Change: A clarification has been added to Section 507.1, Specifically Allowing basements not more than one story below grade beneath Unlimited area buildings.

SECTION 507

UNLIMITED AREA BUILDINGS

507.1 General. The area of buildings of the occupancies and configurations Specified in Sections 507.1 Through 507.13 shall not be limited. Basements Not more than one story below grade plane shall be permitted.

CHAPTER 5 – TABLE 508.4 NEW AMENDMENT

Change: An Oregon amendment clarification has been added to Table 508.4 for ease of usability.

TABLE 508.4
REQUIRED SEPARATION OF OCCUPANCIES (HOURS)[f]

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

CHAPTER 5 – OCCUPANCY & FIRE AREA SEPARATION

Change: There is clarification that was added to Section 508.4.1 identifying the Key difference of typical occupancy separations (Table 508.4) and fire area Separations of 707.3.10.

TABLE 508.4[f]

REQUIRED SEPARATION OF OCCUPANCIES (HOURS)

f Occupancy separations that serve to define fire area limits established in Chapter 9 for requiring fire protection systems shall also comply with Section 707.3.10 and 707.3.10 in accordance with Section 901.7.

508.4.1 Occupancy classification. Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building. The most restrictive provisions of Chapter 9 that apply to the separate occupancies shall apply to the total nonfire-barrier-separated occupancy areas. Occupancy separations that serve to define fire area limits established in Chapter 9 for requiring a fire protection system shall also comply with Section 901.7.

CHAPTER 5 – OCCUPANCY & FIRE AREA SEPARATION

EXAMPLE:

- ✓ 1 story
- ✓ Group B & Group S1 – Separated via 508.4
- ✓ Group B = 5,000 & Group S1 = 10,000 = 15,000 square feet total *fire area*
- ✓ Group S1 requires sprinklers when *fire area* exceeds 12,000 square feet

A fully compliant sprinkler system is required unless the fire areas are separated
By fire barriers to establish two smaller fire areas as is in accordance with 707.3.10.

Interpretation from ICC

Q: In accordance with Table 508.4, no separation is required between the occupancies in the occupancy grouping of B, F-1, M, S-1. Are these occupancies considered "separated" for the purpose of allowable height and allowable area?

A: Yes. Although the occupancies are not required to be physically separated, for the purpose of building height and area only, they are still evaluated under the separated option. These are occupancies that share the same level of hazard with respect to fire safety. It is possible, therefore, to have multiple occupancies that comply with the separated use provisions that require no separation between them.

But note that, where code requirements are based on established fire areas, occupancies not separated must be considered as sharing the same fire area.

CHAPTER 5 – PODIUM DESIGN

Change: New allowances and clarifications have been added to Section 510.2 In the 2015 & 2018 iteration of the IBC.

510.2 Horizontal building separation allowance. A building shall be considered as Separate and distinct buildings for the purpose of determining area limitations, continuity of Fire walls, limitation of number of stories and type of construction where all of the following conditions Are met:

1. The buildings are separated with a horizontal assembly having a fire-resistance rating of not less than 3 hours. Where vertical offsets are provided as part of a horizontal assembly, the vertical offset and the structure supporting the vertical offset shall have a fire-resistance rating of not less than 3 hours.
2. ~~The building below the horizontal assembly is not greater than one story above grade plane.~~
2. The building below, including the horizontal assembly, is of Type IA construction.
3. Unchanged.
4. Unchanged.
5. The building below the horizontal assembly shall be protected throughout by an approved automatic sprinkler system in accordance with Section 903.3.1.1, and shall be permitted to be any occupancy allowed by this code except Group H.

(No longer limited to Groups S-2, A, B, M, R & incidental uses below the horizontal)

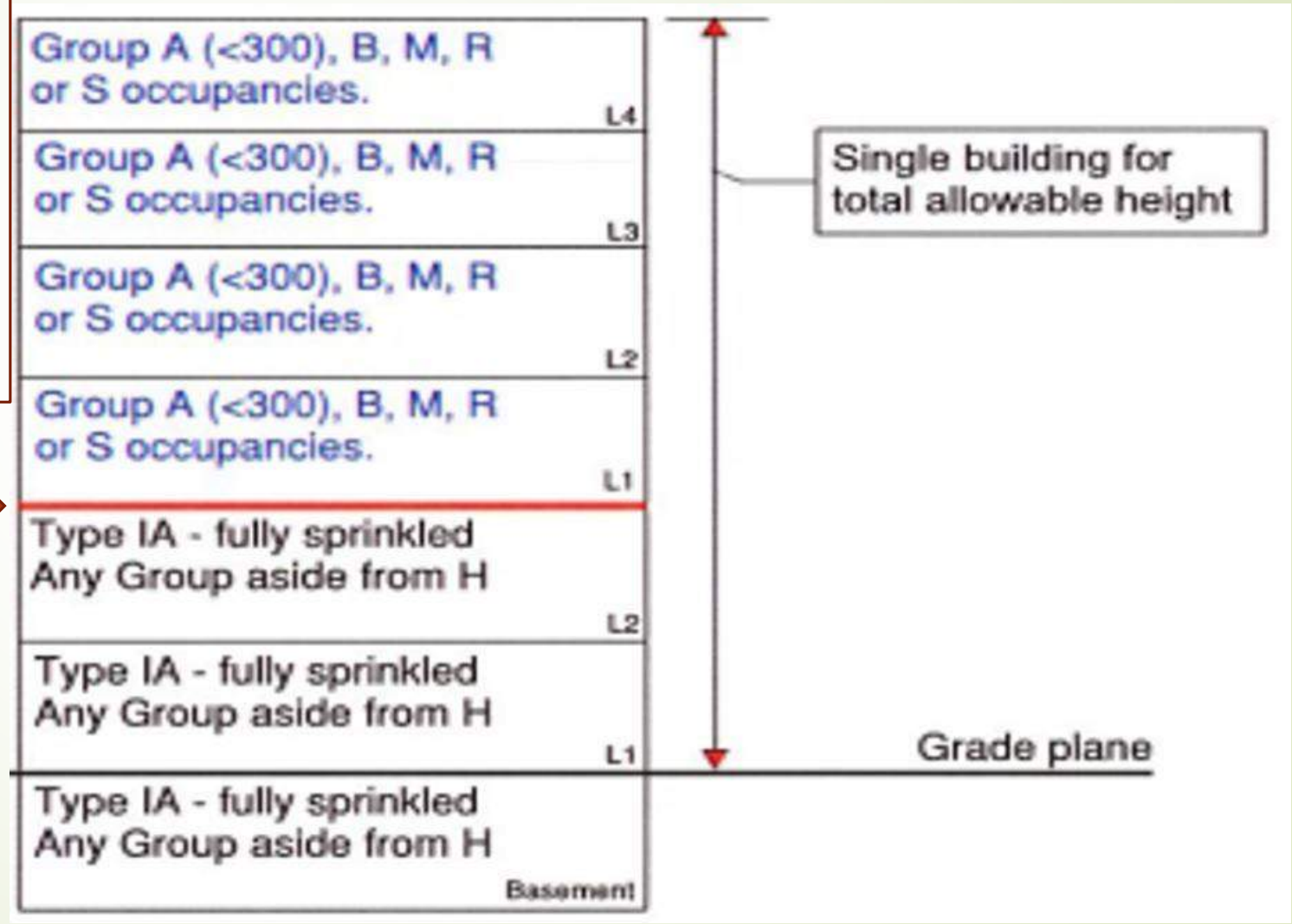
CHAPTER 5 – PODIUM DESIGN

Change: Below is an example

Please Note the Following:
Stories of the building above And below the horizontal Assembly shall be considered Separate buildings for the Purposes of :

1. Number of Stories.
2. Allowable Area.
3. Fire Wall Continuity

3 Hour Horizontal Assembly of Type IA



CHAPTER 6 – AUTOMATIC SPRINKLER SUBSTITUTION

Change: Footnote d. from Table 601, allowing sprinkler tradeoff for 1 hour Fire-resistance-rated construction has been deleted based on it's potential For misapplication.

~~d. An approved automatic sprinkler system in accordance with section 903.3.1.1 shall be Allowed to be substituted for 1 hour fire resistance rated construction, provided such system Is not otherwise required by other provisions of the code or used for an allowable area Increase in accordance with Section 506.3 or an allowable height increase in accordance With Section 504.2. The 1 hour substitution for the fire resistance of exterior walls shall not be Permitted.~~

CHAPTER 6 – PRIMARY FRAME OF TWO-WAY SLABS

Change: There is a new Oregon Amendment footnote that identifies What portions of concrete two-way slabs are considered the primary Structural frame (Type IA)

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A	B	A	B	HT	A	B
Primary structural frame[f] (see Section 202)	3[a, b, g]	2[a, b]	1[b]	0	1[b]	0	HT	1[b]	0

g. For the purpose of determining the fire-resistance rating of joints, penetrations, openings and ducts in concrete floor and roof two-way slabs having direct connections to the columns, the fire-resistance rating for associated secondary members shall be used. All reinforcing steel and post-tensioning tendons in concrete floor and roof two-way slabs having direct connections to the columns shall have concrete coverage adequate to provide the fire-resistance rating required for *primary structural frame* elements.

CHAPTER 6 – FRT SHEATHING

Change: FRT sheathing has been recognized for Type III exterior Wall allowance. It also now applies to Type IV exterior walls.

602.3 Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. *Fire-retardant-treated wood* framing and sheathing complying with Section 2303.2 shall be permitted within *exterior wall* assemblies of a 2-hour rating or less.

(Under Type IV)

602.4.1 Fire-retardant-treated wood in exterior walls. *Fire-retardant-treated wood* framing and sheathing complying with Section 2303.2 shall be permitted within exterior wall assemblies not less than 6 inches (152 mm) in thickness with a 2-hour rating or less.

CHAPTER 6 – TYPE IV MATERIALS

Change: Member equivalencies and additional materials are recognized in the expanded subsection.

602.4 Type IV. Type IV construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid wood, laminated wood, heavy timber (HT) or structural composite lumber (SCL) without concealed spaces. The minimum dimensions for permitted materials including solid timber, glued-laminated timber, structural composite lumber (SCL), and cross-laminated timber and details of Type IV construction shall comply with the provisions of this section and Section 2304.11. Exterior walls complying with Section 602.4.1 or 602.4.2 shall be permitted. Interior walls and partitions not less than 1-hour fire-resistance rating or heavy timber complying with Section 2304.11.2.2 shall be permitted.