

CONST-181

Building Code Interpretation:

Non-Structural

Building Inspector Exam

• Code Administration	4%
• Building Planning	8%
• Footings and Foundations	16%
• Floor Construction	14%
• Wall Construction and Coverings	27%
• Roof/Ceiling Construction	14%
• Public Safety and Special Construction	17%

Introduction

- The provisions of the International Building Code shall apply to the construction, alteration, relocation, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.

Introduction: Exception

- Detached one- and two-family dwellings and multiple single-family dwellings (town-houses) not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with the IBC or the International Residential Code.



Source: 2021 IBC: IBC 101.2, Exception

102.4 Conflicts between IBC and referenced codes

- The codes and standards referenced in the IBC shall be considered part of the requirements.
- Where conflicts occur between provisions of the IBC and referenced codes and standards, the provisions of the IBC shall apply.
- The IBC is, for the most part, a performance-based code, relying on numerous referenced standards to assist the builder and code official in its application. Where standards are referenced in the body of the IBC, the applicable portions of the standard relating to the specific code provision under consideration are considered a part of the code. However, where a referenced standard contains requirements that parallel those in the IBC, the requirements of the IBC take precedence.

103 Code Compliance Agency

- The building official is an appointed officer of the jurisdiction and charged with the administrative responsibilities of the department of building safety. It is not uncommon for the jurisdiction to use a different position title to identify the building official, such as Chief Building Inspector, Superintendent of Central Inspection or Director of Code Enforcement. Regardless of the jurisdictional title, the code recognizes the individual in charge as the building official.

103 Code Compliance Agency



Inspectors, plan reviewers and other technical staff members are typically given some degree of authority to act for the building official in the decision-making process, including the making of appropriate interpretations of various provisions of the code.

103 Code Compliance Agency

The _____ is considered by the code as the term to describe the individual in charge of the code compliance agency.

- a. building official
- b. code official
- c. code administrator
- d. chief building inspector

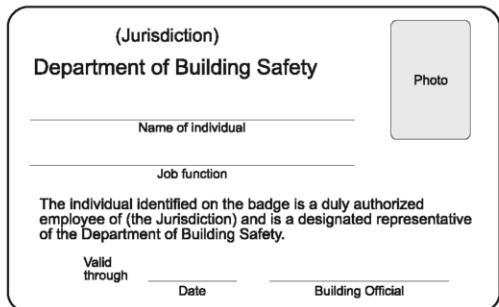
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- c. code administrator
- d. chief building inspector

104.1 Duties and Powers of Building Official

- The building official is hereby authorized and directed to enforce the provisions of the IBC. The building official shall have the authority to render interpretations of the IBC and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of the IBC. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in the IBC.



**Sample of Required Identification
Section 104.5**

Although the IBC gives broad authority to the building official in interpreting the code, this authority also comes with great responsibility. The building official must restrict all decisions to the intent and purpose of the code, with the waiving of any requirements being strictly prohibited.

Source: 2021 IBC: IBC 104.1

104.1 Duties and Powers of Building Official

The building official has the authority to _____ the provisions of the code.

- a. ignore
- b. waive
- c. violate
- d. interpret

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- b. waive
- c. violate
- d. interpret

104.8 Duties and Powers of Building Official

- The building official, member of the board of appeals or employee charged with the enforcement of the IBC, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by the IBC or other pertinent law or ordinance, shall not thereby be civilly or criminally rendered liable personally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

104.11 Duties and Powers of Building Official

- The provisions of the IBC are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by the IBC; provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed alternative meets all of the following:
 - The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of the IBC, and
 - Provides established equivalency to that prescribed in the IBC.

104.11 Duties and Powers of Building Official

In order for an alternative material, design or method of construction to be considered acceptable, it must be equivalent to the code based on all but which of the following criteria?

- a. durability
- b. practicality
- c. strength
- d. fire resistance

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- b. practicality
- c. strength
- d. fire resistance

104.11.1 Duties and Powers of Building Official

- Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in the IBC, shall consist of valid research reports from approved sources.



Although ICC Evaluation Service Reports are generally recognized nationally as valid reports developed by an approved source, the building official is the final authority on the acceptance of any research report for the purpose of accepting an alternate material, method or design.

104.11.1 Duties and Powers of Building Official

Tests performed by _____ may be required by the building official where there is insufficient evidence of code compliance.

- a. the owner
- b. the contractor
- c. an approved agency
- d. a design professional

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- b. the contractor
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105.1-2 Permits

- Any owner or owner's authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure . . . shall first make application to the building official and obtain the required permit. See thirteen exemptions where a building permit is not required. Exemptions from permit requirements of the IBC shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of the IBC or any other laws or ordinances of this jurisdiction.

105.1-2 Permits: Work exempt

Work exempt from permit:

- One-story detached accessory buildings where limited to 120 square feet in floor area
- Fences not over 7 feet high
- Oil derricks
- Retaining walls limited to 4 feet in height, unless supporting a surcharge or impounding Class I, II or III-A liquids
- Water tanks supported directly on grade, limited to capacity of 5,000 gallons and a ratio of height to diameter not exceeding 2 to 1
- Sidewalks and driveways limited to 30 inches above grade, not over any basement or story below, and not part of an accessible route
- Painting, papering, carpeting, cabinets, counter tops and similar finish work
- Temporary motion picture, television and theater stage sets and scenery
- Prefabricated swimming pools accessory to a Group R-3 occupancy when capacity is limited to 5,000 gallons, depth limited to 24 inches and installed entirely above ground
- Shade cloth structures used for nursery or agricultural purposes
- Swings and other playground equipment accessory to detached one- and two-family dwellings
- Window awnings supported by an exterior wall in Groups R-3 and U, where the maximum projection is 54 inches
- Movable fixtures, racks, cases, counters and partitions limited to 5 feet 9 inches in height

Whether or not a building permit is required by the code, it is intended that all work be done in accordance with the code requirements. The owner is responsible for all construction being done properly and safely.

107.1 Submittal Documents

- Submittal documents consisting of construction documents, statement of special inspections, geotechnical report and other data shall be submitted in two or more sets, or in a digital format where allowed by the building official, with each permit application. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. See the exception for projects where nature of work is such that review of construction documents is unnecessary.



Source: 2021 IBC: IBC 107.1

108 Temporary Structures and Uses

- The building official is authorized to issue a permit for temporary structures and temporary uses. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The building official is authorized to grant extensions for demonstrated cause. The building official is authorized to terminate such permit for a temporary structure or use and to order the temporary structure or use to be discontinued.



Source: 2021 IBC

108 Temporary Structures and Uses

Unless extended by the building official, what is the maximum time period allowed to be granted for a permit issued on a temporary structure?

- a. 90 days
- b. 180 days
- c. 1 year
- d. 2 years

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109 Permit Fees

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PERMIT APPLICATION		
→NOTE! INCOMPLETE OR ILLEGIBLE APPLICATIONS CANNOT BE PROCESSED.←		
APPLICATION IS HEREBY MADE FOR PERMISSION TO: (PLEASE PRINT Or TYPE Detailed Description of Work To Be Done)		
Has work commenced on this project? No _____ Yes _____		
PROJECT NAME _____	SUBDIVISION _____	
PROJECT ADDRESS _____	PARCEL _____	LOT# _____
PROJECT TYPE <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> New <input type="checkbox"/> Alteration / Remodeling <input type="checkbox"/> Addition <input type="checkbox"/> Demolition		
APPLICANT'S VALUATION \$_____	CITY'S VALUATION \$_____	TOTAL SQUARE FEET _____
WATER METER SIZE: _____		
PLANS SUBMITTED BY: <input type="checkbox"/> Architect <input type="checkbox"/> Contractor <input type="checkbox"/> Owner <input type="checkbox"/> Tenant <input type="checkbox"/> Other _____		
CONTACT PERSON _____	PHONE () _____	FAX () _____
WHO IS CONTACT PERSON? <input type="checkbox"/> Architect <input type="checkbox"/> Contractor <input type="checkbox"/> Owner <input type="checkbox"/> Tenant <input type="checkbox"/> Other _____		
OWNER INFORMATION		
OWNER _____	PHONE () _____	
ADDRESS _____	CITY _____	STATE _____ ZIP _____
CONTRACTOR INFORMATION		
COMPANY _____	PHONE () _____	
ADDRESS _____	CITY _____	STATE _____ ZIP _____
LICENSE NO. _____	CLASS _____	ARIZONA STATE TAX NO. _____
The Following Information is Required for Commercial, Industrial, and Multi-Family Projects Only		
PROPOSED USE _____	EXISTING USE _____	
PROPOSED CONSTRUCTION TYPE: WALLS: <input type="checkbox"/> Combustible <input type="checkbox"/> Noncombustible	ROOF STRUCTURE: <input type="checkbox"/> Combustible <input type="checkbox"/> Noncombustible	
EXISTING CONSTRUCTION TYPE: WALLS: <input type="checkbox"/> Combustible <input type="checkbox"/> Noncombustible	ROOF STRUCTURE: <input type="checkbox"/> Combustible <input type="checkbox"/> Noncombustible	
IF THIS IS AN EXISTING BUILDING, DOES IT HAVE A FIRE SPRINKLER SYSTEM? <input type="checkbox"/>		FIRE ALARM SYSTEM? <input type="checkbox"/>
OCCUPANCY LOAD: _____	IBC OCCUPANCY TYPE: _____	IBC CONSTRUCTION TYPE: _____
UNDER PENALTY OF INTENTIONAL MISREPRESENTATION AND / OR PERJURY, I DECLARE that I have examined and / or made this application and it is true and correct to the best of my knowledge and belief. I agree to construct said improvements in compliance with all provisions of the Ordinance of the City of Phoenix, Arizona, and the State of Arizona. I further declare that I have submitted this application for the purpose of applying for and approval of any plans in connection therewith shall not be construed to permit any construction upon said premises or use thereof in violation of any provision of the City Code or any other ordinance or to excuse the owner or his successors in from complying therewith. WHERE NO WORK HAS BEEN STARTED WITHIN 180 DAYS AFTER THE ISSUANCE OF A PERMIT OR WHEN MORE THAN 180 DAYS LAPSES BETWEEN APPROVAL AND REQUIRED INSPECTION, THE PERMIT WILL BE REVOKED.		
I hereby certify that I am the OWNER at this address or that, for the purposes of obtaining this approval, I am acting on behalf of the owner. All contract work on this project will be done by a contractor holding a valid privilege tax license and contractor's license issued by the State of Arizona and the City of Phoenix.		
APPLICANT (Please Print Name): _____ SIGNATURE: _____		
ADDRESS _____	CITY _____	STATE _____ ZIP _____
PHONE Home () _____	Office () _____	
Amount Paid: \$ _____ Date: _____ Application received by: _____		

109 Permit Fees

The final permit valuation shall be set by the _____.

- a. owner
- b. building official
- c. design professional
- d. general contractor

109 Permit Fees

The final permit valuation shall be set by the _____.

- a. owner
- b. building official
- c. design professional
- d. general contractor

110.1 Inspections

- Construction or work for which a permit is required shall be subject to inspection by the building official and such construction or work shall remain visible and able to be accessed for inspection purposes until approved. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of the IBC or of other ordinances of the jurisdiction.

110.1 Required Inspections

- Footing and foundation
- Concrete slab or under-floor
- Lowest floor elevation
- Frame
- Types IV-A, IV-B and IV-C connection protection
- Lath, gypsum board and gypsum-panel product
- Weather-exposed elevated walking surfaces waterproofing
- Fire and smoke resistant penetrations
- Energy efficiency
- Others as required by the building official
- Special inspections
- Final

110.1 Required Inspections

- Who is responsible for ensuring that the work is accessible and exposed for inspection purposes?
 - a. owner or owner's authorized agent
 - b. contractor
 - c. permit applicant or their authorized agent
 - d. design professional

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 - c. permit applicant or their authorized agent
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110.6 Inspections

- Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the building official. The building official, upon notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or his or her agent wherein the same fails to comply with the IBC. Any portions that do not comply shall be corrected and such portions shall not be covered or concealed until authorized by the building official.



Source: 2021 IBC

110.6 Certificate of Occupancy

- A building or structure shall not be used or occupied in whole or in part, and a change of occupancy of a building or structure or portion thereof shall not be made, until the building official has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of the IBC or of other ordinances of the jurisdiction. See the exception for work exempt from permits.

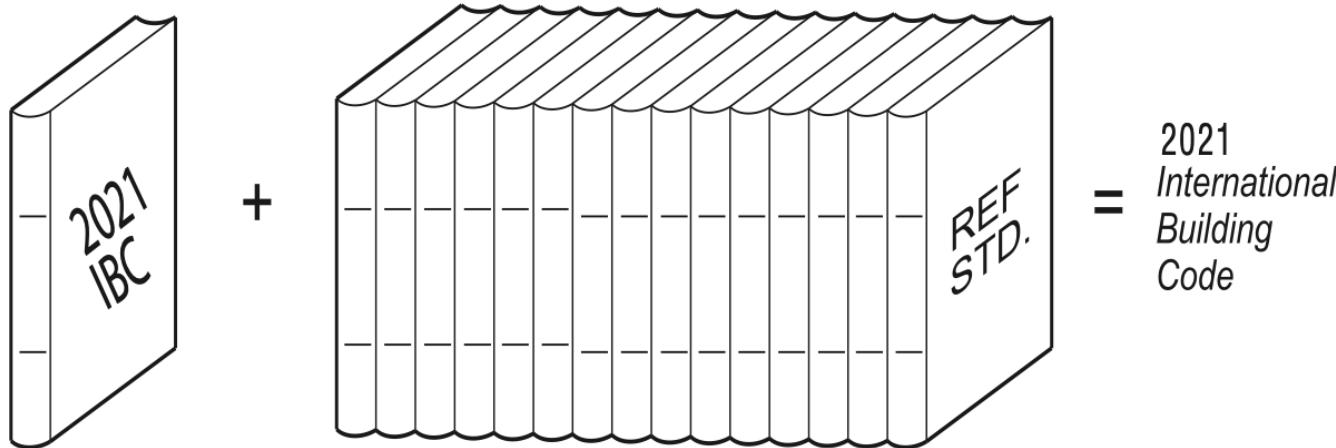
The form is titled "Certificate of Occupancy" in blue, with "(Address of Structure)" in parentheses below it. It features four decorative gold corner pieces. The text states: "This (applicable portion of structure) has been inspected for compliance with the laws and ordinances of (jurisdiction) and is hereby issued a Certificate of Occupancy." Below this, there are several lines for information: Building permit number _____, Applicable edition of code _____, Use and occupancy _____, Type of construction _____, Design occupant load _____, Sprinkler system required _____, Special conditions _____, and Building Official _____. At the bottom, it says "Name and address of owner _____".

Sample of Certificate of Occupancy

Source: 2021 IBC

Chapter 35 Standards

- Chapter 35 lists the standards that are referenced in various sections of the IBC. The standards are listed herein by the promulgation agency of the standard, the standard identification, the effective date and title, and the section or sections of the IBC that reference the standard. The application of the referenced standards shall be as specified in Section 102.4.



Chapter 35 Standards

The referenced standard dealing with accessible buildings is _____.

- a. ASME A17.1—CSA 19/CSA B44-19
- b. DOC PS 1—19
- c. ICC A117.1—17
- d. FEMA 4880—2017

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Class 2: Chapter 3, Section 508/509: Learning Objective

Chapter 3, Section 508/509: Learning Objective

To gain an understanding of how an occupancy is classified based on its intended use and how a building with incidental uses and/or mixed occupancies is addressed.

302.1 Occupancy Classification

- Occupancy classification is the formal designation of the primary purpose of the building, structure or portion thereof. Where a structure is proposed for a purpose which is not specifically listed in Section 302.1, such structure shall be classified in the occupancy it most nearly resembles, based on the fire safety and relative hazard.
- Occupancy groupings are divided into two general categories: those related to people and those related to content.
 - People-related hazards include the number and density of the occupants, their age and mobility, and their awareness of surrounding conditions.
 - Content-related hazards include the storage and use of hazardous materials, as well as the presence of large quantities of combustible materials

302.1 Occupancy Classification

- Assembly (see Section 303): Groups A-1, A-2, A-3, A-4 and A-5.
- Business (see Section 304): Group B.
- Educational (see Section 305): Group E.
- Factory and Industrial (see Section 306): Groups F-1 and F-2.
- High Hazard (see Section 307): Groups H-1, H-2, H- 3, H-4 and H-5.
- Institutional (see Section 308): Groups I-1, I-2, I-3 and I-4.
- Mercantile (see Section 309): Group M.
- Residential (see Section 310): Groups R-1, R-2, R-3 and R-4.
- Storage (see Section 311): Groups S-1 and S-2.
- Utility and Miscellaneous (seeSection312):GroupU

302.1 Occupancy Classification

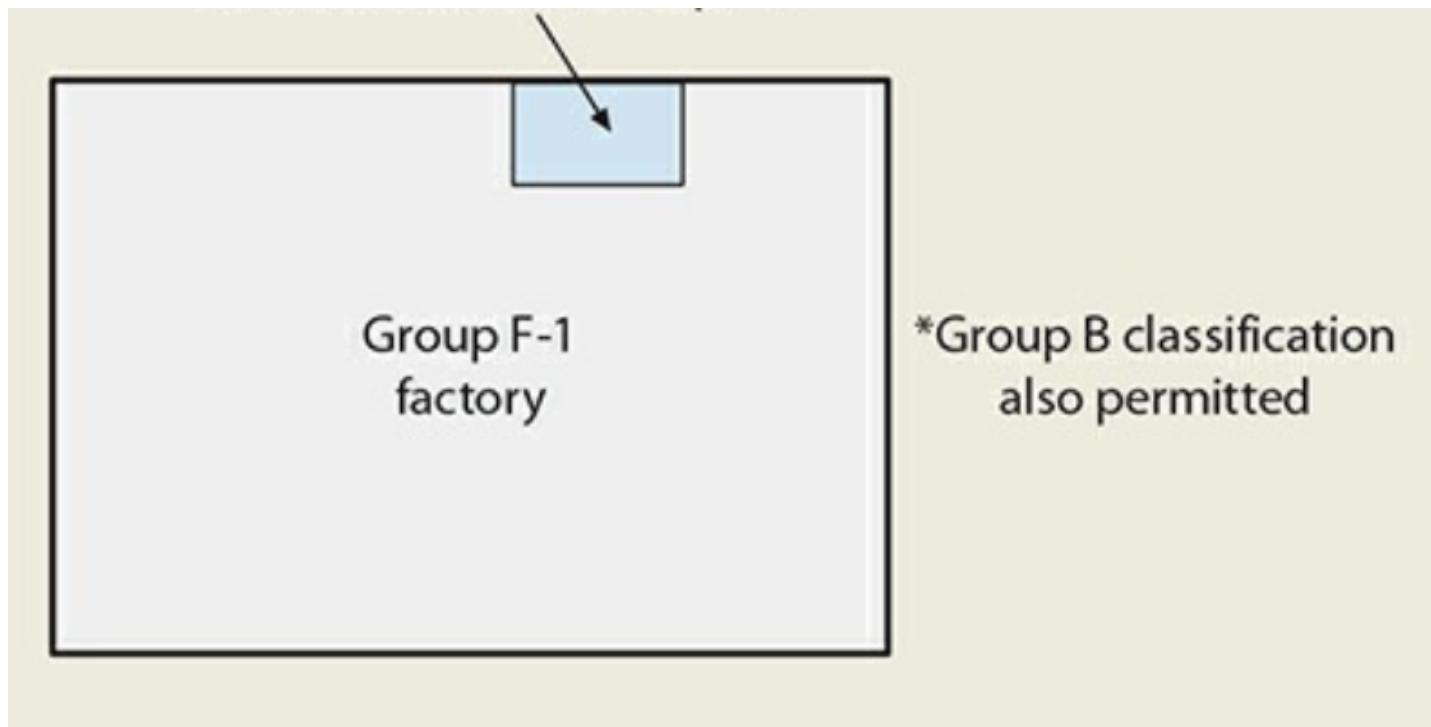
1. An institutional occupancy is typically considered Group _____ .
 - a. A
 - b. B
 - c. I
 - d. R

302.1 Occupancy Classification

2. A Group _____ occupancy is the general classification for miscellaneous and utility structures.
- a. A
 - b. M
 - c. S
 - d. U

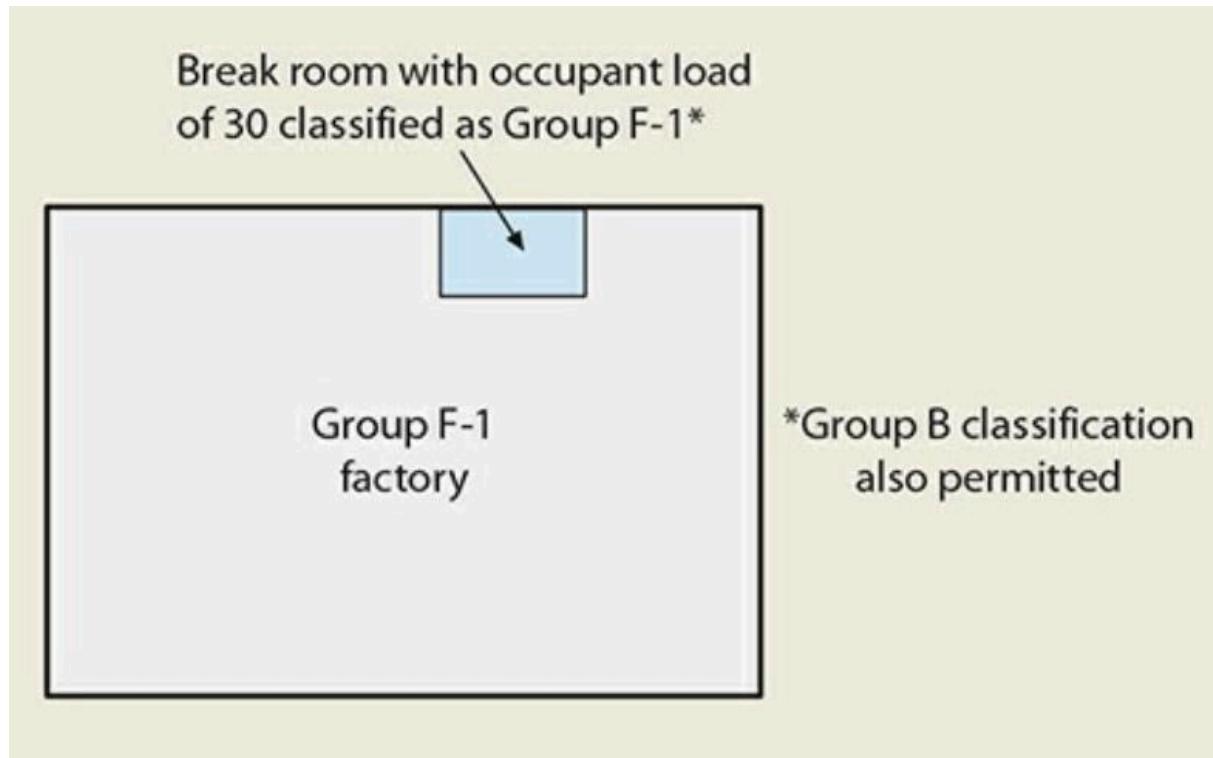
302.1 Mixed Classification

Break room with an occupant load of 30 in a large manufacturing facility ??



302.1 Mixed Classification

Break room with an occupant load of 30 in a large manufacturing facility could simply be considered a portion of the Group F occupancy. As an option to the designer, a Group B classification can be assigned to the break room.



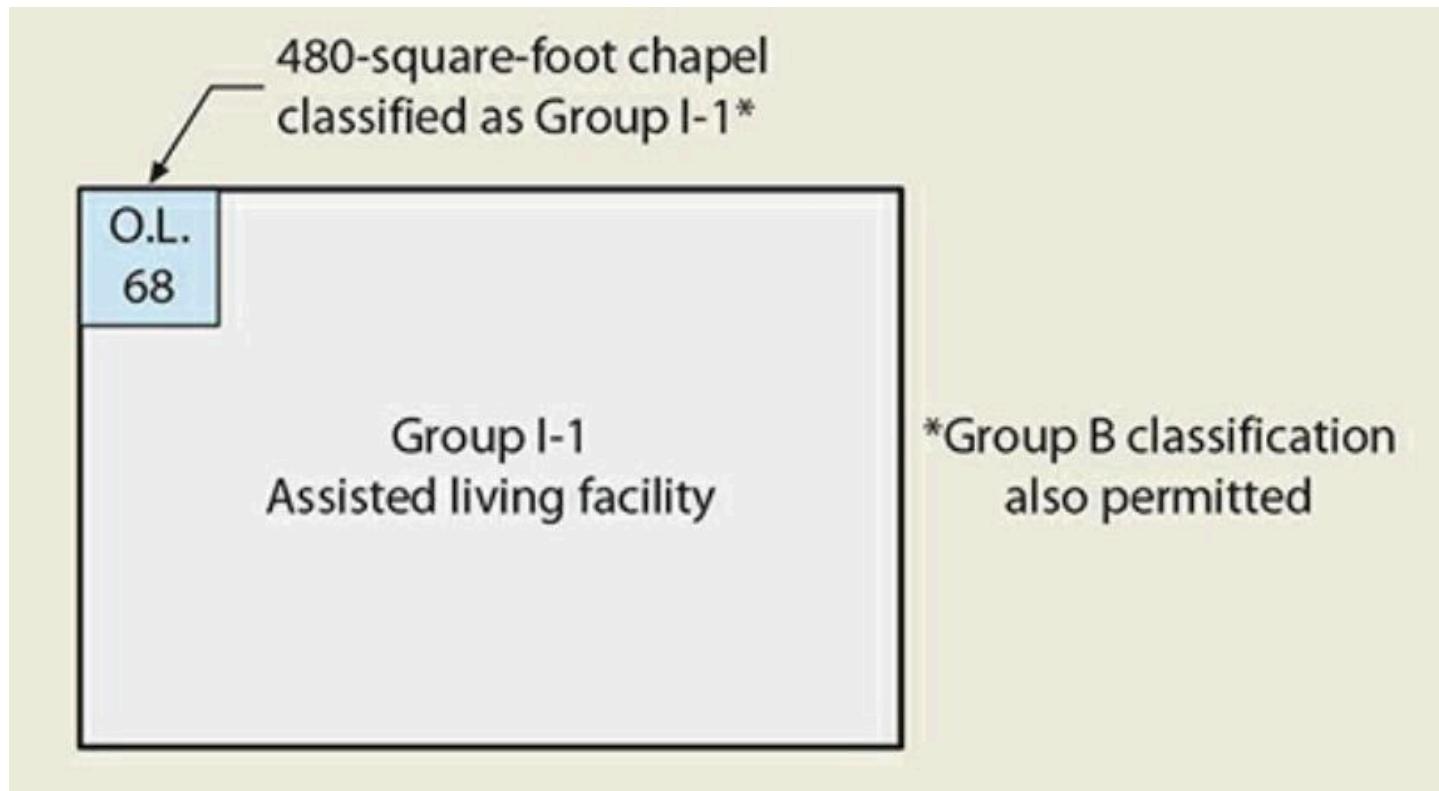
302.1 Mixed Classification

A small 480-square-foot (44-m²) chapel, having an occupant load of 68 and located within an assisted living facility ??



302.1 Mixed Classification

A small 480-square-foot (44-m²) chapel, having an occupant load of 68 and located within an assisted living facility classified as a Group I-1 occupancy, can simply be classified as an extension of the Group I-1 classification



302.1 Occupancy Classification

3. Accessory religious educational rooms need not be considered separate occupancies where the occupant load is less than _____ occupants.
- a. 100
 - b. 150
 - c. 200
 - d. 300

302.1 Occupancy Classification

- Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions, recreation, food or drink consumption or awaiting transportation. See other classification allowances for assembly buildings and assembly spaces with an occupant load of less than 50, accessory assembly spaces less than 750 square feet in floor area, and those assembly spaces associated with Group E occupancies.

302.1 Occupancy Classification

4. An accessory assembly area may be classified as a Group B occupancy where the floor area is a maximum of _____ square feet.
- a. 120
 - b. 399
 - c. 749
 - d. 1,000

303.1 Occupancy Classification

Group A-1

Motion picture theaters
Theaters
Symphony and
concert halls

Group A-3

Amusement arcades
Art galleries
Bowling alleys
Places of worship
Community halls
Conference rooms
Exhibition halls
Lecture halls
Libraries
Museums
Passenger stations

Group A-4

Arenas
Skating rinks
Swimming pools
Tennis courts

Group A-2

Banquet halls
Casino gaming areas
Night clubs
Restaurants
Taverns

Group A-5

Amusement park
structures
Bleachers
Grandstands
Stadiums

Unique conditions are represented by the classifications of Groups A-1, A-2, A-4 and A-5. However, the category Group A-3 includes a variety of broad and diverse assembly uses. It is not uncommon to find high combustible loading in Group A-3 occupancies.

303.1 Occupancy Classification A-1

- A factor involving human behavior in theaters classified as Group A-1 assembly rooms is the fact that in many cases the occupants are not familiar with their surroundings and the lighting level is usually low.
- When an emergency arises, the occupants may perceive the danger to be greater than presented, and panic may occur because of the fear of not being able to reach an exit for escape. In addition, the concentration of occupants in such uses is quite dense.

Group A-1
Motion picture theaters Theaters Symphony and concert halls



303.1 Occupancy Classification A-2

- The fire record in occupancies of this type is not very good, based in part on the delay in occupant response to a fire or other emergency incident.
- Presence of loose tables and chairs, aisles are often difficult to maintain, resulting in obstructions to egress travel.
- Overcrowding conditions, low-lighting levels, and the consumption of alcoholic beverages also increase the risks associated with many of these types of occupancies.

Group A-2

Banquet halls
Casino gaming areas
Night clubs
Restaurants
Taverns

303.1 Occupancy Classification A-2

The gaming floor of a large casino shall be classified as a Group _____ occupancy.

- a. A-2
- b. A-3
- c. B
- d. M

303.1 Occupancy Classification A-3

Multipurpose rooms:

- Varying degrees of occupant density, numerous types and numbers of furnishings and equipment, and fire loading that can vary from low to high.
- Hazards are similar to most of those found in Group A-1 and A-2 occupancies. Where a use does not conveniently fit into one of the other four Group A classifications, a Group A-3 designation is typically appropriate.
- The classification of an assembly occupancy as a Group A-3 is also common where varying assembly uses are likely to occur at different times within the same space.
- For example, a meeting room at a hotel is typically used at differing times for various functions, including seminar presentations, dining activities, trade shows, and wedding receptions.

Group A-3

Amusement arcades
Art galleries
Bowling alleys
Places of worship
Community halls
Conference rooms
Exhibition halls
Lecture halls
Libraries
Museums
Passenger stations

303.1 Occupancy Classification A-4

The combination of spectator seating and sporting events creates a condition within a building that warrants a specific occupancy classification within the Group A classification.

A Group A-4 facility contains those occupant-related hazards found in other assembly occupancies, namely high occupant loads in concentrated areas, along with large areas having limited occupants and little, if any, fire loading conditions.

Group A-4

Arenas
Skating rinks
Swimming pools
Tennis courts

303.1 Occupancy Classification A-4

Which of the following uses is typically considered a Group A-4 occupancy?

- a. restaurant with a dance floor b. school library
- c. outdoor football stadium d. indoor hockey arena

304.1 Occupancy Classification: 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 typically have a low to moderate fire load, a moderate density level, and occupants who are usually mobile and have a general awareness of the surrounding conditions. As such, business occupancies are grouped into a classification based upon a relatively moderate fire hazard level. Group B occupancies are not restricted by occupant load, as the number of people in a business use, such as an office, can range from one person to thousands of people.

304.1 Occupancy Classification: Group B

Group B

- Ambulatory care facilities
- Animal hospitals, kennels and ponds
- Banks
- Barber and beauty shops
- Car wash
- Civil administration
- Clinic-outpatient
- Educational occupancies above the 12th grade
- Food processing \leq 2,500 sf
- Laboratories; testing and research
- Motor vehicle showrooms
- Post offices
- Print shops
- Professional services
- Radio and television stations
- Training and skill development

304.1 Occupancy Classification: Group B

Which of the following uses is not considered a Group B occupancy?

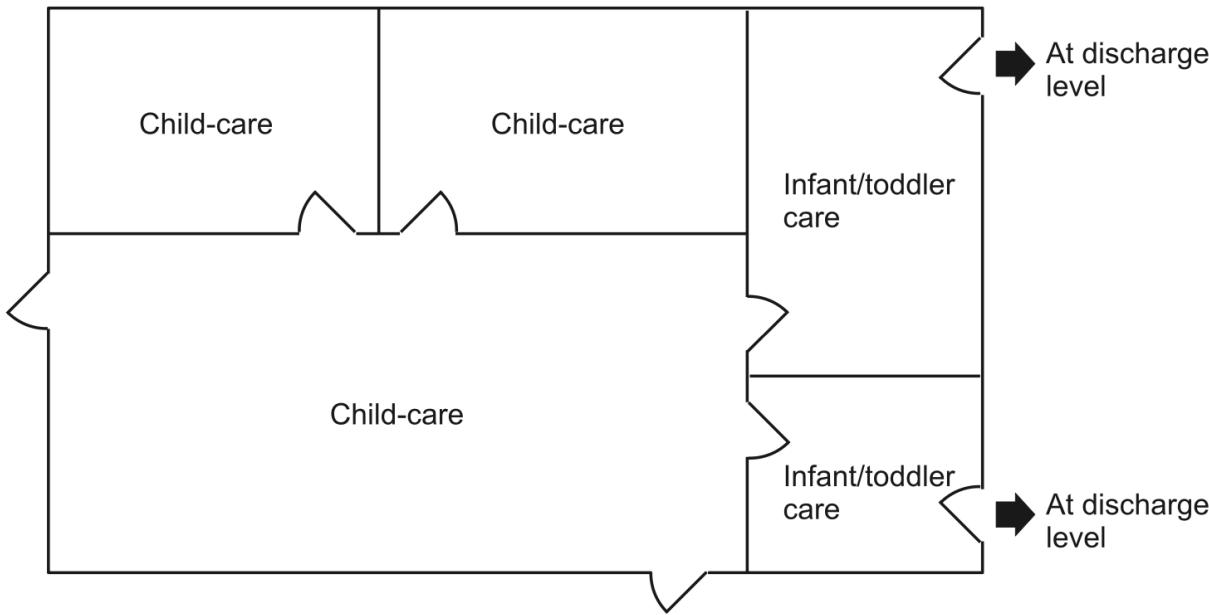
- a. convenience store
- b. motor vehicle showroom
- c. car wash
- d. ambulatory care facility

305.1 Occupancy Classification: Group E

- Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, by six or more persons at any one time for educational purposes through the 12th grade. This group includes buildings and structures or portions thereof occupied by more than five children older than 2½ years of age who receive educational, supervision or personal care services for fewer than 24 hours per day.
- Educational occupancies include classroom uses for students of high school age and younger.
- Education facilities limited to use by older students, such as college classrooms, are classified as Group B occupancies; however, a Group A classification should be considered for lecture halls and similar large occupant load spaces.

305.1 Occupancy Classification: Group E

Entire building can be considered a Group E occupancy



Although a child-care facility that provides care for infants and toddlers (children $2\frac{1}{2}$ years of age or less) is generally considered a Group I-4 occupancy, Section 308.5.1 permits a Group E classification under specific conditions.

305.1 Occupancy Classification: Group E

5. In a Group E middle school, an assembly area associated with the Group E shall be classified as what occupancy?
 - a. Group E
 - b. Group A-5
 - c. Group I-1
 - d. Group U

306.1 Occupancy Classification: Group F

- Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous or Group S storage occupancy.
- Although the potential hazard and fire severity varies among the many uses categorized as Group F occupancies, the uses still share elements in common. The occupants are adults who are awake and who generally have enough familiarity with the premises to be able to exit the building with reasonable efficiency.
- Public occupancy is usually quite limited, if at all, and most occupants are aware of the potential hazards the use creates.
- Contain some degree of hazardous material as a necessary part of the manufacturing process. However, where the amount of hazardous material does not exceed the maximum allowable quantities.

306.1 Occupancy Classification: Group F

Group F-1

- Aircraft
- Appliances
- Automobiles
- Bakeries
- Business machines
- Carpets and rugs
- Clothing
- Electric generation
- ESS (dedicated use)
- Food processing > 2,500 sf
- Furniture
- Laundries
- Millwork
- Paper mills or products
- Plastic products
- Printing or publishing
- Refuse incineration
- Textiles
- Water/sewer treatment
- Woodworking

Group F-2

- Brick and masonry
- Ceramic products
- Foundries
- Glass products
- Gypsum
- Ice
- Metal products

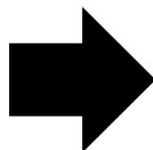
Classification as a Group F-2 occupancy is strictly limited because of the restrictions placed on such uses. The fabrication or manufacture of noncombustible materials, as well as their finishing, packaging or processing operations, cannot involve a significant fire hazard.

307.1 Occupancy Classification: Group H

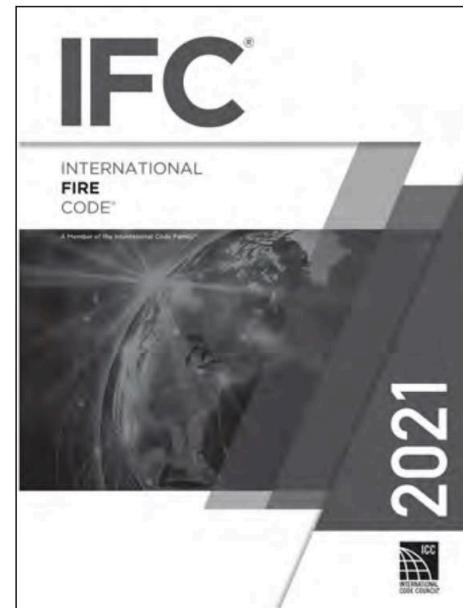
- High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in control areas complying with Section 414, based on the maximum allowable quantity limits for control areas set forth in Tables 307.1(1) and 307.1(2).
- There is only one fundamental type of Group H occupancy—that which is designated based solely on excessive quantities of hazardous materials contained therein. The quantities of hazardous materials that necessitate a Group H classification vary, based on the type, quantity, condition (use or storage) and environment of the materials. Where the use does not exceed the maximum allowable quantities set forth in the code, a classification other than Group H is appropriate.

307.1 Occupancy Classification: Group H

Where hazardous materials and processes are involved.



References
for detailed
provisions



Although the *International Building Code* is limited to general construction regulations and occupancy-specific requirements, the *International Fire Code®* (IFC®) sets forth special detailed provisions relating to hazardous materials and the specific conditions of their storage, use and handling.

Source: 2021 IBC

307.1 Occupancy Classification: Group H

A Group _____ occupancy classification is to be assigned to a facility where combustible dusts are generated in a manner that creates a fire or explosion hazard.

- a. H-1
- b. H-2
- c. H-4
- d. H-5

307.1 Occupancy Classification: Exceptions to Group H

- An occupancy that stores, uses or handles hazardous materials as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles. See a listing of 19 conditions under which a Group H occupancy is not warranted. Hazardous materials in any quantity shall conform to the requirements of the IBC, including Section 414, and the International Fire Code.
- Although some degree of hazardous materials is found in most buildings, the occupancy is designated as Group H only where the quantities are excessive and the hazards are not adequately addressed. The most common condition for a non-H classification is where the amount of hazardous materials contained in the building does not exceed the maximum allowable quantities shown in Table 307.1(1) for physical hazards and Table 307.1(2) for health hazards. Footnotes to both tables can be used to increase the permitted quantities.

307.1 Occupancy Classification: Exceptions to Group H

TABLE 307.1(1)
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD^{a,b,c,d,e,f,g,h,i,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
Combustible fiber ^a	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
Combustible liquid ^{e,f}	Baled ^o		(1,000)			(1,000)			(200)	
	II	H-2 or H-3		120 ^{d,e}			120 ^d			30 ^d
	IIIA	H-2 or H-3		330 ^{d,e}		NA	330 ^d	NA	NA	80 ^d
Cryogenic flammable	NA	H-2	NA	45 ^d	NA	NA	45 ^d	NA	NA	10 ^d
Cryogenic inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic oxidizing	NA	H-3	NA	45 ^d	NA	NA	45 ^d	NA	NA	10 ^d
Explosives	Division 1.1	H-1	1 ^{e,g}	(1) ^{e,g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	Division 1.2	H-1	1 ^{e,g}	(1) ^{e,g}		0.25 ^g	(0.25) ^g		0.25 ^g	(0.25) ^g
	Division 1.3	H-1 or H-2	5 ^{e,g}	(5) ^{e,g}		1 ^g	(1) ^g		1 ^g	(1) ^g
	Division 1.4	H-3	50 ^{e,g}	(50) ^{e,g}		50 ^g	(50) ^g		NA	NA
	Division 1.4G	H-3	125 ^{e,i}	NA		NA	NA		NA	NA
	Division 1.5	H-1	1 ^{e,g}	(1) ^{e,g}		0.25 ^g	(0.25) ^g		0.25 ^g	(0.25) ^g
	Division 1.6	H-1	1 ^{e,g}	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA	1,000 ^{d,e}	NA	NA	1,000 ^{d,e}	NA	NA
	Liquefied			(150) ^{d,e}	NA		(150) ^{d,e}	NA		
Flammable liquid ^d	IA	H-2 or H-3	NA	30 ^{d,e}	NA	NA	30 ^d	NA	10 ^d	30 ^d
	IB and IC			120 ^{d,e}			120 ^d		NA	
Flammable liquid, combination (IA, IB, IC)	NA	H-2 or H-3	NA	120 ^{d,e,h}	NA	NA	120 ^{d,h}	NA	NA	30 ^{d,h}
Flammable solid	NA	H-3	125 ^{d,e}	NA	NA	125 ^d	NA	NA	25 ^d	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1 ^{e,g}	(1) ^{e,g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	I	H-2	5 ^{d,e}	(5) ^{d,e}		1 ^d	(1) ^d		1 ^d	(1) ^d
	II	H-3	50 ^{d,e}	(50) ^{d,e}		50 ^d	(50) ^d		10 ^d	(10) ^d
	III	H-3	125 ^{d,e}	(125) ^{d,e}		125 ^d	(125) ^d		25 ^d	(25) ^d
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL

(continued)

Source: 2021 IBC

307.1 Occupancy Classification: Exceptions to Group H

TABLE 307.1(1)—continued
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)
Oxidizer	4	H-1	1 ^{e, g}	(1) ^{e, g}	NA	0.25 ^g	(0.25) ^g	NA	0.25 ^g	(0.25) ^g
	3 ^k	H-2 or H-3	10 ^{d, e}	(10) ^{d, e}		2 ^d	(2) ^d		2 ^d	(2) ^d
	2	H-3	250 ^{d, e}	(250) ^{d, e}		250 ^d	(250) ^d		50 ^d	(50) ^d
	1	NA	4,000 ^{e, f}	(4,000) ^{e, f}		4,000 ^f	(4,000) ^f		1,000 ^f	(1,000) ^f
Oxidizing gas	Gaseous	H-3	NA	1,500 ^{d,e}	NA	NA	1,500 ^{d,e}	NA	NA	NA
	Liquefied			(150) ^{d, e}		NA	(150) ^{d,e}			
Pyrophoric	NA	H-2	4 ^{e, g}	(4) ^{e, g}	50 ^{e, g}	1 ^g	(1) ^g	10 ^{e, g}	0	0
Unstable (reactive)	4	H-1	1 ^{e, g}	(1) ^{e, g}	10 ^{e, g}	0.25 ^g	(0.25) ^g	2 ^{e, g}	0.25 ^g	(0.25) ^g
	3	H-1 or H-2	5 ^{d, e}	(5) ^{d, e}	50 ^{d, e}	1 ^d	(1) ^d	10 ^{d, e}	1 ^d	(1) ^d
	2	H-3	50 ^{d, e}	(50) ^{d, e}	750 ^{d, e}	50 ^d	(50) ^d	750 ^{d, e}	10 ^d	(10) ^d
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5 ^{d, e}	(5) ^{d, e}	NA	5 ^d	(5) ^d	NA	1 ^d	(1) ^d
	2	H-3	50 ^{d, e}	(50) ^{d, e}		50 ^d	(50) ^d		10 ^d	(10) ^d
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.028 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

h. Containing not more than the maximum allowable quantity per control area of Class IA, IB or IC flammable liquids.

i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 605.4.2 of the *International Fire Code*.

j. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

k. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.

l. Net weight of the pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks, including packaging, shall be used.

m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the *International Fire Code*.

n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).

o. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

p. The following shall not be included in determining the maximum allowable quantities:

1. Liquid or gaseous fuel in fuel tanks on vehicles.

2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with the *International Fire Code*.

3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.

4. Liquid fuels in piping systems and fixed appliances regulated by the *International Mechanical Code*.

5. Alcohol-based hand rubs classified as Class I or II liquids in dispensers that are installed in accordance with Sections 5705.5 and 5705.5.1 of the *International Fire Code*. The location of the alcohol-based hand rub (ABHR) dispensers shall be provided in the construction documents.

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.

Source: 2021 IBC

307.1 Occupancy Classification: Exceptions to Group H

TABLE 307.1(2)
[F] TABLE 307.1(2)

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD^{a, c, f, h, i}

MATERIAL	STORAGE ^b			USE-CLOSED SYSTEMS ^b			USE-OPEN SYSTEMS ^b	
	Solid pounds ^{d, e}	Liquid gallons (pounds) ^{d, e}	Gas cubic feet at NTP (pounds) ^d	Solid pounds ^d	Liquid gallons (pounds) ^d	Gas cubic feet at NTP (pounds) ^d	Solid pounds ^d	Liquid gallons (pounds) ^d
Corrosives	5,000	500	Gaseous 810 ^e	5,000	500	Gaseous 810 ^e	1,000	100
			Liquefied (150)			Liquefied (150)		
Highly Toxic	10	(10)	Gaseous 20 ^g	10	(10)	Gaseous 20 ^g	3	(3)
			Liquefied (4) ^g			Liquefied (4) ^g		
Toxic	500	(500)	Gaseous 810 ^e	500	(500)	Gaseous 810 ^e	125	(125)
			Liquefied (150) ^e			Liquefied (150) ^e		

For SI: 1 cubic foot = 0.028 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

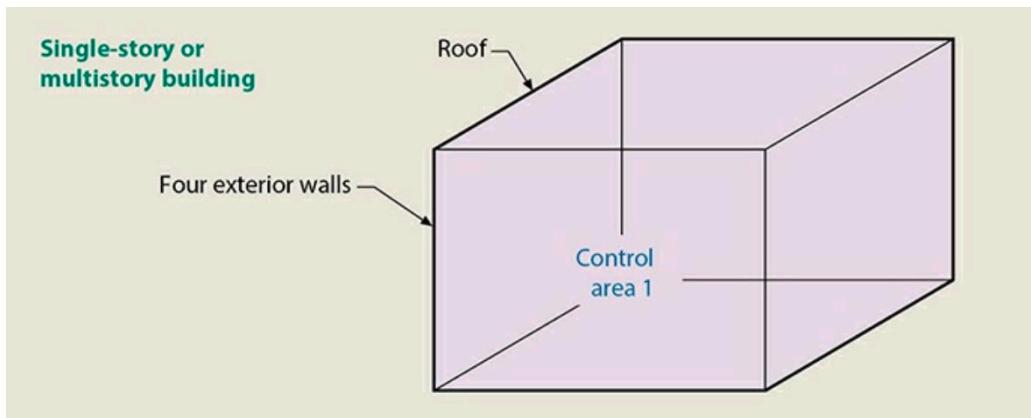
- a. For use of control areas, see Section 414.2.
- b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.
- c. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.
- d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.
- e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures as specified in the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.
- f. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 414.2.5, see Tables 414.2.5(1) and 414.2.5(2).
- g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures as specified in the *International Fire Code*.
- h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.
- i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2 of the *International Fire Code*.

307.1 Occupancy Classification: Exceptions to Group H

- An occupancy that stores, uses or handles hazardous materials as described in one or more of the following items shall not be classified as Group H, but shall be classified as the occupancy that it most nearly resembles. See a listing of 19 conditions under which a Group H occupancy is not warranted. Hazardous materials in any quantity shall conform to the requirements of the IBC, including Section 414, and the International Fire Code.
- Although some degree of hazardous materials is found in most buildings, the occupancy is designated as Group H only where the quantities are excessive and the hazards are not adequately addressed. The most common condition for a non-H classification is where the amount of hazardous materials contained in the building does not exceed the maximum allowable quantities shown in Table 307.1(1) for physical hazards and Table 307.1(2) for health hazards. Footnotes to both tables can be used to increase the permitted quantities.

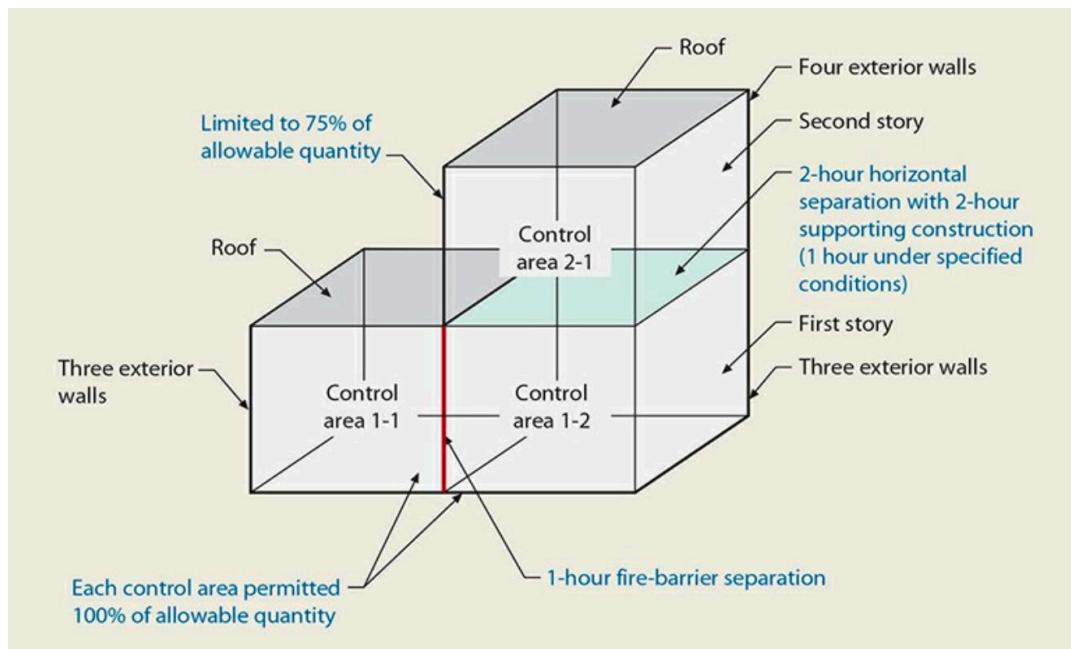
307.1 Occupancy Classification: Exceptions to Group H

- Buildings are generally allowed to have up to the basic maximum allowable quantities of hazardous materials without restriction with respect to separations or protection. In this case, the entire building is designated as a control area. The boundaries of the control area are the boundaries of the building (i.e., exterior walls, roof, and foundation).



307.1 Occupancy Classification: Exceptions to Group H

- Using the footnotes to Tables 307.1(1) and 307.1(2), the maximum allowable quantities can often be increased by providing automatic sprinkler protection throughout the building and/or by using approved storage cabinets, safety cans, or other code-approved enclosures to protect the hazardous materials. It is important that the increases identified in the footnotes only be used where applicable.



Source: 2021 IBC

307.1 Occupancy Classification: Exceptions to Group H

Four other options are available to further increase the quantities of hazardous materials in any building:

- Provide additional control areas as limited by Table 414.2.2,
- Provide one or more fire walls in conformance with Section 706,
- Apply the allowances for unlimited quantities in Section 307.1.1,
- Construct the building as required for a Group H occupancy.

307.1 Occupancy Classification: Exceptions to Group H

GIVEN: A fully sprinklered Group F-1 storage building housing Class II combustible liquids. The Class II liquids are all stored in approved safety cans. The entire building is a single control area.

DETERMINE: The maximum allowable quantity of the Class II liquids in storage in order to maintain the Group F-1 classification.

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
Combustible fiber ^d	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled ^e		(1,000)			(1,000)			(200)	
Combustible liquid ^{c, i}	II	H-2 or H-3	NA	120 ^{d, e}	NA	120 ^d	NA	NA	30 ^d	NA
	IIIA	H-2 or H-3		330 ^{d, e}		330 ^d			80 ^d	
	IIIB	NA		13,200 ^{e, f}		13,200 ^f			3,300 ^f	

For SI: 1 cubic foot = 0.028 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

- a. For use of control areas, see Section 414.2.
- b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.
- c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.
- d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.
- e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.
- f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
- g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

307.1 Occupancy Classification: Exceptions to Group H

GIVEN: A fully sprinklered Group F-1 storage building housing Class II combustible liquids. The Class II liquids are all stored in approved safety cans. The entire building is a single control area.

DETERMINE: The maximum allowable quantity of the Class II liquids in storage in order to maintain the Group F-1 classification.

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
Combustible fiber ^d	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled ^e		(1,000)			(1,000)			(200)	
Combustible liquid ^{c, i}	II	H-2 or H-3		120 ^{d, e}			120 ^d			30 ^d
	IIIA	H-2 or H-3	NA	330 ^{d, e}	NA	NA	330 ^d	NA	NA	80 ^d
	IIIB	NA		13,200 ^{e, f}			13,200 ^f			3,300 ^f

For SI: 1 cubic foot = 0.028 m³, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NL = Not Limited; NA = Not Applicable; UD = Unclassified Detonable.

a. For use of control areas, see Section 414.2.

b. The aggregate quantity in use and storage shall not exceed the quantity specified for storage.

c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited provided the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively.

e. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, gas rooms or exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10 of the *International Fire Code*. Where Note d also applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

307.1 Occupancy Classification: Exceptions to Group H

GIVEN: A fully sprinklered Group F-1 storage building housing Class II combustible liquids. The Class II liquids are all stored in approved safety cans. The entire building is a single control area.

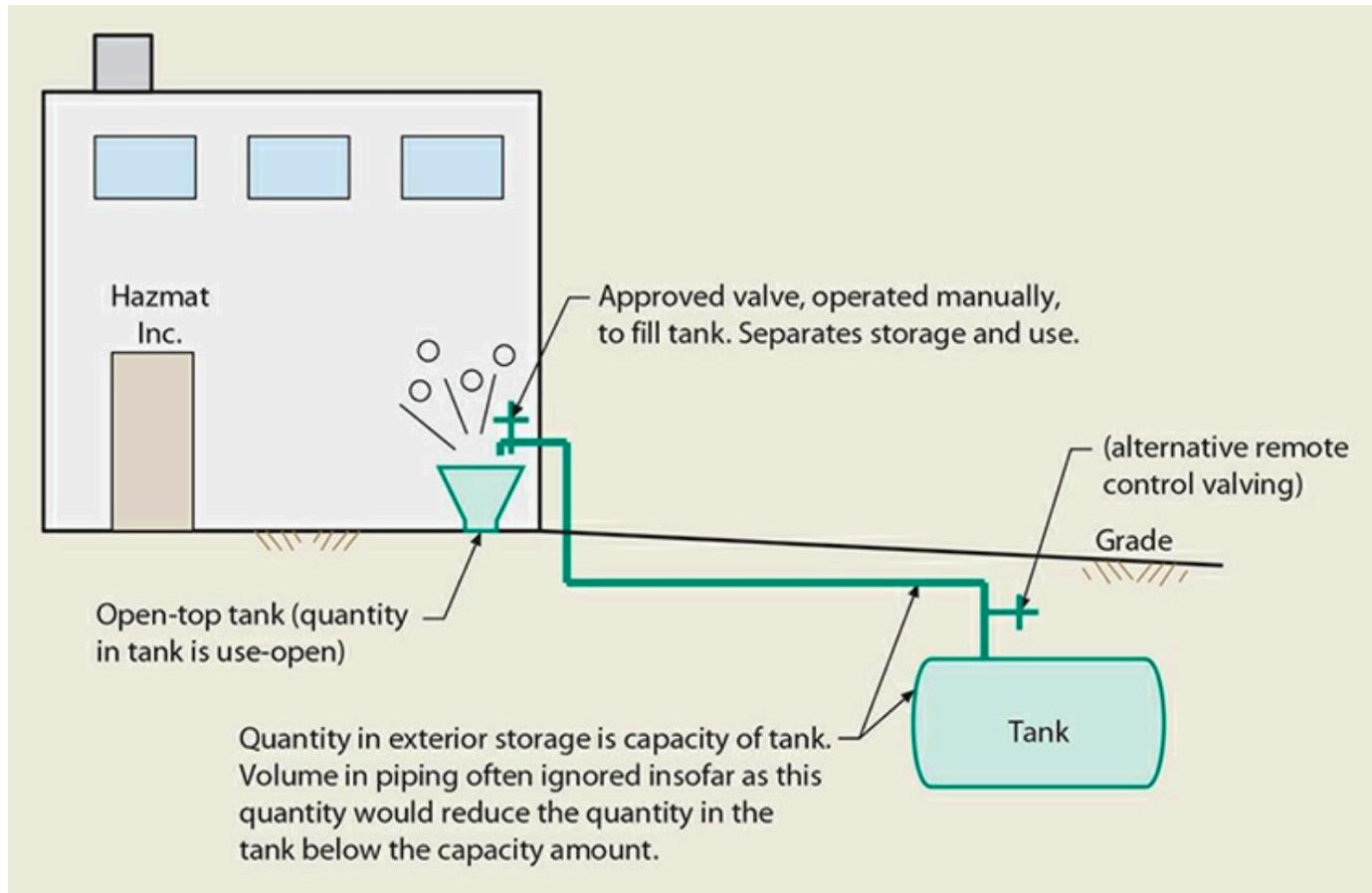
DETERMINE: The maximum allowable quantity of the Class II liquids in storage in order to maintain the Group F-1 classification.

SOLUTION:

Basic MAQs per Table 307.1(1)	120 gallons
Sprinkler increase per Footnote d (100%)	+ 120 gallons
	<hr/>
Safety can increase per Footnote e (100%)	240 gallons
Total of maximum permitted for	+ 240 gallons
	<hr/>
Group F-1 classification	480 gallons

307.1 Occupancy Classification: Storage

- The maximum allowable quantities in the code are based on three potential situations: storage, use-closed, and use-open.



307.1 Occupancy Classification: Storage

Buildings containing materials that present a detonation hazard are typically considered _____ occupancies.

- a. Group H-1
- b. Group H-2
- c. Group H-3
- d. Group H-5

308.1 Occupancy Classification: Group I

- Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are not capable of self preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.
- The institutional uses classified as Group I occupancies are of three broad types. The first is a facility in which care is provided for the very young, sick or injured. The second category includes those facilities in which the personal liberties of the inmates or residents are restricted. Thirdly, supervised care facilities are regulated. Though the hazard due to combustible contents is quite low in institutional uses, the occupants' lack of mobility limits their egress ability.

308.1 Occupancy Classification: Group I

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 and shall comply with Section 420. This group shall include, but not be limited to, the following:

- Alcohol and drug centers
- Assisted living facilities
- Congregate care facilities
- Group homes*
- Halfway houses
- Residential board and care facilities
- Social rehabilitation facilities

308.4 Institutional Group I-3. Institutional Group I-3 occupancy shall include buildings and structures that are inhabited by more than five persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally *incapable of self-preservation* due to security measures not under the occupants' control. This group shall include, but not be limited to, the following:

- Correctional centers
- Detention centers
- Jails
- Prerlease centers
- Prisons
- Reformatories

308.3 Institutional Group I-2. Institutional Group I-2 occupancy shall include buildings and structures used for *medical care* on a *24-hour basis* for more than five persons who are *incapable of self-preservation*. This group shall include, but not be limited to, the following:

- Foster care facilities*
- Detoxification facilities*
- Hospitals*
- Nursing homes*
- Psychiatric hospitals*

308.5 Institutional Group I-4, day care facilities. Institutional Group I-4 occupancy shall include buildings and structures occupied by more than five persons of any age who receive *custodial care* for fewer than 24 hours per day by persons other than parents or guardians; relatives by blood, marriage or adoption; and in a place other than the home of the person cared for. This group shall include, but not be limited to, the following:

- Adult day care
- Child day care

309.1 Occupancy Classification: Group I

Group I-1

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Group homes
Halfway houses
Residential board and care facilities
Social rehabilitation facilities

Group I-2

Foster care facilities
Detoxification facilities
Hospitals
Nursing homes
Psychiatric hospitals

Group I-3

Correctional centers
Detention centers
Jails
Prerelease centers
Prisons
Reformatories

Group I-4

Adult day care
Child day care

308.1 Occupancy Classification: Group I

A foster-care facility providing care on a 24-hour basis to six or more infants/toddlers ($2\frac{1}{2}$ years of age or less) is classified as a Group _____ occupancy.

- a. E
- b. I-1
- c. I-2
- d. R-4

309.1 Occupancy Classification: Group M

- Mercantile Group M occupancy includes, among others, the use of a building or a structure or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and where the public has access.
- A Group M occupancy is a retail or wholesale facility, or a store. An entire building can be classified as a Group M occupancy, such as a department store, or a portion of a building can be considered a mercantile use, such as the sales room in a manufacturing facility. A service station, including a canopy over the pump islands, is also classified as a Group M occupancy. In limited instances, a sales operation is designated as a Group B occupancy, as in the case of automobile showrooms.

309.1 Occupancy Classification: Group M

Group M
Department stores
Drug stores
Greenhouses (display and sale)
Markets
Motor fuel-dispensing facilities
Retail or wholesale stores
Sales rooms

310 Occupancy Classification: Group R

- Residential Group R occupancy includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the International Residential Code.
- Residential occupancies are characterized by: (1) their use by people for living and sleeping purposes, (2) a relatively low potential fire severity, and (3) the worst fire record of all structure types. Because occupants of these types of buildings spend up to one-third of each day sleeping, there is a high potential of a fire to rage out of control before the occupants awaken. After awakening, the residents will typically be disoriented for a short period of time, further decreasing the opportunity for immediate egress. A major difference between the Group R-1 and R-2 occupancy classifications is the transient nature of the use. “Transient” is defined as occupancy of a dwelling unit or sleeping unit for not more than 30 days.

310 Occupancy Classification: Group R

Group R-1

Boarding houses (transient)
> 10 occupants
Congregate living facilities (transient) > 10 occupants
Hotels (transient)
Motels (transient)

Group R-2

Apartment houses
Congregate living facilities (nontransient)
> 16 occupants
Hotels (nontransient)
Live/work units
Motels (nontransient)
Vacation timeshare properties

Group R-3

Buildings with \leq two dwelling units
Care facilities \leq 5 persons receiving care
Congregate living facilities (nontransient) \leq 16 occupants
Congregate living facilities (transient) \leq 10 occupants
Lodging houses with \leq 5 guest rooms and \leq 10 occupants

Group R-4

Alcohol and drug centers
Assisted living facilities
Congregate care facilities
Convalescent facilities
Group homes
Halfway houses
Residential board and custodial care facilities
Social rehabilitation facilities

Occupancy Classification: Group R

Live/work units are to be classified as _____ occupancies.

- a. Group B
- b. Group R-2
- c. accessory
- d. mixed

311 Occupancy Classification: 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.
- Where a warehouse or other storage facility does not contain significant amounts of hazardous commodities (as determined by Section 307), it should be considered a Group S occupancy. A facility used for the storage of combustible goods is classified as Group S- 1, whereas a Group S-2 occupancy shall be used only for the storage of noncombustible materials. If it is reasonable to believe that a storage building will house combustible goods for any significant period of time, it would be appropriate to consider the structure a Group S-1 occupancy, designed and constructed accordingly. Motor-vehicle-related uses are also included in the Group S category, with repair garages classified as Group S- 1 and parking garages (both open and enclosed) as Group S-2 occupancies.

311 Occupancy Classification: Group S

Group S-1

Aerosols products
Level 2 and Level 3
Aircraft repair hangar
Bags; cloth, burlap, paper
Belting; canvas, leather
Books
Paper in rolls
Cardboard and cardboard boxes
Clothing
Furniture
Grains
Lumber
Motor vehicle repair garages
Self-service storage facility
Tires, bulk storage of
Tobacco, cigars, cigarettes
Upholstery and mattresses

Group S-2

Aircraft hangar
Asbestos
Cement in bags
Chalk and crayons
Dairy products
Dry cell batteries
Electric motors
Food products
Fresh fruits and vegetables
Frozen foods
Glass
Gypsum board
Meats
Metals
Open parking garages
Enclosed parking garages
Porcelain and pottery

312 Occupancy Classification: Group U

- Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of the IBC commensurate with the fire and life hazard incidental to their occupancy.
- Those structures not ordinarily occupied by the general public are typically classified as Group U occupancies. The fire load in these structures varies considerably but is usually not excessive. Because these types of uses are not normally occupied, the concern for fire severity is not very great, and as a group they constitute a low hazard. Several of the structures regulated as Group U occupancies are never occupied, such as fences, towers and tanks.

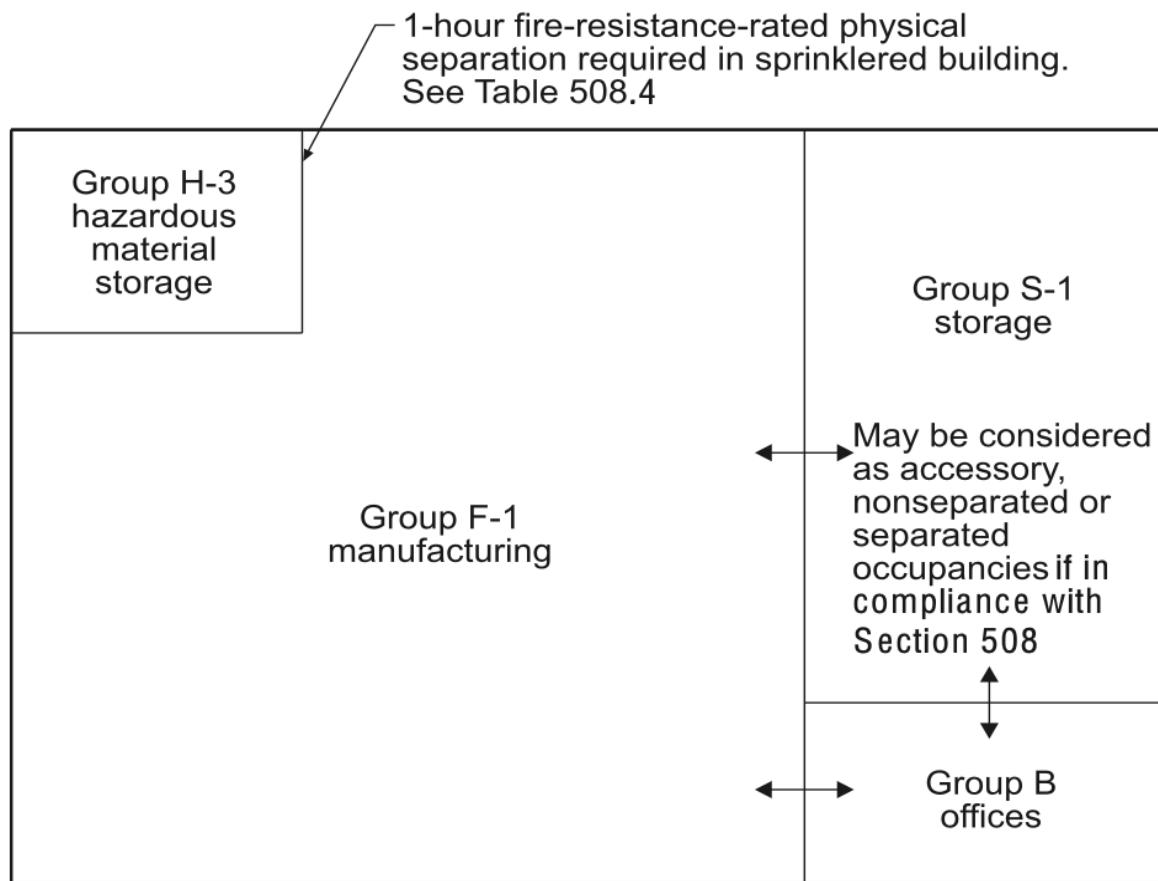
312 Occupancy Classification: Group U

Group U
Agricultural buildings
Barns
Carports
Fences more than 7 feet in height
Livestock shelters
Private garages
Retaining walls
Sheds
Stables
Tanks
Towers

508.1 Occupancy Classification: Mixed Occupancies

- Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2 (Accessory Occupancies), 508.3 (Nonseparated Occupancies), 508.4 (Separated Occupancies), or 508.5 (Live/Work Units), or a combination of these sections. See the exceptions for: (1) occupancies separated in accordance with Section 510 (Special Provisions), and (2) Group H- 1, H-2 and H-3 occupancies required by Table 415.6.5 to be located in a separate and detached building.
- It is not uncommon for two or more distinct occupancy classifications to occur in the same building. Where such conditions exist, the code requires that such multiple occupancies be either (1) isolated from each other using fire-resistive separation elements (fire barriers and/or horizontal assemblies), or (2) imposed with special provisions that eliminate the need for such fire separations.

508.1 Occupancy Classification: Mixed Occupancies



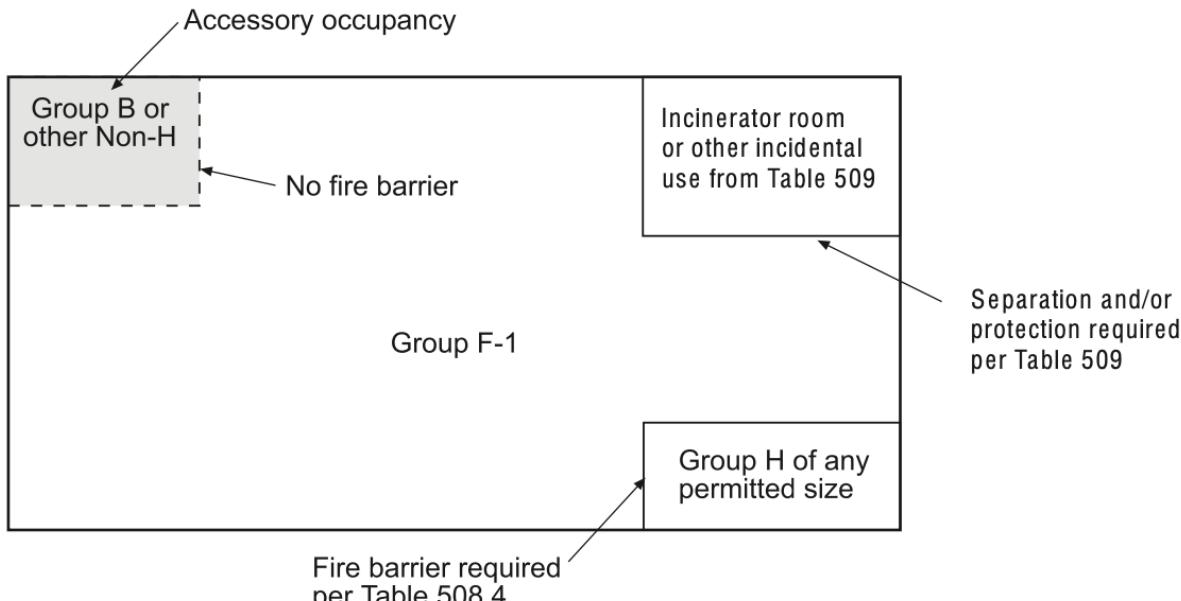
508.2/3 Accessory Occupancy

- Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Aggregate accessory occupancies shall not occupy more than 10 percent of the area of the story in which they are located and shall not exceed the tabular values for nonsprinklered buildings in Table 506.2 for each such accessory occupancy.
- The mixed-occupancy method of “Accessory Occupancies” is one of the three design options that the code provides when dealing with mixed-occupancy buildings. This approach is only applicable where one or more of the occupancies is quite small in relationship to the major occupancy in the building. The aggregate floor area of all accessory occupancies is limited to 10 percent of the floor area of the story in which the accessory occupancies are located. In addition, the aggregate floor area of the accessory occupancies cannot exceed the allowable floor area taken from Table 506.2 for a nonsprinklered building.

508.2/3 Accessory Occupancy

Example:

Given a 100,000 sq ft mixed-occupancy building (F-1, B, H)



For SI: 1 square foot = 0.093 m².

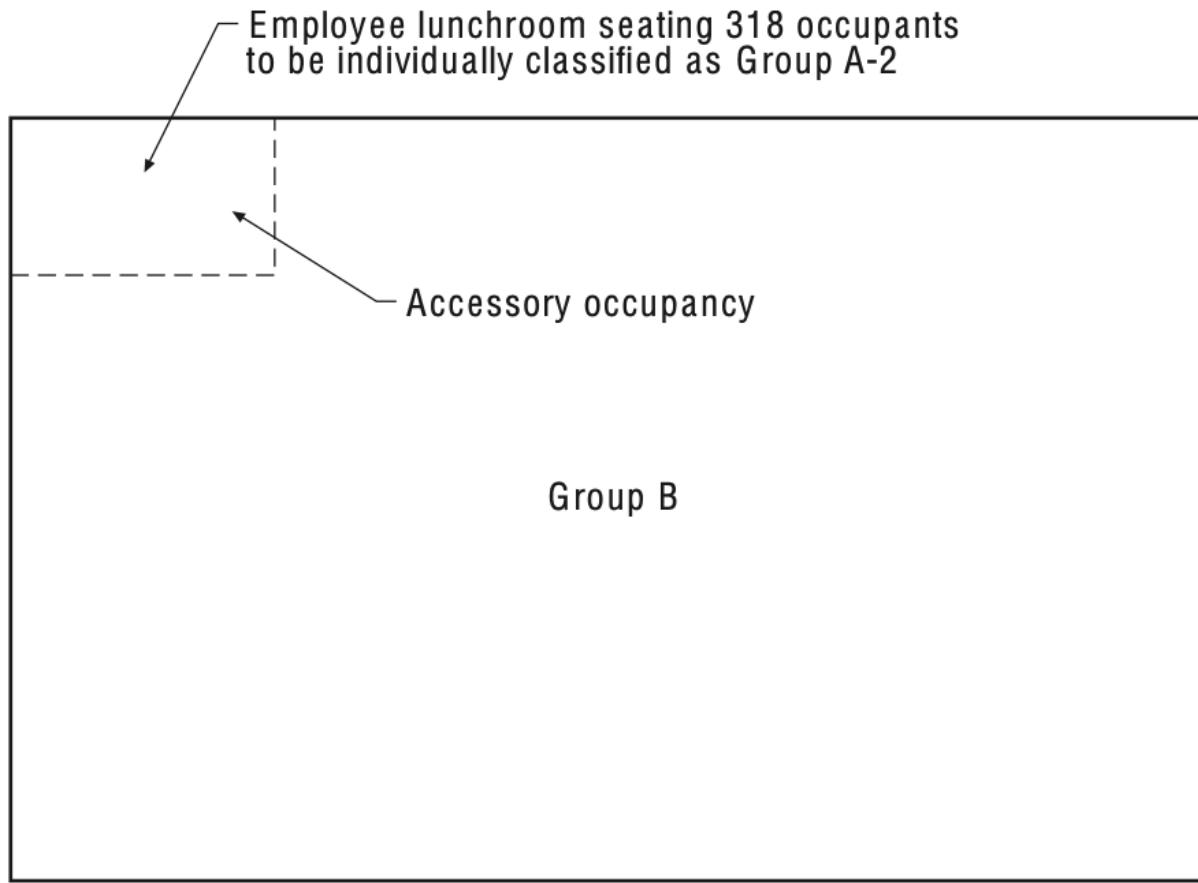
It is possible to have more than one space or occupancy designated an accessory occupancy. Under such circumstances, the 10 percent and tabular area limitations, per story, are to be based upon the aggregate floor area of all of the accessory occupancies.

508.2.1 Accessory Occupancy

- Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of the IBC shall apply to each portion of the building based on the occupancy classification of that space.
- The occupancy classification of a use that is regulated under the provisions for accessory occupancies is based solely upon the specific use of that area. Although the size of the occupancy may be quite small in comparison with the remainder of the building, the accessory occupancy has its own unique hazards that must be adequately addressed.

508.2.1 Accessory Occupancy

Example:

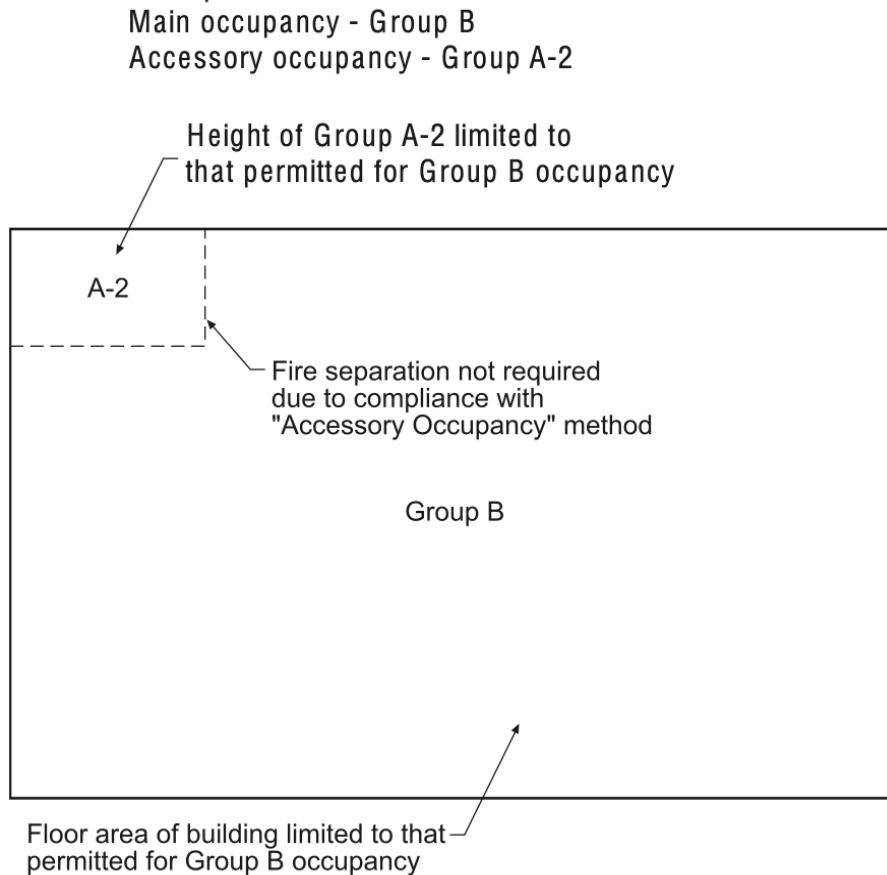


508.2.2/4 Accessory Occupancy

- The allowable height and number of stories of the building containing accessory occupancies shall be in accordance with Section 504 for the main occupancy of the building. No separation is required between accessory occupancies and the main occupancy. See the exceptions for (1) Group H-2, H-3, H-4 and H-5 occupancies; and (2) dwelling and sleeping units in Groups I-1, R-1, R-2 and R-3.
- Where the methodology of “Accessory Occupancies” is utilized, the allowable height and area of the accessory occupancies, as well as that of the major occupancy, is based solely on the building’s major occupancy. There is no mandate to apply the more restrictive height and area provisions of each of the occupancies involved, as required under the “Nonseparated Occupancies” method, nor to go through calculations based on the unity formula as required for “Separated Occupancies.”

508.2.1 Accessory Occupancy

Example:

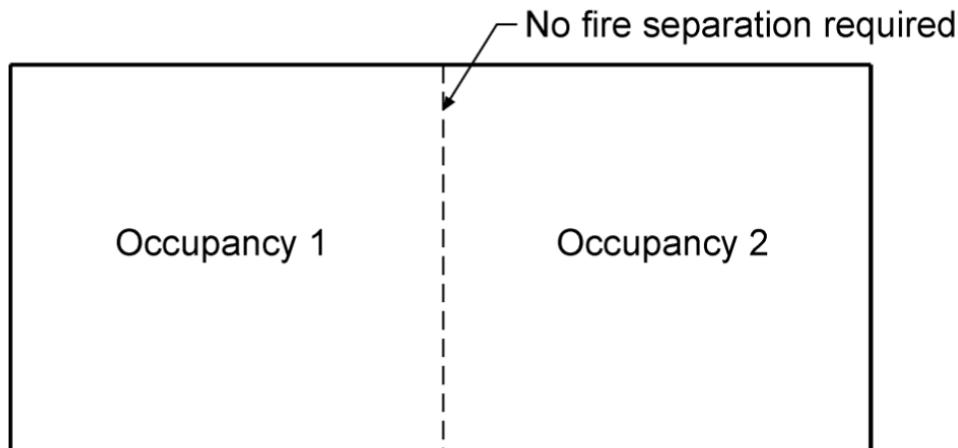


As long as the accessory occupancies involved are not classified as Group H, there is no requirement to separate the accessory occupancies from the major occupancy of the building. In addition, where two or more accessory occupancies are present, they do not need to be separated from each other.

508.3.1 Nonseparated Occupancy

- Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of the IBC shall apply to each portion of the building based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to the nonseparated occupancies shall apply to the total nonseparated occupancy area.
- The allowance for “Nonseparated Occupancies,” one of the alternatives to the physical separation of different occupancies, is based on the most limiting requirements for building size (height and area) and fire-protection features such as sprinklers, standpipes and alarm systems. Where occupancies are regulated by the nonseparated occupancy provisions, a physical separation is permitted, but it is not required.

508.2.1 Nonseparated Occupancy



- Type of construction limited by:
 - Lesser height limit of Occupancy 1 or 2
 - Lesser floor area limit of Occupancy 1 or 2
- Most restrictive fire-protection system requirements of Occupancy 1 and 2

Where the provisions for nonseparated occupancies are utilized in a high-rise building as defined by Section 403, the special high-rise provisions that apply to the nonseparated occupancies are applicable to the entire building.

508.3.2/3 Nonseparated Occupancy

- The allowable building area, height and number of stories of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1. No separation is required between nonseparated occupancies. See the exceptions for (1) Group H-2, H-3, H-4 and H-5 occupancies; and (2) dwelling and sleeping units in Groups I-1, R-1, R-2 and R-3.
- Where the option for nonseparated occupancies is utilized to address a mixed-occupancy building, it is necessary to determine the maximum building size for each of the occupancies that are not appropriately separated. The maximum allowable height and area for each occupancy would be based upon the building's type of construction. The most restrictive height and area of those nonseparated occupancies would then be the limiting size for the combination of such occupancies.

508.2.1 Nonseparated Occupancy

Given: A nonsprinklered Type VB building contains both Group B and Group E occupancies.

Determine: The height and area limitations if the occupancies are not separated under the nonseparated occupancies provisions of Section 508.3.

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	A	B	C	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	3	3	3	2	1
	S	UL	6	4	3	4	3	9	6	4	4	3	2
A-2	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-3	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-4	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-5	NS	UL	UL	UL	UL	UL	UL	1	1	1	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	5	5	5	3	2
	S	UL	12	6	4	6	4	18	12	9	6	4	3
E	NS	UL	5	3	2	3	2	3	3	3	3	1	1
	S	UL	6	4	3	4	3	9	6	4	4	2	2

508.2.1 Nonseparated Occupancy

Given: A nonsprinklered Type VB building contains both Group B and Group E occupancies.

Determine: The height and area limitations if the occupancies are not separated under the nonseparated occupancies provisions of Section 508.3.

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		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	3	3	3	2	1
	S	UL	6	4	3	4	3	9	6	4	4	3	2
A-2	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-3	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-4	NS	UL	11	3	2	3	2	3	3	3	3	2	1
	S	UL	12	4	3	4	3	18	12	6	4	3	2
A-5	NS	UL	UL	UL	UL	UL	UL	1	1	1	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	5	5	5	3	2
	S	UL	12	6	4	6	4	18	12	9	6	4	3
E	NS	UL	5	3	2	3	2	3	3	3	3	1	1
	S	UL	6	4	3	4	3	9	6	4	4	2	2

508.2.1 Nonseparated Occupancy

Given: A nonsprinklered Type VB building contains both Group B and Group E occupancies.

Determine: The height and area limitations if the occupancies are not separated under the nonseparated occupancies provisions of Section 508.3.

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

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV					
		A	B	A	B	A	B	A	B	C	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	45,000	30,000	18,750	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	180,000	120,000	75,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	135,000	90,000	56,250	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-4	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S1												
	SM												
B	NS	UL	UL	37,500	23,000	28,500	19,000	108,000	72,000	45,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	432,000	288,000	180,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	324,000	216,000	135,000	108,000	54,000	27,000

508.2.1 Nonseparated Occupancy

Given: A nonsprinklered Type VB building contains both Group B and Group E occupancies.

Determine: The height and area limitations if the occupancies are not separated under the nonseparated occupancies provisions of Section 508.3.

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

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	45,000	30,000	18,750	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	180,000	120,000	75,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	135,000	90,000	56,250	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-4	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S1												
	SM												
B	NS	UL	UL	37,500	23,000	28,500	19,000	108,000	72,000	45,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	432,000	288,000	180,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	324,000	216,000	135,000	108,000	54,000	27,000
E	NS	UL	UL	26,500	14,500	23,500	14,500	76,500	51,000	31,875	25,500	18,500	9,500
	S1	UL	UL	106,000	58,000	94,000	58,000	306,000	204,000	127,500	102,000	74,000	38,000
	SM	UL	UL	79,500	43,500	70,500	43,500	229,500	153,000	95,625	76,500	55,500	28,500

508.2.1 Nonseparated Occupancy

Example:

Given: A nonsprinklered Type VB building contains both Group B and Group E occupancies.

Determine: The height and area limitations if the occupancies are not separated under the nonseparated occupancies provisions of Section 508.3.

OCCUPANCY	ALLOWABLE HEIGHT ¹	ALLOWABLE AREA ²
Group B ³	2 stories	9,000 square feet
Group E ³	1 story	9,500 square feet

1 Based on Table 504.4

2 Based on Table 506.2 assuming no frontage increase.

3 Most restrictive fire protection requirements of Chapter 9 also applicable to entire building.

^Thus, for nonseparated occupancies, the maximum building size would be 1 story and 9,000 square feet.

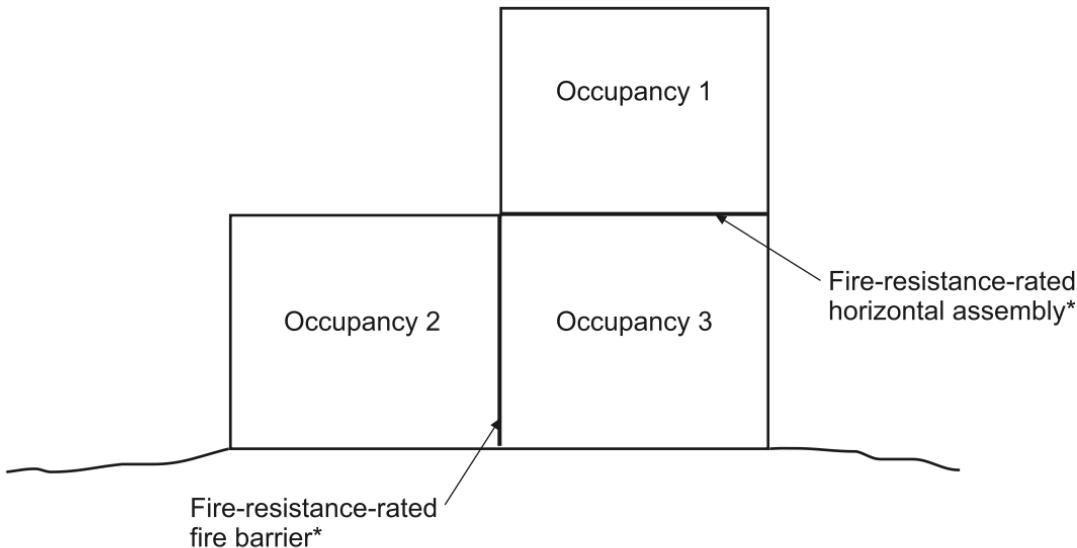
Nonseparated Occupancies

The use of the nonseparated occupancies method is not applicable to high-hazard occupancies. Those areas or spaces classified as Group H occupancies must be isolated from other occupancies within the building by fire barriers and/or horizontal assemblies in accordance with Table 508.4 for occupancy separations.

508.4 Separated Occupancy

- Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with the IBC based on the occupancy classification of that portion of the building.
- Under the provisions for “Separated Occupancies,” each of the distinct uses is to be individually classified as to occupancy. This approach is consistent with that for accessory occupancies and nonseparated occupancies. The concept of separated occupancies provides for a fire-resistance-rated separation in order to isolate the hazards associated with a specific occupancy from other portions of the building.

508.4 Nonseparated Occupancy



*Minimum fire-resistance rating based on Table 508.4

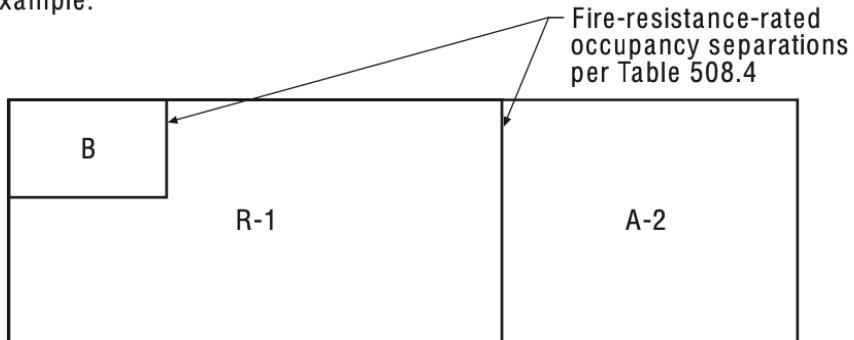
For those mixed-occupancy buildings containing a Group H occupancy, the separated occupancy provisions will always need to be applied. Any Group H occupancy must be physically and fire-resistively separated from other occupancies within the same structure.

508.4.2/3 Separated Occupancy

- 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 area of each separated occupancy shall not exceed 1. Each separated occupancy shall comply with the building height limitations and story limitations based on the type of construction of the building in accordance with Section 503.1. See exception where Section 510 is applied.
- The approach to separated occupancies mandates that the ratios of the actual and allow- able floor areas be calculated in order to determine compliance. Often known as the “unity formula,” this calculation recognizes the relationship between the permitted sizes of the various occupancies involved. The unity formula is only applicable where the separated occupancy method is utilized and does not apply to accessory occupancies or non-separated occupancies.

508.4.2/3 Separated Occupancy

Example:



Allowable height per Section 504 for each individual occupancy

$$\frac{\text{Actual area A-2}}{\text{Allowable area A-2}} + \frac{\text{Actual area B}}{\text{Allowable area B}} + \frac{\text{Actual area R-1}}{\text{Allowable area R-1}} \leq 1.0$$

The height limitations for separated occupancies are based upon the general provisions of Section 504. The height limit, in both feet and stories, is to be measured from the grade plane, and the measurement must include all intervening fire areas.

508.4.2/3 Separated Occupancy

GIVEN: A one-story nonsprinklered building housing day care classified as Group E, Group B offices, and a Group A-3 conference room. The building is of Type VA construction. Insufficient open space is available for area increase purposes. Floor areas are as follows:

Office (B)	4,500 square feet
Assembly (A-3)	1,000 square feet
Day care (E)	6,000 square feet

DETERMINE: If the building area is within the allowable area under the "separated occupancies" provisions.

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										A	B		
		Type I		Type II		Type III		Type IV							
		A	B	A	B	A	B	A	B	C	HT				
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	45,000	30,000	18,750	15,000	11,500	5,500		
	S1	UL	UL	62,000	34,000	56,000	34,000	180,000	120,000	75,000	60,000	46,000	22,000		
	SM	UL	UL	46,500	25,500	42,000	25,500	135,000	90,000	56,250	45,000	34,500	16,500		
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000		
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000		
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000		
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000		
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000		
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000		
A-4	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000		
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000		
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000		
A-5	NS														
	S1	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL				
	SM														
B	NS	UL	UL	37,500	23,000	28,500	19,000	108,000	72,000	45,000	36,000	18,000	9,000		
	S1	UL	UL	150,000	92,000	114,000	76,000	432,000	288,000	180,000	144,000	72,000	36,000		
	SM	UL	UL	112,500	69,000	85,500	57,000	324,000	216,000	135,000	108,000	54,000	27,000		
E	NS	UL	UL	26,500	14,500	23,500	14,500	76,500	51,000	31,875	25,500	18,500	9,500		
	S1	UL	UL	106,000	58,000	94,000	58,000	306,000	204,000	127,500	102,000	74,000	38,000		
	SM	UL	UL	79,500	43,500	70,500	43,500	229,500	153,000	95,625	76,500	55,500	28,500		
	NS	TTT	TTT	25,000	15,000	10,000	12,000	100,500	67,000	41,875	32,500	14,000	8,500		

Source: 2021 IBC

508.4.2/3 Separated Occupancy

GIVEN: A one-story nonsprinklered building housing day care classified as Group E, Group B offices, and a Group A-3 conference room. The building is of Type VA construction. Insufficient open space is available for area increase purposes. Floor areas are as follows:

Office (B)	4,500 square feet
Assembly (A-3)	1,000 square feet
Day care (E)	6,000 square feet

DETERMINE: If the building area is within the allowable area under the "separated occupancies" provisions.

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					
		A	B	A	B	A	B	A	B	C	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	45,000	30,000	18,750	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	180,000	120,000	75,000	60,000	46,000	22,000
	SM	UL	UL	46,500	25,500	42,000	25,500	135,000	90,000	56,250	45,000	34,500	16,500
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-4	NS	UL	UL	15,500	9,500	14,000	9,500	45,000	30,000	18,750	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	180,000	120,000	75,000	60,000	46,000	24,000
	SM	UL	UL	46,500	28,500	42,000	28,500	135,000	90,000	56,250	45,000	34,500	18,000
A-5	NS												
	S1	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL		
	SM												
B	NS	UL	UL	37,500	23,000	28,500	19,000	108,000	72,000	45,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	432,000	288,000	180,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	324,000	216,000	135,000	108,000	54,000	27,000
E	NS	UL	UL	26,500	14,500	23,500	14,500	76,500	51,000	31,875	25,500	18,500	9,500
	S1	UL	UL	106,000	58,000	94,000	58,000	306,000	204,000	127,500	102,000	74,000	38,000
	SM	UL	UL	79,500	43,500	70,500	43,500	229,500	153,000	95,625	76,500	55,500	28,500
	NS	TTT	TTT	25,000	15,000	10,000	12,000	100,500	67,000	41,875	32,500	14,000	8,500

Source: 2021 IBC

508.4.2/3 Separated Occupancy

GIVEN: A one-story nonsprinklered building housing day care classified as Group E, Group B offices, and a Group A-3 conference room. The building is of Type VA construction. Insufficient open space is available for area increase purposes. Floor areas are as follows:

Office (B)	4,500 square feet
Assembly (A-3)	1,000 square feet
Day care (E)	6,000 square feet

DETERMINE: If the building area is within the allowable area under the "separated occupancies" provisions.

SOLUTION: In accordance with Section 508.4.2:

$$\frac{\text{Actual area of office}}{\text{Allowable area of office}} + \frac{\text{Actual area of assembly}}{\text{Allowable area of assembly}} + \frac{\text{Actual area of E}}{\text{Allowable area of E}} \leq 1$$

$$\frac{4,500}{18,000} + \frac{1,000}{11,500} + \frac{6,000}{18,500} \stackrel{?}{\leq} 1$$

$$0.25 + 0.09 + 0.32 \stackrel{?}{\leq} 1$$

$0.66 \leq 1$, therefore OK

Building is within the allowable area.

For SI: 1 square foot = 0.093 m².

508.4.2/3 Separated Occupancy

In the determination of allowable building area for a mixed occupancy building, the _____ occupancies method requires the sum of the ratios of the actual building area of each occupancy divided by the allowable building area of each occupancy to be not greater than 1.0.

- a. accessory
- b. incidental
- c. nonseparated
- d. separated

508.4.4/508.4.4.1 Separated Occupancy

- Individual occupancies shall be separated from adjacent occupancies in accordance with Table 508.4. Required separations shall be fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both, so as to completely separate adjacent occupancies.
- A matrix, Table 508.4, has been established to identify any required fire-resistance-rated separation between various occupancies. The table is based on the perceived degree of dissimilarity between the occupancies involved. Where Table 508.4 requires a level of fire-resistance between the adjoining occupancies, fire barriers and/or horizontal separations are to be used. The intended result is that the hazards associated with one occupancy be completely isolated from those present in the remainder of the building.

508.4.4/508.4.4.1 Separated Occupancy

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 , 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 , 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

S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

NS = Buildings not equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

N = No separation requirement.

NP = Not Permitted.

a. See Section 420.

b. The required separation from areas used only for private or pleasure vehicles shall be reduced by 1 hour but not to less than 1 hour.

c. See Sections 406.3.2 and 406.6.4.

d. Separation is not required between occupancies of the same classification.

e. See Section 422.2 for *ambulatory care facilities*.

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 Table 707.3.10 in accordance with Section 901.7.

509.1/3 Incidental Uses

- Incidental uses are ancillary functions associated with a given occupancy that generally pose a greater level of risk to that occupancy and are limited to those uses listed in Table 509.1. Incidental uses shall not be individually classified in accordance with Section 302.1. Incidental uses shall be included in the building occupancies within which they are located. Incidental uses shall not occupy more than 10 percent of the building area of the story in which they are located.
- It is common to find uses that are typical of the general occupancy classification of the building, yet which create a hazard different from the other hazards found in the occupancy. An example would be a chemistry laboratory classroom in a high school building. The code addresses such conditions by requiring incidental uses to be separated from the remainder of the building with fire-resistance-rated construction, or to be protected with an automatic sprinkler system. An incidental use should be assigned an occupancy classification consistent with the portion of the building in which it is located.

509.1/3 Incidental Uses

[F]TABLE 509.1
INCIDENTAL USES

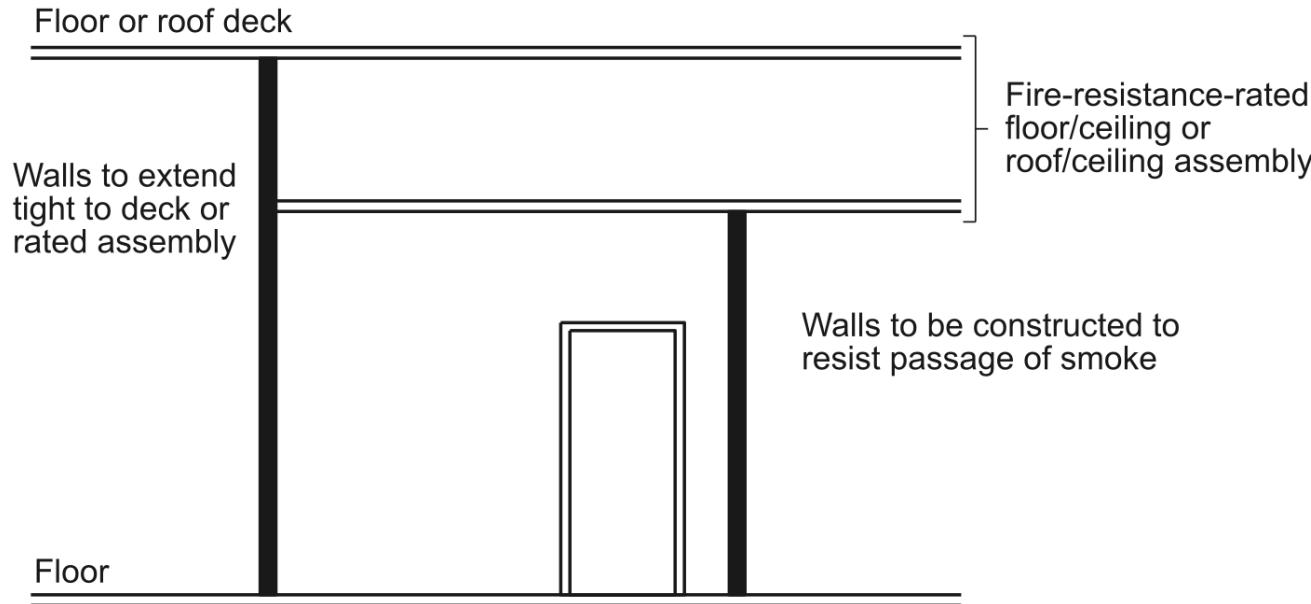
ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.
Incinerator rooms	2 hours and provide automatic sprinkler system
Paint shops, not classified as Group H, located in occupancies other than Group F	2 hours; or 1 hour and provide automatic sprinkler system
In Group E occupancies, laboratories and vocational shops not classified as Group H	1 hour or provide automatic sprinkler system
In Group I-2 occupancies, laboratories not classified as Group H	1 hour and provide automatic sprinkler system
In <i>ambulatory care facilities</i> , laboratories not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
In Group I-2, laundry rooms over 100 square feet	1 hour
Group I-3 cells and Group I-2 patient rooms equipped with padded surfaces	1 hour
In Group I-2, physical plant maintenance shops	1 hour
In ambulatory care facilities or Group I-2 occupancies, waste and linen collection rooms with containers that have an aggregate volume of 10 cubic feet or greater	1 hour
In other than ambulatory care facilities and Group I-2 occupancies, waste and linen collection rooms over 100 square feet	1 hour or provide automatic sprinkler system
In ambulatory care facilities or Group I-2 occupancies, storage rooms greater than 100 square feet	1 hour
Electrical installations and transformers	See Sections 110.26 through 110.34 and Sections 450.8 through 450.48 of NFPA 70 for protection and separation requirements.

For SI: 1 square foot = 0.0929 m², 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L, 1 cubic foot = 0.0283 m³.

509.4 Incidental Uses

- Where Table 509.1 specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the building by a fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 711, or both. Where Table 509.1 permits an automatic sprinkler system without a fire barrier, the incidental uses shall be separated from the remainder of the building by construction capable of resisting the passage of smoke.
- In utilizing Table 509.1, it is common that two options are available for addressing rooms or areas considered incidental uses. A fire barrier may often be used to isolate the specific hazard from the remainder of the building. As an alternative, a sprinkler system may be used to limit any fire in the incidental use to that space only. By incorporating smoke containment construction, little if any smoke created would be transferred to other portions of the building.

509.4 Incidental Uses



Note: Doors shall:

- be self-closing or automatic-closing upon detection of smoke
- have no air transfer openings
- have no excessive undercuts

Construction to resist the passage of smoke