APPENDIX C
CODE CHANGE PROPOSAL
NORTH CAROLINA
BUILDING CODE COUNCIL

B-3

Resubmitted on 12/12/23 for consideration with formatted review aid requested by the Rules Review Commission of the NC Office of Administrative Hearings.

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Petition for Rule Making Item Number _____

Granted by BCC	_____	**Adopted by BCC**	_____	**Approved by RRC**	_____
Denied by BCC	_____	**Disapproved by BCC**	_____	**Objection by RRC**	_____

PROPONENT: BCC Building Standing Committee PHONE: (919)888-0284
REPRESENTING: BCC Building Standing Committee
ADDRESS: Mail Service Center 1202
CITY: Raleigh STATE: NC ZIP: 27699-1202
E-MAIL: carl.martin@ncdoi.gov FAX: (___) -

North Carolina State Building Code, Volume 2024 Building Code - Section

CHECK ONE: [ ] Revise section to read as follows: [ ] Delete section and substitute the following:
[X] Add new section to read as follows: [ ] Delete section without substitution:

~~LINE THROUGH MATERIAL TO BE DELETED~~ UNDERLINE MATERIAL TO BE ADDED

Please type. Continue proposal or reason on plain paper attached to this form. See reverse side for instructions.

The 2024 NCBC is based on the 2021 IBC which can be viewed at: Digital Codes (iccsafe.org)
The NC amendments to the 2021 IBC that make up the 2024 NCBC are shown in ATTACHMENT A below.

Will this proposal change the cost of construction?	Decrease	[ ]	Increase	[ ]	No	[X]
Will this proposal increase to the cost of a dwelling by $80 or more?			Yes	[ ]	No	[X]
Will this proposal affect the Local or State funds?	Local	[ ]	State	[ ]	No	[X]
Will this proposal cause a substantial economic impact (≥$1,000,000)?			Yes	[ ]	No	[X]

- Non-Substantial – Provide an economic analysis including benefit/cost estimates.
- Substantial – The economic analysis must also include 2-alternatives, time value of money and risk analysis.
- Pursuant to §143-138(a1)(2) a cost-benefit analysis is required for all proposed amendments to the NC Energy Conservation Code. The Building Code Council shall also require same for the NC Residential Code, Chapter 11.

REASON: This amendment is proposed to protect the public by updating the code to current standards of practice.

BCC CODE CHANGES

Signature: *CARL MARTIN* Date: November 1, 2022 FORM 11/26/19

ATTACHMENT A

THIS DOCUMENT CONTAINS PROPOSED NORTH CAROLINA AMENDMENTS TO THE 2021 EDITION OF THE INTERNTATIONAL BUILDING CODE (IBC) FOR THE PURPOSE OF ESTABLISHING THE 2024 EDITION OF THE NORTH CAROLINA BUILDING CODE.

UNDERLINED TEXT INDICATE NORTH CAROLINA PROPOSED AMENDMENTS TO THE 2021 INTERNATIONAL IBC FOR THE 2024 NORTH CAROLINA BUILDING CODE.

S~~TRUCKTHROUGH~~ TEXT INDICATES IBC TEXT THAT IS PROPOSED TO BE REMOVED FROM THE 2024 NORTH CAROLINA BUILDING CODE.

TEXT THAT IS HIGHLIGHTED IN YELLOW INDICATES PROPOSED NORTH CAROLINA AMENDMENTS THAT ARE NEW OR DIFFERRENT THAN THE 2018 NORTH CAROLINA BUILDING CODE.

CHAPTER 1

SCOPE AND ADMINISTRATION

User notes:

About this chapter: *Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1—Scope and Application (Sections 101–102) and Part 2—Administration and Enforcement (Sections 103–116). Section 101 identifies which buildings and structures come under its purview and references other I-Codes as applicable. Standards and codes are scoped to the extent referenced (see Section 102.4).*

This code is intended to be adopted as a legally enforceable document and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the authority having jurisdiction and also establish the rights and privileges of the design professional, contractor and property owner. Chapter 1 is largely concerned with maintaining "due process of law" in enforcing the building performance criteria contained in the body of the code.

Code development reminder: *Code change proposals to this chapter will be considered by the Administrative Code Development Committee during the 2022 (Group B) Code Development Cycle.*

SECTION 101
SCOPE AND GENERAL REQUIREMENTS

[A] 101.1 Title. These regulations shall be known as the *North Carolina Building Code* ~~of [NAME OF JURISDICTION], hereinafter referred to as "this code."~~ as adopted by the North Carolina Building Code Council on September 12, 2023 to be effective January 1, 2025. Reference to the International Code shall mean the North Carolina Codes. The North Carolina amendments to the International Code are underlined.

[A] 101.2 Scope. The provisions of this 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.

Exception: If any of the following apply, then the building or structure is exempt from the provisions of this code:

1. Detached one- and two-family *dwellings* and *townhouses* 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 this code or the *International Residential Code*.

2. Farm buildings not used for:

   a. Sleeping purposes; or

   b. Storage of hazardous materials in excess of those listed in Tables 307.1(1) and 307.1(2) within the building rules jurisdiction of any municipality.

3. The design, construction, location, installation or operation of equipment for storing, handling and transporting liquefied petroleum gases for fuel purposes up to the outlet of the first stage pressure regulator, anhydrous ammonia or other liquid fertilizer.

4. The design, construction, location, installation or operation of equipment of facilities of a public utility, as defined in N.C.G.S. 62-3, or electric or telephone membership corporation, including without limitation poles, towers and other structures supporting electric or communication lines from the distribution network up to the meter location.

5. The storage and handling of substances governed by the Hazardous Chemical Right to Know Act in N.C.G.S. Chapter 95, Article 18.

6. Retaining walls complying with any of the following:

   a. 3 feet or less in height where a guard is required;

   b. 5 feet or less of cumulative fill within 3 feet horizontally from the wall;

   c. Not located within 15 feet of another retaining wall; and

   d. Not located within 3 feet of a building or structure.

[A] 101.2.1 Appendices. See the North Carolina Administrative Code and Policies. ~~Provisions in the appendices shall not apply unless specifically adopted.~~

[A] 101.3 ~~Purpose~~ Intent. The ~~purpose~~ intent of this code is to establish the minimum requirements to provide a reasonable level of safety, health and general welfare through structural strength, *means of egress* ~~*facilities*~~, stability, sanitation, ~~adequate~~ light and *ventilation*, energy conservation, and for providing a reasonable level of life safety and property protection ~~safety to life and property~~ from the hazards of fire and other hazards attributed to the built environment, *explosion* or *dangerous* conditions, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

[A] 101.4.4 Property maintenance. Deleted. ~~The provisions of the *International Property Maintenance Code* shall apply to *existing structures* and premises; equipment and facilities; light, *ventilation*, space heating, sanitation, life and fire safety hazards; responsibilities of *owners*, operators and occupants; and occupancy of existing premises and structures.~~

101.5 Requirements of other State agencies, occupational licensing boards or commissions. The North Carolina State Building Codes do not include all additional requirements for *buildings* and structures that may be imposed by other State agencies, occupational licensing boards and commissions. It shall be the responsibility of a permit holder, registered design professional, contractor or occupational licensing holder to determine whether any additional requirements exist.

SECTION 102
APPLICABILITY

[A] 102.4 Referenced codes and standards. The codes and standards referenced in this code shall be considered to be part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections 102.4.1 and 102.4.2 and North Carolina Administrative Code and Policies Section 101.3.5.

[A] 102.6 Existing structures. The legal occupancy of any structure existing on the date of adoption of this code shall be permitted to continue without change, except as otherwise specifically provided in this code, the *International Existing Building Code*~~, the *International Property Maintenance Code*~~ or the *International Fire Code*.

[A] 102.6.2 Buildings previously occupied. The legal occupancy of any building existing on the date of adoption of this code shall be permitted to continue without change, except as otherwise specifically provided in this code, the *International Fire Code* ~~or *International Property Maintenance Code*~~, or as is deemed necessary by the *building official* for the general safety and welfare of the occupants and the public.

SECTION 103
CODE COMPLIANCE AGENCY

Deleted. See the North Carolina Administrative Code and Policies.

~~**[A] 103.1 Creation of enforcement agency.** The **[INSERT NAME OF DEPARTMENT]** is hereby created and the official in charge thereof shall be known as the *building official*. The function of the agency shall be the implementation, administration and enforcement of the provisions of this code.~~

~~**[A] 103.2 Appointment.** The *building official* shall be appointed by the chief appointing authority of the jurisdiction.~~

~~**[A] 103.3 Deputies.** In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the *building official* shall have the authority to appoint a deputy building official, other related technical officers, inspectors and other employees. Such employees shall have powers as delegated by the *building official*.~~

SECTION 104
DUTIES AND POWERS OF BUILDING OFFICIAL

Deleted. See the North Carolina Administrative Code and Policies.

[A] 104.1 General. The *building official* is hereby authorized and directed to enforce the provisions of this code. The *building official* shall have the authority to render interpretations of this code 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 this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2 Applications and permits. The *building official* shall receive applications, review *construction documents* and issue *permits* for the erection, and *alteration*, demolition and moving of buildings and structures, inspect the premises for which such *permits* have been issued and enforce compliance with the provisions of this code.

[A] 104.2.1 Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, *repair*, *alteration*, *addition* or other improvement of *existing buildings or structures* located in *flood hazard areas*, the *building official* shall determine if the proposed work constitutes *substantial improvement* or *repair* of *substantial damage*. Where the *building official* determines that the proposed work constitutes *substantial improvement* or *repair* of *substantial damage*, and where required by this code, the *building official* shall require the building to meet the requirements of Section 1612 or Section R322 of the *International Residential Code*, as applicable.

[A] 104.3 Notices and orders. The *building official* shall issue necessary notices or orders to ensure compliance with this code.

[A] 104.4 Inspections. The *building official* shall make the required inspections, or the *building official* shall have the authority to accept reports of inspection by *approved agencies* or individuals. Reports of such inspections shall be in writing and be certified by a responsible officer of such *approved agency* or by the responsible individual. The *building official* is authorized to engage such expert opinion as deemed necessary to report on unusual technical issues that arise, subject to the approval of the appointing authority.

[A] 104.5 Identification. The *building official* shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the *building official* has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, *dangerous* or hazardous, the *building official* is authorized to enter the structure or premises at reasonable times to inspect or to perform the duties imposed by this code, provided that if such structure or premises be occupied that credentials be presented to the occupant and entry requested. If such structure or premises is unoccupied, the *building official* shall first make a reasonable effort to locate the *owner* or other person having charge or control of the structure or premises and request entry. If entry is refused, the *building official* shall have recourse to the remedies provided by law to secure entry.

[A] 104.7 Department records. The *building official* shall keep official records of applications received, *permits* and certificates issued, fees collected, reports of inspections, and notices and orders issued. Such records shall be retained in the official records for the period required for retention of public records.

[A] 104.8 Liability. The *building official*, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code 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.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The *building official* or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices *approved* by the *building official* shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Used materials and equipment. Materials that are reused shall comply with the requirements of this code for new materials. Used equipment and devices shall not be reused unless *approved* by the *building official*.

[A] 104.10 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the *building official* shall have the authority to grant modifications for individual cases, upon application of the *owner* or the owner's authorized agent, provided that the *building official* shall first find that special individual reason makes the strict letter of this code impractical, the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, *accessibility*, life and fire safety or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the department of building safety.

[A] 104.10.1 Flood hazard areas. The *building official* shall not grant modifications to any provision required in *flood hazard areas* as established by Section 1612.3 unless a determination has been made that:

1. A showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site render the elevation standards of Section 1612 inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, cause fraud on or victimization of the public, or conflict with existing laws or ordinances.
4. A determination that the variance is the minimum necessary to afford relief, considering the *flood* hazard.
5. Submission to the applicant of written notice specifying the difference between the *design flood elevation* and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the *design flood elevation* increases risks to life and property.

[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, 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:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code,
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:
    2.1. Quality.
    2.2. Strength.
    2.3. Effectiveness.
    2.4. *Fire resistance*.
    2.5. Durability.
    2.6. Safety.

Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons why the alternative was not approved.

[A] 104.11.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved* sources.

[A] 104.11.2 Tests. Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an *approved agency*. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

SECTION 105
PERMITS

Deleted. See the North Carolina Administrative Code and Policies.

[A] 105.1 Required. 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, or to erect, install, enlarge, alter, *repair*, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be performed, shall first make application to the *building official* and obtain the required *permit*.

[A] 105.1.1 Annual permit. Instead of an individual *permit* for each *alteration* to an already *approved* electrical, gas, mechanical or plumbing installation, the *building official* is authorized to issue an annual *permit* upon application therefor to any person, firm or corporation regularly employing one or more qualified tradespersons in the building, structure or on the premises owned or operated by the applicant for the *permit*.

[A] 105.1.2 Annual permit records. The person to whom an annual *permit* is issued shall keep a detailed record of *alterations* made under such annual *permit*. The *building official* shall have access to such records at all times or such records shall be filed with the *building official* as designated.

[A] 105.2 Work exempt from permit. Exemptions from *permit* requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction. *Permits* shall not be required for the following:

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided that the floor area is not greater than 120 square feet (11 m^2).
2. Fences not over 7 feet (2134 mm) high.
3. Oil derricks.
4. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II or IIIA liquids.
5. Water tanks supported directly on grade if the capacity is not greater than 5,000 gallons (18 925 L) and the ratio of height to diameter or width is not greater than 2:1.
6. Sidewalks and driveways not more than 30 inches (762 mm) above adjacent grade, and not over any *basement* or *story* below and are not part of an *accessible route*.
7. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
8. Temporary motion picture, television and theater stage sets and scenery.
9. Prefabricated *swimming pools* accessory to a Group R-3 occupancy that are less than 24 inches (610 mm) deep, are not greater than 5,000 gallons (18 925 L) and are installed entirely above ground.
10. Shade cloth structures constructed for nursery or agricultural purposes, not including service systems.
11. Swings and other playground equipment accessory to detached one- and two-family *dwellings*.
12. Window awnings in Group R-3 and U occupancies, supported by an *exterior wall* that do not project more than 54 inches (1372 mm) from the *exterior wall* and do not require additional support.
13. Nonfixed and movable fixtures, cases, racks, counters and partitions not over 5 feet 9 inches (1753 mm) in height.

Electrical:

1. **Repairs and maintenance:** Minor repair work, including the replacement of lamps or the connection of *approved* portable electrical equipment to *approved* permanently installed receptacles.
2. **Radio and television transmitting stations:** The provisions of this code shall not apply to electrical equipment used for radio and television transmissions, but do apply to equipment and wiring for a power supply and the installations of towers and antennas.

3. **Temporary testing systems:** A *permit* shall not be required for the installation of any temporary system required for the testing or servicing of electrical equipment or apparatus.

Gas:

1. Portable heating appliance.
2. Replacement of any minor part that does not alter approval of equipment or make such equipment unsafe.

Mechanical:

1. Portable heating appliance.
2. Portable ventilation equipment.
3. Portable cooling unit.
4. Steam, hot or chilled water piping within any heating or cooling equipment regulated by this code.
5. Replacement of any part that does not alter its approval or make it unsafe.
6. Portable evaporative cooler.
7. Self-contained refrigeration system containing 10 pounds (4.54 kg) or less of refrigerant and actuated by motors of 1 horsepower (0.75 kW) or less.

Plumbing:

1. The stopping of leaks in drains, water, soil, waste or vent pipe, provided, however, that if any concealed trap, drain pipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a *permit* shall be obtained and inspection made as provided in this code.
2. The clearing of stoppages or the repairing of leaks in pipes, valves or fixtures and the removal and reinstallation of water closets, provided that such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

[A] 105.2.1 Emergency repairs. Where equipment replacements and repairs must be performed in an emergency situation, the *permit* application shall be submitted within the next working business day to the *building official*.

[A] 105.2.2 Public service agencies. A *permit* shall not be required for the installation, *alteration* or repair of generation, transmission, distribution or metering or other related equipment that is under the ownership and control of public service agencies by established right.

[A] 105.3 Application for permit. To obtain a *permit*, the applicant shall first file an application therefor in writing on a form furnished by the department of building safety for that purpose. Such application shall:

1. Identify and describe the work to be covered by the *permit* for which application is made.
2. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building or work.
3. Indicate the use and occupancy for which the proposed work is intended.
4. Be accompanied by *construction documents* and other information as required in Section 107.
5. State the valuation of the proposed work.
6. Be signed by the applicant, or the applicant's authorized agent.
7. Give such other data and information as required by the *building official*.

[A] 105.3.1 Action on application. The *building official* shall examine or cause to be examined applications for *permits* and amendments thereto within a reasonable time after filing. If the application or the *construction documents* do not conform to the requirements of pertinent laws, the *building official* shall reject such application in writing, stating the reasons therefor. If the *building official* is satisfied that the proposed work conforms to the requirements of this code and laws and ordinances applicable thereto, the *building official* shall issue a *permit* therefor as soon as practicable.

[A] 105.3.2 Time limitation of application. An application for a *permit* for any proposed work shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been pursued in good faith or a *permit* has been issued; except that the *building official* is authorized to grant one or more extensions of time for additional periods not exceeding 90 days each. The extension shall be requested in writing and justifiable cause demonstrated.

[A] 105.4 Validity of permit. The issuance or granting of a *permit* shall not be construed to be a *permit* for, or an approval of, any violation of any of the provisions of this code or of any other ordinance of the jurisdiction. *Permits* presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a *permit* based on *construction documents* and other data shall not prevent the *building official* from requiring the correction of errors in the *construction documents* and other data. The *building official* is authorized to prevent occupancy or use of a structure where in violation of this code or of any other ordinances of this jurisdiction.

[A] 105.5 Expiration. Every *permit* issued shall become invalid unless the work on the site authorized by such *permit* is commenced within 180 days after its issuance, or if the work authorized on the site by such *permit* is suspended or abandoned for a period of 180 days after the time the work is commenced. The *building official* is authorized to grant, in writing, one or more extensions of time, for periods not more than 180 days each. The extension shall be requested in writing and justifiable cause demonstrated.

[A] 105.6 Suspension or revocation. The *building official* is authorized to suspend or revoke a *permit* issued under the provisions of this code wherever the *permit* is issued in error or on the basis of incorrect, inaccurate or incomplete information, or in violation of any ordinance or regulation or any of the provisions of this code.

[A] 105.7 Placement of permit. The building *permit* or copy shall be kept on the site of the work until the completion of the project.

SECTION 106
FLOOR AND ROOF DESIGN LOADS

Deleted. See the North Carolina Administrative Code and Policies.

[A] 106.1 Live loads posted. In commercial or industrial buildings, for each floor or portion thereof designed for *live loads* exceeding 50 psf (2.40 kN/m^2), such design *live loads* shall be conspicuously posted by the *owner* or the owner's authorized agent in that part of each *story* in which they apply, using durable signs. It shall be unlawful to remove or deface such notices.

[A] 106.2 Issuance of certificate of occupancy. A certificate of occupancy required by Section 111 shall not be issued until the floor load signs, required by Section 106.1, have been installed.

[A] 106.3 Restrictions on loading. It shall be unlawful to place, or cause or permit to be placed, on any floor or roof of a building, structure or portion thereof, a *load* greater than is permitted by this code.

SECTION 107
CONSTRUCTION DOCUMENTS

Deleted. See the North Carolina Administrative Code and Policies.

[A] 107.1 General. 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. Where special conditions exist, the *building official* is authorized to require additional *construction documents* to be prepared by a *registered design professional*.

Exception: The *building official* is authorized to waive the submission of *construction documents* and other data not required to be prepared by a *registered design professional* if it is found that the nature of the work applied for is such that review of *construction documents* is not necessary to obtain compliance with this code.

[A] 107.2 Construction documents. *Construction documents* shall be in accordance with Sections 107.2.1 through 107.2.8.

[A] 107.2.1 Information on construction documents. *Construction documents* shall be dimensioned and drawn on suitable material. Electronic media documents are permitted to be submitted where *approved* by the *building official*. *Construction documents* shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the *building official*.

[A] 107.2.2 Fire protection system shop drawings. Shop drawings for the *fire protection systems* shall be submitted to indicate conformance to this code and the *construction documents* and shall be *approved* prior to the start of system installation. Shop drawings shall contain all information as required by the referenced installation standards in Chapter 9.

[A] 107.2.3 Means of egress. The *construction documents* shall show in sufficient detail the location, construction, size and character of all portions of the *means of egress* including the path of the exit discharge to the *public way* in compliance with the provisions of this code. In other than occupancies in Groups R-2, R-3, and I-1, the *construction documents* shall designate the number of occupants to be accommodated on every floor, and in all rooms and spaces.

[A] 107.2.4 Exterior wall envelope. *Construction documents* for all buildings shall describe the *exterior wall envelope* in sufficient detail to determine compliance with this code. The *construction documents* shall provide details of the *exterior wall envelope* as required, including flashing, intersections with dissimilar materials, corners, end details, control joints, intersections at roof, eaves or parapets, means of drainage, water-resistive barrier and details around openings.

The *construction documents* shall include manufacturer's installation instructions that provide supporting documentation that the proposed penetration and opening details described in the *construction documents* maintain the weather resistance of the *exterior wall envelope*. The supporting documentation shall fully describe the *exterior wall* system that was tested, where applicable, as well as the test procedure used.

[A] 107.2.5 Exterior balconies and elevated walking surfaces. Where balconies or other elevated walking surfaces have *weather-exposed surfaces*, and the structural framing is protected by an impervious moisture barrier, the *construction documents* shall include details for all elements of the impervious moisture barrier system. The *construction documents* shall include manufacturer's installation instructions.

[A] 107.2.6 Site plan. The *construction documents* submitted with the application for *permit* shall be accompanied by a site plan showing to scale the size and location of new construction and *existing structures* on the *site*, distances from *lot lines*, the established street grades and the proposed finished grades and, as applicable, *flood hazard areas*, *floodways*, and *design flood elevations*; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the *site* plan shall show construction to be demolished and the location and size of *existing structures* and construction that are to remain on the *site* or plot. The *building official* is authorized to waive or modify the requirement for a site plan where the application for *permit* is for *alteration* or *repair* or where otherwise warranted.

[A] 107.2.6.1 Design flood elevations. Where *design flood elevations* are not specified, they shall be established in accordance with Section 1612.3.1.

[A] 107.2.7 Structural information. The *construction documents* shall provide the information specified in Section 1603.

107.2.8 Relocatable buildings. *Construction documents* for *relocatable buildings* shall comply with Section 3112.

[A] 107.3 Examination of documents. The *building official* shall examine or cause to be examined the accompanying submittal documents and shall ascertain by such examinations whether the construction indicated and described is in accordance with the requirements of this code and other pertinent laws or ordinances.

[A] 107.3.1 Approval of construction documents. When the *building official* issues a *permit*, the *construction documents* shall be *approved*, in writing or by stamp, as "Reviewed for Code Compliance." One set of *construction documents* so reviewed shall be retained by the *building official*. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the *building official* or a duly authorized representative.

[A] 107.3.2 Previous approvals. This code shall not require changes in the *construction documents*, construction or designated occupancy of a structure for which a lawful *permit* has been heretofore issued or otherwise lawfully author-

ized, and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.

[A] 107.3.3 Phased approval. The *building official* is authorized to issue a *permit* for the construction of foundations or any other part of a building or structure before the *construction documents* for the whole building or structure have been submitted, provided that adequate information and detailed statements have been filed complying with pertinent requirements of this code. The holder of such *permit* for the foundation or other parts of a building or structure shall proceed at the holder's own risk with the building operation and without assurance that a *permit* for the entire structure will be granted.

[A] 107.3.4 Design professional in responsible charge. Where it is required that documents be prepared by a *registered design professional*, the *building official* shall be authorized to require the *owner* or the owner's authorized agent to engage and designate on the building *permit* application a *registered design professional* who shall act as the *registered design professional in responsible charge*. If the circumstances require, the *owner* or the owner's authorized agent shall designate a substitute *registered design professional in responsible charge* who shall perform the duties required of the original *registered design professional in responsible charge*. The *building official* shall be notified in writing by the *owner* or the owner's authorized agent if the *registered design professional in responsible charge* is changed or is unable to continue to perform the duties.

The *registered design professional in responsible charge* shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building.

[A] 107.3.4.1 Deferred submittals. Deferral of any submittal items shall have the prior approval of the *building official*. The *registered design professional in responsible charge* shall list the *deferred submittals* on the *construction documents* for review by the *building official*.

Documents for *deferred submittal* items shall be submitted to the *registered design professional in responsible charge* who shall review them and forward them to the *building official* with a notation indicating that the *deferred submittal* documents have been reviewed and found to be in general conformance to the design of the building. The *deferred submittal* items shall not be installed until the *deferred submittal* documents have been *approved* by the *building official*.

[A] 107.4 Amended construction documents. Work shall be installed in accordance with the *approved construction documents*, and any changes made during construction that are not in compliance with the *approved construction documents* shall be resubmitted for approval as an amended set of *construction documents*.

[A] 107.5 Retention of construction documents. One set of *approved construction documents* shall be retained by the *building official* for a period of not less than 180 days from date of completion of the permitted work, or as required by state or local laws.

SECTION 108
TEMPORARY STRUCTURES AND USES

Deleted. See the North Carolina Administrative Code and Policies and Section 3103.

[A] 108.1 General. 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.

[A] 108.2 Conformance. Temporary structures and uses shall comply with the requirements in Section 3103.

[A] 108.3 Temporary power. The *building official* is authorized to give permission to temporarily supply and use power in part of an electric installation before such installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in NFPA 70.

[A] 108.4 Termination of approval. 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.

SECTION 109
FEES

Deleted. See the North Carolina Administrative Code and Policies.

[A] 109.1 Payment of fees. A *permit* shall not be valid until the fees prescribed by law have been paid, nor shall an amendment to a *permit* be released until the additional fee, if any, has been paid.

[A] 109.2 Schedule of permit fees. Where a *permit* is required, a fee for each *permit* shall be paid as required, in accordance with the schedule as established by the applicable governing authority.

[A] 109.3 Permit valuations. The applicant for a *permit* shall provide an estimated *permit* value at time of application. *Permit* valuations shall reflect the total value of work, including materials and labor, for which the *permit* is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. If, in the opinion of the *building official*, the valuation is underestimated on the application, the *permit* shall be denied, unless the applicant can show detailed estimates to meet the approval of the *building official*. Final building *permit* valuation shall be set by the *building official*.

[A] 109.4 Work commencing before permit issuance. Any person who commences any work before obtaining the necessary *permits* shall be subject to a fee established by the *building official* that shall be in addition to the required *permit* fees.

[A] 109.5 Related fees. The payment of the fee for the construction, *alteration*, removal or demolition for work done in connection to or concurrently with the work authorized by a building *permit* shall not relieve the applicant or holder of the *permit* from the payment of other fees that are prescribed by law.

[A] 109.6 Refunds. The *building official* is authorized to establish a refund policy.

SECTION 110
INSPECTIONS

Deleted. See the North Carolina Administrative Code and Policies.

[A] 110.1 General. 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 this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid. It shall be the duty of the *owner* or the owner's authorized agent to cause the work to remain visible and able to be accessed for inspection purposes. Neither the *building official* nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

[A] 110.2 Preliminary inspection. Before issuing a *permit*, the *building official* is authorized to examine or cause to be examined buildings, structures and *sites* for which an application has been filed.

[A] 110.3 Required inspections. The *building official*, upon notification, shall make the inspections set forth in Sections 110.3.1 through 110.3.12.

[A] 110.3.1 Footing and foundation inspection. Footing and foundation inspections shall be made after excavations for footings are complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. Materials for the foundation shall be on the job, except where concrete is ready mixed in accordance with ASTM C94, the concrete need not be on the job.

[A] 110.3.2 Concrete slab and under-floor inspection. Concrete slab and under-floor inspections shall be made after in-slab or under-floor reinforcing steel and building service equipment, conduit, piping accessories and other ancillary equipment items are in place, but before any concrete is placed or floor sheathing installed, including the subfloor.

[A] 110.3.3 Lowest floor elevation. In *flood hazard areas*, upon placement of the *lowest floor*, including the *basement*, and prior to further vertical construction, the elevation certification required in Section 1612.4 or the *International Residential Code*, as applicable, shall be submitted to the *building official*.

[A] 110.3.4 Frame inspection. Framing inspections shall be made after the roof deck or sheathing, all framing, *fire blocking* and bracing are in place and pipes, chimneys and vents to be concealed are complete and the rough electrical, plumbing, heating wires, pipes and ducts are *approved*.

[A] 110.3.5 Types IV-A, IV-B and IV-C connection protection inspection. In buildings of Types IV-A, IV-B and IV-C construction, where connection *fire resistance ratings* are provided by wood cover calculated to meet the requirements of Section 2304.10.1, inspection of the wood cover shall be made after the cover is installed, but before any other coverings or finishes are installed.

[A] 110.3.6 Lath, gypsum board and gypsum panel product inspection. Lath, *gypsum board* and *gypsum panel product* inspections shall be made after lathing, *gypsum board* and *gypsum panel products*, interior and exterior, are in place, but before any plastering is applied or *gypsum board* and *gypsum panel product* joints and fasteners are taped and finished.

Exception: *Gypsum board* and *gypsum panel products* that are not part of a fire resistance rated assembly or a shear assembly.

[A] 110.3.7 Weather-exposed balcony and walking surface waterproofing. Where balconies or other elevated walking surfaces have *weather-exposed surfaces*, and the structural framing is protected by an impervious moisture barrier, all elements of the impervious moisture barrier system shall not be concealed until inspected and *approved*.

Exception: Where *special inspections* are provided in accordance with Section 1705.1.1, Item 3.

[A] 110.3.8 Fire- and smoke-resistant penetrations. Protection of joints and penetrations in fire-resistance-rated assemblies, *smoke barriers* and *smoke partitions* shall not be concealed from view until inspected and *approved*.

[A] 110.3.9 Energy efficiency inspections. Inspections shall be made to determine compliance with Chapter 13 and shall include, but not be limited to, inspections for: envelope insulation *R*- and *U*-values, *fenestration U*-value, duct system *R*-value, and HVAC and water-heating equipment efficiency.

[A] 110.3.10 Other inspections. In addition to the inspections specified in Sections 110.3.1 through 110.3.9, the *building official* is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced by the department of building safety.

[A] 110.3.11 Special inspections. For *special inspections*, see Chapter 17.

[A] 110.3.12 Final inspection. The final inspection shall be made after all work required by the building *permit* is completed.

[A] 110.3.12.1 Flood hazard documentation. If located in a *flood hazard area*, documentation of the elevation of the *lowest floor* as required in Section 1612.4 shall be submitted to the *building official* prior to the final inspection.

[A] 110.4 Inspection agencies. The *building official* is authorized to accept reports of *approved* inspection agencies, provided that such agencies satisfy the requirements as to qualifications and reliability.

[A] 110.5 Inspection requests. It shall be the duty of the holder of the building *permit* or their duly authorized agent to notify the *building official* when work is ready for inspection. It shall be the duty of the *permit* holder to provide access to and means for inspections of such work that are required by this code.

[A] 110.6 Approval required. 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 the *permit* holder's agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected and such portion shall not be covered or concealed until authorized by the *building official*.

SECTION 111
CERTIFICATE OF OCCUPANCY

Deleted. See the North Carolina Administrative Code and Policies.

[A] 111.1 Change 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 this code or of other ordinances of the *jurisdiction*. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the *jurisdiction* shall not be valid.

Exception: Certificates of occupancy are not required for work exempt from *permits* in accordance with Section 105.2.

[A] 111.2 Certificate issued. After the *building official* inspects the building or structure and does not find violations of the provisions of this code or other laws that are enforced by the department, the *building official* shall issue a certificate of occupancy that contains the following:

1. The *permit* number.
2. The address of the structure.
3. The name and address of the *owner* or the owner's authorized agent.
4. A description of that portion of the structure for which the certificate is issued.
5. A statement that the described portion of the structure has been inspected for compliance with the requirements of this code.
6. The name of the *building official*.
7. The edition of the code under which the *permit* was issued.
8. The use and occupancy, in accordance with the provisions of Chapter 3.
9. The type of construction as defined in Chapter 6.
10. The design *occupant load*.
11. Where an *automatic sprinkler system* is provided, whether the sprinkler system is required.
12. Any special stipulations and conditions of the building *permit*.

[A] 111.3 Temporary occupancy. The *building official* is authorized to issue a temporary certificate of occupancy before the completion of the entire work covered by the *permit*, provided that such portion or portions shall be occupied safely. The *building official* shall set a time period during which the temporary certificate of occupancy is valid.

[A] 111.4 Revocation. The *building official* is authorized to suspend or revoke a certificate of occupancy or completion issued under the provisions of this code, in writing, wherever the certificate is issued in error, or on the basis of incorrect information supplied, or where it is determined that the building or structure or portion thereof is in violation of the provisions of this code or other ordinance of the *jurisdiction*.

SECTION 112
SERVICE UTILITIES

Deleted. See the North Carolina Administrative Code and Policies.

[A] 112.1 Connection of service utilities. A person shall not make connections from a utility, a source of energy, fuel, or power, or a water system or sewer system to any building or system that is regulated by this code for which a *permit* is required, until approved by the *building official*.

[A] 112.2 Temporary connection. The *building official* shall have the authority to authorize the temporary connection of the building or system to the utility, the source of energy, fuel, or power, or the water system or sewer system for the purpose of testing systems or for use under a temporary approval.

[A] 112.3 Authority to disconnect service utilities. The *building official* shall have the authority to authorize disconnection of utility service to the building, structure or system regulated by this code and the referenced codes and standards in case of emergency where necessary to eliminate an immediate hazard to life or property or where such utility connection has been made without the approval required by Section 112.1 or 112.2. The *building official* shall notify the serving utility, and wherever possible the *owner* or the owner's authorized agent and occupant of the building, structure or service

system of the decision to disconnect prior to taking such action. If not notified prior to disconnecting, the *owner* or the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing, as soon as practical thereafter.

SECTION 113
MEANS OF APPEALS

Deleted. See the North Carolina Administrative Code and Policies.

[A] 113.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *building official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *building official*.

[A] 113.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code or interpret the administration of this code.

[A] 113.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the jurisdiction.

[A] 113.4 Administration. The *building official* shall take immediate action in accordance with the decision of the board.

SECTION 114
VIOLATIONS

Deleted. See the North Carolina Administrative Code and Policies.

[A] 114.1 Unlawful acts. It shall be unlawful for any person, firm or corporation to erect, construct, alter, extend, *repair*, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of this code.

[A] 114.2 Notice of violation. The *building official* is authorized to serve a notice of violation or order on the person responsible for the erection, construction, *alteration*, extension, *repair*, moving, removal, demolition or occupancy of a building or structure in violation of the provisions of this code, or in violation of a *permit* or certificate issued under the provisions of this code. Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

[A] 114.3 Prosecution of violation. If the notice of violation is not complied with promptly, the *building official* is authorized to request the legal counsel of the jurisdiction to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation, or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this code or of the order or direction made pursuant thereto.

[A] 114.4 Violation penalties. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who erects, constructs, alters or repairs a building or structure in violation of the *approved construction documents* or directive of the *building official*, or of a *permit* or certificate issued under the provisions of this code, shall be subject to penalties as prescribed by law.

SECTION 115
STOP WORK ORDER

Deleted. See the North Carolina Administrative Code and Policies.

[A] 115.1 Authority. Where the *building official* finds any work regulated by this code being performed in a manner contrary to the provisions of this code or in a *dangerous* or unsafe manner, the *building official* is authorized to issue a stop work order.

~~**[A] 115.2 Issuance.** The stop-work order shall be in writing and shall be given to the *owner* of the property, the owner's authorized agent or the person performing the work. Upon issuance of a stop-work order, the cited work shall immediately cease. The stop-work order shall state the reason for the order and the conditions under which the cited work is authorized to resume.~~

~~**[A] 115.3 Emergencies.** Where an emergency exists, the *building official* shall not be required to give a written notice prior to stopping the work.~~

~~**[A] 115.4 Failure to comply.** Any person who shall continue any work after having been served with a stop-work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to fines established by the authority having *jurisdiction*.~~

SECTION 116
UNSAFE STRUCTURES AND EQUIPMENT

116.1 General. Unsafe structures and equipment must comply with the *NC Administrative Code and Policies*, Section 204.2.8.

116.2 Public access. The structure owner or his representative shall secure the unsafe structure by a method *approved* by the local *building official* to prevent public access. The *approved* method shall be in place within the time limit specified in writing by the *building official* in the notice of unsafe building.

~~**[A] 116.1 Unsafe conditions.** Structures or existing equipment that are or hereafter become unsafe, insanitary or deficient because of inadequate *means of egress* facilities, inadequate light and *ventilation*, or that constitute a fire hazard, or are otherwise *dangerous* to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance, shall be deemed an unsafe condition. Unsafe structures shall be taken down and removed or made safe, as the *building official* deems necessary and as provided for in this section. A vacant structure that is not secured against unauthorized entry shall be deemed unsafe.~~

~~**[A] 116.2 Record.** The *building official* shall cause a report to be filed on an unsafe condition. The report shall state the occupancy of the structure and the nature of the unsafe condition.~~

~~**[A] 116.3 Notice.** If an unsafe condition is found, the *building official* shall serve on the *owner* of the structure, or the owner's authorized agent, a written notice that describes the condition deemed unsafe and specifies the required repairs or improvements to be made to abate the unsafe condition, or that requires the unsafe structure to be demolished within a stipulated time. Such notice shall require the person thus notified to declare immediately to the *building official* acceptance or rejection of the terms of the order.~~

~~**[A] 116.4 Method of service.** Such notice shall be deemed properly served where a copy thereof is served in accordance with one of the following methods:~~

1. ~~A copy is delivered to the *owner* personally.~~
2. ~~A copy is sent by certified or registered mail addressed to the *owner* at the last known address with the return receipt requested.~~
3. ~~A copy is delivered in any other manner as prescribed by local law.~~

~~If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner on the owner's authorized agent shall constitute service of notice on the *owner*.~~

~~**[A] 116.5 Restoration or abatement.** Where the structure or equipment determined to be unsafe by the *building official* is restored to a safe condition, the owner, the owner's authorized agent, operator or occupant of a structure, premises or equipment deemed unsafe by the *building official* shall abate or cause to be abated or corrected such unsafe conditions either by repair, rehabilitation, demolition or other approved corrective action. To the extent that repairs, *alterations* or *additions* are made or a *change of occupancy* occurs during the restoration of the structure, such *repairs*, *alterations*, *additions* and *change of occupancy* shall comply with the requirements of the *International Existing Building Code*.~~

CHAPTER 2
DEFINITIONS

~~**User notes:**~~

~~***About this chapter:*** *Codes, by their very nature, are technical documents. Every word, term and punctuation mark can add to or change the meaning of a technical requirement. It is necessary to maintain a consensus on the specific meaning of each term contained in the code. Chapter 2 performs this function by stating clearly what specific terms mean for the purposes of the code.*~~

~~***Code development reminder:*** *Code change proposals to sections preceded by the designation [A] or [BS] will be considered by one of the code development committees meeting during the 2022 (Group B) Code Development Cycle.*~~

SECTION 202
DEFINITIONS

ACCEPTED ENGINEERING PRACTICE. Design analysis and testing methods that are used in developing design solutions for compliance with the requirements of this code. Accepted engineering practice is the level at which the average, prudent designer in a given community would practice.

AMBULATORY. Able to respond and evacuate without any physical assistance or verbal prompting during emergency conditions.

[A] APPROVED. Acceptable to the *building official* for compliance with the provisions of the applicable code or referenced standard.

BED AND BREAKFAST HOME. A detached single-family dwelling occupied by the dwelling owner and containing eight or fewer guest rooms for rent for a period of less than one week.

[BS] COASTAL A ZONE. Area within a *special flood hazard area*, landward of a V zone or landward of an open coast without mapped *coastal high-hazard areas*. In a *coastal A zone*, the principal source of *flooding* must be astronomical tides, storm surges, seiches or tsunamis, not riverine *flooding*. During the *base flood* conditions, the potential for breaking wave height shall be greater than or equal to $1^1/_2$ feet (457 mm). The inland limit of the *coastal A zone* is (a) the *Limit of Moderate Wave Action* if delineated on a FIRM~~, or (b) designated by the authority having jurisdiction~~.

[F] COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property where the motor vehicle ~~meets on of the following~~:

1. Has a gross vehicle weight rating of 26,001 ~~10,000~~ pounds (11,794 kg) ~~(454 kg)~~ or more~~.~~; or
2. Is designed to transport 16 or more passengers, including the driver.

CONDOMINIUM. Two or more Group R-3 dwellings located on a single parcel of land and Group R-2 dwellings where each Group R-3 and Group R-2 dwelling is separately owned.

COOPERATIVE INNOVATIVE HIGH SCHOOL PROGRAM. A program to supplement the required curriculum for high school students that may require attendance at a college, community college or university.

[BF] ELECTRICAL CIRCUIT PROTECTIVE SYSTEM. A specific construction of devices, materials, or coatings installed as a fire-resistive barrier system applied to electrical system components~~, such as cable trays, conduits and other raceways, open run cables and conductors, cables, and conductors~~].

FARM BUILDING. Any *building* not used for sleeping purposes that is not accessed by the general public and is used primarily for a farm purpose. Farm purposes includes structures or *buildings* for equipment, storage and processing of agricultural products or commodities such as: crops, fruits, vegetables, ornamental or flowering plants, dairy, timber, livestock, poultry and all other such forms of agricultural products by the specific farm on which the structure or *building* is located. Farm purposes do not include structures or *buildings* for uses such as education facilities, research facilities, or aircraft hangers.

[BF] FIBER-REINFORCED POLYMER (FRP). ~~A polymeric composite material consisting of reinforcement fibers, such as glass, impregnated with a fiber binding polymer which is then molded and hardened. Fiber reinforced polymers are permitted to contain cores laminated between fiber-reinforced polymer facings.~~ A polymeric composite material consisting of reinforcement fibers, impregnated with a fiber-binding polymer, such as glass, carbon, aramid, or hybrid com-

binations of these fiber types; which are then molded and hardened. Fiber-reinforced polymers are permitted to contain cores laminated between fiber-reinforced polymer facings.

[F] FIREWORKS. Any composition or device for the purpose of producing a visible or audible effect for entertainment purposes by combustion, *deflagration* or *detonation* that meets the definition of 1.4G fireworks or 1.3G fireworks.

Fireworks, 1.3G. Large fireworks devices, which are explosive materials, intended for use in fireworks displays and designed to produce audible or visible effects by combustion, *deflagration* or *detonation*. Such 1.3G fireworks include, but are not limited to, firecrackers containing more than 130 milligrams (2 grains) of explosive composition, aerial shells containing more than 40 grams of pyrotechnic composition, and other display pieces which exceed the limits for classification as 1.4G fireworks. Such 1.3G fireworks are also described as fireworks, UN0335 by the DOTn.

Fireworks, 1.4G. Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for fireworks, UN0336, and the US Consumer Product Safety Commission (CPSC) as set forth in CPSC 16 CFR: Parts 1500 and 1507.

Fireworks, 1.4G. ~~Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion. Such 1.4G fireworks which comply with the construction, chemical composition and labeling regulations of the DOTn for Fireworks, UN 0336, and the U.S. Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507, are not *explosive materials* for the purpose of this code. (Formerly known as Class C Common Fireworks.)~~ **North Carolina General Statute 14-414.** The following fireworks are allowed to be sold, used or possessed without a permit:

1. Explosive caps designed to be fired in toy pistols, provided that the explosive mixture of the explosive caps shall not exceed twenty-five hundredths (0.25) of a gram for each cap;

2. Snake and glow worms composed of pressed pellets of a pyrotechnic mixture that produce a large, snake-like ash when burning;

3. Smoke devices consisting of tube or sphere containing a pyrotechnic mixture that produce white or colored smoke;

4. Trick noise makers which produce a small report designed to surprise the user which include:

   4.1 A party popper, which is a small plastic or paper item containing not in excess of 16 milligrams of explosive mixture. A string protruding from the device is pulled to ignite the device, expelling paper streamers and producing a small report.

   4.2 A string popper, which is small tube containing not in excess of 16 milligrams of explosive mixture with a string protruding from both ends. The strings are pulled to ignite the friction-sensitive mixture, producing a small report.

   4.3 A snapper or drop pop, which is a small paper-wrapped item containing no more than 16 milligrams of explosive mixture coated on small bits of sand. When dropped, the device produces a small report.

5. Wire sparklers consisting of wire or stick coated with nonexplosive mixture that produces a shower of sparks upon ignition. These items must not exceed 100 grams of mixture per item;

6. Other sparkling devices which emit showers of sparks and sometimes a whistling or crackling effect when burning, do not detonate or explode, do not spin, are hand-held or ground-based, cannot propel themselves through the air and contain not more than 75 grams of chemical compound per tube or not more than 200 grams of chemical compound if multiple tubes are used.

LADDER. As described by OSHA standard 29 CFR 1910 – General Industry, Part 1910.23 – Fixed Ladders.

LICENSING AGENCY. A North Carolina State licensing or certification agency that has regulatory authority to create and enforce rules and regulation for a facility or building.

MEMBRANE STRUCTURE. An *air-supported, air-inflated, membrane-covered cable, membrane-covered frame* or *tensile membrane structure* and not otherwise defined as a *tent*.

NIGHTCLUB. An A-2 occupancy meeting all of the following conditions:

1. The aggregate floor area of concentrated use and standing space that is used for dancing and/or viewing of performers exceeds 10 percent of the Group A-2 fire area, excluding adjacent lobby areas; and
2. Provides live or recorded entertainment by performing artist; and
3. Allows alcoholic beverages consumption.

[BG] NURSING HOMES. Facilities that provide care on a 24-hour basis, including both intermediate care facilities and skilled nursing facilities where any of the persons are *incapable of self-preservation*.

OPEN AIR CAMP CABIN. A single-story residential building that has three walls consisting of at least twenty percent (20%) screened openings with a maximum height of 44 inches above the finished floor to the bottom of the openings, has no heating or cooling system, is occupied for no more than 150 days within any rolling 365-day time span.

[A] REGISTERED DESIGN PROFESSIONAL. An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or *jurisdiction* in which the project is to be constructed. Design by a registered design professional is not required where exempt under the registration or licensure laws.

RESPITE CARE FACILITY. A facility that provides overnight, temporary custodial care to no more than 6 individuals who are elderly, have physical disability or mental impairment. The length of stay shall not to exceed 14 consecutive calendar days and 60 total days annually per recipient.

TEMPORARY OVERFLOW SHELTER. A shelter that provides Temporary Overflow accommodations from an approved homeless shelter in accordance with Section 429.

[A] TOWNHOUSE. A single-family *dwelling unit* constructed in a group of ~~three~~ two or more attached units separated by property lines or assumed property line in which each unit extends from ~~the~~ foundation to roof and with yard or public way ~~open space~~ on ~~at least~~ not less than two sides.

[BS] WINDBORNE DEBRIS REGION. ~~Areas within *hurricane-prone regions* located:~~

~~1. Within 1 mile (1.61 km) of the mean high-water line where an Exposure D condition exists upwind at the waterline and the basic design wind speed, *V*, is 130 mph (58 m/s) or greater; or~~

~~2. In areas where the basic design wind speed is 140 mph (63 m/s) or greater.~~

~~For *Risk Category* II buildings and structures and Risk Category III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure 1609.3.(1). For *Risk Category* IV buildings and structures and *Risk Category* III health care facilities, the windborne debris region shall be based on Figure 1609.3(2).~~

Areas within hurricane-prone regions defined as that area east of the inland waterway from the North Carolina/South Carolina state line north to Beaufort Inlet and from that point to include the barrier islands to the North Carolina/Virginia state line.

CHAPTER 3

OCCUPANCY CLASSIFICATION AND USE

~~**User note:**~~

~~***About this chapter:*** *Chapter 3 provides the criteria by which buildings and structures are classified into use groups and occupancies. Through the balance of the code, occupancy classification is fundamental in the setting of features of construction; occupant safety requirements, especially building limitations; means of egress; fire protection systems; and interior finishes.*~~

SECTION 304
BUSINESS GROUP B

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

Airport traffic control towers

Ambulatory care facilities

Animal hospitals, kennels and pounds

Banks

Barber and beauty shops

Car wash

Civic administration

Clinic, outpatient

Dry cleaning and laundries: pick-up and delivery stations and self-service

Educational occupancies for high school students participating in *Cooperative Innovative High School Programs* taught at colleges, community colleges or universities.

Educational occupancies for students above the 12th grade including *higher education laboratories*

Electronic data processing

Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m^2) in area

Laboratories: testing and research

Motor vehicle showrooms, including vehicle service check-in areas

Post offices

Print shops

Professional services (architects, attorneys, dentists, physicians, engineers, etc.)

Radio and television stations

Telephone exchanges

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

SECTION 305
EDUCATIONAL GROUP E

305.1.2 Cooperative innovative high school programs. Educational occupancies for high school students participating in Cooperative Innovative High School Programs taught at colleges, community colleges or universities shall be classified as Group B occupancies.

305.1.3 Drop-in/short-term childcare. Drop-in/short-term childcare facility as defined in North Carolina G.S. 110-86(2)(d) & (d1) shall be classified as Group E.

SECTION 306
FACTORY GROUP F

306.2 Moderate-hazard factory industrial, Group F-1. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

Aircraft (manufacturing, not to include repair)

Appliances

Athletic equipment

Automobiles and other motor vehicles

Bakeries

Beverages: over 16-percent alcohol content

Bicycles

Boats

Brooms or brushes

Business machines

Cameras and photo equipment

Canvas or similar fabric

Carpets and rugs (includes cleaning)

Clothing

Construction and agricultural machinery

Disinfectants

Dry cleaning and dyeing

Electric generation plants

Electronics

Energy storage systems (ESS) in dedicated use buildings

Engines (including rebuilding)

Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m^2) in area

Furniture

Hemp products

Jute products

Laundries

Leather products

Machinery

Metals

Millwork (sash and door)

Motion pictures and television filming (without spectators)

Musical instruments

Optical goods

Paper mills or products

Photographic film

Plastic products

Printing or publishing

Processing and extraction facilities

Recreational vehicles

Refuse incineration

Shoes

Soaps and detergents

Textiles

Tobacco

Trailers

Upholstering

~~Water/sewer treatment facilities~~

Wood; distillation

Woodworking (cabinet)

306.2.2 Processing and extraction facilities. Processing and extraction facilities shall comply with Chapter 39 of the *International Fire Code*.

SECTION 308
INSTITUTIONAL GROUP I

308.3.1.1 Condition 1 (Ambulatory)**.** This occupancy condition shall include facilities that provide nursing and *medical care* but do not provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to ~~*nursing homes* and~~ *foster care facilities.*

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

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

Respite Care Facility licensed as I-4 day care facilities

308.6.5 Drop-in/short-term child care. Drop-in/short-term child care facility as defined in North Carolina G.S. 110-86(2)(d) & (d1) shall be classified as Group E.

SECTION 310
RESIDENTIAL GROUP R

310.2 Residential Group R-1. Residential Group R-1 occupancies containing *sleeping units* where the occupants are primarily *transient* in nature, including:

Boarding houses (*transient*) with more than 10 occupants

Congregate living facilities (*transient*) with more than 10 occupants

Hotels (*transient*)

Motels (*transient*)

Open air camp cabin (transient) with 17 to 36 occupants

310.3 Residential Group R-2. Residential Group R-2 occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature, including:

Apartment houses

Congregate living facilities (nontransient) with more than 16 occupants

Boarding houses (*nontransient*)

Convents

Dormitories

Fraternities and sororities

Monasteries

Hotels (nontransient)

Live/work units

Motels (nontransient)

Open air camp cabin (nontransient) with 17 to 36 occupants

Vacation timeshare properties

310.4 Residential Group R-3. Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I, including:

Buildings that do not contain more than two *dwelling units*

Adult Day Care facilities that provide accommodations for five or fewer persons receiving care

Child Day Care facilities that provide accommodations for eight or fewer persons with no more than five for a pre-school for less than 24 hours.

Congregate living facilities (nontransient) with 16 or fewer occupants

Boarding houses (nontransient)

Convents

Dormitories

Fraternities and sororities

Monasteries

Congregate living facilities (*transient*) with 10 or fewer occupants

Boarding houses (*transient*)

Lodging houses ~~(*transient*)~~ *(Bed and Breakfast)* with ~~five~~ eight or fewer *guest rooms* ~~and 10 or fewer occupants~~

~~Licensed Small Residential Care Facilities complying with Section 428.3~~

Open air camp cabin with 16 or fewer occupants

~~*Respite Care Facilities* licensed as Small Residential Care Facilities~~

310.4.1 Care facilities within a dwelling. Deleted. See *North Carolina Residential Code* Section R332. ~~Care facilities for five or fewer persons receiving care that are within a single family dwelling are permitted to comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.~~

~~**Exception:** Respite Care Facilities shall be provided with a NFPA 13 sprinkler system complying with Section 903.3.1.1.~~

310.4.2 Lodging houses / Bed and Breakfast. Owner-occupied *lodging houses* with eight or fewer *guest rooms* shall be permitted to be constructed in accordance with the *International Residential Code*. ~~, provided that an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.~~

310.5 Residential Group R-4. Residential Group R-4 occupancy shall include buildings, structures or portions thereof for more than five but not more than 16 persons, excluding staff, who reside on a *24-hour basis* in a supervised residential environment and receive *custodial care*. Buildings of Group R-4 shall be classified as one of the occupancy conditions specified in Section 310.5.1 or 310.5.2. This group shall include, but not be limited to, the following:

Alcohol and drug centers

Assisted living facilities

Adult Day Care facilities, less than 24-hour basis

Child Day Care facilities, less than 24-hour basis

Congregate care facilities

Group homes

Halfway houses

Large Residential Care Facilities complying with Section 430.5

Residential board and care facilities

Respite Care Facilities licensed as Large Residential Care Facilities

Social rehabilitation facilities

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.

SECTION 311
STORAGE GROUP S

311.1.2 Combustible storage. ~~High-piled stock or rack storage, or *attic*~~ *Attic*, under-floor and concealed spaces used for storage of combustible materials, shall be in accordance with Section 413.

311.1.2.1 High-piled storage. High-piled combustible storage or rack storage shall be in accordance with Section 413 and with Chapter 32 of the *International Fire Code*.

SECTION 312
UTILITY AND MISCELLANEOUS GROUP U

312.1 General. 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 this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

Agricultural buildings

Aircraft hangars, accessory to a one- or two-family residence (see Section 412.4)

Barns

Carports

Communication equipment structures with a *gross floor area* of less than 1,500 square feet (139 m^2)

Fences and ground signs more than 7 feet (2134 mm) in height

Grain silos, accessory to a residential occupancy

Livestock shelters

Photovoltaic panel system (mounted at grade)

Private garages

Retaining walls

Sheds

Stables

Tanks

Towers

CHAPTER 4
SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

~~**User note:**~~

~~***About this chapter:*** *Chapter 4 provides detailed criteria for special uses and occupancies. The unique characteristics of a live/work unit as opposed to a 30-story high-rise building call for specific standards for each. Twenty-seven sections address covered and open mall buildings, atriums, hospitals, stages, buildings where hazardous materials are used and stored, jails and prisons, ambulatory care facilities and storm shelters, among other special occupancy issues.*~~

SECTION 404
ATRIUMS

[F] 404.3 Automatic sprinkler protection. An *approved automatic sprinkler system* shall be installed throughout the entire building.

Exceptions:

1. That area of a building adjacent to or above the *atrium* need not be sprinklered provided that portion of the building is separated from the *atrium* portion by not less than 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both.
2. Where the ceiling of the *atrium* is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the *atrium* is not required.
3. ~~Sprinkler protection is not required for atriums that connect only two stories unless required by other sections of this code.~~

SECTION 407
GROUP I-2

407.2.5 Nursing home and licensed adult care home housing units. In Group I-2, Condition 2~~1~~ occupancies, in areas where *nursing home* residents are housed, shared living spaces, group meeting or multipurpose therapeutic spaces shall be permitted to be open to the *corridor*, where all of the following criteria are met:

1. The walls and ceilings of the space are constructed as required for *corridors*.
2. The spaces are not occupied as resident sleeping rooms, treatment rooms, incidental uses in accordance with Section 509, or hazardous uses.
3. The open space is protected by an *automatic* fire detection system installed in accordance with Section 907.
4. The *corridors* onto which the spaces open, in the same *smoke compartment*, are protected by an *automatic* fire detection system installed in accordance with Section 907, or the *smoke compartment* in which the spaces are located is equipped throughout with quick-response sprinklers in accordance with Section 903.3.2.
5. The space is arranged so as not to obstruct access to the required *exits*.

407.2.6 Nursing home and licensed adult care home cooking facilities. In Group I-2, Condition 2~~1~~ occupancies, rooms or spaces that contain a cooking facility with domestic cooking appliances shall be permitted to be open to the *corridor* where all of the following criteria are met:

1. The number of care recipients housed in the *smoke compartment* shall not be greater than 30.
2. The number of care recipients served by the cooking facility shall not be greater than 30.
3. Not more than one cooking facility area shall be permitted in a *smoke compartment*.
4. The *corridor* shall be a clearly identified space delineated by construction or floor pattern, material or color.

5. The space containing the domestic cooking facility shall be arranged so as not to obstruct access to the required *exit*.

6. The cooking appliance shall comply with Section 407.2.7.

407.4.3 Projections in ~~nursing home~~ corridors. In Group I-2, Condition 2 ~~1~~ occupancies, where the *corridor* width is not less than 96 inches (2440 mm), projections shall be permitted for furniture where all of the following criteria are met:

1. The furniture is attached to the floor or to the wall.

2. The furniture does not reduce the clear width of the *corridor* to less than 72 inches (1830 mm) except where other encroachments are permitted in accordance with Section 1005.7.

3. The furniture is positioned on only one side of the *corridor*.

4. Each arrangement of furniture is 50 square feet (4.6 m^2) maximum in area.

5. Furniture arrangements are separated by 10 feet (3048 mm) minimum.

6. Placement of furniture is considered as part of the fire and safety plans in accordance with Section 1002.2.

407.12 Group I-2. See Sections 1010.2.4 and 1010.2.14.2. ~~Door locking arrangements shall be permitted in Group I-2 where the clinical or security needs of the patients require specialized locking measures for their safety or the safety of others, provided keys are carried at all times by staff that are responsible for the evacuation of the occupants within the locked building unit(s). Provisions for remote locking and unlocking of occupied rooms are required where more than ten locks are necessary to be unlocked in order to move occupants from one smoke compartment to another smoke compartment. These locks may include mechanical locks, electromagnetic locks and other approved locking devices.~~

407.13 Electromagnetic special locking arrangements for Licensed Group I-2 and Group R-4 large residential care facilities. See Section 430.5.6.

SECTION 408
GROUP I-3

408.8.5 Padded cell doors. Padded cell doors that are required to be 45-minute rated must meet the requirements of Section 715.4.1 except that a closer is not required. Doors without a closer must have a permanent label adjacent to the door strike on the nonsecure side of the door indicating: FIRE DOOR – KEEP CLOSED.

SECTION 411
SPECIAL AMUSEMENT AREAS

411.3 Fire alarm system. Buildings containing *special amusement areas* shall be equipped with an *automatic smoke detection system* in accordance with Section ~~907.2.13~~ 907.2.12.

SECTION 412
AIRCRAFT-RELATED OCCUPANCIES

412.4.7 Posted Information. Information required to be posted by Sections 412.4.7.1 and 412.4.7.2 shall be posted on an approved sign.

412.4.7.1 Allowable wing height. Where unit heaters are provided in accordance with exception 1 of Section 412.4.4 the maximum wing height shall be posted.

412.4.7.2 Allowable fuel capacity. The maximum allowable fuel quantity for a hangar shall be posted. Where multiple hangars are located within a fire area the maximum allowable fuel quantity for the fire area will be posted in each hanger.

412.4.7.3 Location. Information required to be posted by Sections 412.4.7.1 and 412.4.7.2 shall be located on the interior side and adjacent to the door provided for the aircraft entrance.

SECTION 415
GROUPS H-1, H-2, H-3, H-4 AND H-5

[F] 415.11.8.1.2 HPM rooms. A ~~*continuous*~~ *gas detection system* shall be provided in HPM rooms where HPM gas is used in the room.

SECTION 419
ARTIFICIAL DECORATIVE VEGETATION

[F] 419.1 Artificial decorative vegetation. Artificial decorative vegetation exceeding 6 feet (1830 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building, or on the roof of a building, shall comply with Section 321.1 of the *International Fire Code.*

~~**Exception:** Artificial decorative vegetation located more than 30 feet (9144 mm) from the exterior wall of a building.~~

SECTION 423
STORM SHELTERS

423.1 General. This section applies to the construction of storm shelters constructed as separate detached buildings or constructed as rooms or spaces within buildings for the purpose of providing protection from storms that produce high winds, such as tornadoes and hurricanes, during the storm. This section ~~specifies where *storm shelters* are required and~~ provides requirements for the design and construction of *storm shelters*. Design of facilities for use as emergency shelters after the storm are outside the scope of ICC 500 and shall comply with Table 1604.5 as a *Risk Category* IV Structure.

423.4 Critical emergency operations. Deleted. ~~In areas where the shelter design wind speed for tornados in accordance with Figure 304.2(1) of ICC 500 is 250 mph, 911 call stations, emergency operation centers and fire, rescue, ambulance and police stations shall comply with Table 1604.5 as a *Risk Category* IV structure and shall be provided with a *storm shelter* constructed in accordance with ICC 500.~~

423.5 Group E occupancies. Deleted. ~~In areas where the shelter design wind speed for tornados is 250 mph in accordance with Figure 304.2(1) of ICC 500, all Group E occupancies with an *occupant load* of 50 or more shall have a storm shelter constructed in accordance with ICC 500.~~

~~**Exceptions:**~~

~~1. Group E day care facilities.~~

~~2. Group E occupancies accessory to *places of religious worship*.~~

~~3. Buildings meeting the requirements for shelter design in ICC 500.~~

~~**423.5.1 Required occupant capacity.** The required occupant capacity of the *storm shelter* shall include all of the buildings on the site and shall be the greater of the following:~~

~~1. The total *occupant load* of the classrooms, vocational rooms and offices in the Group E occupancy.~~

~~2. The *occupant load* of the largest indoor assembly space that is associated with the Group E occupancy.~~

~~**Exceptions:**~~

~~1. Where a new building is being added on an existing Group E site, and where the new building is not of sufficient size to accommodate the required occupant capacity of the *storm shelter* for all of the buildings on the site, the storm shelter shall at a minimum accommodate the required occupant capacity for the new building.~~

~~2. Where approved by the *building official*, the required occupant capacity of the shelter shall be permitted to be reduced by the occupant capacity of any existing *storm shelters* on the site.~~

~~**423.5.2 Location.** Storm shelters shall be located within the buildings they serve or shall be located where the maximum distance of travel from not fewer than one exterior door of each building to a door of the shelter serving that building does not exceed 1,000 feet (305 m).~~

SECTION 424
PLAY STRUCTURES

424.2 Materials. Play structures shall be constructed of noncombustible materials or of combustible materials that comply with the following:

1. *Fire-retardant-treated* wood complying with Section 2303.2.
2. Light-transmitting plastics complying with Section 2606.
3. Foam plastics (including the pipe foam used in *soft-contained play equipment structures*) having a maximum heat-release rate not greater than 100 kilowatts when tested in accordance with UL 1975 or when tested in accordance with NFPA 289, using the 20 kW ignition source.
4. Aluminum composite material (ACM) meeting the requirements of Class A *interior finish* in accordance with Chapter 8 when tested as an assembly in the maximum thickness intended for use.
5. Textiles and films complying with the fire propagation performance criteria contained in Test Method 1 or Test Method 2, as appropriate, of NFPA 701.
6. Plastic materials used to construct rigid components of *soft-contained play equipment structures* (such as tubes, windows, panels, junction boxes, pipes, slides and decks) exhibiting a peak rate of heat release not exceeding 400 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation at a thickness of 6 mm.
7. Ball pool balls, used in *soft-contained play equipment structures*, having a maximum heat-release rate not greater than 100 kilowatts when tested in accordance with UL 1975 or when tested in accordance with NFPA 289, using the 20 kW ignition source. The minimum specimen test size shall be 36 inches by 36 inches (914 mm by 914 mm) by an average of 21 inches (533 mm) deep, and the balls shall be held in a box constructed of galvanized steel poultry netting wire mesh.
8. Foam plastics shall be covered by a fabric, coating or film meeting the fire propagation performance criteria contained in Test Method 1 or Test Method 2, as appropriate, of NFPA 701.
9. The floor covering placed under the ~~children's~~ *play structure* shall exhibit a Class I *interior floor finish* classification, as described in Section 804, when tested in accordance with ASTM E648 or NFPA 253.
10. Interior finishes for structures exceeding 600 square feet (56 m^2) in area or 10 feet (3048 mm) in height shall have a flame spread index not greater than that specified in Table 803.13 for the occupancy group and location designated. Interior wall and ceiling finish materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

SECTION 429
TEMPORARY OVERFLOW EMERGENCY SHELTERS FOR THE HOMELESS

429.1 General. Existing A-2 and A-3 Occupancies shall be permitted to provide facilities for temporary overflow emergency shelters for the homeless provided that all of the following conditions are met and approved by the local code official and fire marshal:

429.1.1 Occupant load and age. The maximum number of homeless occupants is 20 individuals who are ambulatory. The homeless occupants must be 18 years of age or older.

Exception: Occupants may be less than 18 years of age if the temporary shelter meets all of the following conditions:

1. Is intended to serve homeless families with children and their parents or other legal guardian;
2. Consists of a group of churches or other nonprofit religious entities that have agreed to host the shelter occupants on the premises of each church or religious entity on a rotating basis; and
3. Equipped with smoke detectors meeting applicable code provisions for such devices in all sleeping areas.

429.1.2 Construction Type. The building must be of Type I, II, or III construction.

429.1.3 Staff. The temporary overflow emergency shelter must be staffed by a minimum of two individuals of 21 years of age or older trained in accordance with Chapter 4 of the NC Fire Code and at least one trained individual shall be awake to monitor the sleeping room and restrooms throughout the time the facility is occupied by the homeless.

429.1.4 Fire alarm and detection systems. Functioning smoke detection and a local fire alarm system per 907.2.8 shall be provided throughout the sleeping room and exit access corridors and stairs of the temporary overflow emergency shelter.

Building Owner shall submit documentation illustrating that the fire alarm system is approved and that all emergency batteries have been tested and are operational.

429.1.5 Means of egress. There shall be a minimum of two separate code compliant means of egress serving the temporary overflow emergency shelter. An evacuation route approved by the local building and fire code officials shall be posted and be in compliance with Sections 403, 404, and 406 of the NC Fire Code.

> **429.1.5.1 Illumination.** The temporary overflow emergency shelter sleeping room and exit access corridors and stairs shall have unswitched illumination and emergency powered illumination with a duration of not less than 90-minutes.

429.1.6 Automatic sprinkler system. No fire protection sprinkler system is required per 903.2.8, Exception #2.

429.1.7 Ventilation and temperature control. Heating, cooling, and ventilation must be provided by equipment installed and approved for such use. Use of space heaters shall be prohibited.

429.1.8 Fire extinguishers. There must be an adequate number of fire extinguishers to serve the temporary overflow emergency shelter as determined by the local fire marshal. Travel distance to an approved fire extinguisher shall not exceed 50 feet. Minimum rating of extinguishers shall be 3A40BC.

429.1.9 Occupant restrictions. No smoking is permitted in the temporary overflow emergency shelter.

429.1.10 Permits. Temporary overflow emergency shelters must be approved by the local code official for Occupancy by issuance of an approved Occupancy Permit. Drawings of the temporary overflow emergency shelter sealed by a NC licensed architect or engineer must be provided for local code official review and approval.

Occupancy of a temporary overflow emergency shelter shall be for a maximum of 150 calendar days within any 365 day time span

429.1.11 Accessibility. For temporary overflow emergency shelters compliance with Chapter 11 and Section 1007 is not required provided that the local jurisdiction has other shelter facilities that are accessible by the disabled.

SECTION 430
LICENSED LARGE RESIDENTIAL CARE FACILITY

430.1 General. Facilities keeping no more than twelve residents, when determined by the State Agency having jurisdiction to be licensable shall have a Group R-4, Residential occupancy classification.

430.2 Construction type. The building shall be Type IA, IB, IIA, IV, or VA construction.

430.3 Automatic sprinkler system. A wet pipe system in accordance with NFPA 13R including bathrooms, toilets, closets, pantries, storage and utility spaces shall be required. The sprinkler system shall be monitored per Section 903.4 (Section 903.4, Exception 1 is not applicable in this occupancy.)

430.4 Building height. The building shall be a maximum of 1-story.

430.5 Means of egress.

> **430.5.1 Exit quantity.** The facility shall have two remotely located exits.
>
> **430.5.2 Door width.** All door openings subject to use by residents shall have a minimum clear width of 32-inches.

430.5.3 Egress width. Required corridors, ramps, and passageways shall have a minimum clear width of 6-feet when serving as part of the means of egress from resident areas.

430.5.4 Corridors continuity. Buildings may have spaces open to the corridor provided:

1. Each area does not exceed 250 square feet.
2. The spaces are not used for patient sleeping rooms, treatment rooms, or incidental use areas as defined in Table 508.2.5.
3. The area is equipped with smoke detectors.
4. Not more than one such area is permitted in any one smoke compartment or building if smoke compartments are not required.
5. The area is arranged not to obstruct access to required exits.

430.5.5 Corridor protection. Unless required otherwise by Section 425.5.8, corridor partitions and doors in corridor partitions need not have a fire resistance rating but shall be designed to resist the passage of smoke. Doors shall be equipped with approved latches that will keep the door tightly closed. All doors except those to patient sleeping rooms shall be self-closing or automatic closing by smoke detection. Interior wall and ceiling finish shall be gypsum wallboard, plaster or other non-combustible material.

430.5.6 Electromagnetic special locking arrangements. See Section 1010.2.14.3. Buildings protected throughout by an automatic fire detection system or automatic sprinkler system and in compliance with all of the following may be equipped with approved, listed locking devices:

1. Doors shall unlock upon actuation of the automatic fire detection system or automatic sprinkler system.
2. Doors shall unlock upon loss of power controlling the locking device.

   Exception: Independent standby power is acceptable as long as the automatic fire detection system, or automatic sprinkler system, when activated has precedence over the standby power and unlocks the door. If a nonemergency situation occurs such as a power outage, the door shall be allowed to remain locked until detection system(s) operate, provided that the power outage does not disable these detection systems. If any of the detection systems are disabled in any way, standby power controlling the locking devices will be interrupted.

3. These types of locks may be used only in wards and wings or other portions of a facility that requires security provisions for the protection of its patients.
4. An on/off emergency release switch(es) must be capable of interrupting power to all electromagnetically locked doors within the ward, wing, or other portions of the facility. Release switch(es) shall be located and identified at each nurses/staff station serving the locked ward, wing, or other portions of the facility and any other control situation responsible for the evacuation of the occupants of the locked units which are manned 24 hours.
5. These systems may be used provided not more than one such system is located in any egress path.
6. A wiring diagram and system components location map shall be provided under glass adjacent to the fire alarm panel.
7. An additional on/off emergency release switch shall be provided for each locked door and located within 3 feet (914mm) of the door and shall not depend on relays or other devices to cause the interruption of power.
8. Any required emergency release switch shall interrupt the power to the locking device(s). If any required emergency release switch is of the locking type, all staff that are responsible for the evacuation of the occupants of the locked unit must carry emergency release switch keys. Additional convenience release devices may be provided.
9. Each special locking installation shall be approved by the appropriate fire and building inspection authority prior to installation, after installation, and prior to initial use and reviewed periodically thereafter.
10. Emergency lighting shall be provided on the egress side of each door such that it illuminates the locking controls involved in the special locking arrangement.

430.6 Fire alarm and detection systems.

430.6.1 Smoke and heat detectors. Corridors shall be provided with smoke detectors. Heat detectors shall be installed in all attic spaces. The heat detectors shall be connected to the fire alarm and detection system.

430.6.2 Incidental uses. Any incidental use area shall comply with the requirements of Table 508.2.5.

430.6.3 Fire alarm systems. A building fire alarm system shall be provided in accordance with NFPA 72. Provisions shall be made to activate the internal evacuation alarm at all required exits.

SECTION 431
LICENSED ADULT AND CHILD DAY CARE

431.1 Means of egress.

431.1.1 Location. Rooms where occupants receive care in I-4 and R-3 adult and child day care facilities shall be on the level of exit discharge.

431.1.2 Quantity of exits. Group E and Group R-4 adult and child day care facilities shall have a minimum two remote means of egress.

Exception: Rooms where occupants receive care are located on the level of exit discharge and each of these rooms has an exit door directly to the exterior.

431.1.3 Walls and ceilings. All walls and ceilings in rooms which are used for day care purposes and are part of the exiting path shall have interior membranes of noncombustible construction such as but not limited to plaster or gypsum wallboard or shall comply with Section 803.

431.2 Ventilation. Rooms where occupants receive care in R-4 adult and child day care facilities shall comply with the ventilation requirements of Section 1203 of this code.

431.3 Fire Protection systems and equipment.

431.3.1 Manual fire alarm systems. A manual fire alarm system approved by the *licensing agency* shall be installed in new adult or child day care facilities in existing R-4 occupancies.

431.3.2 Portable fire extinguishers. In R-3 and R-4 adult and child day care facilities, at least one 2-A:10-B:C fire extinguisher shall be provided per floor with a maximum of 40 feet travel distance to the extinguisher.

431.4 Group E in licensed child day care facilities. Rooms used for first grade children and younger shall be located on the level of exit discharge. Rooms used for second grade children shall not be located more than one story above the level of exit discharge.

SECTION 432
PRIVATE AND PUBLIC SCHOOLS

432.1 Boiler rooms in public schools. Every fuel storage room and boiler room shall be separated 2-hour fire-resistance rated construction. Door openings shall be to the exterior and all penetrations to the interior of the building shall be protected.

432.2 Open flame heating appliances in public schools. Every comfort heating appliance installed within a building which produces an unprotected open flame shall be separated by 2-hour fire-resistance rated construction.

Exception: Direct vent tubular infrared heaters installed in gymnasiums at a minimum height of 20 feet, measured from the finished floor to the bottom of the unit, shall be permitted.

432.3 Group E in churches, private and public schools. Rooms used for first grade children and younger shall be located on the level of exit discharge. Rooms used for second grade children shall not be located more than one story above the level of exit discharge.

Exception: Does not include educational rooms that are classified as Group A-3 under Section 303.1.4.

CHAPTER 5
GENERAL BUILDING HEIGHTS AND AREAS

~~**User note:**~~

~~***About this chapter:*** Chapter 5 establishes the limits to which a building can be built. Building height, number of stories and building area are specified in this chapter. Chapter 5 must be used in conjunction with the occupancies established in Chapter 3 and the types of construction established in Chapter 6. This chapter also specifies the impact that mezzanines, accessory occupancies and mixed occupancies have on the overall size of a building.~~

SECTION 502
BUILDING ADDRESS

[F] 502.1 Address identification. New and existing buildings shall be provided with *approved* address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be a minimum of ~~4~~ 6 inches (~~102~~ 152.4 mm) high with a minimum stroke width of ~~½~~ ¾ inch (~~12.7~~ 19.05 mm). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other approved sign or means shall be used to identify the structure. Address identification shall be maintained.

SECTION 504
BUILDING HEIGHT AND NUMBER OF STORIES

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

OCCUPANCY CLASSIFICATION	See Footnotes	TYPE OF CONSTRUCTION											
		Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	**A**	**B**	**C**	HT	A	B
A, B, E, F, M, S, U[i]	NS[b]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	270	180	85	85	70	60
H-1, H-2, H-3, H-5	NS[c, d]	UL	160	65	55	65	55	120	90	65	65	50	40
	S												
H-4	NS[c, d]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	140	100	85	85	70	60
I-1 Condition 1, I-3	NS[d, e]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	180	120	85	85	70	60
I-1 Condition 2, I-2	NS[d, e, f]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85									
I-4	NS[d, g]	UL	160	65	55	65	55	65	65	65	65	50	40
	S	UL	180	85	75	85	75	180	120	85	85	70	60
R[h]	NS[d]	UL	160	65	55	65	55	65	65	65	65	50	40
	S13D	60	60	60	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	60	60	60	60	60	60	60	60	60

	S	UL	180	85	75	85	75	270	180	85	85	70	60

For SI: 1 foot = 304.8 mm.

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

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
d. The NS value is only for use in evaluation of existing building height in accordance with the *International Existing Building Code*.
e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies Condition 1, see Exception 1 of Section 903.2.6.
f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and Section 1103.5 of the *International Fire Code*.
g. For new Group I-4 occupancies, see Exceptions 2 and 3 of Section 903.2.6.
h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.
i. See Table C102.1 in Appendix C for Group U agricultural buildings.

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

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION												
	See Footnotes	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
F-1	NS	UL	11	4	2	3	2	3	3	3	4	2	1
	S	UL	12	5	3	4	3	10	7	5	5	3	2
F-2	NS	UL	11	5	3	4	3	5	5	5	5	3	2
	S	UL	12	6	4	5	4	12	8	6	6	4	3
H-1	NS[c, d]	1	1	1	1	1	1	NP	NP	NP	1	1	NP
	S							1	1	1			
H-2	NS[c, d]	UL	3	2	1	2	1	1	1	1	2	1	1

	S							2	2	2			
H-3	NS[c, d]	UL	6	4	2	4	2	3	3	3	4	2	1
	S							4	4	4			
H-4	NS[c, d]	UL	7	5	3	5	3	5	5	5	5	3	2
	S	UL	8	6	4	6	4	8	7	6	6	4	3
H-5	NS[c, d]	4	4	3	3	3	3	2	2	2	3	3	2
	S							3	3	3			
I-1 Condition 1	NS[d, e]	UL	9	4	3	4	3	4	4	4	4	3	2
	S	UL	10	5	4	5	4	10	7	5	5	4	3
I-1 Condition 2	NS[d, e]	UL	9	4	3	4	3	3	3	3	4	3	2
	S	UL	10	5				10	6	4			
I-2	NS[d, f]	UL	4	2	1	1	NP	NP	NP	NP	1	1	NP
	S	UL	5	3				7	5	1			
I-3	NS[d, e]	UL	4	2	1	2	1	2	2	2	2	2	1
	S	UL	5	3	2	3	2	7	5	3	3	3	2
I-4	NS[d, g]	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
M	NS	UL	11	4	2	4	2	4	4	4	4	3	1
	S	UL	12	5	3	5	3	12	8	6	5	4	2

(continued)

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

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION												
	See Foot-notes	Type I		Type II		Type III		Type IV				Type V	
		A	B	A	B	A	B	A	B	C	HT	A	B
R-1[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2
	S13R	4	4									4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3
R-2[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2
	S13R	4	4	4								4	3
	S	UL	12	5	5	5	5	18	12	8	5	4	3
R-3[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	3
	S13D	4	4									3	3
	S13R	4	4									4	4
	S	UL	12	5	5	5	5	18	12	5	5	4	4
R-4[h]	NS[d]	UL	11	4	4	4	4	4	4	4	4	3	2

	S13D	4	4									3	2
	S13R	4	4									4	3
	S	UL	12	5	5	5	5	18	12	5	5	4	3
S-1	NS	UL	11	4	2	3	2	4	4	4	4	3	1
	S	UL	12	5	4	4	4	10	7	5	5	4	2
S-2	NS	UL	11	5	3	4	3	4	4	4	5	4	2
	S	UL	12	6	4	5	4	12	8	5	6	5	3
U	NS	UL	5	4	2	3	2	4	4	4	4	2	1
	S	UL	6	5	3	4	3	9	6	5	5	3	2

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

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
d. The NS value is only for use in evaluation of existing *building height* in accordance with the *International Existing Building Code*.
e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.
f. New ~~and existing~~ Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 ~~and 1103.5 of the *International Fire Code*~~.
g. For new Group I-4 occupancies, see Exceptions 2 and 3 of Section 903.2.6.
h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.
i. See Table C102.1 in Appendix C for Group U agricultural buildings.

SECTION 506
BUILDING AREA

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
F-1	NS	UL	UL	25,000	15,500	19,000	12,000	100,500	67,000	41,875	33,500	14,000	8,500
	S1	UL	UL	100,000	62,000	76,000	48,000	402,000	268,000	167,500	134,000	56,000	34,000
	SM	UL	UL	75,000	46,500	57,000	36,000	301,500	201,000	125,625	100,500	42,000	25,500
F-2	NS	UL	UL	37,500	23,000	28,500	18,000	151,500	101,000	63,125	50,500	21,000	13,000
	S1	UL	UL	150,000	92,000	114,000	72,000	606,000	404,000	252,500	202,000	84,000	52,000
	SM	UL	UL	112,500	69,000	85,500	54,000	454,500	303,000	189,375	151,500	63,000	39,000
H-1	NS[c]	21,000	16,500	11,000	7,000	9,500	7,000	10,500	10,500	10,500	10,500	7,500	NP
	S1												
H-2	NS[c]	21,000	16,500	11,000	7,000	9,500	7,000	10,500	10,500	10,500	10,500	7,500	3,000
	S1												
	SM												
H-3	NS[c]	UL	60,000	26,500	14,000	17,500	13,000	25,500	25,500	25,500	25,500	10,000	5,000
	S1												
	SM												
H-4	NS[c, d]	UL	UL	37,500	17,500	28,500	17,500	72,000	54,000	40,500	36,000	18,000	6,500
	S1	UL	UL	150,000	70,000	114,000	70,000	288,000	216,000	162,000	144,000	72,000	26,000
	SM	UL	UL	112,500	52,500	85,500	52,500	216,000	162,000	121,500	108,000	54,000	19,500
H-5	NS[c, d]	UL	UL	37,500	23,000	28,500	19,000	72,000	54,000	40,500	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	288,000	216,000	162,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	216,000	162,000	121,500	108000	54,000	27,000

(continued)

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

OCCUPANCY CLASSIFICATION	SEE FOOT-NOTES	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
I-1	NS[d, e]	UL	55,000	19,000	10,000	16,500	10,000	54,000	36,000	18,000	18,000	10,500	4,500
	S1	UL	220,000	76,000	40,000	66,000	40,000	216,000	144,000	72,000	72,000	42,000	18,000
	SM	UL	165,000	57,000	30,000	49,500	30,000	162,000	108,000	54,000	54,000	31,500	13,500
I-2	NS[d, f]	UL	UL	15,000	11,000	12,000	NP	36,000	24,000	12,000	12,000	9,500	NP

	S1	UL	UL	60,000	44,000	48,000	NP	144,000	96,000	48,000	48,000	38,000	NP
	SM	UL	UL	45,000	33,000	36,000	NP	108,000	72,000	36,000	36,000	28,500	NP
I-3	NS[d, e]	UL	UL	15,000	10,000	10,500	7,500	36,000	24,000	12,000	12,000	7,500	5,000
	S1	UL	UL	60,000	40,000	42,000	30,000	144,000	96,000	48,000	48,000	30,000	20,000
	SM	UL	UL	45,000	30,000	31,500	22,500	108,000	72,000	36,000	36,000	22,500	15,000
I-4	NS[d, g]	UL	60,500	26,500	13,000	23,500	13,000	76,500	51,000	25,500	25,500	18,500	9,000
	S1	UL	121,000	106,000	52,000	94,000	52,000	306,000	204,000	102,000	102,000	74,000	36,000
	SM	UL	181,500	79,500	39,000	70,500	39,000	229,500	153,000	76,500	76,500	55,500	27,000
M	NS	UL	UL	21,500	12,500	18,500	12,500	61,500	41,000	26,625	20,500	14,000	9,000
	S1	UL	UL	86,000	50,000	74,000	50,000	246,000	164,000	102,500	82,000	56,000	36,000
	SM	UL	UL	64,500	37,500	55,500	37,500	184,500	123,000	76,875	61,500	42,000	27,000
R-1[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000
R-2[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000
R-3[h]	NS[d]	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S13D												
	S13R												
	S1												
	SM												
R-4[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	61,500	41,000	25,625	20,500	12,000	7,000
	S13D												
	S13R												
	S1	UL	UL	96,000	64,000	96,000	64,000	246,000	164,000	102,500	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	184,500	123,000	76,875	61,500	36,000	21,000
S-1	NS	UL	48,000	26,000	17,500	26,000	17,500	76,500	51,000	31,875	25,500	14,000	9,000
	S1	UL	192,000	104,000	70,000	104,000	70,000	306,000	204,000	127,500	102,000	56,000	36,000
	SM	UL	144,000	78,000	52,500	78,000	52,500	229,500	153,000	95,625	76,500	42,000	27,000
S-2	NS	UL	79,000	39,000	26,000	39,000	26,000	115,500	77,000	48,125	38,500	21,000	13,500
	S1	UL	316,000	156,000	104,000	156,000	104,000	462,000	308,000	192,500	154,000	84,000	54,000
	SM	UL	237,000	117,000	78,000	117,000	78,000	346,500	231,000	144,375	115,500	63,000	40,500
U	NS	UL	35,500	19,000	8,500	14,000	8,500	54,000	36,000	22,500	18,000	9,000	5,500
	S1	UL	142,000	76,000	34,000	56,000	34,000	216,000	144,000	90,000	72,000	36,000	22,000
	SM	UL	106,500	57,000	25,500	42,000	25,500	162,000	108,000	67,500	54,000	27,000	16,500

(continued)

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

For SI: 1 square foot = 0.0929 m^2.

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

a. See Chapters 4 and 5 for specific exceptions to the allowable area in this chapter.
b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
d. The NS value is only for use in evaluation of existing building area in accordance with the *International Existing Building Code*.
e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.
f. New ~~and existing~~ Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 ~~and Section 1103.5 of the *International Fire Code*~~.
g. New Group I-4 occupancies see Exceptions 2 and 3 of Section 903.2.6.
h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.
i. The maximum allowable area for a single-story nonsprinklered Group U greenhouse is permitted to be 9,000 square feet, or the allowable area shall be permitted to comply with Table C102.1 of Appendix C.

TABLE 506.3.3
FRONTAGE INCREASE FACTOR[a]

PERCENTAGE OF BUILDING PERIMETER	*OPEN SPACE (feet)*			
	0 to less than 20	***20 to less than 25***	***25 to less than 30***	***30 or greater***
0 to less than 25	0	0	0	0
25 to less than 50	0	0.17	0.21	0.25
50 to less than 75	0	0.33	0.42	0.50
75 to 100	0	0.50	0.63	0.75

~~a. Interpolation is permitted.~~

TABLE 506.3.3.1
SECTION 507 BUILDINGS[a]

PERCENTAGE OF BUILDING PERIMETER	*OPEN SPACE (feet)*					
	30 to less than 35	***35 to less than 40***	***40 to less than 45***	***45 to less than 50***	***50 to less than 55***	***55 to less than 60***
0 to less than 25	0	0	0	0	0	0
25 to less than 50	0.29	0.33	0.38	0.42	0.46	0.50
50 to less than 75	0.58	0.67	0.75	0.83	0.92	1.00
75 to 100	0.88	1.00	1.13	1.25	1.38	1.50

~~a. Interpolation is permitted.~~

SECTION 507
UNLIMITED AREA BUILDINGS

507.4 Sprinklered, one-story buildings. The area of a Group A-4 building not more than one *story above grade plane* of other than Type V construction, or the area of a Group B, F, M or S building no more than one *story above grade plane* of any construction type, shall not be limited where the building is provided with an *automatic sprinkler system* throughout

in accordance with Section 903.3.1.1 and is surrounded and adjoined by *public ways* or *yards* not less than 60 feet (18 288 mm) in width. Unseparated mixed use is applicable to these occupancy classifications.

Exceptions:

1. Buildings and structures of Type I or II construction for rack storage facilities that do not have access by the public shall not be limited in height, provided that such buildings conform to the requirements of Sections 507.4 and 903.3.1.1 and Chapter 32 of the *International Fire Code*.
2. The *automatic sprinkler system* shall not be required in areas occupied for indoor participant sports, such as tennis, skating, swimming and equestrian activities in occupancies in Group A-4, provided that the following criteria are met:
   2.1. *Exit* doors directly to the outside are provided for occupants of the participant sports areas.
   2.2. The building is equipped with a *fire alarm system* with *manual fire alarm boxes* installed in accordance with Section 907.
   2.3. An *automatic sprinkler system* is provided in storage rooms, press boxes, concession booths or other spaces ancillary to the sport activity space.

SECTION 509
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[a]	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 *ambulatory care facilities*, 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
In Group I-2, laundries equal to or less than 100 square feet	Smoke resistant construction and doors
In Group I-2, commercial kitchens	Smoke resistant construction and doors
In Group I-2, rooms or spaces that contain fuel-fired heating equipment	Smoke resistant construction and doors

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.
Fuel storage rooms in public schools and boiler rooms in public schools	2 hours (see Section 432.1)
Storage rooms underneath grandstands or bleacher seats containing combustible or flammable materials	1 hour

For SI: 1 square foot = 0.0929 m^2, 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 m^3.

a. Boilers that are part of a manufacturing process and are open to the manufacturing floor that the boiler services is not required to be separated.

SECTION 510
SPECIAL PROVISIONS

510.8 Group B or M buildings with Group S-2 open parking garage above. Group B or M occupancies located below a Group S-2 *open parking garage* of a lesser type of construction shall be considered as a separate and distinct building from the Group S-2 *open parking garage* for the purpose of determining the type of construction where all the following conditions are met:

1. The buildings are separated with a *horizontal assembly* having a *fire-resistance rating* of not less than 2 hours.
2. The occupancies in the building below the *horizontal assembly* are limited to Groups B and M.
3. The occupancy above the *horizontal assembly* is limited to a Group S-2 *open parking garage*.
4. The building below the *horizontal assembly* is of Type IA construction.

   Exception: The building below the *horizontal assembly* shall be permitted to be of Type IB or II construction, but not less than the type of construction required for the Group S-2 *open parking garage* above, where the building below is not greater than *one story* in height above *grade plane.*
5. The height and area of the building below the *horizontal assembly* does not exceed the limits set forth in Section 503.
6. The height and area of the Group S-2 *open parking garage* does not exceed the limits set forth in Section 406.5. The height, in both feet and *stories*, of the Group S-2 *open parking garage* shall be measured from *grade plane* and shall include the building below the *horizontal assembly*.
7. *Exits* serving the Group S-2 *open parking garage* discharge at grade with direct and unobstructed access to a street or *public way* and are separated from the building below the *horizontal assembly* by 2-hour *fire barriers* constructed in accordance with Section 707 or 2-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

CHAPTER 6

TYPES OF CONSTRUCTION

~~**User note:**~~

~~***About this chapter:*** Chapter 6 establishes five types of construction in which each building must be categorized. This chapter looks at the materials used in the building (combustible or noncombustible) and the extent to which building elements such as the building frame, roof, wall and floor can resist fire. Depending on the type of construction and the specific building element, fire resistance of 1 to 3 hours is specified.~~

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

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV				TYPE V	
	A	B	A	B	A	B	**A**	**B**	**C**	HT	A[h]	B
Primary structural frame[f] (see Section 202)	3[a, b]	2[a, b, c]	1[b, c]	0[c]	1[b, c]	0	3[a]	2[a]	2[a]	HT	1[b, c]	0
Bearing walls												
Exterior[e, f]	3	2	1	0	2	2	3	2	2	2	1	0
Interior	3[a]	2[a]	1	0	1	0	3	2	2	1/HT[g]	1	0
Nonbearing walls and partitions Exterior	See Table 705.5											
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	0	0	0	See Section 2304.11.2	0	0
Floor construction and associated secondary structural members (see Section 202)	2	2	1	0	1	0	2	2	2	HT	1	0
Roof construction and associated secondary structural members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	$1^1/_2$	1	1	HT	1[b,c]	0

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members in roof construction shall not be required, including protection of primary structural frame members, roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

c. In all occupancies, heavy timber complying with Section 2304.11 shall be allowed for roof construction, including primary structural frame members, where a 1-hour or less fire-resistance rating is required.

d. Not less than the fire-resistance rating required by other sections of this code.

e. Not less than the fire-resistance rating based on fire separation distance (see Table 705.5).

f. Not less than the fire-resistance rating as referenced in Section 704.10.

g. Heavy timber bearing walls supporting more than two floors or more than a floor and a roof shall have a fire resistance rating of not less than 1 hour.

h. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be allowed to be substituted for 1-hour fire-resistance-rated construction, provided such system is not otherwise required by other provisions of the code or used for an allowable area increase in accordance with Table 506.2 or an allowable height increase in accordance with Tables 504.3 or 504.4. The 1-hour substitution for the fire resistance of exterior walls shall not be permitted.

CHAPTER 7

FIRE AND SMOKE PROTECTION FEATURES

~~***User note:***~~

~~***About this chapter:*** *Chapter 7 provides detailed requirements for fire-resistance-rated construction, including structural members, walls, partitions and horizontal assemblies. Other portions of the code describe where certain fire-resistance-rated elements are required. This chapter specifies how these elements are constructed, how openings in walls and partitions are protected and how penetrations of such elements are protected.*~~

SECTION 703
FIRE-RESISTANCE RATINGS AND FIRE TESTS

703.2.3 Approved alternate method. The *fire resistance* of *building elements*, components or assemblies not complying with Section 703.2.1 or 703.2.2 shall be permitted to be established by an alternative protection method in accordance with ~~Section 104.11~~ North Carolina Administrative Code and Policies Section 105.

SECTION 705
EXTERIOR WALLS

705.2 Projections. *Cornices*, eave overhangs, exterior balconies, porches and similar projections extending beyond the *exterior wall* shall conform to the requirements of this section and Section 1405. Exterior egress balconies and exterior *exit stairways* and *ramps* shall comply with Sections 1021 and 1027, respectively. Projections shall not extend any closer to the line used to determine the *fire separation distance* than shown in Table 705.2.

Exception: Buildings on the same lot and considered as portions of one building in accordance with Section 705.3 are not required to comply with this section for projections between the buildings.

705.8.1 Allowable area of openings. The maximum area of unprotected and protected openings permitted in an *exterior wall* in any *story* of a building shall not exceed the percentages specified in Table 705.8 based on the *fire separation distance* of each individual story.

~~**Exceptions:**~~

~~1. In other than Group H occupancies, unlimited unprotected openings are permitted in the first *story above grade plane* where the wall faces one of the following:~~

~~1.1. A street and has a *fire separation distance* of more than 15 feet (4572 mm).~~

~~1.2. An unoccupied space. The unoccupied space shall be on the same lot or dedicated for public use, shall be not less than 30 feet (9144 mm) in width and shall have access from a street by a posted fire lane in accordance with the *International Fire Code*.~~

~~2. Buildings whose exterior bearing walls, exterior nonbearing walls and exterior *primary structural frame* are not required to be fire-resistance rated shall be permitted to have unlimited unprotected openings.~~

TABLE 705.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION[lm]

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]
0 to less than 3[b, c, k]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted[k]
	Unprotected, Sprinklered (UP, S)[i]	Not Permitted[k]
	Protected (P)	Not Permitted[k]
3 to less than 5[d, e]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted
	Unprotected, Sprinklered (UP, S)[i]	15%
	Protected (P)	15%

5 to less than 10[e, f, j]	Unprotected, Nonsprinklered (UP, NS)	10%[h]
	Unprotected, Sprinklered (UP, S)[i]	25%
	Protected (P)	25%
10 to less than 15[e, f, g, j]	Unprotected, Nonsprinklered (UP, NS)	15%[h]
	Unprotected, Sprinklered (UP, S)[i]	45%
	Protected (P)	45%
15 to less than 20[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	25%
	Unprotected, Sprinklered (UP, S)[i]	75%
	Protected (P)	75%
20 to less than 25[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	45%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
25 to less than 30[f, g, j]	Unprotected, Nonsprinklered (UP, NS)	70%
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit
30 or greater	Unprotected, Nonsprinklered (UP, NS)	No Limit
	Unprotected, Sprinklered (UP, S)[i]	No Limit
	Protected (P)	No Limit

For SI: 1 foot = 304.8 mm.

UP, NS = Unprotected openings in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

UP, S = Unprotected openings in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

P = Openings protected with an opening protective assembly in accordance with Section 705.8.2.

a. Values indicated are the percentage of the area of the exterior wall, per story.
b. For the requirements for fire walls of buildings with differing heights, see Section 706.6.1.
c. For openings in a fire wall for buildings on the same lot, see Section 706.8.
d. The maximum percentage of unprotected and protected openings shall be 25 percent for Group R-3 occupancies.
e. Unprotected openings shall not be permitted for openings with a fire separation distance of less than 15 feet for Group H-2 and H-3 occupancies.
f. The area of unprotected and protected openings shall not be limited for Group R-3 occupancies, with a fire separation distance of 5 feet or greater.
g. The area of openings in an open parking structure with a fire separation distance of 10 feet or greater shall not be limited.
h. Includes buildings accessory to Group R-3.
i. Not applicable to Group H-1, H-2 and H-3 occupancies.
j. The area of openings in a building containing only a Group U occupancy private garage or carport with a fire separation distance of 5 feet or greater shall not be limited.
k. For openings between S-2 parking garage and Group R-2 building, see Section 705.3, Exception 2.

1. In other than Group H occupancies, unlimited unprotected openings are permitted in the first *story above grade plane* where the wall faces one of the following:

    1. A street and has a *fire separation distance* of more than 15 feet (4572 mm); or

    2. An unoccupied space. The unoccupied space shall be on the same lot or dedicated for public use, shall be not less than 30 feet (9144 mm) in width and shall have access from a street by a posted fire lane in accordance with the *International Fire Code*.

m. Buildings whose exterior bearing walls, exterior nonbearing walls and exterior *primary structural frame* are not required to be fire-resistance rated shall be permitted to have unlimited unprotected openings.

705.12 Soffit in Group R. In Group R buildings of combustible construction, soffit material shall be securely attached to framing members and shall be constructed using one of the following methods:

1. Non-combustible soffit material;
2. Fire retardant treated soffit material;

3. Vinyl soffit installed over 3/4-inch wood sheathing;
4. Vinyl soffit installed over 5/8-inch gypsum board;
5. Aluminum soffit installed over 3/4-inch wood sheathing; or
6. Aluminum soffit installed over 5/8-inch gypsum board.

Roof ventilation requirements shall apply to both soffit material and backing board and shall be per Section 1202.2.

Exceptions:

1. Vinyl and aluminum soffit material may be installed without wood sheathing or gypsum backing board if the exterior wall finish is noncombustible for a minimum distance of 10 feet above finished grade or the *building* is equipped throughout with an *automatic sprinkler system* in accordance with 903.3.1.1.
2. Detached one- and two- family dwellings and townhouses.

SECTION 706
FIRE WALLS

706.2 Structural stability. *Fire walls* shall be designed and constructed to allow collapse of the structure on either side without collapse of the wall under fire conditions. *Fire walls* designed and constructed in accordance with NFPA 221 shall be deemed to comply with this section.

Exceptions:

~~**Exception:**~~ 1. In *Seismic Design Categories* D through F, where double *fire walls* are used in accordance with NFPA 221, floor and roof sheathing not exceeding $^{3}/_{4}$ inch (19.05 mm) thickness shall be permitted to be continuous through the wall assemblies of *light frame construction*.

2. For *fire walls* separating Group R-2 from Group S-2 buildings of different construction types per footnotes c and d of Table 706.4, the structural wall of the S-2 building shall be permitted to serve as the *fire wall* between the Group R-2 and Group S-2 buildings and shall be permitted to be laterally supported by floor construction of the same rating as the wall.

TABLE 706.4
FIRE WALL FIRE-RESISTANCE RATINGS

GROUP	FIRE-RESISTANCE RATING (hours)
A, B, E, H-4, I, R-1, R-2[c,d], U	3[a]
F-1, H-3b, H-5, M, S-1	3
H-1, H-2	4[b]
F-2, S-2[c,d], R-3, R-4	2

a. In Type II or V construction, walls shall be permitted to have a 2-hour fire-resistance rating.
b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.7 and 415.8.
c. Where *fire walls* are used to separate R-2 buildings of Type V construction from S-2 buildings of Type IB construction, a 2-hour exterior wall of the Type IB S-2 structure shall be permitted to satisfy the requirements of Section 706.2 and Table 706.4 without requiring a *fire wall* on the R-2 building. The floor construction of the S-2 structure shall have a fire-resistance rating equal to or greater than the exterior walls of the S-2 structure when the floor provides lateral stability to the vertical construction.
d. Where *fire walls* are used to separate R-2 buildings of Type III construction from S-2 buildings of Type IA construction, a 3-hour exterior wall of the Type IA S-2 structure shall be permitted to satisfy the requirements of Section 706.2 and Table 706.4 without requiring a *fire wall* on the R-2 building. The floor construction of the S-2 structure shall have a fire-resistance rating equal to or greater than the exterior walls of the S-2 structure when the floor provides lateral stability to the vertical construction.

SECTION 707
FIRE BARRIERS

707.3.10 Fire areas. The *fire barriers*, ~~*fire walls,*~~ *horizontal assemblies* or combinations thereof separating a single occupancy or multiple occupancies into different *fire areas* shall have a *fire-resistance rating* of not less than that indicated in Table 707.3.10. The *fire barriers*, ~~*fire walls,*~~ *horizontal assemblies* or combinations thereof separating *fire ar-*

eas of mixed occupancies shall have a *fire-resistance rating* of not less than the highest value indicated in Table 707.3.10 for the occupancies under consideration.

SECTION 708
FIRE PARTITIONS

708.1 General. The following wall assemblies shall comply with this section:

1. Separation walls as required by Section 420.2 for Group I-1 and Group R occupancies.
2. Walls separating tenant spaces in *covered and open mall buildings* as required by Section 402.4.2.1.
3. *Corridor* walls as required by Section 1020.3.
4. Enclosed elevator lobby separation as required by Section 3006.3.
5. Egress balconies as required by Section 1021.2.
6. Walls separating *ambulatory care facilities* from adjacent spaces, *corridors* or tenant as required by Section 422.2.
7. Walls separating *dwelling and sleeping units* in Groups R-1 and R-2 in accordance with Sections 907.2.8.1 and 907.2.9.1.
8. Vestibules in accordance with Section 1028.2.
9. Walls separating tenant spaces as described in Note g, Table 1020.2.

SECTION 711
FLOOR AND ROOF ASSEMBLIES

711.2.3 Supporting construction. The supporting construction shall be protected to afford the required *fire-resistance rating* of the *horizontal assembly* supported.

Exception: In buildings of Type IIB, IIIB or VB construction, the construction supporting the *horizontal assembly* is not required to be fire-resistance rated at the following:

1. *Horizontal assemblies* at the separations of incidental uses as specified by Table 509.1 provided that the required *fire-resistance rating* does not exceed 1 hour.
2. *Horizontal assemblies* at the separations of *dwelling units* and *sleeping units* as required by Section 420.3.
3. *Horizontal assemblies* at *smoke barriers* constructed in accordance with Section 709.
4. Horizontal assemblies constructed solely for the purpose of satisfying the requirements of Note g, Table 1020.2.

SECTION 714
PENETRATIONS

714.4.2 Membrane penetrations. *Membrane penetrations* shall comply with Section 714.4.1. Where walls or partitions are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced.

Exceptions:

1. *Membrane penetrations* of maximum 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0 103 m^2) in area, provided that the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m^2) in any 100 square feet (9.29 m^2) of wall area. The *annular space* between the wall membrane and the box shall not exceed $^1/_8$ inch (3.2 mm). Such boxes on opposite sides of the wall or partition shall be separated by one of the following:
    1.1. By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual noncommunicating stud cavities.

1.2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose-fill, rockwool or slag *mineral wool* insulation.

1.3. By solid *fireblocking* in accordance with Section 718.2.1.

1.4. By protecting both outlet boxes with *listed* putty pads.

1.5. By other *listed* materials and methods.

2. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the wall membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise. Such boxes on opposite sides of the wall or partition shall be separated by one of the following:

   2.1. By the horizontal distance specified in the listing of the electrical boxes.

   2.2. By solid *fireblocking* in accordance with Section 718.2.1.

   2.3. By protecting both boxes with *listed* putty pads.

   2.4. By other *listed* materials and methods.

3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of a wall opening protective material system for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

4. *Membrane penetrations* by boxes other than electrical boxes, provided that such penetrating items and the *annular space* between the wall membrane and the box, are protected by an *approved membrane penetration firestop system* installed as tested in accordance with ASTM E814 or UL 1479, with a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water, and shall have an F and *T rating* of not less than the required *fire-resistance rating* of the wall penetrated and be installed in accordance with their listing.

5. The *annular space* created by the penetration of an automatic sprinkler, provided that it is covered by a metal escutcheon plate.

6. *Membrane penetrations* of maximum 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that exceed 16 square inches (0.0 103 m^2) in area, or steel electrical boxes of any size having an aggregate area through the membrane exceeding 100 square inches (0.0645 m^2) in any 100 square feet (9.29 m^2) of wall area, provided that such penetrating items are protected by *listed* putty pads or other *listed* materials and methods, and installed in accordance with the listing.

7. The ceiling membrane of 1- and 2-hour *fire-resistance-rated horizontal assemblies* is permitted to be interrupted with the double wood top plate of a wall assembly, provided that all penetrating items through the double top plate are protected in accordance with Section 714.4.1.1 or 714.4.1.2 and the ceiling membrane is tight to the top plate. For 2-hour fire-resistance-rated horizontal assemblies the wall assembly must be sheathed on all interior surfaces with Type X gypsum wallboard.

714.5.2 Membrane penetrations. Penetrations of membranes that are part of a *horizontal assembly* shall comply with Section 714.5.1.1 or 714.5.1.2. Where floor/ceiling assemblies are required to have a *fire-resistance rating*, recessed fixtures shall be installed such that the required *fire resistance* will not be reduced.

Exceptions:

1. *Membrane penetrations* by steel, ferrous or copper conduits, pipes, tubes or vents, or concrete or masonry items where the *annular space* is protected either in accordance with Section 714.5.1 or to prevent the free passage of flame and the products of combustion. The aggregate area of the openings through the membrane shall not exceed 100 square inches (64 500 mm^2) in any 100 square feet (9.3 m^2) of ceiling area in assemblies tested without penetrations.

2. Ceiling *membrane penetrations* of maximum 2-hour *horizontal assemblies* by steel electrical boxes that do not exceed 16 square inches (10 323 mm^2) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm^2) in any 100 square feet (9.29 m^2) of ceiling area, and the *annular space* between the ceiling membrane and the box does not exceed $^1/_8$ inch (3.2 mm).

3. *Membrane penetrations* by electrical boxes of any size or type, that have been *listed* as part of an opening protective material system for use in *horizontal assemblies* and are installed in accordance with the instructions included in the listing.

4. *Membrane penetrations* by *listed* electrical boxes of any material, provided that such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The *annular space* between the ceiling membrane and the box shall not exceed $^1/_8$ inch (3.2 mm) unless *listed* otherwise.

5. The *annular space* created by the penetration of a fire sprinkler, provided that it is covered by a metal escutcheon plate.

6. Noncombustible items that are cast into concrete *building elements* and that do not penetrate both top and bottom surfaces of the element.

7. The ceiling membrane of a ~~maximum~~ 2-hour fire-resistance-rated *horizontal assembly* is permitted to be interrupted with the double wood top plate of a wall assembly that is sheathed with Type X *gypsum wallboard*, provided that all penetrating items through the double top plates are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.

8. The ceiling membrane of a 1-hour *fire-resistance-rated horizontal assembly* is permitted to be interrupted with the double wood top plate of a wall assembly, provided that all penetrating items through the double top plate are protected in accordance with Section 714.5.1.1 or 714.5.1.2 and the ceiling membrane is tight to the top plates.

~~8.~~9. Ceiling *membrane penetrations* by listed luminaires (light fixtures) or by luminaires protected with *listed* materials, which have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing.

SECTION 716
OPENING PROTECTIVES

TABLE 716.1(1)[b]
MARKING FIRE-RATED GLAZING ASSEMBLIES

FIRE TEST STANDARD	MARKING	DEFINITION OF MARKING
ASTM E119 or UL 263	W	Meets wall assembly criteria.
ASTM E119 or UL 263	FC	Meets floor/ceiling criteria[a]
NFPA 257 or UL 9	OH	Meets fire window assembly criteria including the hose stream test.
NFPA 252 or UL 10B or UL 10C	D	Meets fire door assembly criteria.
	H	Meets fire door assembly hose stream test.
	T	Meets 450°F temperature rise criteria for 30 minutes
—	XXX	The time in minutes of the fire resistance or fire protection rating of the glazing assembly.

For SI: °C = [(°F) – 32]/1.8.
a. See Section 2409.1
b. Includes wire glass.

716.2.6.1 Door closing. *Fire doors* shall be latching and self- or automatic-closing in accordance with this section.

Exceptions:

1. *Fire doors* located in common walls separating *sleeping units* in Group R-1 shall be permitted without automatic- or *self-closing* devices.

2. The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I emergency recall operation.

3. Group I-3 padded cell door closing complying with Section 408.8.5.

SECTION 718
CONCEALED SPACES

718.4 Draftstopping in attics. Draftstopping shall be installed to subdivide *attic* spaces where required by Section 708.4.2. In other than Group R, draftstopping shall be installed to subdivide combustible *attic* spaces and combustible concealed roof spaces such that any horizontal area does not exceed 3,000 square feet (279 m^2). *Ventilation* of concealed roof spaces shall be maintained in accordance with Section 1202.2.1.

Exception: Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

SECTION 722
CALCULATED FIRE RESISTANCE

722.6.3 Design of fire-resistant exposed wood members. The *fire-resistance rating*, in minutes, of timber beams and columns with a minimum nominal dimension of 6 inches (152 mm) is equal to:

Beams: $2.54Zb\,[4 - 2(b/d)]$ for beams which may be exposed to fire on four sides. **(Equation 7-18)**

$2.54Zb\,[4 - (b/d)]$ for beams which may be exposed to fire on three sides. **(Equation 7-19)**

Columns: $2.54Zb\,[3 - (b/d)]$ for columns which may be exposed to fire on four sides. **(Equation 7-20)**

$2.54Zb\,[3 - (b/2d)]$ for columns which may be exposed to fire on three sides. **(Equation 7-22)**

where:

b = The breadth (width) of a beam or larger side of a column before exposure to fire (inches).

d = The depth of a beam or smaller side of a column before exposure to fire (inches).

Z = Load factor, based on Figure 722.6.3(1).

722.6.3.1 Equation 7-21. Equation 7-21 applies only where the unexposed face represents the smaller side of the column. If a column is recessed into a wall, its full dimension shall be used for the purpose of these calculations.

722.6.3.2 Allowable loads. Allowable loads on beams and columns are determined using design values given in ANSI/AWC NDS.

721.6.3.3 Fastener protection. Where minimum 1-hour fire resistance is required, connectors and fasteners shall be protected from fire exposure by 1 ½ inches (38 mm) of wood, or other approved covering or coating for a 1-hour rating. Typical details for commonly used fasteners and connectors are shown in AITC Technical Note 7.

721.6.3.4 Minimum size. Wood members are limited to dimensions of 6 inches (152 mm) nominal or greater. Glued-laminated timber beams utilize standard laminating combinations except that a core lamination is removed. The tension zone is moved inward and the equivalent of an extra nominal 2-inch-thick (51 mm) outer tension lamination is added.

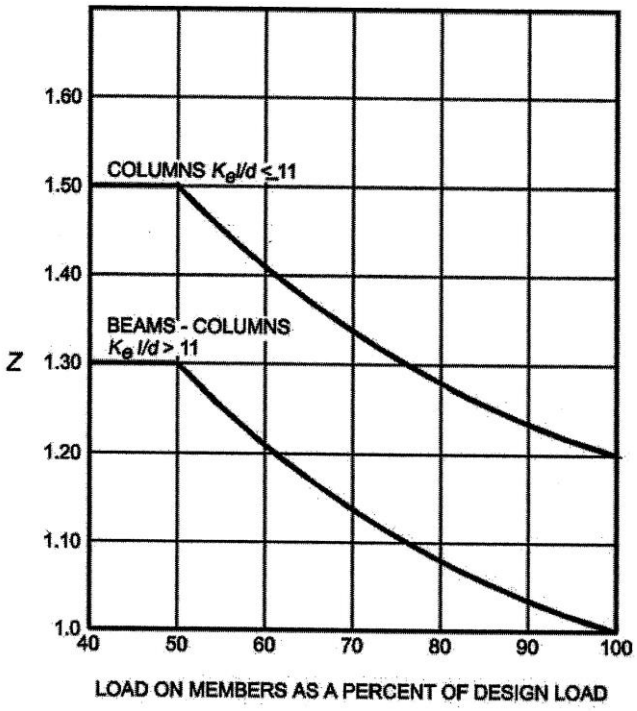

FIGURE 721.6.3(1)
LOAD FIGURE

K_e = The effective length factor as noted in Figure 721.6.3(2).
l = The unsupported length of columns (inches).

BUCKLING MODES						
THEORETICAL K_e VALUE	0.5	0.7	1.0	1.0	2.0	2.0
RECOMMENDED DESIGN K_e WHEN IDEAL CONDITIONS APPROXIMATED	0.65	0.80	1.2	1.0	2.10	2.4
END CONDITION CODE	ROTATION FIXED, TRANSLATION FIXED ROTATION FREE, TRANSLATION FIXED ROTATION FIXED, TRANSLATION FREE ROTATION FREE, TRANSLATION FREE					

FIGURE 721.6.3(2)
EFFECTIVE LENGTH FACTORS

[F] 903.2.1 Group A. An *automatic sprinkler system* shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this section. For Group A-1, A-2, A-3 and A-4 occupancies, the *automatic sprinkler system* shall be provided throughout the *fire area* containing the Group A-1, A-2, A-3 or A-4 occupancy and any fire area traversed to the entrance of an exit, and throughout all stories from the Group A occupancy to, and including, the *levels of exit discharge* serving the Group A occupancy. For Group A-5 occupancies, the *automatic sprinkler system* shall be provided in the spaces indicated in Section 903.2.1.5.

CHAPTER 8

INTERIOR FINISHES

~~User notes:~~

~~***About this chapter:*** *Chapter 8 contains the performance requirements for controlling fire growth and smoke propagation within buildings by restricting interior finish and decorative materials. The provisions of this chapter require materials used as interior finishes and decorations to meet certain flame spread index or flame propagation criteria and smoke development criteria based on the relative fire hazard associated with the occupancy. The performance of the material is evaluated based on test standards.~~

SECTION 806
DECORATIVE MATERIALS AND TRIM

[F] 806.9 Combustible lockers or cubbies. Where lockers or cubbies constructed of combustible materials are used, they ~~the lockers~~ shall be considered to be *interior finish* and shall comply with Section 803.

Exception: Lockers or cubbies constructed entirely of wood and noncombustible materials shall be permitted to be used wherever interior finish materials are required to meet a Class C classification in accordance with Section 803.1.2.

CHAPTER 9

FIRE PROTECTION AND LIFE SAFETY SYSTEMS

~~*User note:*~~

~~***About this chapter:*** Chapter 9 prescribes the minimum requirements for active fire protection equipment systems to perform the functions of detecting a fire, alerting the occupants or fire department of a fire emergency, mass notification, gas detection, controlling smoke and controlling or extinguishing the fire. Generally, the requirements are based on the occupancy, the height and the area of the building, because these are the factors that most affect fire-fighting capabilities and the relative hazard of a specific building or portion thereof. This chapter parallels and is substantially duplicated in Chapter 9 of the International Fire Code®.~~

SECTION 901
GENERAL

901.1 Scope. ~~The provisions of this chapter shall specify where fire protection and *life safety systems* are required and shall apply to the design, installation and operation of *fire protection* and *life safety systems.*~~ The provisions of the *International Building Code* shall specify where *fire protection* and *life safety systems* are required. The provisions of the *International Fire Code* shall determine the design, installation, inspection, operation, testing and maintenance of all *fire protection* and *life safety systems*.

901.2 Fire protection and life safety systems. *Fire protection* and *life safety systems* shall be installed, repaired, operated and maintained in accordance with this code and the *International Fire Code*.

Any *fire protection or life safety system* for which an exception or reduction to the provisions of this code has been granted shall be considered to be a required system.

Exception: Any *fire protection or life safety system* or portion thereof not required by this code shall be permitted to be installed for partial or complete protection provided that such system meets the requirements of this code.

901.2.2 Shop drawings. Shop drawings for fire protection and life safety systems shall be prepared in accordance with Table 901.2.2 and submitted for review and approval prior to installation.

Table 901.2.2
Standards for Shop Drawings

Automatic sprinkler systems	NFPA 13, NFPA 13R, NFPA 13D, NFPA 22
Wet-chemical systems	NFPA 17A
Dry-Chemical systems	NFPA 12
Foam systems	NFPA 11 and NFPA 16
Carbon dioxide systems	NFPA 12
Halon systems	NFPA 12A
Clean agent systems	NFPA 2001
Automatic water mist systems	NFPA 750
Aerosol fire-extinguishing systems	NFPA 2010
Standpipe systems	NFPA 14
Fire alarm and detection systems	NFPA 72
Fire pumps	NFPA 20
Smoke control systems	NFPA 92
Carbon monoxide detection systems	NFPA 720

901.8 Additional fire protection systems. In occupancies where special hazards are identified by the code official in addition to the common hazards of the occupancy, or where fire apparatus access does not comply with section 503 of the *International Fire Code*, the *building official* and *fire code official* shall have the authority to require additional safeguards, *fire protection systems* and *life safety systems* be installed in accordance with this code and the applicable referenced standards.

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

[F] 903.2.1 Group A. An *automatic sprinkler system* shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this section. For Group A-1, A-2, A-3 and A-4 occupancies, the *automatic sprinkler system* shall be provided throughout the *fire area* containing the Group A-1, A-2, A-3 or A-4 occupancy and any fire area traversed to the entrance of an exit, and throughout all stories from the Group A occupancy to, and including, the *levels of exit discharge* serving the Group A occupancy. For Group A-5 occupancies, the *automatic sprinkler system* shall be provided in the spaces indicated in Section 903.2.1.5.

[F] 903.2.1.1 Group A-1. An *automatic sprinkler system* shall be provided throughout ~~stories containing~~ Group A-1 occupancies ~~and throughout all stories from the Group A-1 occupancy to and including the *levels of exit discharge* serving that occupancy~~ where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.
4. The *fire area* contains a multitheater complex.

[F] 903.2.1.2 Group A-2. An *automatic sprinkler system* shall be provided throughout ~~stories containing~~ Group A-2 occupancies ~~and throughout all stories from the Group A-2 occupancy to and including the *levels of exit discharge* serving that occupancy~~ where one of the following conditions exists:

1. The *fire area* exceeds 5,000 square feet (464 m^2).
2. The *fire area* has an *occupant load* of ~~100~~ 300 or more, except 100 or more for nightclubs.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

[F] 903.2.1.3 Group A-3. An *automatic sprinkler system* shall be provided throughout ~~stories containing~~ Group A-3 occupancies ~~and throughout all stories from the Group A-3 occupancy to and including the *levels of exit discharge* serving that occupancy~~ where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.

   Exceptions:

   1. This requirement shall not apply to assembly occupancies used primarily for worship, with fixed seating and part of a separated use.

   2. This requirement shall not apply to assembly occupancies used primarily for worship consisting of a single multipurpose room that are not used for exhibition or display and are part of a separated use.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

[F] 903.2.1.4 Group A-4. An *automatic sprinkler system* shall be provided throughout ~~stories containing~~ Group A-4 occupancies ~~and throughout all stories from the Group A-4 occupancy to and including the *levels of exit discharge* serving that occupancy~~ where one of the following conditions exists:

1. The *fire area* exceeds 12,000 square feet (1115 m^2).
2. The *fire area* has an *occupant load* of 300 or more.
3. The *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.

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

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

[F] 903.2.2 Ambulatory care facilities. An *automatic sprinkler system* shall be installed throughout *fire areas* ~~the entire floor~~ containing an *ambulatory care facility* where either of the following conditions exist at any time:

1. Four or more care recipients are *incapable of self-preservation*.
2. One or more care recipients that are *incapable of self-preservation* are located at other than the *level of exit discharge* serving such a facility.

In buildings where ambulatory care is provided on levels other than the *level of exit discharge*, an *automatic sprinkler system* shall be installed throughout the fire area containing an *ambulatory care facility* and any *fire area* traversed to the entrance of an exit ~~entire floor~~ as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest *level of exit discharge*, the *level of exit discharge*, and all floors below the level of *exit discharge*.

Exception: Floors classified as an *open parking garage* are not required to be sprinklered.

[F] 903.2.3 Group E. An *automatic sprinkler system* shall be provided for Group E occupancies as follows:

1. Throughout all Group E *fire areas* greater than 12,000 square feet (1115 m^2) in area.
2. ~~The Group E *fire area* is located on a floor other than a *level of exit discharge* serving such occupancies.~~ Throughout Group E fire areas located on a floor other than the level of exit discharge and any fire areas traversed to the entrance of an exit, and throughout stories from the Group E occupancy to, and including, the nearest level of exit discharge.

   Exception: In buildings where every classroom has not fewer than one exterior *exit* door at ground level, an *automatic sprinkler system* is not required in any area below the lowest *level of exit discharge* serving that area.
3. The Group E *fire area* has an *occupant load* of 300 or more.

[F] 903.2.4.1 Woodworking operations. Deleted - see 903.2.11.7 ~~An *automatic sprinkler system* shall be provided throughout all Group F-1 occupancy *fire areas* that contain woodworking operations in excess of 2,500 square feet (232 m^2) in area that generate finely divided combustible waste or use finely divided combustible materials.~~

[F] 903.2.4.3 Group F-1 upholstered furniture or mattresses. Deleted - see 903.2.11.8 ~~An *automatic sprinkler system* shall be provided throughout a Group F-1 *fire area* that exceeds 2,500 square feet (232 m^2) used for the manufacture of upholstered furniture or mattresses.~~

903.2.6.1 Dry pipe system. When dry-pipe sprinkler systems are installed, upon activation a full flow of water shall be delivered to the most remote point of the system in no more than 60 seconds.

[F] 903.2.8 Group R. An *automatic sprinkler system* installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R *fire area*, except as provided for in Section 903.2.8.5 and 903.2.8.6.

Exceptions:

1. An *automatic sprinkler system* is not required in new adult and child day care facilities located in existing Group R-3 and R-4 occupancies.

2. An *automatic sprinkler system* is not required in *temporary overflow shelters*.

3. An *automatic sprinkler system* is not required in camping units located within a campground where all of the following conditions exist.

   3.1. The camping unit is limited to one story in height,

   3.2. The camping unit is less than 400 square feet (37 m^2) in area.

   3.3. The camping unit does not have a kitchen

4. An automatic sprinkler system is not required in an *open air camp cabin* that complies with the following:

4.1. The *open air camp cabin* shall have at least two remote unimpeded *exits*. Lighted exit signs shall not be required.

4.2 The *open air camp cabin* shall not be required to have plumbing or electrical systems, but if the cabin has these systems, then the provisions of the Code otherwise applicable to those systems shall apply.

4.3 *Smoke alarms* and portable fire extinguishers shall be installed as required by this code and the *International Fire Code*.

5. Temporary *sleeping units* for disaster relief workers as allowed by *International Fire Code*, Section 324.4.5.

[F] 903.2.8.1 Group R-3. An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.

Exception: An *automatic sprinkler system* installed in accordance with Section 903.3.1.1 shall be installed in all Licensed *Respite Care Facilities*.

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

Exception: An *automatic sprinkler system* installed in accordance with Section 903.3.1.1 shall be installed in all Licensed *Respite Care Facilities*.

[F] 903.2.8.3 Group R-4, Condition 2. An *automatic sprinkler system* installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4, Condition 2 occupancies.

Exception: An *automatic sprinkler system* installed in accordance with Section 903.3.1.1 shall be installed in all Licensed *Respite Care Facilities*.

[F] 903.2.8.4 Care facilities. (Deleted) ~~An *automatic sprinkler system* installed in accordance with Section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family dwelling.~~

[F]903.2.8.5 Group R Migrant Housing. Group R-2 buildings housing farm workers and their families located outside of a municipality's building rules jurisdiction may install a 13D multipurpose sprinkler system where all of the following conditions exist:

1. Building cannot exceed two stories in height;

2. Building cannot exceed 2500 square feet (232 m^2) in area; and

3. Building shall have two remote means of egress.

903.2.8.5.1 Group R Migrant Housing. Migrant housing as defined by N.C.G.S. 95-223 shall be exempt when all of the following conditions exist:

1. Building is not more than one story in height.

2. Building meets all of the requirements of N.C.G.S. 95-222 through N.C.G.S. 95-229.1 (Chapter 95, Article 19) and 29 CFR 1910.142, as amended.

903.2.8.6 Emergency service sleeping area. Group R *fire areas* in fire or emergency medical service buildings ~~fire stations~~ may install a sprinkler system in accordance with Sections 903.3.1.3 and 903.3.5.1 when separated from other occupancies by a *fire wall* where all of the following conditions exist.

1. Building cannot exceed one story in height,

2. Fire area cannot exceed 2500 square feet (232 m^2) in area.

3. Fire area has two remote means of egress.

[F] 903.2.9.4 Group S-1 upholstered furniture and mattresses. An *automatic sprinkler system* shall be provided throughout a Group S-1 *fire area* where the area used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).

Exception: *Self-service storage facilities not greater than one story above grade plane* ~~*where all storage spaces can be accessed directly from the exterior.*~~

[F] 903.2.10 Group S-2 parking garages. An *automatic sprinkler system* shall be provided throughout buildings classified as parking garages where any of the following conditions exists:

1. Where the fire area of the enclosed parking garage in accordance with Section 406.6 exceeds 12,000 square feet (1115 m^2).
2. Where the enclosed parking garage in accordance with Section 406.6 is located beneath other groups.

   Exception: Enclosed parking garages located beneath Group R-3 occupancies.

3. Where the *fire area* of the *open parking garage* in accordance with Section 406.5 exceeds 48,000 square feet (4460 m^2).

   Exception: Open parking garages of Type I-A construction.

[F]TABLE 903.2.11.6
ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS

SECTION	SUBJECT
402.5, 402.6.2	Covered and open mall buildings
403.3	High-rise buildings
404.3	Atriums
405.3	Underground structures
407.7	Group I-2
410.6	Stages
411.3	Special amusement buildings
412.2.4	Airport traffic control towers
412.3.6, 412.3.6.1, 412.5.6	Aircraft hangars
415.11.11	Group H-5 HPM exhaust ducts
416.5	Flammable finishes
417.4	Drying rooms
424.3	Play structures
428	Buildings containing laboratory suites
507	Unlimited area buildings
508.5.7	Live/work units
509.4	Incidental uses
1030.6.2.3	Smoke-protected assembly seating
IFC	Sprinkler system requirements as set forth in Section 903.2.11.6 of the *International Fire Code*

903.2.11.7 Woodworking operations. An *automatic sprinkler system* shall be provided throughout *fire areas* that contain woodworking operations in excess of 2,500 square feet in area (232 m^2) that generate finely divided combustible waste or use finely divided combustible materials.

903.2.11.8 Manufacture of upholstered furniture or mattresses. An *automatic sprinkler system* shall be provided throughout *fire areas* that contain manufacturing operations for upholstered furniture of mattresses in excess of 2,500 square feet in area (232 m^2).

[F] 903.3.1.2 NFPA 13R sprinkler systems. *Automatic sprinkler systems* in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above grade plane.

~~2. The floor level of the highest *story* is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.~~

~~3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.~~

Exception: Respite Care Facilities shall be provided with a NFPA 13 sprinkler system complying with Section 903.3.1.1.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plane.

[F] 903.3.1.2.2 Corridors and balconies in the means of egress. Sprinkler protection shall be provided in *corridors* and for balconies in the *means of egress* where any of the following conditions apply:

1. Corridors with combustible finishes ~~floor or walls~~.
2. Corridors with an interior change of direction exceeding 45 degrees (0.79 rad).
3. Corridors that are less than 50 percent open to the outside atmosphere at the ends.
4. Open-ended corridors and associated exterior stairways and ramps as specified in Section 1027.6, Exception 3.
5. *Egress balconies not complying with Sections 1021.2 and 1021.3.*

[F] 903.3.1.3 NFPA 13D sprinkler systems. *Automatic sprinkler systems* installed in one- and two-family *dwellings*; Group R-3; Group R-4, Condition 1; and *townhouses* shall be permitted to be installed throughout in accordance with NFPA 13D or Section P2904 of the *International Residential Code*.

Exception: Respite Care Facilities shall be provided with a NFPA 13 sprinkler system complying with Section 903.3.1.1.

[F] 903.3.2 Quick-response and residential sprinklers. Where *automatic sprinkler systems* are required by this code, quick-response or residential automatic sprinklers shall be installed in all of the following areas in accordance with Section 903.3.1 and their listings:

1. Throughout all spaces within a *smoke compartment* containing care recipient *sleeping units* in Group I-2 in accordance with this code.
2. Throughout all spaces within a *smoke compartment* containing gas fireplace appliances ~~and~~ or decorative gas appliances in Group I-2.
3. Throughout all spaces within a *smoke compartment* containing treatment rooms in *ambulatory care facilities*.
4. *Dwelling units* and *sleeping units* in Group I-1 and R occupancies.
5. Light-hazard occupancies as defined in NFPA 13.

SECTION 904
ALTERNATIVE AUTOMATIC FIRE-EXTINGUISHING SYSTEMS

[F] 904.13.1 Manual system operation. ~~A manual actuation device shall be located at or near a *means of egress* from the cooking area not less than 10 feet (3048 mm).~~ At least one readily accessible means for manual actuation shall be located in the path of egress or at a location *approved* by the fire code official and not more than 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) or less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Exception: *Automatic sprinkler systems* shall not be required to be equipped with manual actuation means.

SECTION 905
STANDPIPE SYSTEMS

[F] 905.3.8 Landscaped roofs. Buildings or structures that have landscaped roofs in accordance with Section 317 of the *International Fire Code* and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the landscaped roof is located.

[F] 905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required *interior exit stairway and required exterior exit stairway*, a hose connection shall be provided for each story above and below *grade plane*. Hose connections shall be located at the main floor landing unless otherwise *approved* by the fire code official.

   Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open *stairs* that are not greater than 75 feet (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a *horizontal exit*.

   Exception: Where floor areas adjacent to a *horizontal exit* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the *horizontal exit*.

3. In every *exit passageway*, at the entrance from the *exit passageway* to other areas of a building.

   Exception: Where floor areas adjacent to an *exit passageway* are reachable from an *interior exit stairway* hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the *exit passageway* to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit *passageway* or exit *corridor* to the mall. In *open mall buildings*, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit *passageway* or *exit* corridor to the mall.

5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an *interior exit stairway* with access to the roof provided in accordance with Section 1011.12.

6. Where the most remote portion of a nonsprinklered floor or *story* is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or *story* is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in *approved* locations.

SECTION 906
PORTABLE FIRE EXTINGUISHERS

(Deleted - See Section 906 of the *International Fire Code*)

~~**[F] 906.1 Where required.** Portable fire extinguishers shall be installed in all of the following locations:~~

1. In Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.

Exceptions:

1. In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.

2. In Group E occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each classroom is provided with a portable fire extinguisher having a minimum rating of 2-A:20-B:C.

3. In storage areas of Group S Occupancies where forklift, powered industrial truck or powered cart operators are the primary occupants, fixed extinguishers, as specified in NFPA 10, shall not be required where in accordance with all of the following:

3.1. Use of vehicle mounted extinguishers shall be approved by the fire code official.

3.2. Each vehicle shall be equipped with a 10 pound, 40A:80B:C extinguisher affixed to the vehicle using a mounting bracket approved by the extinguisher manufacturer or the fire code official for vehicular use.

3.3. Not less than two spare extinguishers of equal or greater rating shall be available on site to replace a discharged extinguisher.

3.4. Vehicle operators shall be trained in the proper operation, use and inspection of extinguishers.

3.5. Inspections of vehicle mounted extinguishers shall be performed daily.

2. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment and from domestic cooking equipment in Group I-1; I-2, Condition 1; and R-2 college *dormitory* occupancies.

3. In areas where flammable or *combustible liquids* are stored, used or dispensed.

4. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 3315.1 3316.1 of the *International Fire Code*.

5. Where required by the *International Fire Code* sections indicated in Table 906.1.

6. Special hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the fire code official.

Exception: Portable fire extinguishers are not required at normally unmanned Group U occupancy buildings or structures where a portable fire extinguisher suitable to the hazard of the location is provided on the vehicle of visiting personnel.

[F] TABLE 906.1
ADDITIONAL REQUIRED PORTABLE
FIRE EXTINGUISHERS IN THE INTERNATIONAL FIRE CODE

IFC SECTION	SUBJECT
303.5	Asphalt kettles
307.5	Open burning
308.1.3	Open flames - torches
309.4	Powered industrial trucks
1204.10	Portable Generators
2005.2	Aircraft towing vehicles
2005.3	Aircraft welding apparatus
2005.4	Aircraft fuel servicing tank vehicles
2005.5	Aircraft hydrant fuel servicing vehicles

~~2005.6~~	~~Aircraft fuel-dispensing stations~~
~~2007.7~~	~~Heliports and helistops~~
~~2108.4~~	~~Dry cleaning plants~~
~~2305.5~~	~~Motor fuel-dispensing facilities~~
~~2310.6.4~~	~~Marine motor fuel-dispensing facilities~~
~~2311.6~~	~~Repair garages~~
~~2404.4.1~~	~~Spray finishing operations~~
~~2405.4.2~~	~~Dip tank operations~~
~~2406.4.2~~	~~Powder coating areas~~
~~2804.3~~	~~Lumberyards/woodworking facilities~~
~~2808.8~~	~~Recycling facilities~~
~~2809.5~~	~~Exterior lumber storage~~
~~2903.5~~	~~Organic coating areas~~
~~3006.3~~	~~Industrial ovens~~
~~3107.9~~	~~Tents and membrane structures~~
~~3206.10~~	~~High-piled storage~~
~~3315.1~~ ~~3316.1~~	~~Buildings under construction or demolition~~
~~3318.3~~	~~Roofing operations~~
~~3408.2~~	~~Tire rebuilding/storage~~
~~3504.2.6~~	~~Welding and other hot work~~
~~3604.4~~	~~Marinas~~
~~3703.6~~	~~Combustible fibers~~
~~5703.2.1~~	~~Flammable and combustible liquids, general~~
~~5704.3.3.1~~	~~Indoor storage of flammable and combustible liquids~~
~~5704.3.7.5.2~~	~~Liquid storage rooms for flammable and combustible liquids~~
~~5705.4.9~~	~~Solvent distillation units~~
~~5706.2.7~~	~~Farms and construction sites—flammable and combustible liquids storage~~
~~5706.4.10.1~~	~~Bulk plants and terminals for flammable and combustible liquids~~
~~5706.5.4.5~~	~~Commercial, industrial, governmental or manufacturing establishments—fuel dispensing~~
~~5706.6.4~~	~~Tank vehicles for flammable and combustible liquids~~
~~5906.5.7~~	~~Flammable solids~~
~~6108.2~~	~~LP-gas~~

[F] 906.2 General requirements. Portable fire extinguishers shall be selected and installed in accordance with this section and NFPA 10.

Exceptions:

1. The distance of travel to reach an extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies.
2. In Group I-3, portable fire extinguishers shall be permitted to be located at staff locations.

[F] 906.3 Size and distribution. The size and distribution of portable fire extinguishers shall be in accordance with Sections 906.3.1 through 906.3.4.

[F] TABLE 906.3(1)
FIRE EXTINGUISHERS FOR CLASS A FIRE HAZARDS

	LIGHT (Low) HAZARD OCCUPANCY	ORDINARY (Moderate) HAZARD OCCUPANCY	EXTRA (High) HAZARD OCCUPANCY
Minimum rated single extinguisher	2-A[c]	2-A	4-A[a]
Maximum floor area per unit of A	3,000 square feet	1,500 square feet	1,000 square feet
Maximum floor area for extinguisher[b]	11,250 square feet	11,250 square feet	11,250 square feet
Maximum distance of travel to extinguisher	75 feet	75 feet	75 feet

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929m², 1 gallon = 3.785 L.
a. Two 2½-gallon water-type extinguishers shall be deemed the equivalent of one 4-A rated extinguisher.
b. Annex E.3.3 of NFPA 10 provides more details concerning application of the maximum floor area criteria.
c. Two water-type extinguishers each with a 1-A rating shall be deemed the equivalent of one 2-A rated extinguisher for Light (Low) Hazard Occupancies.

[F] TABLE 906.3(2)
FIRE EXTINGUISHERS FOR FLAMMABLE OR COMBUSTIBLE LIQUIDS WITH DEPTHS LESS THAN OR EQUAL TO 0.25 INCH[a]

TYPE OF HAZARD	BASIC MINIMUM EXTINGUISHER RATING	MAXIMUM DISTANCE OF TRAVEL TO EXTINGUISHERS (feet)
Light (Low)	5-B 10-B	30 50
Ordinary (Moderate)	10-B 20-B	30 50
Extra (High)	40-B 80-B	30 50

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. For requirements on water-soluble flammable liquids and alternative sizing criteria, see Section 5.5 of NFPA 10.

[F] 906.3.1 Class A fire hazards. The minimum sizes and distribution of portable fire extinguishers for occupancies that involve primarily Class A fire hazards shall comply with Table 906.3(1).

[F] 906.3.2 Class B fire hazards. Portable fire extinguishers for occupancies involving flammable or combustible liquids with depths less than or equal to 0.25 inch (6.4 mm) shall be selected and placed in accordance with Table 906.3(2).

Portable fire extinguishers for occupancies involving flammable or combustible liquids with a depth of greater than 0.25 inch (6.4 mm) shall be selected and placed in accordance with NFPA 10.

[F] 906.3.3 Class C fire hazards. Portable fire extinguishers for Class C fire hazards shall be selected and placed on the basis of the anticipated Class A or B hazard.

[F] 906.3.4 Class D fire hazards. Portable fire extinguishers for occupancies involving combustible metals shall be selected and placed in accordance with NFPA 10.

[F] 906.4 Cooking equipment fires. Fire extinguishers provided for the protection of cooking equipment shall be of an *approved* type compatible with the automatic fire extinguishing system agent. Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K rated portable extinguisher in accordance with Sections 906.1, Item 2, 906.4.1 and 906.4.2 of the *International Fire Code*, as applicable.

[F] 906.5 Conspicuous location. Portable fire extinguishers shall be located in conspicuous locations where they will have *ready access* and be immediately available for use. These locations shall be along normal paths of travel, unless the fire code official determines that the hazard posed indicates the need for placement away from normal paths of travel.

[F] 906.6 Unobstructed and unobscured. Portable fire extinguishers shall not be obstructed or obscured from view. In rooms or areas in which visual obstruction cannot be completely avoided, means shall be provided to indicate the locations of extinguishers.

[F] 906.7 Hangers and brackets. Hand-held portable fire extinguishers, not housed in cabinets, shall be installed on the hangers or brackets supplied. Hangers or brackets shall be securely anchored to the mounting surface in accordance with the manufacturer's installation instructions.

[F] 906.8 Cabinets. Cabinets used to house portable fire extinguishers shall not be locked.

Exceptions:

1. Where portable fire extinguishers subject to malicious use or damage are provided with a means of ready access.
2. In Group I-3 occupancies and in mental health areas in Group I-2 occupancies, access to portable fire extinguishers shall be permitted to be locked or to be located in staff locations provided that the staff has keys.

[F] 906.9 Extinguisher installation. The installation of portable fire extinguishers shall be in accordance with Sections 906.9.1 through 906.9.3.

[F] 906.9.1 Extinguishers weighing 40 pounds or less. Portable fire extinguishers having a gross weight not exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 5 feet (1524 mm) above the floor.

[F] 906.9.2 Extinguishers weighing more than 40 pounds. Hand-held portable fire extinguishers having a gross weight exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 3.5 feet (1067 mm) above the floor.

[F] 906.9.3 Floor clearance. The clearance between the floor and the bottom of installed hand-held portable fire extinguishers shall be not less than 4 inches (102 mm).

[F] 906.10 Wheeled units. Wheeled fire extinguishers shall be conspicuously located in a designated location.

SECTION 907
FIRE ALARM AND DETECTION SYSTEMS

[F] 907.1.2 Fire alarm shop drawings. See Section 901.2.2. Shop drawings for fire alarm systems shall be prepared in accordance with NFPA 72 and submitted for review and approval prior to system installation.

[F] 907.2 Where required—new buildings and structures. An *approved* fire alarm system installed in accordance with the provisions of this code and NFPA 72 shall be provided in new buildings and structures in accordance with Sections 907.2.1 through 907.2.23 and provide occupant notification in accordance with Section 907.5, unless other requirements are provided by another section of this code.

Not fewer than A minimum of one manual fire alarm box shall be provided in an *approved* location to initiate a fire *alarm signal* for fire alarm systems employing automatic fire detectors or waterflow detection devices. Where other sec-

tions of this code allow elimination of fire alarm boxes due to sprinklers, a single fire alarm box shall be installed when a manual fire alarm system is required.

Exceptions:

1. The manual fire alarm box is not required for fire alarm systems dedicated to elevator recall control and supervisory service.
2. The manual fire alarm box is not required for Group R-2 occupancies unless required by the *fire code official* to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. Where provided, the manual fire alarm box shall not be located in an area that is open to the public.

[F] 907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the *occupant load* due to the assembly occupancy is 300 or more, or where the Group A *occupant load* is more than 100 persons above or below the nearest ~~*lowest*~~ *level of exit discharge*. Group A occupancies not separated from one another in accordance with Section 707.3.10 and 711.2.4 shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

[F] 907.2.3 Group E. A manual fire alarm system that initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall be installed in Group E occupancies. Where *automatic sprinkler systems* or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.

Exceptions:

1. In other than licensed day care centers complying with Section 431 a ~~A~~ manual fire alarm system shall not be required in Group E occupancies with an *occupant load* of 50 or less.
2. Emergency voice/alarm communication systems meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall not be required in Group E occupancies with *occupant loads* of 100 or less, provided that activation of the manual fire alarm system initiates an *approved* occupant notification signal in accordance with Section 907.5.
3. Manual fire alarm boxes shall not be required in Group E occupancies where all of the following apply:
    3.1. Interior *corridors* are protected by smoke detectors.
    3.2. Auditoriums, cafeterias, gymnasiums and similar areas are protected by *heat detectors* or other *approved* detection devices.
    3.3. Shops and laboratories involving dusts or vapors are protected by *heat detectors* or other *approved* detection devices.
    3.4 Manual activation is provided from a normally occupied location.
4. Manual fire alarm boxes shall not be required in Group E occupancies where all of the following apply:
    4.1. The building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1.
    4.2. The emergency voice/alarm communication system will activate on sprinkler waterflow.
    4.3. Manual activation is provided from a normally occupied location.

[F] 907.2.10 Group S. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group S ~~public and self-storage occupancies~~ self-service storage facilities three stories or greater in height for interior corridors and interior common areas. Visible notification appliances are not required within storage units.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.5.1.1 Presignal feature. A presignal feature shall only be provided ~~only~~ where *approved*. The presignal shall be annunciated at an approved, *constantly attended location*, having the capability to activate the occupant notification system in the event of fire or other emergency.

[F] 907.5.2.1 Audible alarms. Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any purpose other than that of a fire alarm.

Exceptions:

1. Audible alarm notification appliances are not required in critical care areas of Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
2. A visible *alarm notification appliance* installed in a nurses' control station or other continuously attended staff location in a Group I-2, Condition 2 suite shall be an acceptable alternative to the installation of audible alarm notification appliances throughout a suite or unit in Group I-2, Condition 2 occupancies that are in compliance with Section 907.2.6, Exception 2.
3. Where provided, audible notification appliances located in each enclosed occupant evacuation elevator lobby in accordance with Section 3008.9.1 shall be connected to a separate notification zone for manual paging only.
4. In Group I-2 occupancies, Group B ambulatory health care facilities and licensed large residential care facilities, as in accordance with Section 430.5 where occupants are incapable of evacuating themselves because of age, physical or mental disabilities, or physical restraint, audible notification appliances shall be permitted to meet the private mode requirements of NFPA 72 in patient care and treatment areas.

[F] 907.5.2.3.3.1 Wired equipment. Where wired equipment is used to comply with the future capability required by Section 907.5.2.3.3, the system shall include one of the following capabilities:

1. The replacement of audible appliances with combination audible/visible appliances or additional visible notification appliances.
2. The future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances.
3. For wired equipment, the fire alarm power supply and circuits shall have not less than 5-percent excess capacity to accommodate the future addition of visible alarm notification appliances, and a single access point to such circuits shall be available on every story. Such circuits shall not be required to be extended beyond a single access point on a story. The fire alarm system shop drawings required by Section ~~907.1.2~~ 901.2.2 of the *North Carolina Fire Code* shall include the power supply and circuit documentation to accommodate the future addition of visible notification appliances.

[F] 907.7 Acceptance tests and completion. ~~Upon completion of the installation, the fire alarm system and all fire alarm components shall be tested in accordance with NFPA 72.~~ Deleted – See Section 907.7 of the *International Fire Code*.

~~**[F] 907.7.1 Single- and multiple-station alarm devices.** When the installation of the alarm devices is complete, each device and interconnecting wiring for multiple-station alarm devices shall be tested in accordance with the smoke alarm provisions of NFPA 72.~~

~~**[F] 907.7.2 Record of completion.** A record of completion in accordance with NFPA 72 verifying that the system has been installed and tested in accordance with the *approved* plans and specifications shall be provided.~~

~~**[F] 907.7.3 Instructions.** Operating, testing and maintenance instructions and *record drawings* ("as-builts") and equipment specifications shall be provided at an *approved* location.~~

SECTION 909
SMOKE CONTROL SYSTEMS

[F] 909.4 Analysis. A rational analysis performed by the registered design professional and *approved* by the fire code official supporting the types of smoke control systems to be employed, their methods of operation, the systems supporting them and the methods of construction to be utilized shall accompany the submitted *construction documents* and shall include, but not be limited to, the items indicated in Sections 909.4.1 through 909.4.7.

[F] 909.5.3 Opening protection. Openings in *smoke barriers* shall be protected by automatic-closing devices actuated by the required controls for the mechanical smoke control system. Door openings shall be protected by *fire door assemblies* complying with Section 716.

Exceptions:

1. Passive smoke control systems with automatic-closing devices actuated by spot-type smoke detectors *listed* for releasing service installed in accordance with Section 907.3.
2. Fixed openings between smoke zones that are protected utilizing the airflow method.
3. In Group I-1, Condition 2; Group I-2; and *ambulatory care facilities*, where a pair of opposite-swinging doors are installed across a *corridor* in accordance with Section 909.5.3.1, the doors shall not be required to be protected in accordance with Section 716. The doors shall be close-fitting within operational tolerances and shall not have a center mullion or undercuts in excess of $^{3}/_{4}$ inch (19.1 mm), louvers or grilles. The doors shall have head and jamb stops and astragals or rabbets at meeting edges and, where permitted by the door manufacturer's listing, positive-latching devices are not required.
4. In Group I-2 and *ambulatory care facilities*, where such doors are special-purpose horizontal sliding, accordion or folding door assemblies installed in accordance with Section 1010.3.3 and are automatic closing by smoke detection in accordance with Section ~~716.2.6.5~~ 716.2.6.6.
5. Group I-3.
6. Openings between smoke zones with clear ceiling heights of 14 feet (4267 mm) or greater and bank-down capacity of greater than 20 minutes as determined by the design fire size.

909.5.3.1 Group I-1, Condition 2; Group I-2; and ambulatory care facilities. In Group I-1, Condition 2; Group I-2; and *ambulatory care facilities*, where doors are installed across a *corridor*, the doors shall be automatic closing by smoke detection in accordance with Section ~~716.2.6.5~~ 716.2.6.6 and shall have a vision panel with fire-protection-rated glazing materials in fire protection-rated frames, the area of which shall not exceed that tested.

909.12.1 Verification. Control systems for mechanical smoke control systems shall include provisions for verification. Verification shall include positive confirmation of actuation, testing, manual override and the presence of power downstream of all disconnects. A preprogrammed weekly test sequence shall report abnormal conditions audibly, visually and by printed report. The preprogrammed weekly test shall operate all devices, equipment and components used for smoke control.

Exception: Where verification of individual components tested through the preprogrammed weekly testing sequence will interfere with, and produce unwanted effects to, normal building operation, such individual components are permitted to be bypassed from the preprogrammed weekly testing, where *approved* by the ~~building~~ fire official and in accordance with both of the following:

1. Where the operation of components is bypassed from the preprogrammed weekly test, presence of power downstream of all disconnects shall be verified weekly by a *listed* control unit.
2. Testing of all components bypassed from the preprogrammed weekly test shall be in accordance with Section 909.20.6 of the *International Fire Code*.

SECTION 915
CARBON MONOXIDE DETECTION

[F] 915.1 General. Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1 through 915.6. Carbon monoxide detection shall be installed in existing buildings in accordance with ~~Chapter 11 of the *International Fire Code*~~ *NCGS 143-138(b2) and applicable sections of the International Existing Building Code*.

[F] 915.1.1 Where required. Carbon monoxide detection shall be provided in Group A-2, I ~~I-1, I-2, I-4~~ and R occupancies and in classrooms in Group E occupancies in the locations specified in Section 915.2 where any of the conditions in Sections 915.1.2 through 915.1.6 exist.

[F] 915.1.2 Fuel-burning appliances and fuel-burning fireplaces. Carbon monoxide detection shall be provided in Group A-2 occupancies, *dwelling units*, *sleeping units* and classrooms that contain a fuel-burning appliance or a fuel-burning fireplace.

[F] 915.1.3 Fuel burning, forced-air furnaces. Carbon monoxide detection shall be provided in Group A-2 occupancies, dwelling units, sleeping units and classrooms served by a fuel-burning, forced-air furnace.

Exception: Carbon monoxide detection shall not be required in *dwelling units*, *sleeping units* and classrooms if a carbon monoxide detector is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

[F] 915.2.2 Sleeping units. Carbon monoxide detection shall be installed in *sleeping units*.

Exceptions:

1. Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit* where the *sleeping unit* or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced-air furnace.

2. In Group I-3, carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the *sleeping unit*.

[F] 915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exceptions:

1. Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.

2. In A-2 occupancies the carbon monoxide detector shall be permitted to be battery-powered.

SECTION 917
MASS NOTIFICATION SYSTEMS

[F] 917.1 College and university campuses. Prior to construction of a new building requiring a fire alarm system on a multiple-building college or university campus having a cumulative building *occupant load* of 1,000 or more, a *registered design professional* shall conduct a mass notification risk analysis ~~shall be conducted~~ in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an *approved* mass notification system shall be provided in accordance with the findings of the risk analysis.

SECTION 919
FIRE APPARATUS ACCESS ROADS

[F] 919.1 General. Fire apparatus roads shall be provided for all new buildings in accordance with Section 503 of the *International Fire Code*.

CHAPTER 10
MEANS OF EGRESS

User notes:

About this chapter: Chapter 10 provides the general criteria for designing the means of egress established as the primary method for protection of people in buildings by allowing timely relocation or evacuation of building occupants. Both prescriptive and performance language is utilized in this chapter to provide for a basic approach in the determination of a safe exiting system for all occupancies. It addresses all portions of the egress system (exit access, exits and exit discharge) and includes design requirements as well as provisions regulating individual components. The requirements detail the size, arrangement, number and protection of means of egress components. Functional and operational characteristics that will permit the safe use of components without special knowledge or effort are specified.

The means of egress protection requirements work in coordination with other sections of the code, such as protection of vertical openings (see Chapter 7), interior finish (see Chapter 8), fire suppression and detection systems (see Chapter 9) and numerous others, all having an impact on life safety. Chapter 10 is subdivided into four main sections: general (Sections 1003–1015), exit access (Sections 1016–1021), exit (Sections 1022–1027) and exit discharge (Sections 1028–*1029*). Special allowances for the unique requirements for assembly spaces (Section 1030) and emergency escape and rescue openings (Section 1031) complete the chapter. Chapter 10 of this code is duplicated in Chapter 10 of the International Fire Code®; however, the International Fire Code contains one additional section on maintenance of the means of egress system in existing buildings.

Section 1010 was extensively reorganized for the 2021 edition. For complete information, see the moved sections table in the preface information for the International Building Code.

[F] SECTION 1002
~~MAINTENANCE AND~~ FIRE SAFETY AND EVACUATION PLANS

[F] 1002.1 Maintenance. Deleted. ~~*Means of egress* shall be maintained in accordance with the *International Fire Code*.~~

SECTION 1004
OCCUPANT LOAD

1004.5.1 Increased occupant load. ~~The~~ Where *approved* by the *building official*, the *occupant load* permitted in any building, or portion thereof, is permitted to be increased from that number established for the occupancies in Table 1004.5, provided that all other requirements of the code are met based on such modified number and the *occupant load* does not exceed one occupant per 7 square feet (0.65 m2) of occupiable floor space. Where required by the *building official*, an *approved aisle*, seating or fixed equipment diagram substantiating any increase in *occupant load* shall be submitted. Where required by the *building official*, such diagram shall be posted.

TABLE 1004.5
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT[c]
(Based on function or use and not occupancy classification)

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross

Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)[b]	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of run-way, and for additional areas	7 net
Business areas	100 ~~150~~ gross
~~Concentrated business use areas~~	~~See Section 1004.8~~
Courtrooms—other than fixed seat-ing areas	40 net
Day care[d]	35 net[d]
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room are-as	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufac-turing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses, repair garages	500 gross
Piers and docks	See Section 3606.8

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

b. An assembly occupancy conference room that is accessory to a Group B office occupancy and meeting the requirements of Section 303.1.2, exception 2, shall be calculated at 100 square feet per occupant for determining the overall occupant load of the associated floor. The assembly occupancy shall be calculated at 15 square feet per occupant for the purpose of determining egress from the room containing the assembly occupancy.

c. For mixed uses sum all loads before rounding up to the next whole number.

d. Day care facility calculated occupant loads may be based on the occupant load allowed by the State licensing agency.

1004.8 Concentrated business use areas. Deleted ~~The *occupant load* factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data processing centers and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. Where approved by the *building official*, the *occupant load* for concentrated business use areas shall be the actual *occupant load*, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.~~

1004.9 Posting of occupant load. ~~Every room or space that is an assembly occupancy shall have the *occupant load* of the room or space posted in a conspicuous place, near the main *exit* or *exit access doorway* from the room or space, for the intended configurations. Posted signs shall be of an approved legible permanent design and shall be maintained by the owner or the owner's authorized agent.~~ Posting of occupant loading shall be in accordance with Section 204.12.2 of the *North Carolina Administrative Code and Policies*.

SECTION 1005
MEANS OF EGRESS SIZING

1005.7.1 Doors. Doors, when fully opened, shall not reduce the required width by more than 7 inches (178 mm). Doors in any position shall not reduce the required width by more than one-half.

Exceptions:

1. Surface-mounted latch release hardware shall be exempt from inclusion in the 7-inch maximum (178 mm) encroachment where both of the following conditions exist:
   1.1. The hardware is mounted to the side of the door facing away from the adjacent wall where the door is in the open position.
   1.2. The hardware is mounted not less than 34 inches (865 mm) nor more than 48 inches (1219 mm) above the finished floor.
2. The restrictions on door swing shall not apply to ~~doors within individual *dwelling units* and *sleeping units* of Group R-2 occupancies and *dwelling units* of Group R-3 occupancies~~ the following locations:

   2.1. Within individual dwelling units and sleeping units of Group R-2 occupancies;

   2.2. Dwelling units of Group R-3 occupancies;

   2.3. Janitor closets 15 square feet or less; or

   2.4. Mechanical or electrical rooms that do not include storage.

SECTION 1006
NUMBER OF EXITS AND EXIT ACCESS DOORWAYS

TABLE 1006.2.1
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY[i]

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	

A[c], E[h], M	49	75	75	75[a]
B	49	100	75	100[a]
F	49	75	75	100[a]
H-1, H-2, H-3	3	NP	NP	25[b]
H-4, H-5	10	NP	NP	75[b]
I-1, I-2[d], I-4	10	NP	NP	75[a]
I-3	10	NP	NP	100[a]
R-1	10	NP	NP	75[a]
R-2	20	NP	NP	125[a]
R-3[e]	20	NP	NP	125[a, g]
R-4[e]	20	NP	NP	125[a, g]
S[f]	29	100	75	100[a]
U	49	100	75	75[a]

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

d. For the travel distance limitations in Group I-2, see Section 407.4.

e. The common path of egress travel distance shall only apply in a Group R-3 occupancy located in a mixed occupancy building or within Group R-3 or R-4 *congregate living facilities*.

f. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

h. Day care maximum occupant load is 10.

i. Single exits as allowed by Section 1006.3.4.

SECTION 1008
MEANS OF EGRESS ILLUMINATION

1008.3.3 Rooms and spaces. In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. ~~Electrical~~ Main electrical equipment rooms.
2. Fire command centers.
3. Fire pump rooms.
4. Generator rooms.
5. Public restrooms ~~with an area greater than 300 square feet (27.87 m^2)~~ where two or more water closets are required by Table 2902.1.
6. Sprinkler riser rooms.
7. *Fire protection and life safety system control units.*

Where the above equipment is not in a dedicated room only the working space around the equipment shall be illuminated.

SECTION 1009
ACCESSIBLE MEANS OF EGRESS

1009.1 Accessible means of egress required. *Accessible* means of egress shall comply with this section. *Accessible* spaces shall be provided with not less than one accessible means of egress. Where more than one *means of egress* is required by Section 1006.2 or 1006.3 from any accessible space, each *accessible* portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. One *accessible means of egress* is required from an *accessible mezzanine* level in accordance with Section 1009.3, 1009.4 or 1009.5.
2. In assembly areas with ramped *aisles* or stepped *aisles*, one *accessible means of egress* is permitted where the *common path of egress travel* is *accessible* and meets the requirements in Section 1030.8.
3. *Accessible means of egress* are not required to be provided in existing buildings unless that component of the means of egress is part of an alteration, renovation, or addition.

1009.4.1 Standby power. The elevator shall meet the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1/CSA B44. Standby power shall be provided in accordance with Chapter 27 and Section 3003. Wiring and cables shall be protected in accordance with Section 3008.8.2.

1009.7.2 Separation. Exterior walls separating the exterior area of assisted rescue from the interior of the building shall have a minimum *fire-resistance rating* of 1 hour, rated for exposure to fire from the inside. The fire-resistance-rated *exterior wall* construction shall extend horizontally not less than 10 feet (3048 mm) beyond the landing on either side of the landing or equivalent fire-resistance-rated construction is permitted to extend out perpendicular to the *exterior wall* not less than 4 feet (1219 mm) on the side of the landing. The *fire-resistance-rated* construction shall extend vertically from the ground to a point not less than 10 feet (3048 mm) above the floor level of the area for assisted rescue or to the roof line, whichever is lower. Openings within such *fire-resistance-rated exterior walls* shall be protected in accordance with Section 716.

~~**Exception:**~~ **Exceptions:**

1. The *fire-resistance rating* and opening protectives are not required in the *exterior wall* where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

2. Areas for assisted rescue that are located not less than 10 feet (3048 mm) from the exterior face of a building are not required to be separated from the building by fire-resistance rated walls or protected openings.

SECTION 1010
DOORS, GATES AND TURNSTILES

1010.2.1 Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices.

Exceptions:

1. Places of detention or restraint.
2. Where manually operated bolt locks are permitted by Section 1010.2.5.
3. Doors with automatic flush bolts as permitted by Section 1010.2.4, Item 4.
4. Doors from individual *dwelling units* and *sleeping units* of Group R occupancies as permitted by Section 1010.2.4, Item 5.
5. Group E classrooms identified by the local school administration as having one or more students that require restraint to preserve the safety of the student or students shall be permitted to have latching devices that require a maximum of two motions to unlatch the door from the egress side.

1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group I-1, Condition 2 and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an *occupant load* of ~~300~~ 100 or less, and Groups B, F, M and S~~, and in *places of religious worship*~~, the main door or doors are permitted to be equipped with a thumb bolt or key-operated locking devices from the egress side provided:
    3.1. The locking device is readily distinguishable as locked and provided with a thumb bolt or key that cannot be removed when locked from the egress side.
    3.2. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
    3.3. The use of the thumb bolt or key-operated locking device is revocable by the *building official* for ~~due cause~~ violation of Section 1010.2.4.
4. Where egress doors are used in pairs, *approved* automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.
5. Doors from individual *dwelling* or *sleeping units* of Group R occupancies having an *occupant load* of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are openable from the inside without the use of a key or tool.
6. *Fire doors* after the minimum elevated temperature has disabled the unlatching mechanism in accordance with *listed fire door* test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked preventing entry to the building from the roof.
8. Other than egress *courts*, where occupants must egress from an exterior space through the building for *means of egress*, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
    8.1. The maximum *occupant load* shall be posted where required by Section 1004.9. Such signage shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.
    8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
    8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
    8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
    8.5. A readily visible, durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating, "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
    8.6. The *occupant load* of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less serving a private office space.

1010.2.7 Stairway doors. Interior *stairway* means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. *Stairway* discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3.
3. *Stairway* exit doors are permitted to be locked from the side opposite the egress side, provided that they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from the *fire command center*, if present, or a signal by emergency personnel from a single location inside the main entrance to the building and upon activation of the fire alarm if present.
4. *Stairway exit* doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single *exit stairway* where permitted in Section 1006.3.4.
5. *Stairway* exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the *dwelling unit* is from a single exit *stairway* where permitted in Section 1006.3.4.
6. ~~In other than high rise, *stairways* serving floors above a 3 hour horizontal building separation, doors are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon activation of the building fire alarm system.~~

1010.2.9 Panic and fire exit hardware. Swinging doors serving a Group H occupancy and swinging doors serving rooms or spaces with an *occupant load* of 50 or more in a Group A or E occupancy shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*.

Exceptions:

1. A main exit of a Group A occupancy shall be permitted to have locking devices in accordance with Section 1010.2.4, Item 3.
2. Doors provided with *panic hardware* or *fire exit hardware* and serving a Group A or E occupancy shall be permitted to be electrically locked in accordance with Section 1010.2.11 or 1010.2.12.
3. Exit access doors serving occupied exterior areas shall be permitted to be locked in accordance with Section 1010.2.4, Item 8.
4. Courtrooms shall be permitted to be locked in accordance with Section 1010.2.13, Item 3.
5. Doors serving a Group A or E occupancy in an I-2 facility shall be permitted to be locked in accordance with Section 1010.2.14.2 or 1010.2.14.3 where the clinical or security needs of the patients require specialized locking measures for their safety or the safety of others.
6. Outdoor swimming pool barrier gates where the barrier height is a maximum of 48 inches when the area served by the gate has a calculated occupant load less than 300.

1010.2.9.2 Rooms with electrical equipment. ~~Exit or exit access doors serving transformer vaults, rooms designated for batteries or energy storage systems, or modular data centers shall be equipped with panic hardware or fire exit hardware. Rooms containing electrical equipment rated 800 amperes or more that contain overcurrent devices, switching devices or control devices and where the exit or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by NFPA 70, such doors shall not be provided with a latch or lock other than *panic hardware* or *fire exit hardware*. The doors shall swing in the direction of egress travel.~~ See the NC Electrical Code, Article 110 for electrical room egress hardware requirements.

1010.2.13.1 Delayed egress locking system. The delayed egress locking system shall be installed and operated in accordance with all of the following:

1. The delay electronics of the delayed egress locking system shall deactivate upon actuation of the *automatic sprinkler system* or *automatic fire detection system*, allowing immediate free egress.

2. The delay electronics of the delayed egress locking system shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate free egress.

3. The delayed egress locking system shall have the capability of being deactivated at the *fire command center* and other *approved* locations. If a *fire command center* is not required by this code, the door locks shall have the capability of being unlocked by a signal from a location *approved* by the fire code official.

4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.

   Exception: Where *approved*, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. The egress path from any point shall not pass through more than one delayed egress locking system.

   Exceptions:

   1. In Group I-1, Condition 2, Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.

   2. In Group I-1, Condition 1 or Group I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds and the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware:

   Exception: Where *approved*, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.

   6.1. For doors that swing in the direction of egress, the sign shall read, "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."

   6.2. For doors that swing in the opposite direction of egress, the sign shall read, "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."

   6.3. The sign shall comply with the visual character requirements in ICC A117.1.

7. Emergency lighting shall be provided on the egress side of the door.

8. The delayed egress locking system units shall be *listed* in accordance with UL 294.

9. The egress path shall not pass through a locking system allowed by Section 407.13.

1010.2.14 Controlled egress doors in Groups I-1, ~~and~~ I-2, and R-4.

1010.2.14.1 Group I-1. Electric locking systems, including electro-mechanical locking systems and electromagnetic locking systems, shall be permitted to be locked in the *means of egress* in Group I-1 ~~or I-2 occupancies~~ where the clinical needs of persons receiving care require their containment. Controlled egress doors shall be permitted in such occupancies where the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or an *approved automatic smoke detection system* installed in accordance with Section 907, provided that the doors are installed and operate in accordance with all of the following:

1. The door locks shall unlock on actuation of the *automatic sprinkler system* or *automatic smoke detection system*.

2. The door locks shall unlock on loss of power controlling the lock or lock mechanism.

3. The door locking system shall be installed to have the capability of being unlocked by a switch located at the *fire command center*, a nursing station or other *approved* location. The switch shall directly break power to the lock.

4. A building occupant shall not be required to pass through more than one door equipped with a controlled egress locking system before entering an *exit*.
5. The procedures for unlocking the doors shall be described and *approved* as part of the emergency planning and preparedness required by Chapter 4 of the *International Fire Code*.
6. All clinical staff shall have the keys, codes or other means necessary to operate the locking systems.
7. Emergency lighting shall be provided at the door.
8. The door locking system units shall be *listed* in accordance with UL 294.

Exception ~~Exceptions~~:

~~1.~~ Items 1 through 4 shall not apply to doors to areas occupied by persons who, because of clinical needs, require restraint or containment as part of the function of a psychiatric or cognitive treatment area.

~~2. Items 1 through 4 shall not apply to doors to areas where a *listed* egress control system is utilized to reduce the risk of child abduction from nursery and obstetric areas of a Group I-2 *hospital*.~~

1010.2.14.2 Group I-2. See Section 407.13. Door-locking arrangements shall be permitted in Group I-2 where the clinical or security needs of the patients require specialized locking measures for their safety or the safety of others, provided keys are carried at all times by staff that are responsible for the evacuation of the occupants within the locked building unit(s). Provisions for remote locking and unlocking of occupied rooms are required where more than ten locks are necessary to be unlocked in order to move occupants from one smoke compartment to another smoke compartment. These locks may include mechanical locks, electromagnetic locks and other approved locking devices.

1010.2.14.3 Special locking arrangements for Licensed Group I-2 and Group R-4 large residential care facilities as described in Section 430. See Section 407.13.

SECTION 1011
STAIRWAYS

1011.4 Walkline. The walkline across *winder* treads shall be concentric to the direction of travel through the turn and located 12 inches (305 mm) horizontally from the handrail that is adjacent to the side where the *winders* are narrower. The 12-inch (305 mm) dimension shall be measured ~~from the widest point of the clear *stair* width at the walking surface of the *winder*~~ perpendicular from the handrail surface that faces the walkline. ~~Where *winders* are adjacent within the *flight*, the point of the widest clear *stair* width of the adjacent *winders* shall be used.~~

1011.12.2 Roof access. Where a *stairway* is provided to a roof, access to the roof shall be provided through a *penthouse* complying with Section 1511.2.

Exception: In buildings without an occupied roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m^2) in area and having a minimum dimension of 2 feet (610 mm). A minimum clearance perpendicular to the ladder or alternating tread device stringer shall be 36 inches (914 mm).

1011.15 Ship's ladders. Ship's ladders are permitted to be used in Group I-3 as a component of a *means of egress* to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m^2) with not more than three occupants and for access to unoccupied roofs. The minimum clear width at and below the *handrails* shall be 20 inches (508 mm). The maximum width to the outside of the handrails shall be of 30 inches (762 mm). The vertical rise between floor levels or landings shall not exceed 20 feet (6096 mm). Ship's ladders shall be designed for the live loads indicated in Section 1607.17.

1011.15.1 Handrails of ship's ladders. 1¼-inch (31.75 mm) pipe *handrails* ~~*Handrails*~~ shall be provided on both sides of ship's ladders.

1011.15.2 Treads of ship's ladders. Ship's ladders shall have a: ~~minimum tread depth of 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the *nosing* projection is not less than 8½ inches (216 mm). The maximum riser height shall be 9½ inches (241 mm).~~

1. Pitch of 60 to 75 degrees,

2. Minimum tread depth of 5 inches, and

3. Riser height of 9-1/2 inches to 12 inches.

1011.16 Ladders. Permanent ladders shall not serve as a part of the *means of egress* from occupied spaces within a building. Permanent ladders shall be constructed in accordance with Section 306.5 of the *International Mechanical Code* and designed for the live loads indicated in Section 1607.17. Permanent ladders shall be allowed ~~permitted~~ to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.
3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupied roofs that are not required to have *stairway* access in accordance with Section 1011.12.1.
6. Where allowed ~~permitted~~ to access equipment and appliances in accordance with Section 306.5 of the *International Mechanical Code*.

SECTION 1013
EXIT SIGNS

1013.3 Illumination. Exit signs shall be internally or externally illuminated.

~~Exception~~ Exceptions:

1. Tactile signs required by Section 1013.4 need not be provided with illumination.

2. Lighted exit signs are not required for Group R *open air cabins*.

SECTION 1014
HANDRAILS

1014.6 Handrail extensions. *Handrails* shall return to a wall, *guard* or the walking surface or shall be continuous to the *handrail* of an adjacent *flight of stairs* or *ramp* run. Where *handrails* are not continuous between flights, the *handrails* shall extend horizontally not less than 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At *ramps* where *handrails* are not continuous between runs, the *handrails* shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of *ramp* runs. The extensions of *handrails* shall be in the same direction of the flights of *stairs* at *stairways* and the *ramp* runs at *ramps*.

Exceptions:

1. *Handrails* within a *dwelling unit* that is not required to be *accessible* need extend only from the top riser to the bottom riser.
2. *Handrails* serving *aisles* in rooms or spaces used for assembly purposes are permitted to comply with the *handrail* extensions in accordance with Section 1030.16.
3. *Handrails* for *alternating tread devices* and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. *Handrails* for *alternating tread devices* are not required to be continuous between flights or to extend beyond the top or bottom risers.
4. Extensions into a path of travel may return along the face of a continuing wall, column, or circulation path.

SECTION 1015
GUARDS

1015.2 Where required. *Guards* shall be located along open-sided walking surfaces, including *mezzanines*, equipment platforms, *aisles*, *stairs*, *ramps*, ~~and~~ landings and retaining walls that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. See Section 3606.6 for piers, docks, catwalks, gangways and floating docks and Section 3607.1.3 for bulkheads.*Guards* shall be adequate in strength and attachment in accordance with Section 1607.9.

Exceptions: *Guards* are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of *stages* and raised *platforms*, including *stairs* leading up to the *stage* and raised *platforms*.
3. On raised *stage* and *platform* floor areas, such as runways, *ramps* and side *stages* used for entertainment or presentations.
4. At vertical openings in the performance area of *stages* and *platforms*.
5. At elevated walking surfaces appurtenant to *stages* and *platforms* for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross *aisles* in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. At retaining walls where the walking surface is more than 6 feet from the adjacent open face of the retaining wall or the retaining wall is in the public right-of-way.

1015.4 Opening limitations. Required *guards* shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required *guard* height. The sphere shall not pass through the opening with a minimum of 50 psf applied horizontally to the sphere from the direction of the walking surface that is being protected. A bottom rail or curb shall be provided that will reject the passage of a 2-inch-diameter (51mm) sphere.

Exceptions:

1. From a height of 36 inches (914 mm) to 42 inches (1067 mm), *guards* shall not have openings that allow passage of a sphere $4^{3}/_{8}$ inches (111 mm) in diameter.
2. The triangular openings at the open sides of a *stair*, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6 inches (152 mm) in diameter.
3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for *alternating tread devices* and ships ladders, *guards* shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
5. In assembly seating areas, *guards* required at the end of *aisles* in accordance with Section 1030.17.4 shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, *guards* shall not have openings that allow passage of a sphere 8 inches (203 mm) in diameter.
6. Within individual *dwelling units* and *sleeping units* in Group R-2 and R-3 occupancies, *guards* on the open sides of *stairs* shall not have openings that allow passage of a sphere $4^{3}/_{8}$ (111 mm) inches in diameter.
7. In child day care facilities any opening in equipment, steps, decks, handrails, and fencing shall be smaller than $3^{1}/_{2}$ inches or greater than 9 inches.

SECTION 1016
EXIT ACCESS

1016.2 Egress through intervening spaces. Egress through intervening spaces shall comply with this section.

1. *Exit access* through an enclosed elevator lobby is permitted. Where access to two or more exits or exit access doorways is required in Section 1006.2.1, access to not less than one of the required *exits* shall be provided without travel through the enclosed elevator lobbies required by Section 3006. Where the path of *exit access* travel passes through an enclosed elevator lobby, the level of protection required for the enclosed elevator lobby is not required to be extended to the *exit* unless direct access to an *exit* is required by other sections of this code.
2. Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas and the area served are accessory to one or the other, are not a Group H occupancy and provide a discernible path of egress travel to an exit.

   Exception: *Means of egress* are not prohibited through adjoining or intervening rooms or spaces in a Group H, S or F occupancy where the adjoining or intervening rooms or spaces are the same or a lesser hazard occupancy group.
3. An *exit access* shall not pass through a room that can be locked to prevent egress.
4. *Means of egress* from *dwelling units* or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.
5. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

   Exceptions:

   1. *Means of egress* are not prohibited through a kitchen area serving adjoining rooms constituting part of the same *dwelling unit* or *sleeping unit*.
   2. *Means of egress* are not prohibited through stockrooms in Group M occupancies where all of the following are met:
      2.1. The stock is of the same hazard classification as that found in the main retail area.
      2.2. Not more than 50 percent of the *exit access* is through the stockroom.
      2.3. The stockroom is not subject to locking from the egress side.
      2.4. There is a demarcated, minimum 44-inch-wide (1118 mm) *aisle* defined by full- or partial-height fixed walls or similar ~~construction~~ barrier that will maintain the required width and lead directly from the retail area to the exit without obstructions.

SECTION 1019
EXIT ACCESS STAIRWAYS AND RAMPS

1019.5 Construction. Exit access stairways and ramps may be unenclosed or in unrated enclosures. Exterior exit access stairways and ramps shall not require separation from the building interior.

Exception: Exit access stairway and ramp enclosures required by 1019.4.

SECTION 1020
CORRIDORS

1020.2 Construction. Corridors shall be fire-resistance rated in accordance with Table 1020.2. The *corridor* walls required to be fire-resistance rated shall comply with Section 708 for *fire partitions*.

~~**Exceptions:**~~

~~1. A *fire resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.~~

~~2. A *fire-resistance rating* is not required for *corridors* contained within a *dwelling unit* or *sleeping unit* in an occupancy in Groups I-1 and R.~~

~~3. A *fire-resistance rating* is not required for *corridors* in *open parking garages*.~~

~~4. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group B that is a space requiring only a single *means of egress* complying with Section 1006.2.~~

~~5. *Corridors* adjacent to the *exterior walls* of buildings shall be permitted to have unprotected openings on unrated *exterior walls* where unrated walls are permitted by Table 705.5 and unprotected openings are permitted by Table 705.8.~~

TABLE 1020.2
CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without sprinkler system	With sprinkler system
H-1, H-2, H-3	All	Not Permitted	1[c]
H-4, H-5	Greater than 30	Not Permitted	1[c]
A, B[g,k], E[e,h], F, M, S[i], U	Greater than 30	1	0
R[f,i]	Greater than 10	Not Permitted	0.5[c]/1[d]
I-2[a]	All	Not Permitted	0
I-1[i], I-3	All	Not Permitted	1[b, c]
I-4	All	1	0

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3.
b. For a reduction in the *fire-resistance rating* for occupancies in Group I-3, see Section 408.8.
c. Buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.
d. Group R-3 and R-4 buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.
e. Adult and child day care facilities without automatic sprinkler systems shall have 1-hour fire-resistance-rated corridors regardless of occupant load.
f. For residential care facilities requirements see Section 430.
g. Exit access corridors are not required to be rated on any single tenant floor or in any single tenant space, if 1-hour fire-resistance-rated floor/ceiling assemblies are provided in multistory buildings and fire partitions are provided between other tenant spaces on the same floor. The structure supporting such floor/ceiling assemblies and fire partitions is not required to be rated in Types IIB, IIIB and VB construction.
h. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required *means of egress* doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
i. A *fire-resistance rating* is not required for *corridors* contained within a *dwelling unit* or *sleeping unit* in Groups I-1 and R.
j. A *fire-resistance rating* is not required for *corridors* in *open parking garages*.
k. A *fire-resistance rating* is not required for *corridors* in an occupancy in Group B which is a space requiring only a single *means of egress* complying with Section 1006.2.
l. *Corridors* adjacent to the *exterior walls* of buildings shall be permitted to have unprotected openings on unrated *exterior walls* where unrated walls are permitted by Table 705.5 ~~602~~ and unprotected openings are permitted by Table 705.8.

1020.7 Corridor continuity. *Fire-resistance-rated corridors* shall be continuous from the point of entry to an *exit*, and shall not be interrupted by intervening rooms. Where the path of egress travel within a *fire-resistance-rated corridor* to the *exit* includes travel along unenclosed *exit access stairways* or *ramps*, the *fire-resistance rating* shall be continuous for the length of the *stairway* or *ramp* and for the length of the connecting *corridor* on the adjacent floor leading to the exit.

Exceptions:

1. Foyers, lobbies or reception rooms constructed as required for *corridors* shall not be construed as intervening rooms.
2. Enclosed elevator lobbies as permitted by Item 1 of Section 1016.2 shall not be construed as intervening rooms.

3. A toilet room as defined by the NC Plumbing Code that meets all of the following requirements may be included as part of the rated corridor enclosure:

3.1. The toilet room shall be separated from the remainder of the building by fire-resistant-rated construction meeting the same requirements as the corridor construction;

3.2. No other rooms open off of the toilet room;

3.3. No gas or electric appliances other than electric point of use water heaters and hand dryers are located in the toilet room; and

3.4. The toilet room is not used for any other purpose.

SECTION 1023
INTERIOR EXIT STAIRWAYS AND RAMPS

1023.2 Construction. Enclosures for interior exit *stairways* and *ramps* shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. *Interior exit stairway* and *ramp* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the *interior exit stairways* or *ramps* shall include any *basements*, but not any *mezzanines*. Enclosures for *interior exit stairways* and *ramps* shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours.

Exceptions:

1. *Interior exit stairways* and *ramps* in Group I-3 occupancies in accordance with the provisions of Section 408.3.8.
2. *Interior exit stairways* within an *atrium* enclosed in accordance with Section 404.6.
3. *Interior exit stairways* in accordance with Section 510.2.
4. In other than Group H and I occupancies, a maximum of 50 percent of egress stairways serving one adjacent floor are not required to be enclosed, provided at least two means of egress are provided from both floors served by the unenclosed stairways. Any two such interconnected floors shall not open to other floors. Unenclosed exit stairways shall be remotely located as required in Section 1007.1.1.
5. In other than Group H and I occupancies, interior egress stairways serving only the first and second stories of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 are not required to be enclosed, provided at least two means of egress are provided from both floors served by the unenclosed stairways. Such interconnected stories shall not be open to other stories. Unenclosed exit stairways shall be remotely located as required in Section 1007.1.1.
6. *Exit access stairways* and *ramps* that are either unenclosed or in allowed unrated enclosures.

SECTION 1030
ASSEMBLY

1030.9.5 ~~Dead-end aisles.~~ Assembly aisle termination. Each end of an *aisle* shall be continuous to a cross *aisle*, foyer, doorway, vomitory, concourse or *stairway* in accordance with Section 1030.9.7 having access to an *exit*.

Exceptions:

1. Dead-end *aisles* shall be not greater than 20 feet (6096 mm) in length.
2. Dead-end *aisles* longer than ~~16 rows~~ 20 feet (6096 mm) are permitted where seats beyond the ~~16 rows~~ 20 feet (6096 mm) dead-end *aisle* are not more than 24 seats from another *aisle*, measured along a row of seats having a minimum clear width of 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.

3. For *smoke-protected* or *open-air assembly seating*, the dead-end *aisle* length of vertical *aisles* shall not exceed a distance of 21 rows.

4. For *smoke-protected* or *open-air assembly seating*, a longer dead-end *aisle* is permitted where seats beyond the 21-row dead-end *aisle* are not more than 40 seats from another *aisle*, measured along a row of seats having an *aisle* accessway with a minimum clear width of 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.

SECTION 1031
EMERGENCY ESCAPE AND RESCUE

1031.2 Where required. In addition to the *means of egress* required by this chapter, *emergency escape and rescue openings* shall be provided in the following ~~occupancies~~:

1. Group R-2 occupancies located in stories with only one *exit* or *access* to only one *exit* as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. ~~Group R-3 and~~ R-4 occupancies.
3. Group R-2 and R-3 occupancies located below the fourth story without automatic fire sprinkler systems.
4. Group E classrooms without automatic fire sprinkler systems where a minimum of one of the following applies:
    1. *Cooperative Innovative High School Programs*.
    2. Places of worship not used as a private or public school.
    3. Classrooms with less than 2 means of egress.
    4. Classrooms or spaces complying with all the following:
        4.1 Doors open directly to a corridor with exit access in one direction and provide access through adjacent classrooms or directly to a separate smoke compartment with exit access in the other direction, and
        4.2 The compartments are separated by smoke barriers having a 1-hour fire resistance rating with self-closing or automatic closing doors, and
        4.3 The length of travel to exits along such paths shall not exceed 150 ft. (45 m) and
        4.4 Each communicating door shall be identified, and
        4.5 No locking device shall be allowed on the communicating doors.

Exceptions:

1. *Basements* with a ceiling height of less than 80 inches (2032 mm) shall not be required to have *emergency escape and rescue openings*.
2. *Emergency escape and rescue openings* are not required from ~~classrooms with 2 means of egress,~~ *basements*, or sleeping rooms that have an *exit* door or *exit access* door that opens directly into a *public way* or to a *yard*, court or exterior egress balcony that opens to a *public way*.
3. *Basements* without *habitable spaces* and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have *emergency escape and rescue openings*.
4. *Storm shelters* are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
5. ~~Within individual *dwelling* and *sleeping units* in Groups R-2 and R-3, where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, *sleeping*~~ *Sleeping rooms* in *basements* shall not be required to have *emergency escape and rescue openings* provided that the basement has one of the following:
    5.1. One *means of egress* and one *emergency escape and rescue opening*.
    5.2. Two *means of egress*.

1031.3.3 Maximum height from floor. *Emergency escape and rescue openings* shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor. For classrooms serving children Grade 5 and younger, the bottom of the clear opening shall be not more than 32 inches (810 mm) measured from the finished floor.

CHAPTER 11
ACCESSIBILITY

User note:

About this chapter: *Chapter 11 contains provisions that set forth requirements for accessibility of buildings and their associated sites and facilities for people with physical disabilities. The fundamental philosophy of the code on the subject of accessibility is that everything is required to be* accessible. *This is reflected in the basic applicability requirement (see Section 1103.1). The code's scoping requirements then address the conditions under which accessibility is not required in terms of exceptions to this general mandate. While the IBC contains scoping provisions for accessibility (for example, what, where and how many), ICC A117.1, Accessible and Usable Buildings and Facilities, is the referenced standard for the technical provisions (in other words, how). Accessibility criteria for existing buildings are addressed in the* International Existing Building Code®. *The* International Residential Code® *references Chapter 11 for accessibility provisions; therefore, this chapter may be applicable to housing covered under the* International Residential Code. *The provisions in the I-Codes are intended to meet or exceed the requirements in the federal accessibility requirement found in the Americans with Disabilities Act and the Fair Housing Act.*

There are many accessibility issues that not only benefit people with disabilities, but also provide a tangible benefit to people without disabilities. This type of requirement can be set forth in the code as generally applicable without necessarily identifying it specifically as an accessibility-related issue. Such a requirement would then be considered as having been "mainstreamed." For example, visible alarms are located in Chapter 9 and accessible means of egress *and ramp requirements are addressed in Chapter 10.*

SECTION 1103
SCOPING REQUIREMENTS

1103.2.11 ~~Residential Group~~ ~~R-1~~ Bed and breakfast homes. ~~Buildings of containing not more than five *sleeping units* for rent or hire that are also occupied as the residence of the proprietor~~ *Bed and breakfast homes* are not required to comply with this chapter.

SECTION 1104
ACCESSIBLE ROUTE

1104.4 Multistory buildings and facilities. At least one *accessible* route shall connect each accessible *story*, *mezzanine* and occupied roofs in multilevel buildings and *facilities*.

Exceptions:

1. An *accessible* route is not required to *stories*, *mezzanines* and occupied roofs that have an aggregate area of not more than 3,000 square feet (278.7 m^2) and are located above and below accessible levels. This exception shall not apply to:
   1.1. Multiple tenant facilities of Group M occupancies containing five or more tenant spaces used for the sales or rental of goods and where at least one such tenant space is located on a floor level above or below the accessible levels.
   1.2. *Stories* or *mezzanines* containing offices of health care providers (Group B or I).
   1.3. Passenger transportation facilities and airports (Group A-3 or B).
   1.4. ~~Government buildings.~~
   All buildings owned or occupied by state, county, or municipal government or any government agencies; and publicly owned schools, colleges, university buildings; and publicly owned dormitories.
   1.5. Structures with four or more dwelling units unless exempt by exception 2 below.
2. *Stories*, *mezzanines* or occupied roofs that do not contain accessible elements or other spaces as determined by Section 1108 or 1109 are not required to be served by an accessible route from an *accessible* level.
3. In air traffic control towers, an *accessible route* is not required to serve the cab and the floor immediately below the cab.

4. Where a two-story building or facility has one *story* or *mezzanine* with an *occupant load* of five or fewer persons that does not contain *public use* space, that *story* or *mezzanine* shall not be required to be connected by an *accessible route* to the *story* above or below.

SECTION 1105
ACCESSIBLE ENTRANCES

1105.1.1 Automatic doors. (Deleted) ~~In facilities with the occupancies and building *occupant loads* indicated in Table 1105.1.1, *public entrances* that are required to be *accessible* shall have one door be either a full *power operated* door or a *low energy power operated door*. Where the *public entrance* includes a vestibule, at least one door into and one door out of the vestibule shall meet the requirements of this section.~~

~~**TABLE 1105.1.1**~~
~~**PUBLIC ENTRANCE WITH POWER-OPERATED DOOR[a]**~~

~~OCCUPANCY~~	~~BUILDING OCCUPANT LOAD GREATER THAN~~
~~A-1, A-2, A-3, A-4~~	~~300~~
~~B, M, R-1~~	~~500~~

~~a. In mixed-use facilities where the total sum of the building occupant load is greater than those listed, the most restrictive building occupant load shall apply.~~

SECTION 1107
MOTOR-VEHICLE-RELATED FACILITIES

1107.2 Electrical vehicle charging stations. ~~Electrical~~ Where provided, electrical vehicle charging stations shall comply with Sections 1107.2.1 and 1107.2.2.

Exception: Electrical vehicle charging stations provided to serve Group R-2, R-3 and R-4 occupancies are not required to comply with this section.

SECTION 1108
DWELLING UNITS AND SLEEPING UNITS

1108.5.1.1 Accessible units in Group I-1, Condition 1. In Group I-1, Condition 1, at least 4 percent, but not less than one, of the *dwelling units* and *sleeping units* shall be *Accessible units*. Accessible dwelling units and sleeping units shall be dispersed among the various classes of units.

Exceptions:

1. Water closets shall not be required to comply with ICC A117.1 where such water closets comply with Section 1110.2.2, in not more than 50 percent of the *Accessible units*.
2. Roll-in-type showers shall not be required to comply with ICC A117.1 where roll-in-type showers comply with Section 1110.2.3, in not more than 50 percent of the *Accessible units*.

1108.6.2.2 Apartment houses, condominiums, monasteries and convents. *Type A units* and *Type B units* shall be provided in apartment houses, monasteries and convents in accordance with Sections 1108.6.2.2.1 and 1108.6.2.2.2. Bedrooms in monasteries and convents shall be counted as units for the purpose of determining the number of units. Where the bedrooms are grouped in *sleeping units*, only one bedroom in each *sleeping unit* shall count toward the number of required *Type A units*.

Exception: *Condominiums*.

1108.6.2.2.1 Type A units. In Group R-2 occupancies containing more than 20 *dwelling units* or *sleeping units*, at least ~~2~~ 5 percent but not less than one of the units shall be a *Type A unit*. All Group R-2 units on a site shall be

considered to determine the total number of units and the required number of *Type A units*. *Type A units* shall be dispersed among the various classes of units.

Exceptions:

1. The number of *Type A units* is permitted to be reduced in accordance with Section 1108.7.
2. *Existing structures* on a site shall not contribute to the total number of units on a site.
3. For a *site* with more than 100 units, at least 2 percent of the number of units exceeding 100 shall be *Type A units*.

SECTION 1110
OTHER FEATURES AND FACILITIES

1110.2.1 Family or assisted-use toilet and bathing rooms. In assembly and mercantile occupancies, an accessible family or assisted-use toilet room shall be provided where an aggregate of six or more male and female water closets is required. In buildings of mixed occupancy, only those water closets required for the assembly or mercantile occupancy shall be used to determine the family or assisted-use toilet room requirement. In recreational facilities where separate-sex bathing rooms are provided, an accessible family or assisted-use bathing room shall be provided. Fixtures located within family or assisted-use toilet and bathing rooms shall be included in determining the number of fixtures provided in an occupancy.

Exceptions:

1. Where each separate-sex bathing room has only one shower or bathtub fixture, a family or assisted-use bathing room is not required.
2. In a *nightclub* the family or assisted-use toilet room is not required.

1110.2.1.6 Privacy. Doors to family or assisted-use toilet and bathing rooms shall be securable from within the room ~~and be provided with an "occupied" indicator~~.

SECTION 1111
RECREATIONAL FACILITIES

1111.4.9.1.1 Calculated total number of boat slips (berths). The total number of berths in a marina facility shall include all single berths, double berths, side-tie berths, end-tie berths, open berths and covered berths, as well as berths that are components of courtesy landings, visitor docks, fuel *docks*, sewage pumpout *docks*, harbor master office docks, haul out and repair docks, and similar uses.

SECTION 1112
SIGNAGE

1112.1 Signs. Required accessible elements shall be identified by the International Symbol of Accessibility at the following locations.

1. Accessible parking spaces required by Section 1106.2. Location and design of signage shall comply with the requirements of N.C.G.S. 20-37.6 and 136-30, and the NCDOT *Manual on Uniform Traffic Control Devices*.

   Exception: Where the total number of parking spaces provided is four or less, identification of accessible parking spaces is not required.

2. *Accessible* parking spaces required by Section 1106.3. Location and design of signage shall comply with the requirements of N.C.G.S. 20-37.6 and 136-30, and the NCDOT *Manual on Uniform Traffic Control Devices*.

   Exception: In Group I-1, R-2, R-3 and R-4 facilities, where parking spaces are assigned to specific *dwelling units* or *sleeping units*, identification of *accessible* parking spaces is not required.

3. *Accessible* passenger loading zones.
4. *Accessible* toilet or bathing rooms where not all toilet or bathing rooms are *accessible*.

5. *Accessible* entrances where not all entrances are *accessible*.
6. *Accessible* check-out aisles where not all aisles are *accessible*. The sign, where provided, shall be above the check-out aisle in the same location as the checkout aisle number or type of check-out identification.
7. *Accessible* dressing, fitting and locker rooms where not all such rooms are *accessible*.
8. *Accessible areas of refuge* in accordance with Section 1009.9.
9. Exterior areas for assisted rescue in accordance with Section 1009.9.
10. In recreational facilities, lockers that are required to be *accessible* in accordance with Section 1110.10.

CHAPTER 12
INTERIOR ENVIRONMENT

~~**User note:**~~

~~***About this chapter:*** *Chapter 12 provides minimum provisions for the interior of buildings—the occupied environment. Ventilation, lighting, and space heating are directly regulated in this chapter and in conjunction with the* International Mechanical Code® *and the* International Energy Conservation Code®*. Minimum room size, maximum room-to-room sound transmission and classroom acoustics are set for educational occupancies.*~~

SECTION 1202
VENTILATION

1202.2.1 Ventilated attics and rafter spaces. Enclosed *attics* and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilation openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. An airspace of not less than 1 inch (25 mm) shall be provided between the insulation and the roof sheathing. The net free ventilating area shall be not less than $^1/_{150}$ of the area of the space ventilated. Ventilators shall be installed in accordance with manufacturer's installation instructions.

Exception: The net free cross-ventilation area shall be permitted to be reduced to $^1/_{300}$ provided both of the following conditions are met:

1. (Deleted) ~~In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.~~
2. At least 40 percent and not more than 50 percent of the required venting area is provided by ventilators located in the upper portion of the *attic* or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the *ventilation* provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.

1202.3 Unvented attic and unvented enclosed rafter assemblies. Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings applied directly to the underside of the roof framing members/rafters and the structural roof sheathing at the top of the roof framing members shall be permitted where all of the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, not less than a $^1/_4$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing *underlayment* above the structural sheathing.
4. In Climate Zone ~~Zones~~ 5~~, 6, 7 and 8~~, any *air-impermeable insulation* shall be a Class II vapor retarder or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall comply with either Item 5.1 or 5.2, and additionally Item 5.3.

    5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.

        5.1.1. Where only *air-impermeable insulation* is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.

        5.1.2. Where air-permeable insulation is provided inside the building thermal envelope, it shall be installed in accordance with Item 5.1.1. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the *R*-values in Table 1202.3 for condensation control.

        5.1.3. Where both air-impermeable and air-permeable insulation are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in ac-

cordance with Item 5.1.1 and shall be in accordance with the R-values in Table 1202.3 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.

5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

5.2. In Climate Zones 1, 2 and 3, air-permeable insulation installed in unvented attics shall meet the following requirements:

5.2.1. A vapor diffusion port shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.

5.2.2. The port area shall be greater than or equal to $^1/_{600}$ of the ceiling area. Where there are multiple ports in the attic, the sum of the port areas shall be greater than or equal to the area requirement.

5.2.3. The vapor permeable membrane in the vapor diffusion port shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.

5.2.4. The vapor diffusion port shall serve as an air barrier between the attic and the exterior of the building.

5.2.5. The vapor diffusion port shall protect the attic against the entrance of rain and snow.

5.2.6. Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (50 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.

5.2.7. The roof slope shall be greater than or equal to 3 units vertical in 12 units horizontal (3:12).

5.2.8. Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing, on top the attic floor, or on top of the ceiling.

5.2.9. Where only air-permeable insulation is used and is installed directly below the structural roof sheathing, air shall be supplied at a flow rate greater than or equal to 50 cubic feet per minute (23.6 L/s) per 1,000 square feet (93 m^2) of ceiling.

5.3. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating. Where preformed insulation board is used as the air-impermeable insulation layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Exceptions:

1. Section 1202.3 does not apply to special use structures or enclosures such as swimming pool enclosures, data processing centers, hospitals or art galleries.
2. Section 1202.3 does not apply to enclosures in Climate Zone ~~Zones~~ 5 ~~through 8~~ that are humidified beyond 35 percent during the three coldest months.

TABLE 1202.3
INSULATION FOR CONDENSATION CONTROL

CLIMATE ZONE	MINIMUM ***R***-VALUE OF AIR-IMPERMEABLE INSULATION[a]
~~2B and 3B tile roof only~~	~~0 (none required)~~
~~1, 2A, 2B,~~ 3A~~, 3B, 3C~~	R-5
~~4C~~	~~R-10~~
4A~~, 4B~~	R-15
5	R-20
~~6~~	~~R-25~~

~~7~~	~~R 30~~
~~8~~	~~R 35~~

a. Contributes to, but does not supersede, thermal resistance requirements for attic and roof assemblies in Section C402.2.1 of the *International Energy Conservation Code*.

1202.4.2 Ventilation in cold climates. (Deleted) ~~In extremely cold climates, where a ventilation opening will cause a detrimental loss of energy, ventilation openings to the interior of the structure shall be provided.~~

1202.4.3 Mechanical ventilation. Mechanical ventilation shall be provided ~~to~~ in closed crawl spaces where the ground surface is covered with a Class I vapor retarder. Ventilation shall be in accordance with Section 1202.4.3.1 or 1202.4.3.2.

SECTION 1207
ENHANCED CLASSROOM ACOUSTICS

(Deleted)

~~**1207.1 General.** Enhanced classroom acoustics, where required by this section, shall comply with Section 808 of ICC A117.1.~~

~~**1207.2 Where required.** In Group E occupancies, enhanced classroom acoustics shall be provided in all classrooms with a volume of 20,000 cubic feet (566 m^3) or less.~~

SECTION 1208
INTERIOR SPACE DIMENSIONS

1208.2 Minimum ceiling heights. *Occupiable spaces*, *habitable spaces* and corridors shall have a ceiling height of not less than 7 feet 6 inches (2286 mm) above the finished floor. Bathrooms, toilet rooms, kitchens, storage rooms and laundry rooms shall have a ceiling height of not less than 7 feet (2134 mm) above the finished floor.

Exceptions:

1. In one- and two-family *dwellings*, beams or girders spaced not less than 4 feet (1219 mm) on center shall be permitted to project not more than 6 inches (152 mm) below the required ceiling height.
2. If any room in a building has a sloped ceiling, the prescribed ceiling height for the room is required in one-half the area thereof. Any portion of the room measuring less than 5 feet (1524 mm) from the finished floor to the ceiling shall not be included in any computation of the minimum area thereof.
3. The height of *mezzanines* and spaces below *mezzanines* shall be in accordance with Section 505.2.
4. Corridors contained within a *dwelling unit* or *sleeping unit* in a Group R occupancy shall have a ceiling height of not less than 7 feet (2134 mm) above the finished floor.
5. Ceiling mounted electrical fixtures shall be a minimum of 80 inches (2032 mm) above the finished floor unless mounted over a barrier that prevents occupants from traveling under the fixture.

SECTION 1210
TOILET AND BATHROOM REQUIREMENTS

[P] 1210.2.1 Floors and wall bases. In other than *dwelling units*, toilet, bathing and shower room floor finish materials shall have a smooth, hard, nonabsorbent surface. The intersections of such floors with walls shall have a smooth, hard, nonabsorbent vertical base that extends upward onto the walls not less than ~~4 inches (102 mm)~~ 3 inches (76 mm).

[P] 1210.3.1 Water closet compartment. Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.

2. ~~Toilet rooms located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.~~ In toilet rooms in childcare facilities in areas used exclusively by children five years of age and under, the following is permitted:

   2.1. Toilet stall enclosures, toilet stall doors and partitions between toilets may be omitted.

   2.2 Doors into toilet rooms may be omitted.

   2.3 Walls enclosing toilet rooms may be full height with vision panels or may be partial height at least 42 inches (1067 mm) high in areas for children four and five years of age and 36 inches (914 mm) high in areas for children under four years of age.

3. This provision is not applicable to toilet areas located within Group I-3 occupancy housing areas.

CHAPTER 13
ENERGY EFFICIENCY

~~**User notes:**~~

~~***About this chapter:*** *The purpose of Chapter 13 is to provide minimum design requirements that will promote efficient energy utilization in buildings. The requirements address the building thermal envelope, the selection of HVAC and lighting equipment, and the installation of controls that dictate efficient operation. Also promoted is efficient use of power where providing water and lighting to the users of the space.*~~

~~***Code development reminder:*** *Code change proposals to this chapter will be considered by the International Energy Conservation Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

SECTION 1301
GENERAL

[E] 1301.1.1 Criteria. Buildings shall be designed and constructed in accordance with the *International Energy Conservation Code*.

Exception: Per N.C.G.S. 143-138 (b18), no energy conservation code provisions shall apply to any structure for which the primary occupancy classification is Group F, S, or U. This exclusion shall apply to the entire building area.

CHAPTER 14
EXTERIOR WALLS

User notes:

About this chapter: *Chapter 14 addresses requirements for* exterior walls *of buildings. Minimum standards for wall covering materials, such as material performance and fire resistance, installation of wall coverings and the ability of the wall to provide weather protection are provided. This chapter also contains limitations on the areas and heights of combustible wall coverings based on fire separation distances, radiant heat exposure and surface burning characteristics.*

Code development reminder: *Code change proposals to sections preceded by the designation [BS] will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*

SECTION 1404
INSTALLATION OF WALL COVERINGS

1404.3 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table 1404.3(1). A vapor retarder shall be provided on the interior side of frame walls in accordance with Tables 1404.3(2) and 1404.3(3), or an approved design using accepted engineering practice for hygrothermal analysis. The appropriate climate zone shall be selected in accordance with Chapter 3 of the International Energy Conservation Code.

TABLE 1404.3(2)
VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	I	II	III[a]
1, 2	Not permitted	Not Permitted	Permitted
3, 4 (except Marine 4)	Not permitted	Permitted	Permitted
Marine 4, 5, 6, 7, 8	Permitted	Permitted	See Table 1404.3(3)

a. See also Section 1404.3.2.

TABLE 1404.3(3)
CLASS III VAPOR RETARDERS

ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
4	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R-2.5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R-3.75 over 2 × 6 wall
5	Vented cladding over wood structural panels Vented cladding over fiberboard Vented cladding over gypsum Continuous insulation with *R*-value ≥ R-5 over 2 × 4 wall Continuous insulation with *R*-value ≥ R-7.5 over 2 × 6 wall

~~6~~	~~Vented cladding over fiberboard~~ ~~Vented cladding over gypsum~~ ~~Continuous insulation with *R*-value ≥ R-7.5 over 2 × 4 wall~~ ~~Continuous insulation with *R*-value ≥ R-11.25 over 2 × 6 wall~~
~~7~~	~~Continuous insulation with *R*-value ≥ R-10 over 2 × 4 wall~~ ~~Continuous insulation with *R*-value ≥ R-15 over 2 × 6 wall~~
~~8~~	~~Continuous insulation with *R*-value ≥ R-12.5 over 2 × 4 wall~~ ~~Continuous insulation with *R*-value ≥ R-20 over 2 × 6 wall~~

a. Vented cladding shall include vinyl lap siding, polypropylene, or horizontal aluminum siding, brick *veneer* with airspace as specified in this code, and other approved vented claddings.
b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of the *International Energy Conservation Code*.

TABLE 1404.3.1
CONTINUOUS INSULATION WITH CLASS II VAPOR RETARDER

CLIMATE ZONE	PERMITTED CONDITIONS[a]
3	Continuous insulation with *R*-value ≥ R-2
4, 5~~, 6~~	Continuous insulation with *R*-value ≥ R-3 over 2 × 4 wall Continuous insulation with *R*-value ≥ R-5 over 2 × 6 wall
~~7~~	~~Continuous insulation with *R*-value ≥ R-5 over 2 × 4 wall~~ ~~Continuous insulation with *R*-value ≥ R-7.5 over 2 × 6 wall~~
~~8~~	~~Continuous insulation with *R*-value ≥ R-7.5 over 2 × 4 wall~~ ~~Continuous insulation with *R*-value ≥ R-10 over 2 × 6 wall~~

a. In addition to the vapor retarder, spray foam with a maximum permeance of 1.5 perms at the installed thickness, applied to the interior cavity side of *wood structural panels*, *fiberboard*, insulating sheathing or gypsum is deemed to comply with the continuous insulation requirement only for the moisture control purposes of this table where the spray foam *R*-value plus any continuous insulation *R*-value provided equals or exceeds the specified continuous insulation *R*-value.

1404.4.2 Masonry. Flashing and weep holes in anchored *veneer* designed in accordance with Section 1404.6 shall be located not more than 10 inches (245 mm) above finished ground level ~~above~~, the top of solid foundation wall, or slab. At other points of support including structural floors, shelf angles and lintels, flashing and weep holes shall be located in the first course of masonry above the support.

1404.14.2 Flame spread. Vinyl siding and vinyl soffit materials, when used in Group R buildings, shall have a flame spread index of 25 or less as tested in accordance with ASTM E84.

CHAPTER 15

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

~~***User notes:***~~

~~***About this chapter:*** *Chapter 15 provides minimum requirements for the design and construction of roof assemblies and rooftop structures. The criteria address the weather-protective barrier at the roof and, in most circumstances, a fire-resistant barrier. The chapter is largely prescriptive in nature and is based on decades of experience with various traditional materials, but it also recognizes newer products. Section 1511 addresses rooftop structures, which include penthouses, tanks, towers and spires. Rooftop penthouses larger than prescribed in this chapter must be treated as a story under Chapter 5.*~~

~~***Code development reminder:*** *Code change proposals to sections preceded by the designation [BF], [BG] or [P] will be considered by one of the code development committees meeting during the 2021 (Group A) Code Development Cycle. All other code change proposals will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

SECTION 1505
FIRE CLASSIFICATION

TABLE 1505.1
MINIMUM ROOF COVERING
CLASSIFICATION FOR TYPES OF CONSTRUCTION[a, b]

IA	IB	IIA	IIB	IIIA	IIIB	IVA	IVB	IVC	IVHT	VA	VB
B	B	B	C[c]	B	C[c]	B	B	B	B	B	C[c]

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Unless otherwise required in accordance with the *International Wildland-Urban Interface Code* or due to the location of the building within a fire district in accordance with Appendix D.

b. Nonclassified *roof coverings* shall be permitted on buildings of Group R-3 and Group U occupancies, where there is a minimum fire-separation distance of 6 feet measured from the leading edge of the roof.

c. Buildings that are not more than two stories above grade plane and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire-separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street fronts or public ways, shall be permitted to have roofs of No. 1 cedar or redwood shakes and No. 1 shingles constructed in accordance with Section 1505.7.

SECTION 1507
REQUIREMENTS FOR ROOF COVERINGS

1507.1.2 Ice barriers. Where required by the roofing manufacturer or *design professional* ice barriers shall be installed. ~~In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier shall be installed for asphalt shingles, *metal roof shingles*, mineral surfaced roll roofing, slate and slate-type shingles, wood shingles, and wood shakes. The ice barrier shall consist of not less than two layers of *underlayment* cemented together, or a self-adhering polymer modified bitumen sheet shall be used in place of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the *exterior wall* line of the building.~~

~~**Exception:** Detached accessory structures that do not contain conditioned floor area.~~

1507.18 Solar photovoltaic power systems. Solar photovoltaic power systems shall be installed in accordance with this section, the *International Building Code*, *International Fire Code*, and NFPA 70.

Exceptions:

1. Detached, non-habitable Group U structures including, but not limited to, parking shade structures, carports, solar trellises, and similar structures.

2. Roof access, pathways, and spacing requirements need not be provided where the local fire official has determined that rooftop operations shall not be employed.

1507.18.1 Access and pathways. Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 1507.18.1.1 through 1507.18.1.3.

Exceptions:

1. Detached, non-habitable Group U structures including, but not limited to, parking shade structures, carports, solar trellises, and similar structures.

2. Roof access, pathways, and spacing requirements need not be provided where the fire code official has determined that rooftop operations shall not be employed.

1507.18.1.1 Roof access points. Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows or doors and shall be located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires, or signs.

1507.18.1.2 Solar photovoltaic systems for Group R-3 buildings. Solar photovoltaic systems for Group R-3 buildings shall comply with Sections 1507.18.1.2.1 through 1507.18.1.2.5.

Exception: These requirements shall not apply to detached one and two family dwelling and townhomes.

1507.18.1.2.1 Size of solar photovoltaic array. Each photovoltaic array shall be limited to 150 feet (45 720 mm) by 150 feet (45 720 mm). Multiple arrays shall be separated by a 3-foot-wide (914 mm) clear access pathway.

1507.18.1.2.2 Hip roof layouts. Panels and modules installed on Group R-3 buildings with hip roof layouts shall be located in a manner that provides a 3-foot-wide (914 mm) clear access pathway from the eave to the ridge on each roof slope where panels and modules are located. The access pathway shall be at a location on the building capable of supporting the fire fighters accessing the roof.

Exception: These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

1507.18.1.2.3 Single-ridge roofs. Panels and modules installed on Group R-3 buildings with a single ridge shall be located in a manner that provides two, 3-foot-wide (914 mm) access pathways from the eave to the ridge on each roof slope where panels and modules are located.

Exception: This requirement shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

1507.18.1.2.4 Roofs with hips and valleys. Panels and modules installed on Group R-3 buildings with roof hips and valleys shall not be located closer than 18 inches (457 mm) to a hip or a valley where panels/modules are to be placed on both sides of a hip or valley. Where panels are to be located on only one side of a hip or valley that is of equal length, the panels shall be permitted to be placed directly adjacent to the hip or valley.

Exception: These requirements shall not apply to roofs with slopes of two units vertical in 12 units horizontal (2:12) or less.

1507.18.1.2.5 Allowance for smoke ventilation operations. Panels and modules installed on Group R-3 buildings shall be located not less than 3 feet (914 mm) from the ridge in order to allow for fire department smoke ventilation operations.

Exception: Panels and modules shall be permitted to be located up to the roof ridge where an alternative ventilation method *approved* by the fire chief has been provided or where the fire chief has determined vertical ventilation techniques shall not be employed.

1507.18.1.3 Other than Group R-3 buildings. Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 1507.18.1.3.1 through 1507.18.1.3.3.

Exception: Where it is determined by the fire code official that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in Sections 1507.18.1.2.1 through 1507.18.1.2.5 shall be permitted to be used.

1507.18.1.3.1 Access. There shall be a minimum 6 foot-wide (1829 mm) clear perimeter around the edges of the roof.

Exception: Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum 4 foot wide (1290 mm).

1507.18.1.3.2 Pathways. The solar installation shall be designed to provide designated pathways. The pathways shall meet the following requirements:

1. The pathway shall be over areas capable of supporting fire fighters accessing the roof.

2. The centerline axis pathways shall be provided in both axes of the roof. Centerline axis pathways shall run where the roof structure is capable of supporting fire fighters accessing the roof.

3. Pathways shall be a straight line not less than 4 feet (1290 mm) clear to roof standpipes or ventilation hatches.

4. Pathways shall provide not less than 4 feet (1290 mm) clear around roof access hatch with not less than one singular pathway not less than 4 feet (1290 mm) clear to a parapet or roof edge.

1507.18.1.3.3 Smoke ventilation. The solar installation shall be designed to meet the following requirements:

1. Arrays shall not be greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in distance in either axis in order to create opportunities for fire department smoke ventilation operations.

2. Smoke ventilation options between array sections shall be one of the following:

   2.1 A pathway 8 feet (2438 mm) or greater in width.

   2.2 A 4-foot (1290 mm) or greater in width pathway and bordering roof skylights or gravity-operated dropout smoke and heat vents on not less than one side.

   2.3 A 4-foot (1290 mm) or greater in width pathway and bordering all sides of non-gravity-operated dropout smoke and heat vents.

   2.4 A 4-foot (1290 mm) or greater in width pathway and bordering 4-foot by 8-foot (1290 mm by 2438 mm) “venting cutouts” every 20 feet (6096 mm) on alternating sides of the pathway.

SECTION 1511
ROOFTOP STRUCTURES

1511.1.1 Area limitation. The aggregate area of *penthouses* and other enclosed *rooftop structures* shall not exceed one-third the area of the supporting roof deck. Such *penthouses* and other enclosed *rooftop structures* shall not be required to be included in determining the *building area* or number of stories as regulated by Section 503.1. The area of such *penthouses* and other enclosed *rooftop structures* shall not be included in determining the *fire area* specified in Section 901.7.

CHAPTER 16
STRUCTURAL DESIGN

~~**User notes:**~~

~~***About this chapter:*** *Chapter 16 establishes minimum design requirements so that the structural components of buildings are proportioned to resist the loads that are likely to be encountered. In addition, this chapter assigns buildings and structures to risk categories that are indicative of their intended use. The loads specified herein along with the required load combinations have been established through research and service performance of buildings and structures. The application of these loads and adherence to the serviceability criteria enhance the protection of life and property.*~~

~~***Code development reminder:*** *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

SECTION 1602
NOTATIONS

1602.1 Notations. The following notations are used in this chapter:

D = Dead load.

D_i = Weight of ice in accordance with Chapter 10 of ASCE 7.

E = Combined effect of horizontal and vertical earthquake induced forces as defined in Section 12.4 of ASCE 7.

F = Load due to fluids with well-defined pressures and maximum heights.

F_a = Flood load in accordance with Chapter 5 of ASCE 7.

H = Load due to lateral earth pressures, ground water pressure or pressure of bulk materials.

L = Live load.

L_r = Roof live load.

R = Rain load.

S = Snow load.

T = Cumulative effects of self-straining load forces and effects.

V_{asd} = Allowable stress design wind speed, miles per hour (mph) (km/hr) where applicable.

V = Basic design wind speeds, miles per hour (mph) (km/hr) determined from Figures 1609.3(1) through 1609.3(~~12~~ 4) or ASCE 7.

W = Load due to wind pressure.

W_i = Wind-on-ice in accordance with Chapter 10 of ASCE 7.

1603.1.9 Roof rain load data. Rain intensity, *i* (in/hr) (cm/hr), shall be shown ~~regardless of whether~~ where rain *loads* govern the design.

1607.8.5 Posting. The maximum weight of vehicles allowed into or on a garage or other structure shall be posted by the owner or the owner's authorized agent~~. in accordance with Section 106.1~~. L*ive loads* shall be conspicuously posted by the *owner* or the owner's authorized agent in that part of each *story* in which they apply, using durable signs. It shall be unlawful to remove or deface such notices.

1608.2 Ground snow loads. The ground snow *loads* to be used in determining the design snow *loads* for roofs shall be determined in accordance with ASCE 7 or Figures 1608.2~~(1) and 1608.2(2) for the contiguous United States and Table 1608.2 for Alaska~~. Site-specific case studies shall be made in areas designated "CS" in Figures 1608.2~~(1) and 1608.2(2).~~

Ground snow *loads* for sites at elevations above the limits indicated in Figures 1608.2~~(1) and 1608.2(2)~~ and for all sites within the CS areas shall be *approved*. Ground snow *load* determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2-percent annual probability of being exceeded (50-year mean recurrence interval). Snow loads are zero for Hawaii, except in mountainous regions as *approved* by the *building official*.

1608.3 Ponding instability. Deleted ~~*Susceptible bays* of roofs shall be evaluated for ponding instability in accordance with Chapters 7 and 8 of ASCE 7.~~

~~TABLE 1608.2~~ DELTED
~~GROUND SNOW LOADS, p_g,~~ ~~FOR ALASKAN LOCATIONS~~

~~LOCATION~~	~~POUNDS PER SQUARE FOOT~~
~~Adak~~	~~30~~
~~Anchorage~~	~~50~~
~~Angoon~~	~~70~~
~~Barrow~~	~~25~~
~~Barter Island~~	~~35~~
~~Bethel~~	~~40~~
~~Big Delta~~	~~50~~
~~Cold Bay~~	~~25~~
~~Cordova~~	~~100~~
~~Fairbanks~~	~~60~~
~~Fort Yukon~~	~~60~~
~~Galena~~	~~60~~
~~Gulkana~~	~~70~~
~~Homer~~	~~40~~
~~Juneau~~	~~60~~
~~Kenai~~	~~70~~
~~Kodiak~~	~~30~~
~~Kotzebue~~	~~60~~
~~McGrath~~	~~70~~
~~Nenana~~	~~80~~
~~Nome~~	~~70~~
~~Palmer~~	~~50~~
~~Petersburg~~	~~150~~
~~St. Paul Islands~~	~~40~~
~~Seward~~	~~50~~
~~Shemya~~	~~25~~
~~Sitka~~	~~50~~
~~Talkeetna~~	~~120~~
~~Unalakleet~~	~~50~~
~~Valdez~~	~~160~~
~~Whittier~~	~~300~~

~~Wrangell~~	~~60~~
~~Yakutat~~	~~150~~

~~For SI: 1 pound per square foot = 0.0479 kN/m^2.~~

FIGURE 1608.2 (1) Deleted

FIGURE 1608.2 (2) Enlarge North Carolina from the 2021 IBC Figure 1608.2(2) and modified name to **FIGURE 1608.2** "GROUND SNOW LOADS P_g FOR STATE OF NORTH CAROLINA (psf)"

SECTION 1609
WIND LOADS

1609.1.1 Determination of wind loads. Wind *loads* on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. The type of opening protection required, the basic design *wind speed*, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.

The wind speeds in Figures 1609.3(1) through 1609.3(~~12~~ 4) are basic design wind speeds, *V*, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, V_{asd}, when the provisions of the standards referenced in Exceptions 4 and 5 are used.

1609.2 Protection of openings. In *windborne debris regions*, glazing in buildings shall be impact resistant or protected with an impact-resistant covering meeting the requirements of an *approved* impact-resistant standard or ASTM E1996 referenced herein as follows:

1. Glazed openings located within 30 feet (9144 mm) of grade shall meet the requirements of the large missile test of ASTM E1996.
2. Glazed openings located more than 30 feet (9144 mm) above grade shall meet the provisions of the small missile test of ASTM E1996.

Exceptions:

1. Wood structural panels with a minimum thickness of $^7/_{16}$ inch (11.1 mm) and maximum panel span of 8 feet (2438 mm) shall be permitted for opening protection in buildings with a mean roof height of ~~33~~ 45 feet (13 716 mm) or less ~~that are classified as a Group R-3 or R-4 occupancy~~. Panels shall be precut so that they shall be attached to the framing surrounding the opening containing the product with the glazed opening. ~~Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided.~~ Attachments shall be designed to resist the components and cladding loads determined in accordance with the provisions of ASCE 7 ~~with corrosion resistant attachment hardware provided and anchors permanently installed on the building~~. Attachment in accordance with Table 1609.2 ~~with corrosion resistant attachment hardware provided and anchors permanently installed on the building~~ is permitted for

buildings with a mean roof height of 45 feet (13 716 mm) or less ~~where V_{asd} determined in accordance with Section 1609.3.1 does not exceed 140 mph (63 m/s).~~

2. Glazing in *Risk Category* I buildings, including *greenhouses* that are occupied for growing plants on a production or research basis, without public access shall be permitted to be unprotected.

3. Glazing in *Risk Category* II, III or IV buildings located over 60 feet (18 288 mm) above the ground and over 30 feet (9144 mm) above *aggregate* surface roofs located within 1,500 feet (458 m) of the building shall be permitted to be unprotected.

1609.3 Basic design wind speed. The basic design *wind speed*, *V*, in mph, for the determination of the wind *loads* shall be determined by Figures 1609.3(1) through 1609.3(12). The basic design *wind speed*, *V*, for use in the design of *Risk Category* II buildings and structures shall be obtained from Figures 1609.3(1), ~~1609.3(5) and 1609.3(6)~~. The basic design *wind speed*, *V*, for use in the design of *Risk Category* III buildings and structures shall be obtained from Figures 1609.3(2), ~~1609.3(7) and 1609.3(8).~~ The basic design *wind speed*, *V*, for use in the design of *Risk Category* IV buildings and structures shall be obtained from Figures 1609.3(3), ~~1609.3(9) and 1609.3(10).~~ The basic design *wind speed*, *V*, for use in the design of *Risk Category* I buildings and structures shall be obtained from Figures 1609.3(4), ~~1609.3(11) and 1609.3(12).~~ The basic design *wind speed*, *V*, for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. The basic design wind speeds, *V*, determined by the local jurisdiction shall be in accordance with Chapter 26 of ASCE 7.

In nonhurricane-prone regions, when the basic design *wind speed*, *V*, is estimated from regional climatic data, the basic design *wind speed*, *V*, shall be determined in accordance with Chapter 26 of ASCE 7.

1609.3.1 Wind speed conversion. Where required, the basic design wind speeds of Figures 1609.3(1) through 1609.3(~~12~~ 4) shall be converted to *allowable stress design* wind speeds, V_{asd}, using Table 1609.3.1 or Equation 16-17.

$$V_{asd} = V\sqrt{0.6} \qquad \textbf{(Equation 16-17)}$$

where:

V_{asd} = *Allowable stress design* wind speed applicable to methods specified in Exceptions 4 and 5 of Section 1609.1.1.

V = Basic design wind speeds determined from Figures 1609.3(1) through 1609.3(12).

TABLE 1609.3.1
WIND SPEED CONVERSIONS[a, b, c]

V	100	110	120	130	140	150	160	170	180	190	200
V_{asd}	78	85	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.44 m/s.
a. Linear interpolation is permitted.
b. V_{asd} = allowable stress design wind speed applicable to methods specified in Exceptions 1 through 5 of Section 1609.1.1.
c. V = basic design wind speeds determined from Figures 1609.3(1) through 1609.3(12).

FIGURE 1609.3(1) Enlarge North Carolina from the 2021 IBC Figure 1609.3(1)

FIGURE 1609.3(2) Enlarge North Carolina from the 2021 IBC Figure 1609.3(2)

FIGURE 1609.3(3) Enlarge North Carolina from the 2021 IBC Figure 1609.3(3)

FIGURE 1609.3(4) Enlarge North Carolina from the 2021 IBC Figure 1609.3(4)

FIGURE 1609.3(5) Deleted. ~~BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES IN HAWAII~~

FIGURE 1609.3(6) Deleted. ~~BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY II BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~

FIGURE 1609.3(7) Deleted. ~~BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY III BUILDINGS AND OTHER STRUCTURES IN HAWAII~~

FIGURE 1609.3(8) Deleted. ~~BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY III BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~

FIGURE 1609.3(9) Deleted. ~~BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY IV BUILDINGS AND OTHER STRUCTURES IN HAWAII~~

FIGURE 1609.3(10) Deleted. ~~BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY IV BUILDINGS AND OTHER STRUCTURES IN HAWAII (OAHU, KAUAI)~~

FIGURE 1609.3(11) Deleted. ~~BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY I BUILDINGS AND OTHER STRUCTURES IN HAWAII~~

FIGURE 1609.3(12) Deleted. ~~BASIC DESIGN WIND SPEEDS, V, FOR RISK CATEGORY I BUILDINGS AND OTHER STRUCTURES IN HAWAI(OAHU, KAUAI)~~

SECTION 1611
RAIN LOADS

1611.1 Design rain loads. Each portion of a roof shall be designed to sustain the *load* of rainwater as per the requirements of Chapter 8 of ASCE 7. The design rainfall shall be based on the 100-year 15-minute duration event, or on other rainfall rates determined from approved local weather data. Alternatively, a design rainfall of twice the 100-year hourly rainfall rate indicated in Figures 1611.1~~(1) through 1611.1(5)~~ shall be permitted.

$R = 5.2(d_s + d_h)$ **(Equation 16-19)**

For SI: $R = 0.0098(d_s + d_h)$

where:

d_h = Additional depth of water on the undeflected roof above the inlet of secondary drainage system at its design flow (in other words, the hydraulic head), in inches (mm).

d_s = Depth of water on the undeflected roof up to the inlet of secondary drainage system when the primary drainage system is blocked (in other words, the static head), in inches (mm).

R = Rain load on the undeflected roof, in psf (kN/m^2). Where the phrase "undeflected roof" is used, deflections from *loads* (including *dead loads*) shall not be considered when determining the amount of rain on the roof.

FIGURE 1611.1 Enlarge North Carolina from the 2021 IBC Figure 1611.1(3)

FIGURE 1611.1 (1) Deleted. ~~100-YEAR, 1-HOUR RAINFALL (INCHES) WESTERN UNITED STATES~~

FIGURE 1611.1 (2) Deleted. ~~100-YEAR, 1-HOUR RAINFALL (INCHES) CENTRAL UNITED STATES~~

FIGURE 1611.1 (3) Deleted. ~~100-YEAR, 1-HOUR RAINFALL (INCHES) EASTERN UNITED STATES~~

FIGURE 1611.1 (4) Deleted. ~~100-YEAR, 1-HOUR RAINFALL (INCHES) ALASKA~~

FIGURE 1611.1 (5) Deleted. ~~100-YEAR, 1-HOUR RAINFALL (INCHES) HAWAII~~

1612.4 Flood hazard documentation. The following documentation shall be prepared and sealed by a *registered design professional* and submitted to the *building official*:

1. For construction in *flood hazard areas* other than *coastal high hazard areas* or *coastal A zones*:

    1.1. The elevation of the *lowest floor*, including the basement, ~~as required by the lowest floor elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.~~ prior to further vertical construction.

    1.2. For fully enclosed areas below the *design flood elevation* where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, *construction documents* shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

    1.3. For *dry floodproofed* nonresidential buildings, *construction documents* shall include a statement that the *dry floodproofing* is designed in accordance with ASCE 24 and shall include the flood emergency plan specified in Chapter 6 of ASCE 24.

2. For construction in *coastal high hazard areas* and *coastal A zones*:

    2.1. The elevation of the bottom of the lowest horizontal structural member ~~as required by the *lowest floor* elevation inspection in Section 110.3.3 and for the final inspection in Section 110.3.12.1.~~ prior to further vertical construction.

    2.2. *Construction documents* shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and *flood loads* acting simultaneously on all building components, and other *load* requirements of Chapter 16.

    2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m^2) determined using *allowable stress design*, *construction documents* shall include a statement that the breakaway wall is designed in accordance with ASCE 24.

    2.4 For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

1613.2.1 Mapped acceleration parameters. The parameters S_S and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.2.1(1) through 1613.2.1(~~10~~ 2). Where S_1 is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned *Seismic Design Category* A.

FIGURE 1613.2.1(1) Deleted. ~~RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 0.2-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

FIGURE 1613.2.1(~~2~~ 1) RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 0.2-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING) Enlarge North Carolina from the 2021 IBC Figure 1613.2.1(2)

FIGURE 1613.2.1(3) Deleted. ~~RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

FIGURE 1613.2.1(42) RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR THE CONTERMINOUS UNITED STATES OF 1-SECOND SPRECRAL RE-

SPONSE ACCELERATION (5% OF CRITICAL DAMPING) Enlarge North Carolina from the 2021 IBC Figure 1613.2.1(4)

FIGURE 1613.2.1(5) Deleted. ~~RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR HAWAII OF 0.2-AND 1-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

FIGURE 1613.2.1(6) Deleted. ~~RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 0.2-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

FIGURE 1613.2.1(7) Deleted. ~~RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR ALASKA OF 1-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

FIGURE 1613.2.1(8) Deleted. ~~RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR PUERTO RICO AND THE UNITED STATES VIRGIN ISLANDS OF 0.2-AND 1-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

FIGURE 1613.2.1(9) Deleted. ~~RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR GUAM AND THE NORTHERN MARIANA ISLANDS OF 0.2-AND 1-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

FIGURE 1613.2.1(10) Deleted. ~~RISK-TARGETD MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) GROUND MOTION RESPONSE ACCELERATIONS FOR AMERICAN SAMOA OF 0.2-AND 1-SECOND SPRECRAL RESPONSE ACCELERATION (5% OF CRITICAL DAMPING)~~

SECTION 1615
TSUNAMI LOADS

1615.1 General. Deleted. ~~The design and construction of *Risk Category* III and IV buildings and structures located in the *Tsunami Design Zones* defined in the *Tsunami Design Geodatabase* shall be in accordance with Chapter 6 of ASCE 7, except as modified by this code.~~

CHAPTER 17

SPECIAL INSPECTIONS AND TESTS

~~***User notes:***~~

~~***About this chapter:*** *Chapter 17 provides a variety of procedures and criteria for testing materials and assemblies, and labeling materials and assemblies. Its key purposes are to establish where additional inspections/observations and testing must be provided, and the submittals and verifications that must be provided to the building official. This chapter expands on the inspections of Chapter 1 by requiring special inspection by a qualified individual where indicated and, in some cases, structural observation by a registered design professional. Quality assurance measures that verify proper assembly of structural components and the suitability of the installed materials are intended to provide a building that, once constructed, complies with the minimum structural and fire-resistance code requirements as well as the approved design. To determine this compliance often requires frequent inspections and testing at specific stages of construction.*~~

~~***Code development reminder:*** *Code change proposals to sections preceded by the designation [BF] will be considered by the IBC—Fire Safety Code Development Committee during the 2021 (Group A) Code Development Cycle. Sections preceded by the designation [F] will be considered by the International Fire Code Development Committee during the 2021 (Group A) Code Development Cycle. All other code change proposals will be considered by the IBC—Structural Code Development Committee during the Group B cycle.*~~

SECTION 1702
~~NEW~~ ALTERNATE MATERIALS

1702.1 General. New building materials, equipment, appliances, systems or methods of construction not provided for in this code, and any material of questioned suitability proposed for use in the construction of a building or structure, shall be subjected to the tests prescribed in this chapter and in the ~~approved rules to determine character, quality and limitations of use.~~ *North Carolina Administrative Code and Policies*.

1704.1 General. *Special inspections* and tests, statements of *special inspections*, responsibilities of contractors, submittals to the *building official* and *structural observations* shall meet the applicable requirements of this section.

Where application is made for construction as described in this section, the owner shall employ one or more special inspectors to provide inspections during construction on the types of work listed in accordance with Section 1705.1. These inspections are in addition to the inspections specified in the *North Carolina Administrative Code and Policies*.

1704.1.1 Building permit requirement. The permit applicant shall submit a statement of special inspections prepared by the registered design professional in responsible charge in accordance with the *North Carolina Administrative Code and Policies* as a condition for permit issuance. This statement shall include a list of materials and work requiring special inspections by Section 1705.1, the inspections to be performed and a list of the individuals, approved agencies or firms intended to be retained for conducting such inspections.

1704.2 Special inspections and tests. Where application is made to the *building official* for construction as specified in ~~Section 105,~~ the *North Carolina Administrative Code and Policies*, the owner ~~or the owner's authorized agent, other than the contractor,~~ shall employ one or more *approved agencies* to provide *special inspections* and tests during construction on the types of work specified in Section 1705 and identify the *approved agencies* to the *building official*. ~~These *special inspections* and tests are in addition to the inspections by the *building official* that are identified in Section 110.~~

Exceptions:

1. *Special inspections* and tests are not required for construction of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. Unless otherwise required by the *building official*, *special inspections* and tests are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.

3. *Special inspections* and tests are not required for portions of structures designed and constructed in accordance with the cold-formed steel *light-frame construction* provisions of Section 2211.1.2 or the *conventional light-frame construction* provisions of Section 2308.

4. The contractor is permitted to employ the *approved agencies* where the contractor is also the owner.

1704.2.1 Special inspector qualifications. ~~Prior to the start of the construction, the *approved agencies* shall provide written documentation to the *building official* demonstrating the competence and relevant experience or training of the *special inspectors* who will perform the *special inspections* and tests during construction. Experience or training shall be considered to be relevant where the documented experience or training is related in complexity to the same type of *special inspection* or testing activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.~~

~~The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as an *approved agency* and their personnel are permitted to act as *special inspectors* for the work designed by them, provided they qualify as *special inspectors*.~~

The registered design professional in responsible charge or engineers of record involved in the design of the project shall indicate in the project documents the required qualifications of the *special inspector*.

The *special inspector* shall demonstrate competence in accordance with the required qualifications, to the satisfaction of the *building official*, for the inspection of the particular type of construction or operation requiring *special inspection*. The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the *approved agency* and their personnel are permitted to act as the special inspector for the work designed by them, provided those personnel meet the qualification requirements of this section to the satisfaction of the *building official*. The special inspector shall provide written documentation to the *building official* demonstrating his or her competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of *special inspection* activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

1704.2.3 Submittal of Statement of special inspections. The applicant shall submit a statement of *special inspections* ~~in accordance with Section 107.1~~ as a condition for permit issuance. This statement shall be in accordance with Section 1704.3.

Exception:

1. A statement of *special inspections* is not required for portions of structures designed and constructed in accordance with the cold-formed steel *light-frame construction* provisions of Section 2211.1.2 or the *conventional light-frame construction* provisions of Section 2308.
2. The *building official* is authorized to waive the submission of a statement of special inspections if it is found that the nature of the work applied for is such that review of a statement of special inspections is not necessary to obtain compliance with this code.

1704.3 Statement of special inspections. Where *special inspections* or tests are required by Section 1705, the *registered design professional in responsible charge* for each discipline shall prepare a statement of *special inspections* in accordance with Section 1704.3.1 for submittal by the applicant in accordance with Section 1704.2.3. Statements of special inspections shall be included in the construction documents.

Exception: The statement of *special inspections* is permitted to be prepared by a qualified person *approved* by the *building official* for construction not designed by a *registered design professional*.

1704.6 Structural observations. Where required by the provisions of Section 1704.6.1, the owner ~~or the owner's authorized agent~~ shall employ a *registered design professional* to perform *structural observations*. The structural observer shall visually observe representative locations of structural systems, details and load paths for general conformance to the ap-

proved construction documents. *Structural observation* does not include or waive the responsibility for the inspections in ~~Section 110~~ the *North Carolina Administrative Code and Policies* or the *special inspections* in Section 1705 or other sections of this code. Prior to the commencement of observations, the structural observer shall submit to the *building official* a written statement identifying the frequency and extent of *structural observations*. At the conclusion of the work included in the permit, the structural observer shall submit to the *building official* a written statement that the site visits have been made and identify any reported deficiencies that, to the best of the structural observer's knowledge, have not been resolved.

SECTION 1705
REQUIRED SPECIAL INSPECTIONS AND TESTS

1705.1 General. *Special inspections* and tests of elements and nonstructural components of buildings and structures shall meet the applicable requirements of this section.

1705.1.1 Special cases. *Special inspections* and tests shall be required for proposed work that is, in the opinion of the *building official*, unusual in its nature, such as, but not limited to, the following examples:

1. Construction materials and systems that are alternatives to materials and systems prescribed by this code.
2. Unusual design applications of materials described in this code.
3. Materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained in this code or in standards referenced by this code.

1705.1.2 Specific elements always requiring special inspections.

Special inspections in accordance with Sections 1704 and 1705 are required for the following elements only, regardless of the building or structure that they are in:

1. Piles, piers, special foundations in accordance with Sections 1705.7, 1705.8, and 1705.9;
2. Sprayed fire-resistant materials in accordance with Section 1705.14;
3. Mastic and intumescent fire-resistant coatings in accordance with Section 1705.15;
4. Smoke control and smoke exhaust systems in accordance with Sections 1705.18;
5. Retaining walls and retaining systems exceeding 5 feet (1524 mm) of unbalanced backfill height in accordance with Section 1807.2.
6. Deep foundations for docks, piers, bulkheads and waterway structures in accordance with Section 3608

Special inspections are not required for other elements unless the building or structure is one identified in Section 1705.1.3.

1705.1.3 Structures requiring special inspections. *Special inspections* in accordance with Sections 1704 and 1705 are required for the building, building components or other structures according to the following:

1. Buildings or other structures listed in Table 1604.5 in Risk Category II if:
   1.1. Building height exceeds 45 feet (13.7 m) or three *stories*; or
   1.2. The building is an underground building in accordance with Section 405.1.
2. Buildings or other structures listed in Table 1604.5 in Risk Categories III or IV.

1705.3 Concrete construction. *Special inspections* and tests of concrete construction shall be performed in accordance with this section and Table 1705.3.

Exceptions: *Special inspections* and tests shall not be required for:

1. Isolated spread concrete footings of buildings three stories or less above *grade plane* that are fully supported on earth or rock.
2. Continuous concrete footings supporting walls of buildings three stories or less above *grade plane* that are fully supported on earth or rock where:
   2.1. The footings support walls of *light-frame construction*.
   2.2. The footings are designed in accordance with Table 1809.7.
   2.3. The structural design of the footing is based on a specified compressive strength, f'_c, not more than 2,500 pounds per square inch (psi) (17.2 MPa), regardless of the compressive strength specified in the *approved construction documents* or used in the footing construction.
3. *Nonstructural concrete* slabs supported directly on the ground, including prestressed slabs on grade, where the effective prestress in the concrete is less than 150 psi (1.03 MPa).
4. Concrete foundation walls constructed in accordance with Table 1807.1.6.2.
5. Concrete patios, driveways and sidewalks, on grade.

TABLE 1705.3
REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE /SHOTCRETE CONSTRUCTION

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[a]	IBC REFERENCE
1. Inspect reinforcement, including prestressing tendons, and verify placement.	—	X	ACI 318: Ch. 20, 25.2, 25.3, 26.6.1-26.6.3	—
2. Reinforcing bar welding: a. Verify weldability of reinforcing bars other than ASTM A706; b. Inspect single-pass fillet welds, maximum $^5/_{16}$″; and c. Inspect all other welds.	— — X	X X —	AWS D1.4 ACI 318: 26.6.4	—
3. Inspect anchors cast in concrete.	—	X	ACI 318: 17.8.2	—
4. Inspect anchors post-installed in hardened concrete members.[b] a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads. b. Mechanical anchors and adhesive anchors not defined in 4.a.	X —	— X	ACI 318: 17.8.2.4 ACI 318: 17.8.2	—
5. Verify use of required design mix.	—	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump, density, and air content tests, and determine the temperature of the concrete.	X	—	ASTM C31 ASTM C172 ACI 318: 26.5, 26.12	—
6a. Verify that the concrete specimens for strength tests are maintained in the required initial curing environment, and that the maximum and minimum temperatures during the initial curing period are being reported.	—	X	ACI 318: 26.12.3.1(a) ASTM C31: 10.1.2, 12.1.5	—
6b. Prior to shotcrete placement, perform slump and air content tests, and determine the temperature of the shotcrete. After the placement of the shotcrete, obtain strength test specimens.	X	—	ACI 318 ASTM C172 ASTM C143 ASTM C231	—

7. Inspect concrete and shotcrete placement for proper application techniques.	X	—	ACI 318: 26.5	—
8. Verify maintenance of specified curing temperature and techniques.	—	X	ACI 318: 26.5.3-26.5.5	—
9. Inspect prestressed concrete for: a. Application of prestressing forces; and b. Grouting of bonded prestressing tendons.	 X X	 — —	ACI 318: 26.10	—
10. Inspect erection of precast concrete members.	—	X	ACI 318: 26.9	—
11. For precast concrete diaphragm connections or reinforcement at joints classified as moderate or high deformability elements (MDE or HDE) in structures assigned to Seismic Design Category C, D, E or F, inspect such connections and reinforcement in the field for: a. Installation of the embedded parts b. Completion of the continuity of reinforcement across joints. c. Completion of connections in the field.	 X X X	 — — —	ACI 318: 26.13.1.3 ACI 550.5	—
12. Inspect installation tolerances of precast concrete diaphragm connections for compliance with ACI 550.5.	—	X	ACI 318: 26.13.1.3	—
13. Verify in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	—	X	ACI 318: 26.11.2	—
14. Inspect formwork for shape, location and dimensions of the concrete member being formed.	—	X	ACI 318: 26.11.1.2(b)	—

For SI: 1 inch = 25.4 mm.

a. Where applicable, see Section 1705.13.

b. Specific requirements for special inspection shall be included in the research report for the anchor issued by an approved source in accordance with 17.8.2 in ACI 318, or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to the commencement of the work.

1705.4 Masonry construction. *Special inspections* and tests of masonry construction shall be performed in accordance with the quality assurance program requirements of TMS 402 and TMS 602.

Exception: *Special inspections* and tests shall not be required for:

1. Empirically designed masonry, *glass unit masonry* or masonry *veneer* designed in accordance with Section 2109, Section 2110 or Chapter 14, respectively, where they are part of a structure classified as *Risk Category* I, II or III.
2. Masonry foundation walls constructed in accordance with Table 1807.1.6.3(1), 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4).
3. Masonry fireplaces, masonry heaters or masonry chimneys installed or constructed in accordance with Section 2111, 2112 or 2113, respectively.
4. Non-load bearing masonry partition walls and screens as determined and designated as such by the registered design professional in or added to the construction documents.

1705.4.2 Vertical masonry foundation elements. Deleted. ~~*Special inspections* and tests of vertical masonry foundation elements shall be performed in accordance with Section 1705.4.~~

1705.13.6 Plumbing, mechanical and electrical components. *Periodic special inspection* of plumbing, mechanical and electrical components shall be required for the following:

1. Anchorage of electrical equipment for emergency and standby power systems in structures assigned to *Seismic Design Category* C, D, E or F.
2. Anchorage of other electrical equipment in structures assigned to *Seismic Design Category* E or F.
3. Installation and anchorage of piping systems designed to carry hazardous materials and their associated mechanical units in structures assigned to *Seismic Design Category* C, D, E or F.
4. Installation and anchorage of ductwork designed to carry hazardous materials in structures assigned to *Seismic Design Category* C, D, E or F.
5. Installation and anchorage of vibration isolation systems in structures assigned to *Seismic Design Category* C, D, E or F where the *approved construction documents* require a nominal clearance of $^{1}/_{4}$ inch (6.4 mm) or less between the equipment support frame and restraint.
6. Installation of mechanical and electrical equipment, including duct work, piping systems and their structural supports, where automatic sprinkler systems are installed in structures assigned to *Seismic Design Category* C, D, E or F to verify one of the following:
    6.1. Minimum clearances have been provided as required by Section 13.2.3 ASCE/SEI 7.
    6.2. A nominal clearance of not less than 3 inches (76 mm) has been ~~be~~ provided between automatic sprinkler system drops and sprigs and: structural members not used collectively or independently to support the sprinklers; equipment attached to the building structure; and other systems' piping.

Where flexible sprinkler hose fittings are used, *special inspection* of minimum clearances is not required.

1706.2 ~~New~~ Alternative materials. For materials that are not specifically provided for in this code, the *design strengths* and permissible stresses shall be established by tests as provided for in Section 1707.

SECTION 1707
ALTERNATIVE TEST PROCEDURE

1707.1 General. In the absence of *approved* rules or other *approved* standards, the *building official* shall make, or cause to be made, the necessary tests and investigations; or the *building official* shall accept duly authenticated reports from *approved agencies* in respect to the quality and manner of use of new materials or assemblies as provided for in ~~Section 104.11~~. the *North Carolina Administrative Code and Policies*. The cost of all tests and other investigations required under the provisions of this code shall be borne by the owner ~~or the owner's authorized agent~~.

CHAPTER 18
SOILS AND FOUNDATIONS

User notes:

About this chapter: *Chapter 18 provides criteria for geotechnical and structural considerations in the selection, design and installation of foundation systems to support the loads imposed by the structure above. This chapter includes requirements for soils investigation and site preparation for receiving a foundation, including the load-bearing values for soils and protection for the foundation from frost and water intrusion. Section 1808 addresses the basic requirements for all foundation types while subsequent sections address foundation requirements that are specific to shallow foundations and deep foundations.*

Code development reminder: *Code change proposals to this chapter will be considered by the IBC–Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*

1803.5.6 Rock strata. Where subsurface explorations at the project site indicate variations or doubtful characteristics in the structure of rock on which foundations are to be constructed, a sufficient number of borings shall be drilled to sufficient depths to assess the competency of the rock and its load-bearing capacity.

1805.4.2 Foundation drain. A drain system shall be placed around the perimeter of a foundation that consists of gravel or crushed stone containing not more than 10-percent material that passes through a No. 4 (4.75 mm) sieve. The drain shall extend not less than 12 inches (305 mm) beyond the outside edge of the footing. The thickness shall be such that the bottom of the drain is not higher than the bottom of the base under the floor, and that the top of the drain is not less than 6 inches (152 mm) above the top of the footing. ~~The top of the drain shall be covered with an *approved* filter membrane material.~~ Where a drain tile or perforated pipe is used, the invert of the pipe or tile shall not be higher than the floor elevation. The top of joints or the top of perforations shall be protected with an *approved* filter membrane material. The pipe or tile shall be placed on not less than 2 inches (51 mm) of gravel or crushed stone complying with Section 1805.4.1, and shall be covered with not less than 6 inches (152 mm) of the same material. The drain system shall be wrapped with an *approved* filter membrane material.

1805.4.3 Drainage discharge. The floor base and foundation perimeter drain shall discharge by gravity or mechanical means into an *approved* drainage system that complies with the *International Plumbing Code*.

Exception: Where a site is located in well-drained gravel or sand/gravel mixture soils, a dedicated drainage system is not required.

1806.2 Presumptive load-bearing values. The load-bearing values used in design for supporting soils near the surface shall not exceed the values specified in Table 1806.2 unless data to substantiate the use of higher values are submitted and *approved* provided that all of the following criteria are satisfied. ~~Where the *building official* has reason to doubt the classification, strength or compressibility of the soil, the requirements of Section 1803.5.2 shall be satisfied.~~

1. Presumptive bearing pressures are acceptable only for structures where column loads are less than 50 kips per column and wall loads do not exceed 3.0 kips per linear foot.

2. Finished grades, including cut or fill operations, do not differ from the natural grades by more than 5 feet (1524mm).

3. Histories of favorable foundation performance are available from adjoining sites for similar loading conditions.

~~Presumptive load-bearing values shall apply to materials with similar physical characteristics and dispositions. Mud, organic silt, organic clays, peat or unprepared fill shall not be assumed to have a presumptive load-bearing capacity unless data to substantiate the use of such a value are submitted.~~

~~**Exception:** A presumptive load-bearing capacity shall be permitted to be used where the *building official* deems the load-bearing capacity of mud, organic silt or unprepared fill is adequate for the support of lightweight or temporary structures.~~

1807.2.5 Retaining systems adjacent to structures. Retaining systems less than 5 feet (1524 mm) in cumulative vertical relief and adjacent to a structure located closer than the vertical relief shall be designed under the responsible charge of a registered design professional.

1807.2.6 Retaining systems. Retaining systems providing a cumulative vertical relief greater than 5 feet (1524 mm) in height with a horizontal distance of 15 feet (4572 mm) or less between retaining walls or mechanically stabilized earth walls shall be designed under the responsible charge of a registered design professional. Retaining systems shall meet the requirements of Section 1610. Testing and inspection reports shall comply with Section 1704.2.4 and shall verify:

1. Foundation support system is adequate for the intended site conditions;
2. Measurement of the quality of construction materials for conformance with specifications;
3. Determination of similarity of actual soil conditions to those anticipated in design; and
4. Examination of backfill materials and any drainage systems for compliance with plans and specifications.

1808.8.1 Concrete or grout strength and mix proportioning. Concrete or grout in foundations shall have a specified compressive strength (f'_c) not less than the largest applicable value indicated in Table 1808.8.1. Where concrete is placed through a funnel hopper at the top of a deep foundation element, the concrete mix shall be designed and proportioned so as to produce a cohesive workable mix. Where concrete or grout is to be pumped, the mix design including slump shall be adjusted to produce a pumpable mixture.

1809.4 Depth and width of footings. The minimum depth of footings below the undisturbed ground surface shall be 12 inches (305 mm). Where applicable, the requirements of Section 1809.5 shall be satisfied. The minimum width of footings shall be ~~12 inches (305 mm).~~ 16 inches (406 mm). The minimum width of turned down slabs shall be 12 inches (305 mm) unless engineering analysis is provided.

1809.7 Prescriptive footings for light-frame construction. Where a specific design is not provided, concrete or masonry-unit footings supporting walls of *light-frame construction* shall be permitted to be designed in accordance with Table 1809.7.

TABLE 1809.7
PRESCRIPTIVE FOOTINGS SUPPORTING WALLS OF LIGHT-FRAME CONSTRUCTION[a, b, c, d, e]

NUMBER OF FLOORS SUPPORTED BY THE FOOTING[f]	WIDTH OF FOOTING (inches)	THICKNESS OF FOOTING (inches)
1	~~12~~ 16	6
2	~~15~~ 16	6
3	18	8[g]

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Depth of footings shall be in accordance with Section 1809.4.

b. The ground under the floor shall be permitted to be excavated to the elevation of the top of the footing.

c. Interior stud-bearing walls shall be permitted to be supported by isolated footings. The footing width and length shall be twice the width shown in this table, and footings shall be spaced not more than 6 feet on center.
d. See Section 1905 for additional requirements for concrete footings of structures assigned to Seismic Design Category C, D, E or F.
e. For thickness of foundation walls, see Section 1807.1.6.
f. Footings shall be permitted to support a roof in addition to the stipulated number of floors. Footings supporting roof only shall be as required for supporting one floor.
g. Plain concrete footings for Group R-3 occupancies shall be permitted to be 6 inches thick.

1810.3.2.4 Timber. Timber *deep foundation* elements shall be designed as piles or poles in accordance with ANSI/AWC NDS. Round timber elements shall conform to ASTM D25. Sawn timber elements shall conform to DOC PS-20.

1810.3.2.4.1 Preservative treatment. Timber *deep foundation* elements used to support permanent structures shall be treated in accordance with this section unless it is established that the tops of the untreated timber elements will be below the lowest ground-water level assumed to exist during the life of the structure. Preservative and minimum final retention shall be in accordance with AWPA U1 (Commodity Specification E, Use Category 4C) for round timber elements and AWPA U1 (Commodity Specification A, Use Category 4B) for sawn timber elements. Preservative-treated timber elements shall be subject to a quality control program administered by an *approved* agency. Element cutoffs shall be treated in accordance with AWPA M4. <u>For preservative treatment of piles in marine and underwater environments, see Chapter 36.</u>

1810.3.3.1 Allowable axial load. The allowable axial load on a deep foundation element shall be determined in accordance with Sections 1810.3.3.1.1 through 1810.3.3.1.9.

Exception: <u>Deleted.</u> ~~Where approved by the *building official*, load testing is not required.~~

CHAPTER 19

CONCRETE

Italics are used for text within Sections 1903 through 1905 of this code to indicate provisions that differ from ACI 318.

~~**User notes:**~~

~~***About this chapter:*** *Chapter 19 provides minimum accepted practices for the design and construction of buildings and structural components using concrete—both plain and reinforced. Chapter 19 relies primarily on the reference to American Concrete Institute (ACI) 318, Building Code Requirements for Structural Concrete. Structural concrete must be designed and constructed to comply with this code and all listed standards. There are also specific provisions addressing concrete slabs and shotcrete.*~~

~~***Code development reminder:*** *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

SECTION 1907
MINIMUM SLAB PROVISIONS

1907.1 General. The thickness of concrete floor slabs supported directly on the ground shall be not less than $3^1/_2$ inches (89 mm). A 6-mil (0.006 inch; 0.15 mm) polyethylene vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other *approved* equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

Exception: A vapor retarder is not required:

1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports attached to occupancies in Group R-3.
3. ~~For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.~~ Deleted.
4. For driveways, walks, patios and other flatwork that will not be enclosed at a later date.
5. Where *approved* based on local site conditions.

CHAPTER 20

ALUMINUM

User notes:

About this chapter: Chapter 20 contains standards for the use of aluminum in building construction. Only the structural applications of aluminum are addressed so it would not apply to the use of aluminum in specialty products such as storefront or window framing or architectural hardware. The use of aluminum in heating, ventilating or air-conditioning systems is addressed in the International Mechanical Code®. This chapter references national standards from the Aluminum Association for use of aluminum in building construction, AA ASM 35, *Aluminum Sheet Metal Work in Building Construction, and* AA ADM, *Aluminum Design Manual.*

Code development reminder: *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*

CHAPTER 21

MASONRY

~~**User notes:**~~

~~***About this chapter:*** *Chapter 21 establishes minimum requirements for masonry construction. The provisions address: material specifications and test methods; types of wall construction; criteria for engineered and empirical designs; and required details of construction, including the execution of construction. The provisions provide a framework for applying applicable standards to the design and construction of masonry structures. Masonry design methodologies including allowable stress design, strength design and empirical design are covered by the provisions of this chapter. Also addressed are masonry fireplaces and chimneys, masonry heaters and glass unit masonry.*~~

~~***Code development reminder:*** *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

2111.2 Fireplace drawings. The *construction documents* shall describe in sufficient detail the location, size and construction of masonry fireplaces. The structural reinforcement, thickness and characteristics of materials and the clearances from walls, partitions and ceilings shall be indicated.

2111.3 Footings and foundations. Footings for masonry fireplaces and their chimneys shall be constructed of concrete or *solid masonry* not less than 12 inches (305 mm) thick and shall extend not less than ~~6~~ 12 inches (~~153~~ 305 mm) beyond the face of the fireplace or foundation wall on all sides. Footings shall be founded on natural undisturbed earth or engineered fill below frost depth. In areas not subjected to freezing, footings shall be not less than 12 inches (305 mm) below finished grade.

2113.1 General. The construction of masonry chimneys consisting of solid *masonry units*, hollow *masonry units* grouted solid, stone or concrete shall be in accordance with this section.

2113.1.1 Chimney drawings. The construction documents shall describe in sufficient detail the location, size and construction of masonry chimneys. The structural reinforcement, thickness and characteristics of materials and the clearances in accordance with Section 2113.19 shall be indicated.

2113.2 Footings and foundations. Footings for masonry chimneys shall be constructed of concrete or *solid masonry* not less than 12 inches (305 mm) thick and shall extend not less than ~~6~~ 12 inches (~~152~~ 305 mm) beyond the face of the foundation or support wall on all sides. Footings shall be founded on natural undisturbed earth or engineered fill below frost depth. In areas not subjected to freezing, footings shall be not less than 12 inches (305 mm) below finished grade.

2113.4 Seismic anchorage. Masonry chimneys and foundations shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above grade with two $^{3}/_{16}$-inch by 1-inch (4.8 mm by 25 mm) straps embedded not less than 12 inches (305 mm) into the chimney. Straps shall be hooked around the outer bars and extend 6 inches (152 mm) beyond the bend. Each strap shall be fastened to not less than four floor joists with two $^{1}/_{2}$-inch (12.7 mm) bolts.

Exception: Seismic anchorage is not required for the following:

1. In structures assigned to *Seismic Design Category* A or B.
2. Where the masonry ~~fireplace~~ chimney is constructed completely within the *exterior walls*.

CHAPTER 22

STEEL

~~**User notes:**~~

~~***About this chapter:*** *Chapter 22 provides the minimum requirements for the design and construction of structural steel (including composite construction), cold-formed steel, steel joists, steel cable structures and steel storage racks. This chapter specifies appropriate design and construction standards for these types of structures. It also provides a road map of the applicable technical requirements for steel structures. Chapter 22 requires that the design and use of steel structures and components be in accordance with the applicable specifications and standards of the American Institute of Steel Construction, the American Iron and Steel Institute, the Steel Joist Institute and the American Society of Civil Engineers.*~~

~~***Code development reminder:*** *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

2211.1.3 Truss design. Cold-formed steel trusses and the placement diagram shall be designed and detailed by a registered design professional and comply with the additional provisions of Sections 2211.1.3.1. through 2211.1.3.3.

2211.1.3.1 Truss design drawings. The truss design drawings shall conform to the requirements of Section I1 of AISI S202 and shall be provided with the shipment of trusses delivered to the job site. The truss design drawings shall include the details of permanent *individual truss member* restraint/bracing in accordance with Section I1.6 of AISI S202 where these methods are utilized to provide restraint/bracing. Each individual truss design drawing shall bear the seal and signature of the truss designer. The truss submittal package shall consist of each individual truss design drawing, the truss placement diagram for the project, the truss member permanent bracing specification and, as applicable, the cover sheet/truss index sheet. The submittal package shall be submitted to the project *registered design professional* for final approval prior to fabrication of trusses.

CHAPTER 23

WOOD

~~**User notes:**~~

~~***About this chapter:*** *Chapter 23 provides minimum requirements for the design of buildings and structures that use wood and wood-based products. The chapter is organized around three design methodologies: allowable stress design (ASD), load and resistance factor design (LRFD) and conventional light-frame construction. In addition it allows the use of the American Wood Council Wood Frame Construction Manual for a limited range of structures. Included in the chapter are references to design and manufacturing standards for various wood and wood-based products; general construction requirements; design criteria for lateral force-resisting systems and specific requirements for the application of the three design methods.*~~

~~***Code development reminder:*** *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

SECTION 2301
GENERAL

2301.1 Scope. The provisions of this chapter shall govern the materials, design, construction and quality of wood members and their fasteners. Refer to Chapter 7 for fire-resistance requirements. Refer to Section 718 for fireblocking and draftstopping requirements.

2303.1.1 Sawn lumber. Sawn lumber used for load-supporting purposes, including end-jointed or edge-glued lumber, machine stress-rated or machine-evaluated lumber, shall be identified by the grade *mark* of a lumber grading or inspection agency that has been approved by an *accreditation body* that complies with DOC PS 20 or equivalent. Grading practices and identification shall comply with rules published by an agency approved in accordance with the procedures of DOC PS 20 or equivalent procedures.

2303.1.1.1 Certificate of inspection. In lieu of a grade *mark* on the material, a certificate of inspection as to species and grade issued by a lumber grading or inspection agency meeting the requirements of this section is permitted to be accepted for precut, remanufactured or rough-sawn lumber and for sizes larger than 3 inches (76 mm) nominal thickness.

2303.1.1.2 End-jointed lumber. *Approved* end-jointed lumber is permitted to be used interchangeably with solid-sawn members of the same species and grade. End-jointed lumber used in an assembly required to have a *fire-resistance rating* shall have the designation "Heat Resistant Adhesive" or "HRA" included in its grade *mark*.

2303.1.1.3 Minimum lumber grades. The minimum grade of lumber used for conventional light-frame construction shall be:

1. For joists and rafters, those obtained in AWC STJR Span Tables for Joists and Rafters.
2. For load-bearing studs, No. 3 grade, standard grade or stud grade, utility grade may be used to support roof and ceiling loads only.
3. For nonload-bearing studs, utility grade.
4. For wall top plates, utility grade.

2303.1.1.4 Moisture content. All lumber shall have a maximum moisture content of 19 percent at time of grading.

2303.4.1.4 Truss designer. The individual or organization responsible for the design of trusses~~.~~ shall be a registered design professional.

2303.4.1.4.1 Truss design drawings. ~~Where required by the *registered design professional*, the *building official* or the statutes of the jurisdiction in which the project is to be constructed, each~~ Each individual truss design drawing shall bear the seal and signature of the truss designer.

Exceptions: (Deleted)

1. ~~Where a cover sheet and truss index sheet are combined into a single sheet and attached to the set of truss design drawings, the single cover/truss index sheet is the only document required to be signed and sealed by the truss designer.~~
2. ~~Where a cover sheet and a truss index sheet are separately provided and attached to the set of truss design drawings, the cover sheet and the truss index sheet are the only documents required to be signed and sealed by the truss designer.~~

2303.4.3 Truss submittal package. The truss submittal package provided by the truss manufacturer shall consist of each individual truss design drawing, the truss placement diagram, the permanent *individual truss member* restraint/bracing method and details and any other structural details germane to the trusses; and, as applicable, the cover/truss index sheet. The submittal package shall be submitted to the registered design professional in responsible charge for final approval prior to fabrication of trusses.

2304.12.2.5 ~~Ventilation beneath balcony or elevated walking surfaces.~~ Concealed floor spaces in exterior balconies and elevated walking surfaces. Enclosed framing in exterior balconies and elevated walking surfaces that have *weather-exposed surfaces* shall be designed to remove moisture from within the concealed space or preservative-treated in accordance with AWPA U1. ~~provided with openings that provide a net free cross-ventilation area not less than $^{1}/_{150}$ of the area of each separate space.~~

2304.12.2.7 ~~Termite protection.~~ ~~In geographical areas where hazard of termite damage is known to be very heavy, wood floor framing in the locations specified in Section 2304.12.1.1 and exposed framing of exterior decks or balconies shall be of *naturally durable species* (*termite resistant*) or preservative treated in accordance with AWPA U1 for the species, product preservative and end use or provided with *approved* methods of termite protection.~~

Termite control methods. Protection shall be one of the following methods or a combination of these methods:

1. Chemical termiticide treatment, as provided in Section 2304.12.2.7.2.
2. Termite baiting system installed and maintained according to the label.
3. Pressure-preservative-treated wood in accordance with the AWPA standards listed in Section 2303.
4. Naturally termite-resistant wood as provided in Section 2304.12.2.7.3.
5. Physical barriers as provided in Section 2304.12.2.7.4.

2304.12.2.7.1 Field treatment. Field-cut ends, notches and drilled holes of pressure-preservative-treated wood shall be re-treated in the field in accordance with AWPA M4.

2304.12.2.7.2 Chemical termiticide treatment. Chemical termiticide treatment shall include soil treatment and field-applied-wood treatment. The concentration, rate of application and method of treatment of the chemical termiticide shall be in accordance with the termiticide label and applied according to the rules adopted by the North Carolina Structural Pest Control Committee.

2304.12.2.7.3 Naturally resistant wood. Heartwood of redwood and eastern red cedar shall be considered termite resistant.

2304.12.2.7.4 Barriers. Approved physical barriers, such as metal or plastic sheeting or collars specifically designed for termite prevention, shall be installed in a manner to prevent termites from entering the structure. Shields placed on top of an exterior foundation wall are permitted to be used only if in combination with another method of protection.

CHAPTER 24

GLASS AND GLAZING

User notes:

About this chapter: *Chapter 24 establishes regulations for glass and glazing used in buildings and structures. Engineering and design requirements are included in the chapter for glazing that is subjected to wind and snow loads. Another concern of this chapter is glass and glazing used in areas where it is likely to be impacted by the occupants. Section 2406 identifies hazardous locations where glazing must either be safety glazing or protected to prevent impacts by occupants. Safety glazing must meet stringent standards and be appropriately marked or identified. Additional requirements are provided for glass and glazing in guards, handrails, elevator hoistways and elevator cars, as well as in athletic facilities.*

Code development reminder: *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*

CHAPTER 25

GYPSUM BOARD, GYPSUM PANEL PRODUCTS AND PLASTER

User notes:

About this chapter: *Chapter 25 contains the provisions and referenced standards that regulate the design, construction and quality of gypsum board, gypsum panel products and plaster and, in addition, addresses reinforced gypsum concrete. These materials are some of the most commonly used interior and exterior finish materials in the building industry. This chapter primarily addresses quality-control-related issues with regard to material specifications and installation requirements. Most products are manufactured in accordance with industry standards. The building official or inspector needs to verify that the appropriate product is used and properly installed for the intended use and location. Proper design and installation of these materials are necessary to provide weather resistance and required fire protection for both structural and nonstructural building components.*

Code development reminder: *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*

CHAPTER 26

PLASTIC

~~**User note:**~~

~~***About this chapter:*** *The use of plastics in building construction and components is addressed in Chapter 26. This chapter provides standards addressing foam plastic insulation, foam plastics used as interior finish and trim, and other plastic veneers used on the inside or outside of a building. This chapter addresses the use of light-transmitting plastics in various configurations such as walls, roof panels, skylights, signs and glazing. Requirements for the use of fiber-reinforced polymers, fiberglass-reinforced polymers and reflective plastic core insulation are also contained in this chapter. Additionally, requirements specific to the use of wood-plastic composites and plastic lumber are contained in this chapter.*~~

2603.8 Protection against termites. ~~In areas where the probability of termite infestation is very heavy in accordance with Figure 2603.8,~~ Extruded and expanded polystyrene, polyisocyanurate and other foam plastics shall not be installed on the exterior face or under interior or exterior foundation walls or slab foundations located below grade. ~~The clearance between foam plastics installed above grade and exposed earth shall be not less than 6 inches (152 mm).~~ Foam plastic installed less than 8 inches (203 mm) above or in contact with grade shall be installed in accordance with Section 2603.8.1.

Exceptions:

1. Buildings where the structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or *preservative-treated wood*.
2. An approved method of protecting the foam plastic and structure from subterranean termite damage is provided.
3. On the interior side of basement walls.

2603.8.1 Chemical treatment. When foam plastic is less than 6 inches or in contact with the ground, the soil area shall be chemically treated in accordance with the North Carolina Structural Pest Control Committee rules.

2603.8.2 Inspection gap. Foam plastic in contact with ground shall not be continuous to the bottom of the weather-resistant siding. A clear unobstructed 2-inch minimum inspection gap shall be maintained from the bottom of weather-resistant siding to the top of foam plastic. The top edge of the foam plastic shall be cut at a 45-degree angle to drain moisture way from the structure.

~~FIGURE 2603.8 TERMITE INFESTATION PROBABILITY MAP~~ (DELETED)

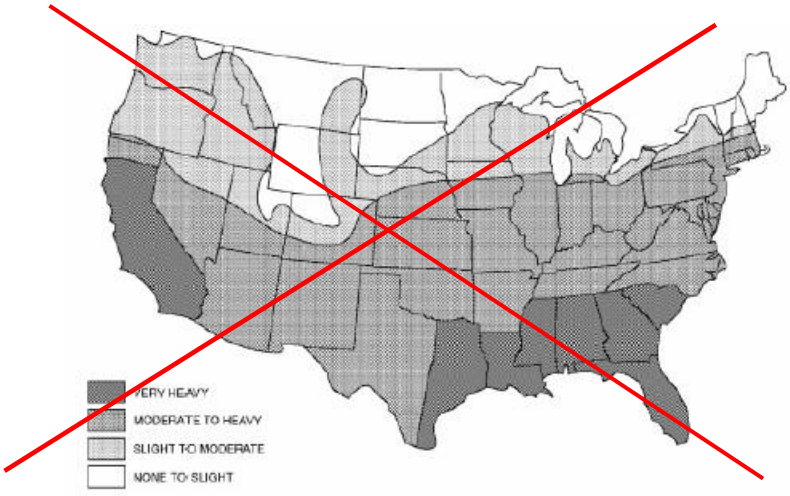

FIGURE 2603.8
TERMITE INFESTATION PROBABILITY MAP

2609.4 Area limitations. Roof panels shall be limited in area and the aggregate area of panels shall be limited by a percentage of the floor area of the room or space sheltered in accordance with Table 2609.4.

Exceptions:

1. The area limitations of Table 2609.4 shall be permitted to be increased by 100 percent in buildings equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
2. Low-hazard occupancy buildings, such as swimming pool shelters, shall be exempt from the area limitations of Table 2609.4, provided that the buildings do not exceed 5,000 square feet (465 m^2) in area and have a minimum *fire separation distance* of 10 feet (3048 mm). Buildings may exceed the 5,000 square feet (465 m2) area limit if an analysis by a registered design professional is performed that indicates equivalent or greater occupant safety than is provided by the 5,000 square feet (465 m2) area limit.
3. *Greenhouses* that are occupied for growing or maintaining plants, without public access, shall be exempt from the area limitations of Table 2609.4 provided that they have a minimum *fire separation distance* of 4 feet (1220 mm).
4. Roof coverings over terraces and patios in occupancies in Group R-3 shall be exempt from the area limitations of Table 2609.4 and shall be permitted with light-transmitting plastics.

TABLE 2609.4
AREA LIMITATIONS FOR
LIGHT-TRANSMITTING PLASTIC ROOF PANELS[a]

CLASS OF PLASTIC	MAXIMUM AREA OF INDIVIDUAL ROOF PANELS (square feet)	MAXIMUM AGGREGATE AREA OF ROOF PANELS (percent of floor area)
CC1	300	30
CC2	100	25

For SI: 1 square foot = 0.0929 m^2.
a. Area limitations of this table do not apply to buildings complying with 2609.4, exception 2.

CHAPTER 27

~~ELECTRICAL~~ EMERGENCY AND STANDBY POWER SYSTEMS

~~**User note:**~~

~~***About this chapter:*** *Electrical systems and components are integral to most structures; therefore, it is necessary for the code to address their installation and protection. Structures depend on electricity for the operation of many life safety systems including fire alarm, smoke control and exhaust, fire suppression, fire command and communication systems. Since power supply to these systems is essential, Chapter 27 addresses where standby and emergency power must be provided.*~~

SECTION 2701
GENERAL

2701.1 Scope. The provisions of this chapter and ~~NFPA 70~~ *North Carolina Electrical Code* shall govern the design, construction, erection and installation of the electrical components, appliances, equipment and systems used in buildings and structures covered by this code. The *International Fire Code*, ~~the *International Property Maintenance Code*~~ and ~~NFPA 70~~ *North Carolina Electrical Code* shall govern the use and maintenance of electrical components, appliances, equipment and systems. The *International Existing Building Code* and ~~NFPA 70~~ *North Carolina Electrical Code* shall govern the alteration, repair, relocation, replacement and addition of electrical components, appliances, or equipment and systems.

Exception: Optional back-up systems as defined in the *North Carolina Electrical Code* are not required to meet the provisions of this chapter.

[F] 2702.1.3 Installation. Emergency power systems and standby power systems required by this code or the *International Fire Code* shall be installed in accordance with the *International Fire Code*, ~~NFPA 70~~ *North Carolina Electrical Code*, NFPA 110 and NFPA 111.

[F] 2702.3 Critical circuits. Required *critical circuits* shall be protected using one of the following methods:

1. Cables, used for survivability of required *critical circuits* ~~supplying fire pumps~~, that are listed in accordance with UL 2196 and have a *fire-resistance rating* of not less than 1 hour.
2. *Electrical circuit protective systems* having a *fire-resistance rating* of not less than 1 hour. *Electrical circuit protective systems* are installed in accordance with their listing requirements.
3. Construction having a *fire-resistance rating* of not less than 1 hour.

CHAPTER 28
MECHANICAL SYSTEMS

~~**User note:**~~

~~***About this chapter:*** Mechanical systems are a key element of any building. Chapter 28 regulates such systems by linking to the International Mechanical Code® and International Fuel Gas Code®, where details of mechanical system requirements are provided.~~

SECTION 2801
GENERAL

[M] 2801.1 Scope. The provisions of this chapter, the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the design, construction, erection and installation of mechanical appliances, equipment and systems used in buildings and structures covered by this code. Masonry chimneys, fireplaces and barbecues shall comply with the *International Mechanical Code* and Chapter 21 of this code. The *International Fire Code*~~,~~ ~~the *International Property Maintenance Code*~~, the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the use and maintenance of mechanical components, appliances, equipment and systems. The *International Existing Building Code*, the *International Mechanical Code* and the *International Fuel Gas Code* shall govern the alteration, repair, relocation, replacement and addition of mechanical components, appliances, equipment and systems.

CHAPTER 29

PLUMBING SYSTEMS

~~**User note:**~~

~~***About this chapter:*** *Plumbing systems are another key element of any building. Chapter 29 provides the necessary number of plumbing fixtures, including water closets, lavatories, bathtubs and showers. The quality and design of each fixture must be in accordance with the* International Plumbing Code®*.*~~

[P] 2902.1.1 Fixture calculations. To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where approved statistical data indicates a distribution of the sexes of other than 50 percent of each sex.

~~2. Where multiple user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total *occupant load*. In such multiple user user facilities, each fixture type shall be in accordance with ICC A117.1 and each urinal that is provided shall be located in a stall.~~

2. In buildings that contain dwellings or sleeping units that have a pool dedicated to the residents, a percentage reduction of the total required fixtures provided for a pool and pool deck without bleachers and grandstands may be taken equal to the percentage of total residential units whose entries fall within a 500 foot horizontal travel distance of the pool deck. In multi-story structures, the residential units located not more than one story above or below the pool and pool deck may be included in the percentage. Travel from the pool to the required toilet facilities shall be on an accessible route.

3. Distribution of the sexes is not required where single-user ~~water closets~~ toilet rooms and bathing room fixtures are provided in accordance with Section 2902.1.2.

[P] TABLE 2902.1
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)

No.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 424.2 OF THE *INTERNATIONAL PLUMBING CODE*)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAINS (SEE SECTION 410 OF THE *INTERNATIONAL PLUMBING CODE*)	OTHER
			Male	Female	Male	Female			
1	Assembly (see Sections 2902.2, 2902.3, and 2902.3.3.2)	Theaters and other buildings for the performing arts and motion pictures[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Theaters in K-12 schools[d,i]	1 per 25	1 per 100	1 per 200		—	1 per 500	1 service sink
		Nightclubs, bars, taverns, dance halls and buildings for similar purposes[d]	1 per 40	1 per 40	1 per 75		—	1 per 500	1 service sink

		Restaurants, banquet halls and food courts[d]	1 per 75	1 per 75	1 per 200		—	1 per 500	1 service sink
		Cafeterias in K-12 schools	1 per 125	1 per 125	1 per 200		—	1 per 500	1 service sink
		Casino gaming areas	1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		—	1 per 1,000	1 service sink
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums[d] Indoor and outdoor public swimming pools without spectator seating	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Gymnasiums in K-12 schools [d,i]	1 per 125	1 per 100	1 per 200		—	1 per 500	1 service sink
		Passenger terminals and transportation facilities[d]	1 per 500	1 per 500	1 per 750		—	1 per 1,000	1 service sink
		Places of worship and other religious services, churches without assembly halls[d]	1 per 150	1 per 75	1 per 200	—	1 per 1,000	1 service sink	1 service sink
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[f-k,q]	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		K-12 stadiums, bleachers and grandstands for outdoor sporting events and activities[i,k]	1 per 125	1 per 100	1 per 250	1 per 200	—	1 per 1,000	

(continued)

[P] TABLE 2902.1—continued

MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)

No.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 424.2 OF THE *INTERNATIONAL PLUMBING CODE*)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAINS (SEE SECTION 410 OF THE *INTERNATIONAL PLUMBING CODE*)	OTHER
			Male	Female	Male	Female			
2	Business (see Sections 2902.2, 2902.3, and 2902.3.3.2)	Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial, ambulatory care and similar uses	1 per ~~25~~ 30 for the first ~~50~~ 30 and 1 per 50 for the remainder exceeding ~~50~~ 30		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100[q]	1 service sink[e,o]
3	Educational	~~Educational facilities~~ K-8[b] 9-12[b] Teachers/staff	~~1 per 50~~ 1 per 25 1 per 30 1 per 30	~~1 per 50~~ 1 per 25 1-per 25 1 per 25	~~1 per 50~~ 1 per 60 1 per 100 1 per 100		—	1 per 100	~~1 service sink~~ —
4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials (see Section 2902.3.1 for adjustments in occupant content)	1 per 100		1 per 100		—	1 per 400	1 service sink
5	Institutional	Custodial care facilities	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Medical care recipients in hospitals, ~~and~~ nursing homes, and other healthcare facilities[b]	Fixture requirements are regulated and enforced by State licensing and certification jurisdictions only.						
		Employees in hospitals and nursing homes[b]	1 per 25		1 per 35		—	1 per 100	—
		Visitors in hospitals and nursing homes	1 per 75		1 per 100		—	1 per 500	—
		Prisons[b]	Fixture requirements are regulated and enforced by State licensing and certification jurisdictions only.						
		Reformatories, detention centers and correctional centers[b]	Fixture requirements are regulated and enforced by State licensing and certification jurisdictions only.						
		Employees in reformitories, detention centers and correctional centers[b]	1 per 25		1 per 35		—	1 per 100	—
		Visitors	1 per 75		1 per 100		—	1 per 500	—
		Adult day care ~~and child day care~~	1 per 15		1 per 15		1	1 per 100	1 service sink

		Child care[h] Employees Visitors	1 per 15 1 per 25 1 per 75	1 per 25 1 per 35 1 per 100	—	— 1 per 100 1 per 500	1 service sink
6	Mercantile	Retail stores, service stations, shops, sales-rooms, markets and shopping centers	1 per 500	1 per 750	—	1 per 1,000 1 greater than 1,000 requires 1 more for each additional 1,000	1 service sink[e ~~o~~]

(continued)

[P] TABLE 2902.1—continued
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)

No.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS SEE SECTION 424.2 OF THE *INTERNATIONAL PLUMBING CODE*)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNDTAINS (SEE SECTION 410 OF THE *INTERNATIONAL PLUMBING CODE*)	OTHER
			Male	Female	Male	Female			
7	Residential	Hotels, motels, boarding houses (transient)	1 per sleeping unit		1 per sleeping unit		1 per sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		One- and two-family dwellings and lodging houses with ~~five~~ eight or fewer guestrooms	1 per dwelling unit		1 per 10		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
		Congregate living facilities with 16 or fewer persons	1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Residential care / unlicensed assisted living facilities	1 per 10		1 per 10		1 per 8	—	—
8	Storage	Structures for the storage of goods, warehouses, storehouses and freight depots, low and moderate hazard	1 per 100		1 per 100		—	~~1 per 1,000~~ —	~~1 service sink~~ —

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by this code.
b. Toilet facilities for employees shall be separate from facilities for inmates, students, or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient sleeping units shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.
d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.
~~e. For business and mercantile classifications with an occupant load of 15 or fewer, a service sink shall not be required.~~
~~f. The required number and type of plumbing fixtures for outdoor swimming pools shall be in accordance with Section 609 of the *International Swimming Pool and Spa Code*.~~
e. The number of fixtures provided shall be based on either the capacity of the church sanctuary or the church educational building (including fellowship halls and multiple purpose rooms), whichever is larger and within 300-foot horizontal travel distance (91.44 m).
f. For attached one- and two-family dwellings, one automatic clothes washer connection shall be required per 20 dwelling units.
g. A mop receptacle with a water supply, or a hose bibb and floor drain, may be used in lieu of a service sink.
h. A can wash may be used in lieu of a service sink.
i. See Section 2902.8 for additional information on plumbing fixtures for public schools.
j. When the rearrangement of an area or space increases the occupant content, the plumbing facilities shall be increased in accordance with this code.
k. For baseball stadiums, the number of fixtures shall be reduced by 50 percent.
l. Service sink may be omitted when located within a single-family dwelling.
m. Self-service mini-storage facilities without an office area are exempt.
n. Unheated storage buildings that are used periodically are not required to have toilet rooms.
o. For business and mercantile occupancies with an occupant load of 30 or fewer, service sinks shall not be required.
p. See Section 2902.6 for adjustments in occupant count.
q. For business occupant loads of 25 or fewer, drinking fountains shall not be required.

[P] 2902.2 Separate facilities. Where plumbing fixtures are required, separate facilities shall be provided for each sex.

Exceptions:

1. Separate facilities shall not be required for *dwelling units* and *sleeping units.*
2. Separate facilities shall not be required in ~~structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or fewer~~ all other structures or tenant spaces with a total occupant load, including employees and customers, of 25 or fewer.
3. Separate facilities shall not be required in mercantile occupancies in which the maximum *occupant load* is 100 or fewer.
4. Separate facilities shall not be required in business occupancies ~~in which the maximum *occupant load* is 25 or fewer~~ with a total occupant load, including both employees and customers, of 30 or fewer.
5. Separate facilities shall not be required to be designated by sex where single-user toilets rooms are provided in accordance with Section 2902.1.2.
6. ~~Separate facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by both sexes and privacy for water closets are installed in accordance with Section 405.3.4 of the *International Plumbing Code*. Urinals shall be located in an area visually separated from the remainder of the facility or each urinal that is provided shall be located in a stall.~~

[P] 2902.3.3 Location of toilet facilities in occupancies other than malls. In occupancies other than covered and *open mall buildings*, the required public and employee toilet facilities shall be located not more than one *story* above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 500 feet (152 m).

Exceptions:

1. The location and maximum distances of travel to required employee facilities in factory and industrial *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.
2. The location and maximum distances of travel to required public and employee facilities in Group S *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.

2902.3.3.1 Location of employee toilet facilities in occupancies other than assembly or mercantile. Access to toilet facilities in occupancies other than mercantile and assembly occupancies shall be from within the em-

ployees' working area. Employee facilities shall be either separate facilities or combined employee and public facilities.

Exception: Facilities that are required for employees in kiosks and similar structures, and are located in adjacent structures under the same ownership, lease or control, shall be a maximum travel distance of 500 feet (152 m) from the employees' working area.

2902.3.3.2 Location of employee toilet facilities in mercantile and assembly occupancies. Employees shall be provided with toilet facilities in buildings and tenant spaces utilized as restaurants, nightclubs, places of public assembly and mercantile occupancies. The employee facilities shall be either separate facilities or combined employee and public facilities.

[P] 2902.6 Small occupancies. Drinking fountains shall not be required for an *occupant load* of ~~15~~ 30or fewer.

2902.6 Adjustments in occupant content. If an owner or tenant requests, the plumbing official shall make adjustments in the occupant content established by Table 403.1 for manufacturing, workshops, loft building, foundries, storage, aircraft hangars, garages and similar establishments. The owner or occupant shall provide written data accompanied by plans that substantiates a claim that the occupant content of a particular building or tenancy will, at all times, be less than provided for in the above table. Approval of such data and accompanying claims shall not prevent the plumbing official from requiring additional facilities based on the above table, should changes be made affecting the floor plan upon which the original approval was based whether such changes be made by the original or ultimate owner or building occupant or occupants. The remainder of the facilities requirements of Section 403.2 are not affected by this paragraph.

2902.7 Multiplex theaters. Plumbing fixtures for multiple adjoining motion picture theaters with a common lobby shall be based upon the seating capacity of the largest single auditorium plus 50 percent of the seats in the remaining auditoriums.

2902.8 Plumbing fixtures for public schools.

2902.8.1 Occupant content. Occupant content of public schools for the purpose of determining the number of required facilities shall be the maximum legal class size multiplied by the number of classrooms. A public school classroom is a room or space 500 square feet (46.5 m2) or larger normally used for instructional purposes. Maximum class sizes are 29 students for grades K through 8 and 33 students for grades 9 through 12 (GS 115C-301). The occupant load for private schools shall be as listed in Table 1004.1.2 of the *North Carolina Building Code*.

2902.8.2 Occupant load and distance. The total student occupant load shall be the sum of the occupant loads for all classrooms, labs, shops and vocational spaces. The total occupant load for all buildings on a campus may be utilized when calculating the total number of fixtures required. Toilet facilities for students and teachers may be located in an adjacent building but shall be located so that no person will have more than 200 feet (61 mm) of accessible, covered horizontal travel distance from any classroom lab, shop or vocational space closest door for access to the required number of fixtures. The occupant content of kindergarten and first grade classrooms with internal toilet facilities is not required to be used in determining the number of group facilities for the entire school.

2902.8.3 Occupant load for teachers and staff. Fixtures provided for teachers and staff shall be determined by multiplying the number of classrooms by 1.75. Staffing ratio for grades K through 8 is 80-percent female and 20-percent male. Staffing ratio for grades 9 through 12 is 70-percent female and 30-percent male.

2902.8.4 Gymnasiums, cafeterias, auditoriums and stadiums for schools. Fixtures in group toilet facilities provided for classroom areas may be used toward satisfying the total number of required fixtures for gymnasiums, cafeterias and auditoriums provided that such facilities are located within 200 feet (61 m) from the space and cannot be locked off from access during after-school-hours' use of the gymnasium, cafeteria or auditorium. Simultaneous use of classrooms, gymnasium, cafeteria or auditoriums shall not be considered for calculation of occupant loads for toilet fixtures. Stadium facilities shall be located within 400 feet (122 m) of the closest bleacher exit from each set of bleachers that the facility serves.

2902.8.5 Miscellaneous provisions.

2902.8.5.1 Single-User facilities. A single-user facility may be used when the classroom area served is 1,200 square feet (112 m2) or less and is used either for K through grade 2 or is a modular classroom used for any grade

level. Single-user facilities may be provided for teacher/staff if their total occupant load within 200 feet (61 m) is 15 or less.

2902.8.5.2 Student group facilities. Every public school group facility shall have a minimum of four flushing type fixtures. Four flushing male group toilets shall have a minimum of two water closets.

2902.8.5.3 Substitutions. Water closets may be substituted for urinals for grades K through 2. Urinals may be substituted for water closets in male group toilet rooms for teachers/staff and gyms, auditoriums, cafeterias or stadiums. The number of water closets shall not be reduced to less than one-third of the required total number of flushing fixtures.

2902.8.5.4 Modular classroom buildings. Toilet rooms may be omitted in a modular classroom building when facilities of sufficient capacity for the additional occupants are provided in an adjacent building and located within 200 feet (61 m) of horizontal travel distance from the modular classroom.

2902.8.5.5 Temporary modular classroom buildings. Toilet rooms may be omitted in modular classroom buildings housing grades 9 through 12 when these temporary buildings are to be replaced by permanent facilities which are under contract. Facilities of sufficient capacity for the additional occupants shall be provided within 450 feet (137 m) of horizontal travel distance from the modular classroom.

[P] 2902.~~7~~ 9 Service sink location. Service sinks shall not be required to be located in individual tenant spaces in a covered mall provided that service sinks are located within a distance of travel of 300 feet (91 m) of the most remote location in the tenant space and not more than one story above or below the tenant space. Service sinks shall be located on an *accessible route*.

[P] 2903
INSTALLATION OF FIXTURES

[P] 2903.1.1 Water closets, urinals, lavatories and bidets. A water closet, urinal, lavatory or bidet shall not be set closer than 15 inches (381 mm) from its center to any side wall, partition, vanity or other obstruction. Where partitions or other obstructions do not separate adjacent fixtures, fixtures shall not be set closer than 30 inches (762 mm) center to center between adjacent fixtures. There shall be not less than a 21-inch (533 mm) clearance in front of a water closet, urinal, lavatory or bidet to any wall, fixture or door. Water closet compartments shall be not less than 30 inches (762 mm) in width and not less than 60 inches (1524 mm) in depth for floor-mounted water closets and not less than 30 inches (762 mm) in width and 56 inches (1422 mm) in depth for wall-hung water closets.

~~**Exception**~~ **Exceptions:**

1. An accessible children's water closet shall be set not closer than 12 inches (305 mm) from its center to the required partition or to the wall on one side.

2. Private side by side lavatories may be less than 30 inches (762 mm) center to center.

[P] 2903.1.2 Public lavatories. In employee and public toilet rooms, the required lavatory shall be located in the same room as the required water closet except in Education K-5, lavatories may be provided in a common toilet room vestibule, visible from the corridor.

[P] 2903.1.4 Water closet compartment. Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. ~~Toilet rooms located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.~~ In toilet rooms in childcare facilities in areas used exclusively by children five years of age and under, the following is permitted:

2.1 Toilet stall enclosures, toilet stall doors and partitions between toilets may be omitted.

2.2 Doors into toilet rooms may be omitted.

2.3 Walls enclosing toilet rooms may be full height with vision panels or may be partial height at least 42 inches (1067 mm) high in areas for children four and five years of age and 36 inches (914 mm) high in areas for children under four years of age.

3. This provision is not applicable to toilet areas located within Group I-3 housing areas.

CHAPTER 30
ELEVATORS AND CONVEYING SYSTEMS

~~**User note:**~~

~~***About this chapter:*** *Chapter 30 contains the provisions that regulate vertical and horizontal transportation and material-handling systems installed in buildings. This chapter also provides several elements that protect occupants and assist emergency responders during fires.*~~

3002.10 Pits. For damproofing and waterproofing requirement refer to Section 1805.

SECTION 3006
ELEVATOR LOBBIES AND HOISTWAY OPENING PROTECTION

3006.1 General. Elevator hoistway openings and enclosed elevator lobbies shall be provided in accordance with the following:

1. Where hoistway opening protection is required by Section 3006.2, such protection shall be in accordance with Section 3006.3.
2. Where enclosed elevator lobbies are required for underground buildings, such lobbies shall comply with Section 405.4.3.
3. Where an *area of refuge* is required and an enclosed elevator lobby is provided to serve as an *area of refuge*, the enclosed elevator lobby shall comply with Section 1009.6.
4. Where fire service access elevators are provided, enclosed elevator lobbies shall comply with Section 3007.6.
5. Where occupant evacuation elevators are provided, enclosed elevator lobbies shall comply with Section 3008.6.

3006.2 Hoistway opening protection required. Elevator hoistway door openings for occupied and unoccupied stories shall be protected in accordance with Section 3006.3 where an elevator hoistway connects more than three *stories*, is required to be enclosed within a *shaft enclosure* in accordance with Section 712.1.1 and any of the following conditions apply:

1. The building is not protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The building contains a Group I-1, Condition 2 occupancy.
3. The building contains a Group I-2 occupancy.
4. The building contains a Group I-3 occupancy.
5. The building is a high rise and the elevator hoistway is more than 75 feet (22 860 mm) in height. The height of the hoistway shall be measured from the *lowest floor* to the highest floor of the floors served by the hoistway.

Exceptions:

1. Protection of elevator hoistway door openings is not required where the elevator serves only *open parking garages* in accordance with Section 406.5.
2. Protection of elevator hoistway door openings is not required at the level(s) of exit discharge, provided that the level(s) of exit discharge is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
3. Enclosed elevator lobbies and protection of elevator hoistway door openings are not required on levels where the elevator hoistway opens to the exterior.

3006.3 Hoistway opening protection. Where Section 3006.2 requires protection of the elevator hoistway door opening, the protection shall be provided by one of the following:

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway *shaft enclosure* doors from each floor by *fire partitions* in accordance with Section 708. In addition, doors protecting openings in the elevator lobby enclosure walls shall comply with Section 716.2.2.1 as required for *corridor* walls. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway *shaft enclosure* doors from each floor by *smoke partitions* in accordance with Section 710 where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition, doors protecting openings in the *smoke partitions* shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for *corridors* in accordance with Section 717.5.4.1.
3. Additional doors shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such door shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal and contain a vision panel as allowed by Table 716.5. The door shall not be installed in a way that affects the fire-resistance-rating or operation of the normal elevator shaft doors.
4. The elevator hoistway shall be pressurized in accordance with Section 909.21.

CHAPTER 31

SPECIAL CONSTRUCTION

~~**User notes:**~~

~~***About this chapter:*** *Chapter 31 provides regulations for unique buildings and building elements. Those include buildings such as membrane structures, greenhouses and relocatable buildings. Special elements include pedestrian walkways and tunnels, awnings, canopies and marquees, vehicular gates, solar energy systems, public use restrooms in flood hazard areas, and intermodal shipping containers.*~~

~~***Code development reminder:*** *Code change proposals to sections preceded by the designation [BS] will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

3103.1 General. The provisions of Sections 3103.1 through 3103.4 shall apply to structures erected for a period of less than 180 days. *Special event structures*, tents, ~~canopies,~~ umbrella structures and other membrane structures erected for a period of less than 180 days shall ~~also~~ only comply with Chapter 31 of the *International Fire Code* and accessibility requirements of Chapter 11 and Section 1009. Those erected for a longer period of time shall comply with applicable sections of this code.

3105.1 General. *Awnings* and *canopies* shall comply with the requirements of Sections 3105.2 and 3105.3 and other applicable sections of this code. For awnings or canopies that encroach into public right-of-ways, refer to Chapter 32.

3105.4 ~~Permanent~~ Canopies. ~~Permanent~~ *Canopies* are permitted to extend over adjacent open spaces, provided:

1. The *canopy* and its supports shall be of noncombustible material, fire-retardant-treated wood, Type IV construction, or of 1-hour *fire-resistance* rated construction.

   Exception: Any textile covering for the *canopy* shall be flame resistant as determined by tests conducted in accordance with NFPA 701 after both accelerated water leaching and accelerating weathering.

2. Any *canopy* covering, other than textiles, shall have a *flame spread index* not greater than 25 when tested in accordance with ASTM E84 or UL 723 ~~in the form intended for use~~.

3. The *canopy* shall have at least one long side open.

4. The width of the *canopy* perpendicular to the *building* shall not exceed 15 feet (4572 mm).

5. The *fire resistance* of exterior walls shall not be reduced.

3107.1 General. Signs shall be designed, constructed and maintained in accordance with Appendix H of this code.

3108.3 Foundations. Footings and foundations shall be designed and constructed in accordance with the provisions of Chapter 18.

3109.2 Public *swimming pools*. Public *swimming pools* shall be completely enclosed by a fence or barrier not less than 4 feet (1290 mm) in height or a screen enclosure. Openings in the fence shall not permit the passage of a 4-inch-diameter (102 mm) sphere. The fence or screen enclosure shall be equipped with self-closing and self-latching gates.

3110.1 General. *Automatic vehicular gates* shall comply with the requirements of Sections 3110.2 and 3110.3 and other applicable sections of this code and the *International Fire Code*.

3111.3 Photovoltaic solar energy systems. Photovoltaic solar energy systems shall be designed and installed in accordance with this section, the *International Fire Code*, ~~NFPA 70~~ *North Carolina Electrical Code* and the manufacturer's installation instructions.

3113.2 Supplemental information. Supplemental information specific to a relocatable building shall be submitted to the authority having jurisdiction. It shall, as a minimum, include the following in addition to the information required by ~~Section 105~~ the permitting process:

1. Manufacturer's name and address.
2. Date of manufacture.
3. Serial number of module.
4. Manufacturer's design drawings.
5. Type of construction in accordance with Section 602.
6. Design *loads* including: *roof live load*, roof snow *load*, floor *live load*, wind *load* and seismic *site class*, use group and design category.
7. Additional building planning and structural design data.
8. Site-built structure or appurtenance attached to the relocatable building.

3113.3 Manufacturer's data plate. See the North Carolina Modular Construction Regulations. ~~Each relocatable module shall have a data plate that is permanently attached on or adjacent to the electrical panel, and shall include the following information:~~

~~1. Occupancy group.~~

~~2. Manufacturer's name and address.~~

~~3. Date of manufacture.~~

~~4. Serial number of module.~~

~~5. Design *roof live load*, design floor *live load*, snow *load*, wind and seismic design.~~

~~6. *Approved* quality assurance agency or *approved* inspection agency.~~

~~7. Codes and standards of construction.~~

~~8. Envelope thermal resistance values.~~

~~9. Electrical service size.~~

~~10. Fuel burning equipment and size.~~

~~11. Special limitations if any.~~

3113.4 Inspection agencies. The building official is authorized to accept reports of inspections conducted by ~~*approved* inspection~~ agencies approved by the North Carolina Department of Insurance ~~during off-site construction of the relocatable building, and to satisfy the applicable requirements of Sections 110.3 through 110.3.12.1~~.

SECTION 3114
PUBLIC USE RESTROOM
BUILDINGS IN FLOOD HAZARD AREAS

Deleted.

~~**3114.1 General.** For the purpose of this section, public restroom buildings are located on publicly owned lands in *flood hazard areas* and intended for public use. Public restroom buildings and portions of other buildings that contain public restrooms are limited to toilet rooms, bathrooms, showers and changing rooms. Public restroom buildings and portions of buildings that contain public restrooms shall comply with the requirements of this section. Public use restrooms that are not elevated or *dry floodproofed* in accordance with Section 1612 shall comply with Section 3114.2. Portions of buildings that include uses other than public use toilet rooms, bathrooms, showers and changing rooms shall comply with Section 1612.~~

~~**3114.2 Flood resistance.** Public use restrooms on publicly owned lands in *flood hazard areas* shall comply with the requirements of ASCE 24, except for elevation requirements, and shall comply with all of the following criteria:~~

~~1. The building footprint is not more than 1,500 square feet (139 m^2).~~

~~2. Located, designed and constructed to resist the effects of flood hazards and flood loads to minimize flood damage from a combination of wind and water loads associated with the base flood.~~

~~3. Anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy during conditions of the base flood.~~

~~4. Constructed of flood-damage-resistant materials.~~

~~5. Where enclosed by walls, the walls have flood openings.~~

~~6. Mechanical and electrical systems are located above the base flood elevation.~~

~~7. Plumbing fixtures and plumbing connections are located above the base flood elevation.~~

~~8. An emergency plan, approved by the jurisdiction, is submitted to the building official and includes building design documents specifying implementation of protection measures prior to the onset of flooding conditions.~~

~~**Exceptions:**~~

~~1. Minimum necessary electric equipment required to address health, life safety and electric code requirements is permitted below the base flood elevation in accordance with ASCE 24 provisions for electric elements installed below the minimum elevations.~~

~~2. Plumbing fixtures and connections are permitted below the base flood elevation provided that the fixtures and connections are designed and installed to minimize or eliminate infiltration of floodwaters into the sanitary sewage system and discharges from sanitary sewage systems into floodwaters.~~

3115.3 Intermodal shipping container information. Intermodal shipping containers shall bear an existing data plate containing the following information as required by ISO 6346 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.

1. Manufacturer's name or identification number.
2. Date manufactured.
3. Safety approval number.
4. Identification number.

5. Maximum operating gross mass or weight (kg) (lbs).
6. Allowable stacking load for 1.8G (kg) (lbs).
7. Transverse racking test force (Newtons).
8. Valid maintenance examination date.

~~Where approved by the *building official*, the markings and existing data plate are permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.~~

3115.8.1 Foundations. *Intermodal shipping containers* repurposed for use as a permanent building (in place for 180 days or more) or structure shall be supported on foundations or other supporting structures designed and constructed in accordance with Chapters 16 through 23.

CHAPTER 32

ENCROACHMENTS INTO THE PUBLIC RIGHT-OF-WAY

~~**User note:**~~

~~***About this chapter:*** *From time to time it is necessary or appropriate for a portion of a building to encroach onto an adjoining public right-of-way. Chapter 32 establishes parameters for such encroachments not only at grade but also above and below grade.*~~

3202.5 Space under public property.

3202.5.1 Space under sidewalk. Where space under the sidewalk is used for any purpose, a special permit shall be required.

3202.5.2 Sidewalk lights. When glass is set in the sidewalk to provide light for spaces underneath, the glass shall be supported by metal or reinforced concrete frames and such glass shall be not less than 1/2 inch (12.7 mm) thick. Where such glass is over 12 square inches (7742 mm^2), it shall have wire mesh embedded in the glass. All portions of sidewalk lights shall be of not less strength than required for the load specified.

CHAPTER 33
SAFEGUARDS DURING CONSTRUCTION

~~**User notes:**~~

~~***About this chapter:*** *While the balance of the chapters in this code specify how a building is to be designed and constructed in order to be in compliance with the code, Chapter 33 looks to the actual construction process. Parameters are provided for demolition and for protecting adjacent property during demolition and construction. This chapter also addresses the need for a fire watch during nonworking hours for certain buildings once the construction has progressed significantly. Issues such as how to provide egress while the building is growing, the timing of standpipe and sprinkler installation, and protection of pedestrians are addressed.*~~

~~***Code development reminder:*** *Code change proposals to sections preceded by the designation [BS] will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

3304.1.2 Surcharge. ~~Fill or other surcharge *loads* shall not be placed adjacent to any building or structure unless such building or structure is capable of withstanding the additional *loads* caused by the fill or surcharge. Existing footings or foundations that can be affected by any excavation shall be underpinned adequately or otherwise protected against settlement and shall be protected against lateral movement.~~ See Section 1808.3.2

[F] 3310.2 Maintenance of means of egress. ~~*Means*~~ Required *means of egress* and required *accessible means of egress* shall be maintained at all times during construction, demolition, remodeling or *alterations* and *additions* to any building.

Exception: Existing *means of egress* need not be maintained where *approved* temporary *means of egress* systems and facilities are provided.

[F] 3314.1 Fire watch during combustible construction. A fire watch shall be provided during nonworking hours for construction that exceeds 40 feet (12 192 mm) in height above the lowest adjacent grade at any point along the building perimeter, for new multistory construction with an aggregate area exceeding 50,000 square feet (4645 m^2) per story as required by Section 3305.5 of the *International Fire Code*. ~~or as required by the fire code official.~~

CHAPTER 34

RESERVED

~~*Action taken during the 2012 Code Development Process removed Chapter 34, Existing Structures, from the IBC. The provisions of this chapter are contained in the International Existing Building Code. See Section 101.4.7*~~

CHAPTER 36

DOCKS, PIERS, BULKHEADS AND WATERWAY STRUCTURES

This chapter is a North Carolina addition to the 2021 International Building Code. There will be no underlined Text.

SECTION 3601
GENERAL AND SCOPE

3601.1 General. The intent of this chapter is to provide minimum standards for the design, construction and maintenance of docks, piers, bulkheads and waterway structures. The guidelines in this chapter address minimum standards for foundations, design forces, structural integrity, material selection and utilization and construction techniques.

3601.2 Scope. The following structures shall be designed in accordance with the requirements of this chapter:

1. Docks, piers, gangways and catwalks, other than residential and farm docks and piers exempted from this chapter in the exceptions below, shall be designed by a registered design professional.

2. All bulkheads having an exposed height greater than 5 feet or with a superimposed load shall be designed by a registered design professional and require special inspection. Special inspection shall be waived for bulkheads of any height constructed from property line to property line of one and two family dwellings and including attachment to neighboring bulkheads.

3. Oceanfront retaining walls, bulkheads and other types of retaining walls used by the public on the coastline of the ocean or adjacent inlets shall be designed by a registered design professional.

4. Marine terminal or port facilities for berthing, mooring, docking and servicing ships, barges or tug boats that handle cargo of all types, including bulks, containers, liquids, fuels and people, which shall be designed by a registered design professional in accordance with accepted industry standards.

5. Groins not exempted below, jetties, breakwaters, oceanfront seawalls, and oceanfront revetments which shall be designed by a registered design professional in accordance with accepted industry standards.

Exceptions*:* The following structures are exempt from the requirements of this chapter:

1. Sill structures combined with marsh plantings and certain groins in accordance with the Department of Environmental and Natural Resources general permit requirements.

2. Oceanfront and inlet sandbag revetments in accordance with the Department of Environmental and Natural Resources general permit requirements.

3. Revetments constructed on single family residential property having a height no greater than 10 feet and slope greater than 1.5 horizontal: 1.0 vertical and in accordance with the Department of Environmental and Natural Resources general permit requirements.

4. Farm structures not on public waters.

5. Piers and docks associated with one and two family dwellings meeting the exceptions of the *NC Residential Code*.

SECTION 3602
DEFINITIONS

ADDITIVES. Substances added to a polymer resin or vinyl chloride material to aid in processing the material.

BOAT SLIP. A berthing place for one or two watercraft where the watercraft can be securely moored to cleats, piling, or other devices while the boats are in the water. Boat slips are commonly configured as “side-ties” or as single or double loaded “U” shaped berths.

BULKHEAD. A vertical wall structure designed to retain shoreline material and prevent erosion due to wave activity.

CATWALK. A narrow footway platform extending alongside a structure.

DESIGN WAVE. A wave that is potentially most damaging to an economically feasible structure, or wave for which a structure is designed.

DOCK. A structure extending alongshore or out from the shore into a body of water, usually accommodating multiple boat slips, to which boats may be moored in order to load or unload people or cargo, or to provide access to the water.

EXTRUSION. Manufacturing process whereby a material is pushed through a die to form a shape of constant cross section. Vinyl Chloride sheet piling is generally manufactured using an extrusion process.

FETCH. Open water exposure over which waves are generated.

FIBER. One or more glass, carbon, or aramid filaments in the form of a continuous strand or roving in an FRP material.

FIBER ARCHITECTURE. Construction of a composite material from layers with different types and orientations of fibrous material.

FIBER ORIENTATION. Fiber orientation is the alignment of the longitudinal axis of a fiber in an FRP material with respect to the stated reference axis.

FIBER REINFORCED POLYMER (FRP). A polymeric composite material consisting of reinforcement fibers, such as glass, impregnated with a fiber-binding polymer which is then molded and hardened. Fiber-reinforced polymers are permitted to contain cores laminated between fiber-reinforced polymer facings.

FIBER VOLUME FRACTION. The volume of reinforcement fiber in a cured composite divided by the volume of the composite section.

FILLER. Substance added to the matrix of a FRP material intended to alter its engineering properties, performance, and/or cost.

GANGWAY. A footway bridge extending from the dock, pier, bulkhead or shore, usually to a floating structure.

GLASS TRANSITION TEMPERATURE (T_g). Temperature at which the polymer matrix of an FRP material changes from a glassy state to a rubbery state.

KING PILE. The primary structural member that supports horizontal panels to form a vertical wall sometimes used in bulkhead or groin construction.

LAMINA. A layer of fibers and resin in an FRP material.

MARINE BORERS. Water borne organisms (mollusks, crustaceans, worms) that live in saltwater and brackish water. These organisms damage exposed timber structures and vessels. Marine borers typically enter timber and causing damage from the inside out – leaving the exterior appearing unaffected. Dimensional lumber is more susceptible to damage from marine borers than round timber piles.

MATERIAL LONGITUDINAL DIRECTION. Direction in an FRP material parallel to the direction of pultrusion (pulling) during the manufacture of a plate or structural shape.

MATERIAL TRANSVERSE DIRECTION. Direction in an FRP material orthogonal to the longitudinal direction.

MATRIX. Continuous constituent of an FRP material surrounding the reinforcing fibers and consisting of a polymer resin with any fillers and additives.

PIER. An elevated deck structure, usually pile supported, extending out into the water from the shore.

PILE. A timber, concrete, metal, or composite member embedded into the ground to support or brace a structure. “Piles” or “piling” are plural forms of “pile.”

PILE WRAPS. Protective and / or strengthening coverings for marine piles. Pile wraps are made of a variety of materials. Pile wraps protect timber piles from marine borers by limiting damage after they are installed.

PRIVATE WATERFRONT STRUCTURES. A *dock, pier, bulkhead,* or associated structure that does not meet the definition of *public waterfront structure* ~~not open to the general public and with no more than ten total boat slips and no more than ten owners~~.

PUBLIC WATERFRONT STRUCTURES. A *dock, pier, bulkhead,* or associated structure located on ~~*multi-family*~~ residential property serving more than 10 boat slips ~~(greater than ten *dwelling units*)~~, public property or commercial property.

PULTRUSION. Manufacturing process whereby a material is pulled through a die to form a shape of constant cross section. FRP plates and structural shapes are generally manufactured using a pultrusion process.

RESIN. An organic polymer possessing indefinite and often high molecular weight and a softening or melting range that exhibits a tendency to flow when subjected to stress.

REVETMENT. A sloping structure usually constructed of stone or concrete and placed on a shoreline to protect it against erosion by wave and current action.

ROVING. In an FRP material a roving is a large number of continuous parallel filaments or a group of untwisted parallel strands.

SHEET PILE. A pile with a generally slender flat cross section to be embedded into the ground or seabed and meshed or interlocked with like members to form a diaphragm, wall or bulkhead.

SYMMETRIC COMPOSITE. A symmetric composite is a composite material in which the sequence of lamina below the laminate mid-plane is a mirror image to those above the laminate mid-plane.

SECTION 3603
PERMITS AND APPROVALS

3603.1 General. In addition to a building permit, permits may be required from federal, state or county agencies such as, but not limited to, the United States Army Corps of Engineers or the Department of Environmental and Natural Resources. In cases of structures to be built on lakes operated by an electric utility for the generation of power, a permit from the operating utility may also be required.

SECTION 3604
MINIMUM DESIGN LOADS

3604.1 General. Every structure shall be of sufficient strength to support the imposed dead, live, snow, wind, impact and seismic loads without exceeding the prescribed stresses for the various materials described elsewhere in this code. Adequate consideration shall be made for forces imposed by earth, water, docking and mooring.

3604.2 Dead loads. The weight of the component parts of a structure shall be used in the design when it will influence the strength of the structural elements. All utilities, permanent furniture, dock boxes and mooring hardware should be considered as dead load.

3604.3 Live loads. Design live loads shall be the greatest load that will likely be imposed on the structure, including superimposed loads on retained material which exert horizontal loads on the structure. Where vehicles are allowed, actual weight of vehicles and wheel loads as specified in the latest edition of Standard Specifications for Highway Bridges of the American Association of State Highway and Transportation Officials or obtained from the vehicle manufacturer shall be used. The design load shall be posted at the dock or pier approach where vehicles are allowed. Minimum live loads are:

1. Fixed piers, docks, catwalks - Private waterfront piers: 40 psf or 300 pounds concentrated load on any 2 foot by 2 foot area. Public waterfront piers: Design loads shall be the greatest combinations of loads exerted on the structure but not less than 60 psf or 300 pounds concentrated load on any 2 foot by 2 foot area.

2. Floating docks - Private waterfront docks: 20 psf, public waterfront docks: 30 psf, or 300 pounds concentrated load on any 2 foot by 2 foot area. Under dead and live load, all floating docks shall have a minimum of 3 inches freeboard from the top of the flotation device, other than low freeboard watercraft (e.g. kayak) launching facilities. Floating docks with roofs shall have a minimum of 3 inches freeboard from the top of the flotation device under a combination of dead, snow and 75% of live load. All floating docks subject to this chapter shall have not more than 6 degrees tilt from the horizontal under uniform live loading on one-half of the dock width or under concentrated load of 400 pounds applied within 12 inches of any side.

3. Gangways - Gangways shall be designed for a live load of for 100 psf. Flotation for gangway landing shall be designed for 50 psf, live load.

4. Bulkheads, revetments - Design loads shall be the greatest combinations of loads exerted on the structure. Consideration shall be given to horizontal loads exerted by superimposed loads on the retained earth and by inclined surface slopes. Superimposed loads shall be considered when exceeding 50 psf and located within a horizontal distance of three times the height of the bulkhead from the face of the bulkhead.

3604.4 Snow Loads. Design snow loads shall be as prescribed in Chapter 16.

3604.5 Wind loads. Design wind loads shall be as prescribed in Chapter 16 without moored vessels. In wind regions with a design wind speed greater than 90 mph, the design wind speed with moored vessels shall be no less than 90 mph (3 second gust). This gust wind speed shall be adjusted for duration and height (not restricted to 15 feet minimum) for wind pressures applied to vessels moored at the facility in accordance with Chapter 16.

3604.6 Impact loads. Design impact loads shall be as prescribed in Chapter 16 but not less than 1.25 times the kinetic energy exerted by a striking vessel or vehicle.

3604.7 Seismic Loads. Design seismic loads shall be as prescribed in Chapter 16. Seismic loads are not applicable for any structure exempted from design by a registered design professional.

3604.8 Water loads. Hydrostatic and hydrodynamic loadings shall be considered as follows:

3604.8.1 Hydrostatic Pressures. Hydrostatic pressures shall be considered in conjunction with the equivalent fluid pressure of soil and any surcharge acting on the structure. For bulkheads hydrostatic pressures shall be estimated based on maximum difference between retained and offshore water surface elevations.

3604.8.2 Current Loads. Current loads for structures and vessels shall be determined from records on current velocity using accepted engineering practice.

3604.8.3 Anchorage for Uplift. Sufficient anchorage against uplift between all components, except elements specifically designed to break away shall be provided. Resisting forces shall be not less than 1.5 times the applied uplift force.

3604.8.4 Wave Forces. Wave forces shall be determined from wave records where available. Where no wave records are available, the design wave shall be determined from probable wind speed, direction, fetch and water depth that will yield a critical wave. Forces shall then be calculated using accepted engineering practice.

3604.8.5 Forces due to Passing Vessels. All piers, floating docks, bulkheads and revetments shall be designed for water loading generated by wind and passing vessels. Adjacent to federal designated channels, water loading shall be based on commercial and recreational vessels with minimum passing speeds of 10 and 20 knots, respectively.

3604.9 Earth loads. Lateral earth pressures shall be determined by considering the specific soil properties and applying earth pressure theories generally accepted for soil mechanics in engineering practice. A geotechnical investigation or other adequate consideration shall be given by the registered design professional for the effect of probable varying levels of retained water, tide and flood water. Pressures exerted by the earth shall be checked for dry, moist, and saturated conditions as applicable.

3604.10 Erosion. The effects of reasonably predictable erosion, propeller wash-induced scour, and wave-induced scour shall be given ample consideration.

3604.11 Water Levels. The ability to accommodate dead, live, wind, current and wave loadings for the range of water levels (from low water to base flood level) anticipated at the site shall be given ample consideration. For public and private floating docks, guide piling systems shall be capable of accommodating water levels extending a minimum of 2 feet above base flood elevation plus the freeboard of the dock structure.

SECTION 3605
MATERIALS

3605.1 General. The quality of materials and fasteners used for load-supporting purposes shall conform to good engineering practices.

3605.2 Piling and Foundations. Materials used for piling and repairing piling shall comply with applicable provisions of Chapter 18 and the material requirements of Sections 3605.3 through 3605.7.

3605.2.1 Helical Anchors. Helical anchors shall be hot dip galvanized or stainless steel. A representative number of helical anchors subjected to tensile loading shall be load tested in accordance with ASTM D 3689 to two times their design load capacity. Load testing of anchors in tension shall include creep testing of a representative number of the anchors. Helical anchors shall be designed and installed as determined by a registered design professional.

3605.3 Wood. Wood shall be pressure treated with a preservative recommended by the American Wood Preservers' Association for the specific application. Wood species, preservative treatment, minimum lumber size, and lumber grade shall be in accordance with Table 3605.3. Handrails, guardrails, wallcaps, and decking may be constructed of naturally durable species where located above the normal high water mark.

3605.3.1 Wood Connections. All steel bolts, rods and other hardware shall be hot-dipped galvanized or protected with an equivalent system. All bolts, rods and other metal materials shall be no smaller than 5/8 inch in diameter. Beams, girders or pile caps shall be attached to the piling with a minimum of two 5/8-inch hot-dip galvanized steel bolts per beam member through bolted at each piling connection. Piling shall not be notched so that the cross-section is reduced below 50 percent. Threaded fasteners shall not be tightened directly against wood surfaces but used only in conjunction with standard ogee or flat washers. Cold formed metal connectors shall not be used in wet applications or applications subject to wetting and drying cycles. Mooring hardware, including cleats, and pile guides shall be through bolted using sizes recommended by the manufacturer.

Table 3605.3: SPECIFICATIONS FOR SOUTHERN PINE[2] LUMBER IN FRESH AND SALT WATER SERVICE

Location	Component	AWPA Use Category[1,4]		Dimensions	Lumber Grade		Moisture Content at Treatment
		Saltwater	Freshwater		Saltwater	Freshwater	
Above Normal High Water	Decking[3]	3B	3B	5/4 “ 2” Nominal Min.	Premium No. 2	Premium No. 2	Surfaced Dry 19%
	Guardrails	3B	3B	2” Nominal Min.	No. 2	No. 2	Surfaced Dry 19%
	Wallcaps	3B	3B	2” Nominal Min.	No. 2	No. 2	Surfaced Dry 19%
	Walers	3B	3B	4x6 Nominal	No. 2	No. 2	KD 20% or less or Dry 23%
	Cross Bracing	3B	3B	2” to 4” Nominal	No. 2	No. 2	Surfaced Dry 19%
Splash Zone	Split Pile Caps	4B	4B	2” to 4” Nominal	No. 2	No. 2	Surfaced Dry 19%
	Stringers	4B	4B	2” Nominal	No. 2	No. 2	Surfaced Dry 19%
Below Normal High Water	Sheet Piles	5B	4C	2” to 4” Nominal	Marine No. 1[7]	No. 2	Surfaced Dry 19%
	Walers	5B	4C	4x6 Nominal	Marine No. 1[7]	No. 2	KD 20% or less or Dry 23%
	Cross Bracing	5B	4C	2” to 4” Nominal	Marine No. 1[7]	No. 2	Surfaced Dry 19%
	Rectangular Timber Piles	Not Allowed[6]	4C	6x6 Nominal	Not Allowed[6]	No. 2	KD 20% or less or Dry 23%
	Round Timber Piles	5B[6]	4C	ASTM D25	ASTM D25	ASTM D25	KD 25% or Less
Engineered Lumber	Glulam Timber	5B	4B	4” Nominal Min.	Note 5	Note 5	12% Average
	Parallel Strand Lumber	5B	4B	3½” Minimum	1.8E or Better	1.8E or Better	Per Manufacturer’s Specifications

Footnotes:

1. Lumber shall be pressure treated with preservative treatment in accordance with AWPA U1.
2. At the discretion of the Building Official, lumber species other than Southern Pine may be approved when span tables for wet use conditions are submitted, and the lumber is treated for comparable service life to the treatment specifications required by Table 3605.1.
3. Wood composite decking, treated or untreated, shall provide equivalent service life to the treated decking specified in Table 3605.1.
4. All notches, holes, and field cuts shall be field treated in accordance with AWPA M4.
5. Glulam grade shall be specified as a layup combination or stress class in accordance with the National Design Specification or the manufacturer's published data. Layup combinations shall consist of species and grades capable of the treatment retentions equivalent to the AWPA use categories specified in Table 3605.1.
6. Commercial pile wraps may be used to extend the life expectancy of timber piles exposed to marine borers.
7. AWPA requirements for Marine No. 1 specify that no heartwood be exposed on any face prior to preservative treatment.

3605.4 Concrete. Concrete components shall comply with applicable provisions of Chapter 19 and ACI 318. Minimum concrete strength, air entrainment, maximum chloride content, and maximum water cement ratio shall be determined from ACI 318 on the basis of required structural strength, required resistance to freeze-thaw exposure, required abrasion resistance, and required resistance to water penetration and salt water intrusion. Minimum concrete cover shall be increased and reinforcing steel spacing shall be decreased in accordance with ACI 350, to reduce crack size. All steel embedments, other than reinforcing steel, shall be stainless, hot dip galvanized or coated for corrosion protection. Field welds and abrasions of coatings on embeds shall be touch coated in the field.

3605.5 Structural Steel. Steel components shall comply with applicable provisions of Chapter 22 and AISC 360. All structural steel members, fasteners, and fittings shall be protected from corrosion by coating or cathodic protection for the specific exposure. Steel bulkhead components and dock components shall be hot dip galvanized or coated to achieve the corrosion protection required for the degree of exposure of corrosive elements. Field welds and abrasions to coatings shall be touched up ~~coated~~ after erection or installation is completed. Cold formed metal joists, girders, columns and studs shall not be used in applications where the members are constantly wet or subject to wetting and drying cycles.

3605.6 Aluminum. Aluminum bulkhead sheets or aluminum bulkhead or dock components shall be of proper alloy to resist corrosive elements in the adjacent water and soil. Bulkhead components and hardware shall be aluminum or stainless steel. Aluminum shall be galvanically and physically isolated from concrete and galvanically isolated from steel. Connection hardware and fasteners for aluminum components may be stainless steel or galvanized steel if isolated from aluminum structural elements.

3605.7 Plastics and Composites. Bulkheads, structural shapes, plates, and guardrail systems manufactured from vinyl chloride based materials or fiber reinforced polymer (FRP) materials shall be designed to comply with manufacturer's published load tables or manufacturer's published mechanical properties subject to the requirements for specific materials in Sections 3605.7.1, 3605.7.2, and 3605.7.3. Plastic and composite members shall contain additives to inhibit ultra violet radiation degradation or shall be protected from ultra violet radiation by an appropriate coating.

3605.7.1 Sheet Piling Manufactured from Vinyl Chloride Based Materials. Vinyl chloride materials for sheet piling shall be specified and tested for conformance in accordance with ASTM D4216, including weathering tests in accordance with ASTM D1435. Mechanical properties shall be established in accordance with the tests specified in Table 3605.7.1. Design values of the tabulated properties shall conform to the limiting values specified in the table. The manufacturer of the sheet piling shall produce a certificate of analysis from a third party testing agency certifying the vinyl chloride material from which the sheet piling is manufactured conforms to the physical properties specified. The third party testing agency shall be accredited in accordance with ISO 17025 to conduct the specified tests. Testing programs shall address changes in

material sources and composition over time, and test data shall accurately represent the properties of the product produced at any given time.

3605.7.1.1 Deflection of Vinyl Chloride Based Sheet Piling. Deflection of vinyl sheet pile bulkheads shall not exceed the lesser of 1/60 times the height from the mud line to the top of the wall or 2 inches. Effects of in-service temperatures exceeding 80^0F on modulus of elasticity shall be considered in deflection calculations and selection of materials.

3605.7.1.2 Service Stresses for Vinyl Chloride Based Sheet Piling. Service load stresses in the vinyl sheet piling shall not exceed 3200 psi.

3605.7.1.3 Ultra Violet Light Stabilization. Vinyl chloride based materials shall be compounded with stabilizing agents. Addition of stabilizers during the extrusion process is prohibited.

3605.7.1.4 Impact Resistance of Vinyl Materials. Vinyl sheet pile bulkheads shall have sufficient impact resistance, determined in accordance with ASTM D256 and ASTM D4226, to resist impact from vessels traveling at mooring speeds, resist wave impact when installed in high velocity flood zones (V-Zones on Flood Insurance Rate Maps), and to resist impact from debris likely to collide with the bulkhead at flood stage or in areas subject to storm surge.

3605.7.1.5 Fire, Smoke, and Toxicity. Vinyl materials shall be tested for the in-service thickness in accordance with ASTM D635 with a resulting burning rate of 2 ½ inches per minute or less.

Table 3605.7.1: LIMITATIONS ON MECHANICAL PROPERTIES FOR VINYL CHLORIDE BASED SHEET PILING

Mechanical Property	Test Protocol	Limitations on Property
Notch Impact Resistance	ASTM D256	2.0 ft-lb./in minimum
Drop Dart Impact Resistance, Procedure A	ASTM D4226	1.0 in-lb./mil minimum
Drop Dart Impact Resistance, Procedure B	ASTM D4226	2.0 in-lb./mil minimum
Tensile Strength	ASTM D638	6500 psi minimum
Modulus of Elasticity in Tension	ASTM D638	377,000 psi minimum
Deflection Temperature under 264 psi	ASTM D648	158 psi minimum
Linear Coefficient of Expansion	ASTM D696	$4.4x10^{-5}$ in/in/^{0}F maximum

3605.7.2 Pultruded Fiber Reinforced Polymer (FRP) Sheet Piling, Shapes and Plates. Mechanical properties for FRP structural components shall be established in accordance with the tests specified in Table 3605.7.2. Each manufacturer shall publish the characteristic values for the product in accordance with ASTM D7290. The manufacturer of the FRP shall produce a certificate of analysis certifying the FRP material and constituent materials from which the FRP components are manufactured conform to the physical properties specified. Testing programs shall address changes in material sources and composition over time, and test data shall accurately represent the properties of the product produced at any given time. Manufactured components shall be inspected in the plant in accordance with ASTM D3917 for dimensional tolerances and according to ASTM D4385 for visual defects. Inspection reports shall be provided.

Table 3605.7.2: LIMITATIONS ON PHYSICAL AND MECHANICAL PROPERTIES FOR FIBER REINFORCED POLYMER COMPONENTS

Property	ASTM Test Method	Minimum Number of Tests
Barcol Hardness	D2583	5
Glass Transition Temperature T_g	D4065	5
Coefficient of Thermal Expansion	D696	5
Moisture Equilibrium Content	D570	5
Longitudinal Tensile Strength	D638	10
Transverse Tensile Strength	D638	10
Longitudinal Tensile Modulus	D638	10
Transverse Tensile Modulus	D638	10
Longitudinal Compressive Strength	D6641	10
Transverse Compressive Strength	D6641	10
Longitudinal Compressive Modulus	D6641	10
Transverse Compressive Modulus	D6641	10

Longitudinal Flexural Strength	D790	10
Transverse Flexural Strength	D790	10
Longitudinal Flexural Modulus	D790	10
Transverse Flexural Modulus	D790	10
In-Plane Shear Strength	D5379	10
In-Plane Shear Modulus	D5379	10
Inter-laminar Shear Strength	D2344	10
Longitudinal Pin Bearing Strength	D953[2]	10
Transverse Pin Bearing Strength	D953[2]	10
Pull Through Strength per Fastener t = 3/8” t = ½” t = ¾”	D7332, Proc. B	10

Footnotes:

1. Property requirements for shapes apply to sheet piles.
2. Tests shall be conducted for material thicknesses, t, tabulated and bolt sizes from 3/8 inch to 1 inch in diameter. No more than 1/3 of the bolt shank within the thickness of the connection material may be threaded. Bolts shall be installed snug tight.

3605.7.2.1 Maximum Service Temperature. Service temperature of FRP structural components shall not exceed T_g-40^{0}F, where T_g is the glass transition temperature determined in accordance with ASTM D4065.

3605.7.2.2 FRP Constituent Materials. Fibers and matrix constituents shall comply with the following requirements:

3605.7.2.2.1 Fiber Type. Fibers shall be glass, carbon, aramid, or hybrid combinations of these fiber types. Glass fibers shall conform to ASTM D578.

3605.7.2.2.2 Fiber Architecture and Content. The fiber architecture of any pultruded element comprising the cross section of a pultruded FRP structural member shall be symmetrical and balanced. Each pultruded FRP structural element shall contain a minimum total fiber volume fraction of 30%.

3605.7.2.2.3 Fiber Orientations. Each element of a pultruded FRP structural member shall have fibers oriented in a minimum of two directions separated by a minimum of 30 degrees. In the direction of the longitudinal axis of the member the percentage of continuous fiber in each pultruded element shall be a minimum of 30% of the total fiber reinforcement by volume for shapes and a minimum of 25% of the total fiber reinforcement by volume for plates. When multiple elements share a common edge in the direction of pultrusion, at least 50% of the non-roving reinforcement in the element having the largest percentage of non-roving reinforcement shall extend through the junction connecting the elements.

3605.7.2.2.4 Minimum Fiber Tensile Strength. Determined in accordance with ASTM D7290, the characteristic value of the tensile strength of the fiber strands, yarns, and rovings shall be at least 290,000 psi. Tensile tests shall be conducted in accordance with ASTM D2343.

3605.7.2.2.5 Resin. A commercial grade thermoset resin shall be used for fabricating pultruded FRP structural members.

3605.7.2.2.6 Other Constituent Materials. Additives to the resin system that influence processing or curing, such as fillers, promoter, accelerators, inhibitors, UV resistant agent, and pigments shall be compatible with the fiber and resin system.

3605.7.2.3 Durability and Environmental Effects. Materials for FRP structural components shall be selected, designed, and manufactured to tolerate long term environmental effects anticipated during the service life of the structure.

3605.7.2.3.1 Factors Considered in Material Selection. The following factors shall be considered in selecting FRP materials for marine structures:

a. Performance criteria for the structure;
b. Intended service life of the structure;
c. Expected environmental conditions, including likelihood of exposure to alkalis or organic solvents;
d. Protective measures;
e. Feasibility of maintenance and repair during service.

3605.7.2.3.2 Adjustment of Material Properties to Account for Environmental Effects. Unless the glass transition temperature determined in accordance with ASTM D4065 and the tensile strength of the

composite in the longitudinal and transverse directions determined in accordance with ASTM D638, can be shown to retain at least 85% of their characteristic values after conditioning in the environments listed below, the nominal strength and stiffness shall be reduced for design purposes in accordance with test data produced from testing simulating the anticipated environment. Materials that cannot retain at least 15% of their characteristic values after conditioning the listed environments are prohibited in structural applications. Design tensile strength shall be reduced in accordance with material specific tests when in-service temperatures exceed of 90^0F. Condition test samples as follows:

a. Water: Samples shall be immersed in distilled water having a temperature of 100 + 3^0F and tested after 1,000 hours of exposure.

b. Alternating Ultraviolet Light and Condensing Humidity: Samples shall be exposed according to Cycle No. 1 (0.89 W/m^2/mm, 8 hours UV at 60^0C, 4 hours condensation at 50^0C) using UVA-340 lamps in an apparatus meeting the requirements of ASTM G154. Samples shall be tested within two hours after removal from the apparatus.

3605.7.2.4 Impact Resistance of FRP materials. Deleted

3605.7.2.5 Deflection of FRP Sheet Piling. Deflection of vinyl sheet pile bulkheads shall not exceed the lesser of 1/60 times the height from the mud line to the top of the wall or 2 inches. Effects of in-service temperatures in excess of 90^0F on modulus of elasticity shall be considered in deflection calculations.

3605.7.2.6 Fire, Smoke, and Toxicity. FRP materials shall be tested for the in-service thickness in accordance with ASTM D635 with a resulting burning rate of 2 ½ inches per minute or less.

3605.7.3 Carbon Fiber Reinforced Polymer Repair Products. Carbon Fiber Reinforced plate and wrap used for flexural and shear reinforcement of existing concrete structures shall be designed in accordance with the design procedures specified in ACI 440.2R. Mechanical properties of Carbon Fiber Reinforced plate and wrap shall be established in accordance with the tests specified in ACI 440.3R.

3605.8 Masonry. Masonry used in bulkheads and dock work shall comply with Chapter 21.

SECTION 3606
CONSTRUCTION OF PIERS, DOCKS, CATWALKS, GANGWAYS, AND FLOATING DOCKS

3606.1 Fixed piers. Fixed piers shall be constructed in accordance with Sections 3606.1.1 through 3606.1.4.

3606.1.1 Required depth of piles. Fixed piers shall be supported by pilings with tip penetrations dependent on the soil conditions and the total applied load. Piers support by shallow piling, legs or columns with point bearing on rock shall have provisions to resist horizontal forces and overturning, as well as flotation uplift. Piles shall be installed in accordance with the requirements of Chapter 18 and inspected in accordance with the requirements of Chapter 17.

3606.1.2 Structural steel and concrete members. Structural steel members shall be designed in accordance with AISC 360, Chapter 22 of this code, and the material requirements of this chapter. Con-

crete members shall be designed in accordance with ACI 318, Chapter 19 of this code, and the materials requirements of this chapter.

3606.1.3 Size of wood piles. Piles shall be sized in accordance with the American Wood Council National Design Specification. In no case shall round timber piles be less than 7 inches in diameter at the butt and have a minimum tip diameter of less than 5 ½ inches. Rectangular timber piles shall not be less than nominal 6 inches x 6 inches.

3606.1.4 Bracing of wood piles. Where required by design, bracing shall be sized to limit stresses in the piles from lateral loads in accordance with the American Wood Council National Design Specification to prevent buckling.

3606.1.5 Wood girder and joist spans. Maximum spans for pier pile caps or girders and joists or stringers shall be determined in accordance with the American Wood Council National Design Specification considering the member to be subject to wet use.

3606.1.6 Connections. Connections between piling or legs to pile caps, stringers, beams, bracing and deck shall have sufficient capacity to safely support all applied loads and provide transfer of load to adjoining members.

3606.1.7 Gangways. On coastal waterways, the maximum slope permitted shall be 3:1 at 0.0 mean low water or above and 2½:1 below 0.0 mean low water. On lakes and other inland waters, the maximum slope shall be 3:1 not less than 90% of the time and 2½:1 not more than 10% of the time.

3606.2 Flotation units. Flotation units shall be foam filled encapsulated floats or polystyrene billets securely wrapped with Class I woven geotextile fabric in accordance with AASHTO M288. The use of metal barrels not specifically designed for use as flotation devices and unwrapped polystyrene billets are prohibited.

3606.3 Electrical service. All electrical service to marine structures shall be in accordance with the *North Carolina Electrical Code*.

3606.4 Fire protection. All fire protection for marine structures shall be in accordance with applicable provisions of the *North Carolina Fire Prevention Code.*

3606.5 Fuel docks. Fuel docks and other marine facilities handling flammable liquids shall comply with the *Flammable and Combustible Liquids Code*, NFPA 30 and the *North Carolina Fire Code*. All fuel installations shall be designed to prevent fuel spillage from entering the water. The fuel docks or floats shall be isolated to the extent that fire or explosion would have minimal opportunity to spread to or from the fuel dock to the berths. Storage tanks for public facilities shall be located a minimum distance of 50 feet from the dispenser with a shutoff valve at the tank.

3606.6 Guardrails. For walkways, access piers, steps or ramps, guardrails or other safety provisions shall be provided along the edges where the vertical drop to the lesser of the mean low water level, normal low water level (sounds), normal pool (lakes and rivers) or mud line exceeds 6 feet. Edges having a

primary function other than walks or access ways, such as docking frontage and swimming access shall not require guardrails. Guardrails shall be designed in accordance with Chapter 16 for balconies. Guardrails shall be a minimum of 42 inches high and shall prevent the passage of a 21 inch sphere except where required otherwise by Chapter 11. Edge protection shall be provided as required by other regulations.

Exception: For private waterfront piers and docks, guardrails or other safety provisions shall be provided along the edges where the vertical drop to the lesser of the mean low water level, normal low water level (sounds), normal pool (lakes and rivers) or mud line exceeds 8 feet. Guardrails shall be a minimum of 36 inches high and shall prevent the passage of a 21 inch sphere. Edge protection shall be provided as required by other regulations.

3606.7 Accessibility. Piers, docks, catwalks, gangways, and floating docks shall comply with Chapter 11 and ANSI/ICC A117.1 for accessibility.

3606.8 Egress. Piers and docks shall be provided with means of egress in accordance with Sections 3606.8.1 through 3606.8.4.

3606.8.1 Occupant Load. Occupant load for piers and docks shall be calculated as follows:

3606.8.1.1 Piers and Boardwalks. Occupant load for piers and boardwalks intended for recreational fishing shall be calculated based on 3 linear feet of rail per person on the perimeter plus 50 square feet per person on a net area with a perimeter 3 feet inside the rail. Occupant load for piers and boardwalks intended for other uses shall be in accordance with Chapter 10.

3606.8.1.2 Public Waterfront Docks. Occupant load for docks constructed a public marinas intended for mooring of private pleasure craft shall be calculated based on 30 square feet of net dock area per person.

3606.8.1.3 Private Waterfront Docks. Occupant load for private waterfront docks shall be calculated based on 20 square feet per person.

3606.8.2 Piers. Piers intended for recreational fishing, assembly, or educational purposes with travel distance to exit discharge exceeding 600 feet and greater than 15 feet above mean low water shall have emergency access ladders at ~~300~~ 200 feet intervals and at the end of the pier.~~, and the pier shall be constructed of noncombustible material with the exception that the floor decking may be heavy timber.~~

3606.8.3 Public Waterfront Docks. Public waterfront docks intended for mooring of private pleasure craft with travel distance to exit discharge in excess of 600 feet shall have a second means of egress or a means of rescue from the water. Construction for these docks shall be noncombustible with the exception that wood walers may be embedded in the dock edges for attachment of mooring hardware.

3606.8.4 Buildings Constructed on Piers and Docks. Buildings constructed on public waterfront piers and docks shall comply with the requirements of all applicable provisions of the North Carolina State Building Code.

SECTION 3607
CONSTRUCTION: BULKHEADS AND REVETMENTS

3607.1 Bulkheads. Bulkheads shall be constructed in accordance with Sections 3607.1.1 through 3607.1.5.

3607.1.1 General. Bulkheads shall be constructed in a manner to be effective against erosion and provide for bank stabilization. The bulkhead system may consist of either of the following or combinations thereof: braced sheet pile walls with tie backs, king piles and horizontal panels, gravity walls, cantilever and counterfort retaining walls. Bulkhead walls shall be constructed to prevent passage of fine material (See ASTM D 2487) through joints or cracks from the fill side to the stream side.

3607.1.2 Systems. Local site conditions and performance of bulkheads in service shall govern in selection of a system. The potential for erosion and scour at the mud line shall also be investigated, and compensating features shall be reflected in the construction. Bulkheads shall be terminated by either tying into adjoining structures or by extending the bulkhead line a minimum of 10 feet in a landward direction at an angle of not less than 45 degrees to the shoreline in order to protect against end erosion or flanking by wave action. No structure shall be terminated without regard for end anchorage and stabilization.

3607.1.3 Guardrails. Where designated public walkways, steps or ramps run adjacent to bulkheads within 6 feet, guardrails or other safety provisions shall be provided along the top of the wall where the vertical drop to the lesser of the mean low water level, normal low water level (sounds), normal pool (lakes and rivers) or mud line exceeds 6 feet. Guardrails shall be designed in accordance with Chapter 16 for balcony guardrails. Guardrails shall be 42 inches high and shall prevent the passage of a 21 inch sphere except where required otherwise by Chapter 11. Edge protection shall be provided as required by other regulations.

Exception: For private waterfront bulkheads with designated walkways within 6 feet, guardrails or other safety provisions shall be provided along the edges where the vertical drop to the lesser of the mean low water level , normal low water level (sounds), normal pool (lakes and rivers) or mud line exceeds 8 feet. Guardrails shall be a minimum of 36 inches high and shall prevent the passage of a 21 inch sphere. A wall cap 30 inches or less in width shall not be considered a designated walkway unless it is connected to a walkway. Edge protection shall be provided as required by other regulations.

3607.1.4 Wood Construction. For wood grades, member sizes, preservative treatment, and protection of metal fasteners and fittings see Section 3605.3.

3607.1.5 Bulkheads of Materials Other than Wood. Vinyl, fiber reinforced polymer, aluminum, concrete and steel bulkheads shall be constructed in a manner to ensure performance. Connections shall be designed to resist the full applied load. For materials and corrosion protection reference Sections 3605.4 through 3605.7.

3607.2 Revetments. Revetments shall be constructed in accordance with Sections 3607.2.1 through 3607.2.2

3607.2.1 Rigid revetments. Rigid revetments shall be founded on a firm foundation to prevent undermining and progressive instability. Provisions shall be made to provide for adequate toe protection to compensate for known or anticipated scour. Additional protection may be needed in active areas and may consist of sheet piling along the toe or stone rip rap. An adequate pattern of weep holes shall be provided in the face to relieve hydrostatic pressure behind the wall. Joints shall be sealed or provided with a properly designed filter to prevent loss of fines from the protected slope.

3607.2.2 Flexible revetments. Adequate provisions shall be made to prevent migration of fine materials through the structure. The face shall not be steeper than one unit horizontal to one unit vertical. Flatter slopes may be needed for stability depending on the construction materials and site conditions. The face may consist of armor stone, rip rap, or individual interlocking concrete units or poured concrete. Toe protection provisions shall be provided as discussed for the rigid type and the top of slope shall be detailed to prevent erosions under the revetment from surface water runoff. Flexible revetments shall be provided with a filter layer designed to prevent loss of fines from the protected slope and to relieve hydrostatic pressure behind the face.

SECTION 3608
SPECIAL INSPECTIONS FOR DEEP FOUNDATION OF MARINE STRUCTURES

3608.1 Special inspector qualifications. Qualification for special inspector shall be in accordance with Section 1704.2.1

3608.2 Building permit and report requirement. Statement of special Inspections shall be in accordance with Section 1704.1.1. Approved Special Inspection report shall be in accordance with Section 1704.2.4 and shall be issued prior to issuing a Certificate of Compliance.

3608.3 Content of statement of special inspections. The statement of special inspections shall be in accordance with Section 1704.3.1.

3608.4 Required Special Inspections & Tests. Special Inspections of deep foundation of marine structures shall be performed in accordance with Tables 3608.4.1 thru 3608.4.9

3608.5 Coatings. Coatings to be designed by the registered design professional as required to extend the life of marine structural components.

Table 3608.4.1
REQUIRED SPECIAL INSPECTIONS FOR MATERIALS IN MARINE STRUCTURES

TYPE	NC Building Code Section	REFERENCED STANDARD*
Steel Elements, perform additional special inspection in	Section 1705.2	AISC 360

accordance with:		
Concrete Grout Precast	Section 1705.3	ACI 318 ACI 318: 26.10
Aluminum	Chapter 20	AA ASM 35 AA ADM 1
Stainless Steel		Design Manual for Structural Stainless Steel
Plastics & Composites	Table 3605.7.2	
Masonry	Section 1705.4	TMS 402 & 602
Vinyl		ASTM D256 ASTM 4226 ASTM 4587 - UV Resistance
Wood	Section 1705.5 Section 3605.3	AWC AWPA

Table 3608.4.2
REQUIRED SPECIAL INSPECTIONS OF DEEP FOUNDATIONS (PILES AND SHEETPILES) IN MARINE STRUCTURES

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Verify element materials, sizes and lengths comply with the requirements.	X	---
2. Determine capacities of test elements and conduct additional load tests, as required.	X	---
3. Inspect driving operations and maintain complete and accurate records for each element.	X	---
4. Verify placement location and plumbness, confirm type and size of hammer, record number of blows per foot of penetration (if vertical capacity is required), determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element.	X	---
5. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	---	---

Table 3608.4.3
REQUIRED SPECIAL INSPECTIONS OF GROUTED ANCHORS IN MARINE STRUCTURES

TYPE	CONTINUOUS SPECIAL INSPEC-	PERIODIC SPECIAL INSPEC-

	TION	TION
1. Inspect drilling operations and maintain complete and accurate records for each element.	X	---
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes.	X	---

Table 3608.4.4
REQUIRED SPECIAL INSPECTIONS OF JETTED PILES IN MARINE STRUCTURES

TYPE	CONTINUOUS SPECIAL INSPEC-TION	PERIODIC SPE-CIAL INSPEC-TION
1. Verify element materials, sizes and lengths comply with the requirements.	X	---
2. Inspect driving operations and maintain complete and accurate records for each element.	X	---
3. Verify placement location and plumbness, record tip and butt elevations and document any damage to founda-tion element.	X	---
4. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	---	---

Table 3608.4.5
REQUIRED SPECIAL INSPECTIONS OF HELICAL ANCHORS IN MARINE STRUCTURES

TYPE	CONTINUOUS SPECIAL INSPEC-TION	PERIODIC SPE-CIAL INSPEC-TION
1. Record installation equipment, helical anchor materials and components, installation angle, pile dimensions, tip elevations, final depth, final installation torque.	X	---
2. Review equipment calibration certification.	---	X
3. For specialty elements, perform additional inspections	---	---

as determined by the registered design professional in responsible charge.		

Table 3608.4.6
REQUIRED SPECIAL INSPECTIONS OF PULL-DOWN PILES IN MARINE STRUCTURES

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Record installation equipment, helical anchor materials and components, pile dimensions, tip elevations, final depth, final installation torque.	X	---
2. Review equipment calibration certification.	---	X
3. Perform concrete elements, perform test and additional special inspections in accordance with Table 3608.4.1.	---	X
4. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	---	---

Table 3608.4.7
REQUIRED SPECIAL INSPECTIONS OF PERCUSSION DRIVEN EARTH ANCHORS IN MARINE STRUCTURES

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Record installation equipment, anchor materials and components, pile dimensions, tip elevations, final depth, pull back length, full lock out strength.	X	---
2. Review equipment calibration certification.	---	X
3. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	---	---

Table 3608.4.8
REQUIRED SPECIAL INSPECTIONS OF DEADMAN CONSTRUCTION IN MARINE STRUCTURES

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Record installation anchor, length, and verify tie rods are snug to supported elements.	---	X
2. Record soil compaction supporting deadman.	X	---
3. Perform concrete elements, perform test and additional special inspections in accordance with Table 3608.4.1.	---	X
4. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	---	---

Table 3608.4.9
REQUIRED SPECIAL INSPECTIONS OF COATINGS IN MARINE STRUCTURES

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Review material preparation design requirements.	---	X
2. Review application certifications.	---	X
3. Verify that damaged coatings are repaired.	---	X

APPENDIX A

EMPLOYEE QUALIFICATIONS

Deleted.

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

User notes:

About this appendix: Appendix A provides optional criteria for the qualifications for jurisdictions to consider when hiring personnel to enforce the building code. Criteria for the building official, plan reviewers and inspectors are provided.

Code development reminder: Code change proposals to this appendix will be considered by the Administrative Code Development Committee during the 2022 (Group B) Code Development Cycle.

SECTION A101
BUILDING OFFICIAL QUALIFICATIONS

[A] A101.1 Building official. The *building official* shall have not fewer than 10 years' experience or equivalent as an architect, engineer, inspector, contractor or superintendent of construction, or any combination of these, 5 years of which shall have been supervisory experience. The *building official* should be certified as a *building official* through a recognized certification program. The building official shall be appointed or hired by the applicable governing authority.

[A] A101.2 Chief inspector. The *building official* can designate supervisors to administer the provisions of this code and the *International Mechanical*, *Plumbing* and *Fuel Gas Codes*. Each supervisor shall have not fewer than 10 years experience or equivalent as an architect, engineer, inspector, contractor or superintendent of construction, or any combination of these, 5 years of which shall have been in a supervisory capacity. They shall be certified through a recognized certification program for the appropriate trade.

[A] A101.3 Inspector and plans examiner. The *building official* shall appoint or hire such number of officers, inspectors, assistants and other employees as shall be authorized by the jurisdiction. A person who has fewer than 5 years of experience as a contractor, engineer, architect, or as a superintendent, foreman or competent mechanic in charge of construction shall not be appointed or hired as inspector of construction or plans examiner. The inspector or plans examiner shall be certified through a recognized certification program for the appropriate trade.

[A] A101.4 Termination of employment. Employees in the position of *building official*, chief inspector or inspector shall not be removed from office except for cause after full opportunity has been given to be heard on specific charges before such applicable governing authority.

SECTION A102
REFERENCED STANDARDS

[A] A102.1 General. See Table A102.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE A102.1
REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
IBC—21	*International Building Code*	A101.2
IMC—21	*International Mechanical Code*	A101.2
IPC—21	*International Plumbing Code*	A101.2
IFGC—21	*International Fuel Gas Code*	A101.2

APPENDIX B

BOARD OF APPEALS

Deleted.

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

User notes:

About this appendix: Appendix B provides criteria for Board of Appeals members. Also provided are procedures by which the Board of Appeals should conduct its business.

Code development reminder: Code change proposals to this appendix will be considered by the Administrative Code Development Committee during the 2022 (Group B) Code Development Cycle.

SECTION B101
GENERAL

[A] B101.1 Scope. A board of appeals shall be established within the jurisdiction for the purpose of hearing applications for modification of the requirements of this code pursuant to the provisions of Section 113. The board shall be established and operated in accordance with this section, and shall be authorized to hear evidence from appellants and the building official pertaining to the application and intent of this code for the purpose of issuing orders pursuant to these provisions.

[A] B101.2 Application for appeal. Any person shall have the right to appeal a decision of the building official to the board. An application for appeal shall be based on a claim that the intent of this code or the rules legally adopted hereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equally good or better form of construction is proposed. The application shall be filed on a form obtained from the building official within 20 days after the notice was served.

[A] B101.2.1 Limitation of authority. The board shall not have authority to waive requirements of this code or interpret the administration of this code.

[A] B101.2.2 Stays of enforcement. Appeals of notice and orders, other than Imminent Danger notices, shall stay the enforcement of the notice and order until the appeal is heard by the board.

[A] B101.3 Membership of board. The board shall consist of five voting members appointed by the chief appointing authority of the jurisdiction. Each member shall serve for **[INSERT NUMBER OF YEARS]** years or until a successor has been appointed. The board members' terms shall be staggered at intervals, so as to provide continuity. The building official shall be an ex officio member of said board but shall not vote on any matter before the board.

[A] B101.3.1 Qualifications. The board shall consist of five individuals, who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the jurisdiction.

[A] B101.3.2 Alternate members. The chief appointing authority is authorized to appoint two alternate members who shall be called by the board chairperson to hear appeals during the absence or disqualification of a member. Alternate members shall possess the qualifications required for board membership, and shall be appointed for the same term or until a successor has been appointed.

[A] B101.3.3 Vacancies. Vacancies shall be filled for an unexpired term in the same manner in which original appointments are required to be made.

[A] B101.3.4 Chairperson. The board shall annually select one of its members to serve as chairperson.

[A] B101.3.5 Secretary. The chief appointing authority shall designate a qualified clerk to serve as secretary to the board. The secretary shall file a detailed record of all proceedings, which shall set forth the reasons for the board's decision, the vote of each member, the absence of a member and any failure of a member to vote.

[A] B101.3.6 Conflict of interest. A member with any personal, professional or financial interest in a matter before the board shall declare such interest and refrain from participating in discussions, deliberations and voting on such matters.

[A] B101.3.7 Compensation of members. Compensation of members shall be determined by law.

[A] B101.3.8 Removal from the board. A member shall be removed from the board prior to the end of their term only for cause. Any member with continued absence from regular meeting of the board may be removed at the discretion of the chief appointing authority.

[A] B101.4 Rules and procedures. The board shall establish policies and procedures necessary to carry out its duties consistent with the provisions of this code and applicable state law. The procedures shall not require compliance with strict rules of evidence, but shall mandate that only relevant information be presented.

[A] B101.5 Notice of meeting. The board shall meet upon notice from the chairperson, within 10 days of the filing of an appeal or at stated periodic intervals.

[A] B101.5.1 Open hearing. All hearings before the board shall be open to the public. The appellant, the appellant's representative, the building official and any person whose interests are affected shall be given an opportunity to be heard.

B101.5.2 Quorum. Three members of the board shall constitute a quorum.

[A] B101.5.3 Postponed hearing. When five members are not present to hear an appeal, either the appellant or the appellant's representative shall have the right to request a postponement of the hearing.

[A] B101.6 Legal counsel. The jurisdiction shall furnish legal counsel to the board to provide members with general legal advice concerning matters before them for consideration. Members shall be represented by legal counsel at the jurisdiction's expense in all matters arising from service within the scope of their duties.

[A] B101.7 Board decision. The board shall only modify or reverse the decision of the building official by a concurring vote of three or more members.

[A] B101.7.1 Resolution. The decision of the board shall be by resolution. Every decision shall be promptly filed in writing in the office of the *building* official within three days and shall be open to the public for inspection. A certified copy shall be furnished to the appellant or the appellant's representative and to the *building official*.

[A] B101.7.2 Administration. The *building official* shall take immediate action in accordance with the decision of the board.

[A] B101.8 Court review. Any person, whether or not a previous party of the appeal, shall have the right to apply to the appropriate court for a writ of certiorari to correct errors of law. Application for review shall be made in the manner and time required by law following the filing of the decision in the office of the chief administrative officer.

APPENDIX C

GROUP U—AGRICULTURAL BUILDINGS

The provisions contained in this appendix are ~~not mandatory unless specifically referenced in the adopting ordinance.~~ adopted as part of this code

~~**User note:**~~

~~***About this appendix:*** Agricultural buildings are given special consideration in Appendix C. Often such buildings have unique uses and structural needs. Where an agricultural building is surrounded by 60 feet of open area on all sides, size limits are waived. Automatic sprinkler protection may be required.~~

SECTION C101
GENERAL

C101.1 Scope. The provisions of this appendix shall apply exclusively to *agricultural buildings* not exempted by N.C.G.S 143-138. Such buildings shall be classified as Group U and shall include the following uses:

1. Livestock shelters or buildings, including shade structures and milking barns.
2. Poultry buildings or shelters.
3. Barns.
4. Storage of equipment and machinery used exclusively in agriculture.
5. Horticultural structures, including detached production *greenhouses* and crop protection shelters.
6. Sheds.
7. Grain silos.
8. Stables.

APPENDIX D

FIRE DISTRICTS

The provisions contained in this appendix are ~~not mandatory unless specifically referenced in the adopting ordinance.~~ adopted as part of this code.

~~**User note:**~~

~~***About this appendix:*** Appendix D establishes a framework by which a jurisdiction can establish a portion of a jurisdiction as a fire district. Fire districts are often designated in a more densely developed portion of a city where limiting the potential spread of fire is a key consideration. Specific construction types and users are prohibited in a fire district.~~

SECTION D101
GENERAL

D101.1 Scope. The fire district as required by N.C.G.S 160D-1128 shall include such territory or portion as outlined in an ordinance or law entitled "An Ordinance (Resolution) Creating and Establishing a Fire District." Wherever, in such ordinance creating and establishing a fire district, reference is made to the fire district, it shall be construed to mean the fire district designated and referred to in this appendix.

D102.2.8 Permanent canopies. See Section 3105.4 ~~Permanent canopies are permitted to extend over adjacent open spaces provided that all of the following are met:~~

~~1. The canopy and its supports shall be of noncombustible material, *fire-retardant-treated wood*, Type IV construction or of 1-hour fire-resistance-rated construction.~~

~~**Exception:** Any textile covering for the canopy shall be flame resistant as determined by tests conducted in accordance with NFPA 701 after both accelerated water leaching and accelerated weathering.~~

~~2. Any canopy covering, other than textiles, shall have a *flame spread index* not greater than 25 when tested in accordance with ASTM E84 or UL 723 in the form intended for use.~~

~~3. The canopy shall have one long side open.~~

~~4. The maximum horizontal width of the canopy shall be not greater than 15 feet (4572 mm).~~

~~5. The *fire resistance* of *exterior walls* shall not be reduced.~~

APPENDIX E

SUPPLEMENTARY ACCESSIBILITY REQUIREMENTS

The provisions contained in this appendix are ~~not mandatory unless specifically referenced in the adopting ordinance.~~ adopted as part of this code.

~~User note:~~

~~About this appendix:~~ *~~The Architectural and Transportation Barriers Compliance Board (U.S. Access Board) has revised and updated its accessibility guidelines for buildings and facilities covered by the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA). Appendix E includes scoping requirements contained in the 2010 ADA Standards for Accessible Design that are not in Chapter 11 and not otherwise mentioned or mainstreamed throughout the code. Items in this appendix address subjects not typically addressed in building codes (for example, beds, room signage, transportation facilities).~~*

APPENDIX F

RODENTPROOFING

The provisions contained in this appendix are ~~not mandatory unless specifically referenced in the adopting ordinance.~~ adopted as part of this code.

~~**User notes:**~~

~~***About this appendix:*** The provisions of Appendix F are minimum mechanical methods to prevent the entry of rodents into a building. These standards, when used in conjunction with cleanliness and maintenance programs, can significantly reduce the potential of rodents invading a building.~~

~~***Code development reminder:*** Code change proposals to this appendix will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.~~

APPENDIX G

FLOOD-RESISTANT CONSTRUCTION

The provisions contained in this appendix are adopted as part of this code. ~~not mandatory unless specifically referenced in the adopting ordinance.~~

~~**User notes:**~~

~~***About this appendix:*** Appendix G is intended to provide the additional flood-plain management and administrative requirements of the National Flood Insurance Program (NFIP) that are not included in the code. Communities that adopt the *International Building Code*® and Appendix G will meet the minimum requirements of NFIP as set forth in Title 44 of the Code of Federal Regulations.~~

~~***Code development reminder:*** Code change proposals to this appendix will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.~~

G101.3 Scope. The provisions of this appendix shall apply to all proposed development in a *flood hazard area* established in Section 1612 of this code, including certain building work exempt from permit under ~~Section 105.2~~. the *North Carolina Administrative Code and Policies*.

G101.4 Violations. Any violation of a provision of this appendix, or failure to comply with a *permit* or variance issued pursuant to this appendix or any requirement of this appendix, shall be handled in accordance with ~~Section 114.~~ the *North Carolina Administrative Code and Policies*.

G101.5 Designation of floodplain administrator. ~~The **[INSERT JURISDICTION'S SELECTED POSITION TITLE]** is designated as~~ The ~~the~~ floodplain administrator ~~and~~ is authorized and directed to enforce the provisions of this appendix. The floodplain administrator is authorized to delegate performance of certain duties to other employees of the jurisdiction. Such designation shall not alter any duties and powers of the building official.

SECTION G106
VARIANCES

Deleted.

~~**G106.1 General.** The *board of appeals* established pursuant to Section 113, or other established or designed board, shall hear and decide requests for variances. The board shall base its determination on technical justifications, and has the right to attach such conditions to variances as it deems necessary to further the purposes and objectives of this appendix and Section 1612.~~

~~**G106.2 Records.** The floodplain administrator shall maintain a permanent record of all variance actions, including justification for their issuance.~~

~~**G106.3 Historic structures.** A variance is authorized to be issued for the repair or rehabilitation of a historic structure upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure, and the variance is the minimum necessary to preserve the historic character and design of the structure.~~

~~**Exception:** Within *flood hazard areas*, historic structures that do not meet one or more of the following designations:~~

1. ~~Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.~~
2. ~~Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.~~
3. ~~Designated as *historic* under a state or local historic preservation program that is approved by the Department of Interior.~~

G106.4 Functionally dependent facilities. A variance is authorized to be issued for the construction or *substantial improvement* of a functionally dependent facility provided that the criteria in Section 1612.1 are met and the variance is the minimum necessary to allow the construction or *substantial improvement*, and that all due consideration has been given to methods and materials that minimize *flood* damages during the *design flood* and do not create additional threats to public safety.

G106.5 Restrictions. The board shall not issue a variance for any proposed development in a *floodway* if any increase in flood levels would result during the *base flood* discharge.

G106.6 Considerations. In reviewing applications for variances, the board shall consider all technical evaluations, all relevant factors, all other portions of this appendix and the following:

1. The danger that materials and debris may be swept onto other lands resulting in further injury or damage.
2. The danger to life and property due to *flooding* or erosion damage.
3. The susceptibility of the proposed development, including contents, to *flood* damage and the effect of such damage on current and future owners.
4. The importance of the services provided by the proposed development to the community.
5. The availability of alternate locations for the proposed development that are not subject to *flooding* or erosion.
6. The compatibility of the proposed development with existing and anticipated development.
7. The relationship of the proposed development to the comprehensive plan and flood plain management program for that area.
8. The safety of access to the property in times of *flood* for ordinary and emergency vehicles.
9. The expected heights, velocity, duration, rate of rise and debris and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site.
10. The costs of providing governmental services during and after *flood* conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, streets and bridges.

G106.7 Conditions for issuance. Variances shall only be issued by the board where all of the following criteria are met:

1. A technical showing of good and sufficient cause that the unique characteristics of the size, configuration or topography of the site renders the elevation standards inappropriate.
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable.
3. A determination that the granting of a variance will not result in increased *flood* heights, additional threats to public safety, extraordinary public expense, nor create nuisances, cause fraud on or victimization of the public or conflict with existing local laws or ordinances.
4. A determination that the variance is the minimum necessary, considering the *flood* hazard, to afford relief.
5. Notification to the applicant in writing over the signature of the floodplain administrator that the issuance of a variance to construct a structure below the *base flood* level will result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage, and that such construction below the *base flood* level increases risks to life and property.

APPENDIX H

SIGNS

The provisions contained in this appendix are ~~not mandatory unless specifically referenced in the adopting ordinance.~~ adopted as part of this code.

~~User notes:~~

~~***About this appendix:*** *Appendix H gathers in one place the various standards that regulate the construction and protection of outdoor signs. Wherever possible, the appendix provides standards in performance language, thus allowing the widest possible application.*~~

~~***Code development reminder:*** *Code change proposals to this appendix will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.*~~

H101.2 Signs exempt from permits. The following signs are exempt from the requirements to obtain a *permit* before erection:

1. ~~Painted~~ Nonilluminated wall signs.
2. Temporary signs ~~announcing the sale or rent of property~~.
3. Signs erected by transportation authorities.
4. Projecting signs not exceeding ~~2.5~~ 6 square feet (~~0.23~~ 0.56 m^2).
5. The changing of moveable parts of an approved sign that is designed for such changes, or the repainting or repositioning of display matter shall not be deemed an alteration.
6. Ground signs less than 6 feet (1829 mm) in height above finished grade.

H109.2 Required clearance. The bottom coping of every ground sign shall be not less than 3 feet (914 mm) above the ground or street level, which space can be filled with platform decorative trim or light wooden construction.

Exception: Signs that have a solid base of masonry, steel or similar material, commonly known as monument signs.

APPENDIX I

PATIO COVERS

The provisions contained in this appendix are ~~not mandatory unless specifically referenced in the adopting ordinance.~~ adopted as part of this code.

~~User notes:~~

~~***About this appendix:*** Appendix I provides standards applicable to the construction and use of patio covers. It is limited in application to patio covers accessory to dwelling units. Covers of patios and other outdoor areas associated with restaurants, mercantile buildings, offices, nursing homes or other nondwelling occupancies would be subject to standards in the main code and not this appendix.~~

~~***Code development reminder:*** Code change proposals to this appendix will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.~~

APPENDIX J

GRADING

The provisions contained in this appendix are ~~not mandatory unless specifically referenced in the adopting ordinance.~~ adopted as part of this code.

~~User notes:~~

~~***About this appendix:*** Appendix J provides standards for the grading of properties. The appendix also provides standards for the administration and enforcement of a grading program, including permit and inspection requirements. Appendix J was originally developed in the 1960s and used for many years in jurisdictions throughout the western United States. It is intended to provide consistent and uniform code requirements anywhere grading is considered an issue.~~

~~***Code development reminder:*** Code change proposals to this appendix will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.~~

J104.1 Submittal requirements. In addition to the provisions of ~~Section 105.3~~ *the North Carolina Administrative and Policies*, the applicant shall state the estimated quantities of excavation and fill.

J104.2 Site plan requirements. In addition to the provisions of ~~Section 107~~ *the North Carolina Administrative and Policies*, a grading plan shall show the existing grade and finished grade in contour intervals of sufficient clarity to indicate the nature and extent of the work and show in detail that it complies with the requirements of this code. The plans shall show the existing grade on adjoining properties in sufficient detail to identify how grade changes will conform to the requirements of this code.

J105.1 General. Inspections shall be governed by ~~Section 110 of this code~~ *the North Carolina Administrative and Policies*.

APPENDIX K

ADMINISTRATIVE PROVISIONS

Deleted.

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~User note:~~

~~***About this appendix:*** Appendix K primarily provides the administrative mechanisms for the enforcement of NFPA 70, the National Electrical Code. While NFPA 70 includes an administrative annex, the provisions of Appendix K are designed to be compatible with the administrative provisions found in Chapter 1 of the International Building Code® and the other I-Codes.~~

~~*With the exception of Section K111, this appendix contains only administrative provisions that are intended to be used by a jurisdiction to implement and enforce NFPA 70, the National Electrical Code. Annex H of NFPA 70 also contains administrative and enforcement provisions, and these provisions may or may not be completely compatible with or consistent with Chapter 1 of the IBC, whereas the provisions in this appendix are compatible and consistent with Chapter 1 of the IBC and other I-Codes. Section K111 contains technical provisions that are unique to this appendix and are in addition to those of NFPA 70.*~~

~~*The provisions of Appendix K are specific to what might be designated as an Electrical Department of Inspection and Code Enforcement and could be implemented where other such provisions are not adopted.*~~

~~SECTION K101~~
~~GENERAL~~

~~**K101.1 Purpose.** A purpose of this code is to establish minimum requirements to safeguard public health, safety and general welfare by regulating and controlling the design, construction, installation, quality of materials, location, operation and maintenance or use of electrical systems and equipment.~~

~~**K101.2 Scope.** This code applies to the design, construction, installation, *alteration*, repairs, relocation, replacement, *addition* to, use or maintenance of electrical systems and equipment.~~

~~SECTION K102~~
~~APPLICABILITY~~

~~**K102.1 General.** The provisions of this code apply to all matters affecting or relating to structures and premises, as set forth in Section K101.~~

~~**K102.2 Existing installations.** Except as otherwise provided for in this chapter, a provision in this code shall not require the removal, *alteration* or abandonment of, or prevent the continued utilization and maintenance of, existing electrical systems and equipment lawfully in existence at the time of the adoption of this code.~~

~~**K102.3 Maintenance.** Electrical systems, equipment, materials and appurtenances, both existing and new, and parts thereof shall be maintained in proper operating condition in accordance with the original design and in a safe, hazard-free condition. Devices or safeguards that are required by this code shall be maintained in compliance with the code edition under which installed. The *owner* or the *owner's* authorized agent shall be responsible for the maintenance of the electrical systems and equipment. To determine compliance with this provision, the *building official* shall have the authority to require that the electrical systems and equipment be reinspected.~~

~~**K102.4 Additions, alterations and repairs.** *Additions, alterations,* renovations and *repairs* to electrical systems and equipment shall conform to that required for new electrical systems and equipment without requiring that the existing electrical systems or equipment comply with all of the requirements of this code. *Additions, alterations* and *repairs* shall not cause existing electrical systems or equipment to become unsafe, hazardous or overloaded.~~

~~Minor *additions, alterations,* renovations and *repairs* to existing electrical systems and equipment shall meet the provisions for new construction, except where such work is performed in the same manner and arrangement as was in the existing system, is not hazardous and is *approved*.~~

K102.5 Subjects not regulated by this code. Where no applicable standards or requirements are set forth in this code, or are contained within other laws, codes, regulations, ordinances or bylaws adopted by the jurisdiction, compliance with applicable standards of nationally recognized standards as are *approved* shall be deemed as prima facie evidence of compliance with the intent of this code. Nothing herein shall derogate from the authority of the *building official* to determine compliance with codes or standards for those activities or installations within the building official's jurisdiction or responsibility.

SECTION K103
PERMITS

K103.1 Types of permits. An *owner*, authorized agent or contractor who desires to construct, enlarge, alter, *repair*, move, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, *repair*, remove, convert or replace electrical systems or equipment, the installation of which is regulated by this code, or to cause such work to be done, shall first make application to the *building official* and obtain the required *permit* for the work.

Exception: Where *repair* or replacement of electrical systems or equipment must be performed in an emergency situation, the *permit* application shall be submitted within the next working business day of the department of electrical inspection.

K103.2 Work exempt from permit. The following work shall be exempt from the requirement for a *permit*:

1. Listed cord- and plug-connected temporary decorative lighting.
2. Reinstallation of attachment plug receptacles, but not the outlets therefor.
3. Replacement of branch circuit overcurrent devices of the required capacity in the same location.
4. Temporary wiring for experimental purposes in suitable experimental laboratories.
5. Electrical wiring, devices, appliances, apparatus or equipment operating at less than 25 volts and not capable of supplying more than 50 watts of energy.

Exemption from the permit requirements of this code shall not be deemed to grant authorization for work to be done in violation of the provisions of this code or other laws or ordinances of this jurisdiction.

SECTION K104
CONSTRUCTION DOCUMENTS

K104.1 Information on construction documents. *Construction documents* shall be drawn to scale upon suitable material. Electronic media documents are permitted to be submitted where *approved* by the *building official*. *Construction documents* shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that such work will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the *building official*.

K104.2 Penetrations. *Construction documents* shall indicate where penetrations will be made for electrical systems and shall indicate the materials and methods for maintaining required structural safety, *fire resistance rating* and *fireblocking*.

K104.3 Load calculations. Where an *addition* or *alteration* is made to an existing electrical system, an electrical load calculation shall be prepared to determine if the existing electrical service has the capacity to serve the added load.

SECTION K105
ALTERNATIVE ENGINEERED DESIGN

K105.1 General. The design, documentation, inspection, testing and approval of an alternative engineered design electrical system shall comply with this section.

K105.2 Design criteria. An alternative engineered design shall conform to the intent of the provisions of this code and shall provide an equivalent level of quality, strength, effectiveness, *fire resistance*, durability and safety. Materials, equipment or components shall be designed and installed in accordance with the manufacturer's instructions.

K105.3 Submittal. The *registered design professional* shall indicate on the *permit* application that the electrical system is an alternative engineered design. The *permit* and permanent *permit* records shall indicate that an alternative engineered design was part of the *approved* installation.

K105.4 Technical data. The *registered design professional* shall submit sufficient technical data to substantiate the proposed alternative engineered design and to prove that the performance meets the intent of this code.

K105.5 Construction documents. The *registered design professional* shall submit to the *building official* two complete sets of signed and sealed *construction documents* for the alternative engineered design. The *construction documents* shall include floor plans and a diagram of the work.

K105.6 Design approval. Where the *building official* determines that the alternative engineered design conforms to the intent of this code, the electrical system shall be *approved*. If the alternative engineered design is not *approved*, the *building official* shall notify the *registered design professional* in writing, stating the reasons therefor.

K105.7 Inspection and testing. The alternative engineered design shall be tested and inspected in accordance with the requirements of this code.

SECTION K106
REQUIRED INSPECTIONS

K106.1 General. The *building official*, upon notification, shall make the inspections set forth in this section.

K106.2 Underground. Underground inspection shall be made after trenches or ditches are excavated and bedded, piping and conductors installed, and before backfill is put in place. Where excavated soil contains rocks, broken concrete, frozen chunks and other rubble that would damage or break the raceway, cable or conductors, or where corrosive action will occur, protection shall be provided in the form of granular or selected material, *approved* running boards, sleeves or other means.

K106.3 Rough-in. Rough-in inspection shall be made after the roof, framing, *fireblocking* and bracing are in place and all wiring and other components to be concealed are complete, and prior to the installation of wall or ceiling membranes.

K106.4 Contractors' responsibilities. It shall be the responsibility of every contractor who enters into contracts for the installation or repair of electrical systems for which a *permit* is required to comply with adopted state and local rules and regulations concerning licensing.

SECTION K107
PREFABRICATED CONSTRUCTION

K107.1 Prefabricated construction. Prefabricated construction is subject to Sections K107.2 through K107.5.

K107.2 Evaluation and follow-up inspection services. Prior to the approval of a prefabricated construction assembly having concealed electrical work and the issuance of an electrical *permit*, the *building official* shall require the submittal of an evaluation report on each prefabricated construction assembly, indicating the complete details of the electrical system, including a description of the system and its components, the basis upon which the system is being evaluated, test results and similar information, and other data as necessary for the *building official* to determine conformance to this code.

K107.3 Evaluation service. The *building official* shall designate the evaluation service of an *approved* agency as the evaluation agency and review such agency's evaluation report for adequacy and conformance to this code.

K107.4 Follow-up inspection. Except where ready access is provided to electrical systems, service equipment and accessories for complete inspection at the site without disassembly or dismantling, the *building official* shall conduct the in-plant inspections as frequently as necessary to ensure conformance to the *approved* evaluation report or shall designate an independent, *approved* inspection agency to conduct such inspections. The inspection agency shall furnish the *building official* with the follow-up inspection manual and a report of inspections upon request, and the electrical system shall have an identifying label permanently affixed to the system indicating that factory inspections have been performed.

K107.5 Test and inspection records. Required test and inspection records shall be available to the *building official* at all times during the fabrication of the electrical system and the erection of the building; or such records as the *building official* designates shall be filed.

SECTION K108
TESTING

K108.1 Testing. Electrical work shall be tested as required in this code. Tests shall be performed by the *permit* holder and observed by the *building official*.

K108.1.1 Apparatus, material and labor for tests. Apparatus, material and labor required for testing an electrical system or part thereof shall be furnished by the *permit* holder.

K108.1.2 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with this code. The work or installation shall then be resubmitted to the *building official* for inspection and testing.

SECTION K109
RECONNECTION

K109.1 Connection after order to disconnect. A person shall not make utility service or energy source connections to systems regulated by this code, which have been disconnected or ordered to be disconnected by the *building official*, or the use of which has been ordered to be discontinued by the *building official* until the *building official* authorizes the reconnection and use of such systems.

SECTION K110
CONDEMNING ELECTRICAL SYSTEMS

K110.1 Authority to condemn electrical systems. Wherever the *building official* determines that any electrical system, or portion thereof, regulated by this code has become hazardous to life, health or property, the *building official* shall order in writing that such electrical systems either be removed or restored to a safe condition. A time limit for compliance with such order shall be specified in the written notice. A person shall not use or maintain a defective electrical system or equipment after receiving such notice.

Where such electrical system is to be disconnected, written notice as prescribed in this code shall be given. In cases of immediate danger to life or property, such disconnection shall be made immediately without such notice.

SECTION K111
ELECTRICAL PROVISIONS

K111.1 Adoption. Electrical systems and equipment shall be designed, constructed and installed in accordance with the *International Residential Code* or NFPA 70 as applicable, except as otherwise provided in this code.

[F] K111.2 Abatement of electrical hazards. All identified electrical hazards shall be abated. All identified hazardous electrical conditions in permanent wiring shall be brought to the attention of the *building official* responsible for enforcement of this code. Electrical wiring, devices, appliances and other equipment that is modified or damaged and constitutes an electrical shock or fire hazard shall not be used.

[F] K111.3 Appliance and fixture listing. Electrical appliances and fixtures shall be tested and listed in published reports of inspected electrical equipment by an *approved* agency and installed in accordance with all instructions included as part of such listing.

K111.4 Nonmetallic sheathed cable. The use of Type NM, NMC and NMS (nonmetallic sheathed) cable wiring methods shall not be limited based on height, number of stories or construction type of the building or structure.

K111.5 Cutting, notching and boring. The cutting, notching and boring of wood and steel framing members, structural members and engineered wood products shall be in accordance with this code.

K111.6 Smoke alarm circuits. Single- and multiple-station smoke alarms required by this code and installed within *dwelling* units shall not be connected as the only load on a branch circuit. Such alarms shall be supplied by branch circuits having lighting loads consisting of lighting outlets in habitable spaces.

~~**K111.7 Equipment and door labeling.** Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating "ELECTRICAL ROOM" or similar *approved* wording. The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident.~~

APPENDIX L

EARTHQUAKE RECORDING INSTRUMENTATION

Deleted.

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

User notes:

About this appendix: The purpose of Appendix L is to foster the collection of ground motion data, particularly from strong-motion earthquakes. When this ground motion data is synthesized, it may be useful in developing future improvements to the earthquake provisions of the code.

Code development reminder: Code change proposals to this appendix will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.

SECTION L101
GENERAL

L101.1 General. Every structure located where the 1-second spectral response acceleration, S_1, determined in accordance with Section 1613.2, is greater than 0.40 and either exceeds six stories in height with an aggregate floor area of 60,000 square feet (5574 m^2) or more, or exceeds 10 *stories* in height regardless of floor area, shall be equipped with not fewer than three approved recording accelerographs. The accelerographs shall be interconnected for common start and common timing.

L101.2 Location. As a minimum, instruments shall be located at the lowest level, mid-height, and near the top of the structure. Each instrument shall be located so that access is maintained at all times and is unobstructed by room contents. A sign stating "MAINTAIN CLEAR ACCESS TO THIS INSTRUMENT" in 1 inch (25 mm) block letters shall be posted in a conspicuous location.

L101.3 Maintenance. Maintenance and service of the instrumentation shall be provided by the owner of the structure. Data produced by the instrument shall be made available to the *building official* on request.

Maintenance and service of the instruments shall be performed annually by an *approved* testing agency. The owner shall file with the *building official* a written report from an approved testing agency certifying that each instrument has been serviced and is in proper working condition. This report shall be submitted when the instruments are installed and annually thereafter. Each instrument shall have affixed to it an externally visible tag specifying the date of the last maintenance or service and the printed name and address of the testing agency.

APPENDIX M

TSUNAMI-GENERATED FLOOD HAZARDS

Deleted.

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

User notes:

About this appendix: Appendix M allows the adoption of guidelines for constructing vertical evacuation refuge structures within areas that are considered tsunami hazard zones.

Code development reminder: Code change proposals to this appendix will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.

SECTION M101
REFUGE STRUCTURES FOR VERTICAL EVACUATION FROM TSUNAMI-GENERATED FLOOD HAZARDS

M101.1 General. The purpose of this appendix is to provide tsunami vertical evacuation planning criteria for those coastal communities that have a tsunami hazard as shown in a *Tsunami Design Zone* Map.

M101.2 Definitions. The following term shall, for the purposes of this appendix, have the meaning shown herein. Refer to Chapter 2 of this code for general definitions.

TSUNAMI DESIGN ZONE MAP. A map that designates the extent of inundation by a Maximum Considered Tsunami, as defined by Chapter 6 of ASCE 7.

M101.3 Establishment of tsunami design zone. Where applicable, the *Tsunami Design Zone* Map shall meet or exceed the inundation limit given by the ASCE 7 *Tsunami Design Geodatabase*.

M101.4 Planning of tsunami vertical evacuation refuge structures within the tsunami design zone. Tsunami Vertical Evacuation Refuge Structures located within a tsunami hazard design zone shall be planned, sited, and developed in general accordance with the planning criteria of the FEMA P646 guidelines.

Exception: These criteria shall not be considered mandatory for evaluation of existing buildings for evacuation planning purposes.

SECTION M102
REFERENCED STANDARDS

M102.1 General. See Table M102.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE M102.1
REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASCE 7—16 with Supplement 1	*Minimum Design Loads and Associated Criteria for Buildings and Other Structures*	M101.2, **M101.3**
FEMA P646—12	*Guidelines for Design of Structures for Vertical Evacuation from Tsunamis*	M101.4

APPENDIX N

REPLICABLE BUILDINGS

Deleted.

~~*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*~~

~~User notes:~~

~~***About this appendix:*** Appendix N provides jurisdictions with a means of incorporating guidelines for replicable buildings into their building code adoption process. The intent of these provisions is to give jurisdictions a means of streamlining their document review process while verifying code compliance.~~

~~***Code development reminder:*** Code change proposals to this appendix will be considered by the IBC—Structural Code Development Committee during the 2022 (Group B) Code Development Cycle.~~

~~SECTION N101~~
~~ADMINISTRATION~~

~~**N101.1 Purpose.** The purpose of this appendix is to provide a format and direction regarding the implementation of a replicable building program.~~

~~**N101.2 Objectives.** Such programs allow a jurisdiction to recover from a natural disaster faster and allow for consistent application of the codes for replicable building projects. It will result in faster turnaround for the end user, and a quicker turnaround through the plan review process.~~

~~SECTION N102~~
~~DEFINITIONS~~

~~**N102.1 Definitions.** The following words and terms shall, for the purposes of this appendix, have the meanings shown herein.~~

~~**REPLICABLE BUILDING.** A building or structure utilizing a replicable design.~~

~~**REPLICABLE DESIGN.** A prototypical design developed for application in multiple locations with minimal variation or modification.~~

~~SECTION N103~~
~~REPLICABLE DESIGN REQUIREMENTS~~

~~**N103.1 Prototypical construction documents.** A replicable design shall establish prototypical construction documents for application at multiple locations. The construction documents shall include details appropriate to each wind region, *seismic design category*, and climate zone for locations in which the replicable design is intended for application. Application of replicable design shall not vary with regard to the following, except for allowable variations in accordance with Section N106.~~

~~1. Use and occupancy classification.~~

~~2. Building heights and area limitations.~~

~~3. Type of construction classification.~~

~~4. *Fire-resistance ratings*.~~

~~5. *Interior finishes*.~~

~~6. Fire protection system.~~

~~7. *Means of egress*.~~

~~8. Accessibility.~~

~~9. Structural design criteria.~~

10. Energy efficiency.

11. Type of mechanical and electrical systems.

12. Type of plumbing system and number of fixtures.

SECTION N104
REPLICABLE DESIGN SUBMITTAL REQUIREMENTS

N104.1 General. A summary description of the replicable design and related construction documents shall be submitted to an *approved* agency. Where approval is requested for elements of the replicable design that is not within the scope of the *International Building Code*, the construction documents shall specifically designate the codes for which review is sought. Construction documents shall be signed, sealed and dated by a registered design professional.

N104.1.1 Architectural plans and specifications. Where approval of the architectural requirements of the replicable design is sought, the submittal documents shall include architectural plans and specifications as follows:

1. Description of uses and the proposed occupancy groups for all portions of the building.

2. Proposed type of construction of the building.

3. Fully dimensioned drawings to determine *building areas* and height.

4. Adequate details and dimensions to evaluate *means of egress*, including *occupant loads* for each floor, exit arrangement and sizes, corridors, doors and *stairs*.

5. Exit signs and means of egress lighting, including power supply.

6. Accessibility scoping provisions.

7. Description and details of proposed special occupancies such as a covered mall, high rise, *mezzanine*, *atrium* and public garage.

8. Adequate details to evaluate fire resistance rated construction requirements, including data substantiating required ratings.

9. Details for plastics, insulation and safety glazing installation.

10. Details of required fire protection systems.

11. Material specifications demonstrating fire resistance criteria.

N104.1.2 Structural plans, specifications and engineering details. Where approval of the structural requirements of the replicable design is sought, the submittal documents shall include details for each wind region, *seismic design category* and climate zone for which approval is sought; and shall include the following:

1. Signed and sealed structural design calculations that support the member sizes on the drawings.

2. Design *load* criteria, including: frost depth, *live loads*, snow *loads*, wind *loads*, earthquake design date, and other special *loads*

3. Details of foundations and superstructure.

4. Provisions for *special inspections*.

N104.1.3 Energy conservation details. Where approval of the energy conservation requirements of the replicable design is sought, the submittal documents shall include details for each climate zone for which approval is sought; and shall include the following:

1. Climate zones for which approval is sought.

2. Building envelope details.

3. Building mechanical system details.

4. Details of electrical power and lighting systems.

5. Provisions for system commissioning.

SECTION N105
REVIEW AND APPROVAL OF REPLICABLE DESIGN

N105.1 General. Proposed replicable designs shall be reviewed by an approved agency. The review shall be applicable only to the replicable design features submitted in accordance with Section N104. The review shall determine compliance with this code and additional codes specified in Section N104.1.

N105.2 Documentation. The results of the review shall be documented indicating compliance with the code requirements.

N105.3 Deficiencies. Where the review of the submitted construction documents identifies elements where the design is deficient and will not comply with the applicable code requirements, the approved agency shall notify the proponent of the replicable design, in writing, of the specific areas of noncompliance and request correction.

N105.4 Approval. Where the review of the submitted construction documents determines that the design is in compliance with the codes designated in Section N104.1, and where deficiencies identified in Section N105.3 have been corrected the approved agency shall issue a summary report of Approved Replicable Design. The summary report shall include any limitations on the approved replicable design including, but not limited to climate zones, wind regions and *seismic design categories*.

SECTION N106
SITE-SPECIFIC APPLICATION OF APPROVED REPLICABLE DESIGN

N106.1 General. Where site specific application of a replicable design that has been approved under the provisions of Section N105 is sought, the construction documents submitted to the building official shall comply with this section.

N106.2 Submittal documents. A summary description of the replicable design and related construction document shall be submitted. Construction documents shall be signed, sealed and dated by the registered design professional. A statement, signed, sealed and dated by the registered design professional, that the replicable design submitted for local review is the same as the replicable design reviewed by the approved agency, shall be submitted.

N106.2.1 Architectural plans and specifications. Architectural plans and specifications shall include the following:

1. Construction documents for variations from the replicable design.
2. Construction for portions that are not part of the replicable design.
3. Documents for local requirements as identified by the building official.
4. Construction documents detailing the foundation system.

SECTION N107
SITE-SPECIFIC REVIEW AND APPROVAL OF REPLICABLE DESIGN

N107.1 General. Proposed site specific application of replicable design shall be submitted to the building official in accordance with the provisions of Chapter 1 and Appendix N.

N107.2 Site-specific review and approval of replicable design. The building official shall verify that the replicable design submitted for site-specific application is the same as the approved replicable design reviewed by the approved agency. In addition, the building official shall review the following for code compliance.

1. Construction documents for variations from the replicable design.
2. Construction for portions of the building that are not part of the replicable design.
3. Documents for local requirements as identified by the building official.

[A] APPENDIX O

PERFORMANCE-BASED APPLICATION

Deleted.

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

User notes:

About this appendix: *Appendix O provides an optional design, review and approval framework for use by the building official. Typical uses would include cases of alternate methods in Chapter 1, select areas of the code that require a rational analysis such as Section 909 and elsewhere. It simply extracts the relevant administrative provisions from the ICC Performance Code into a more concise, usable appendix format for a jurisdiction confronted with such a need. Currently there are multiple, varying jurisdictional rules and procedures in many communities regarding procedure and none in even more. The building official is often left alone to reach decisions not just on the merits of a design, but must first also decide on the submittal and review process. As an appendix, the provisions herein are entirely optional to a jurisdiction. This appendix can be adopted, adopted with local modifications, or even used on a case-by-case basis as part of a Memorandum of Understanding or similar legal agreement between the jurisdiction and the owner/design team. It simply represents another tool for the jurisdiction to reach for in cases of need; it neither encourages nor creates any additional opportunity for performance-based design.*

Code development reminder: *Code change proposals to this appendix will be considered by the Administrative Code Development Committee during the 2022 (Group B) Code Development Cycle.*

[A] SECTION O101 GENERAL

O101.1 Introduction. The following administrative provisions are excerpted from the *ICC Performance Code for Buildings and Facilities* and can be used in conjunction with the Alternate Methods provisions in Chapter 1, or for a review of submittals requiring a rational analysis or performance based design. These provisions provide an established framework for the building official in terms of the design expertise needed, the necessary submittals, a review framework and related items.

O101.2 Qualifications. Registered design professionals shall possess the knowledge, skills and abilities necessary to demonstrate compliance with this code.

O101.3 Construction document preparation. Construction documents required by this code shall be prepared in adequate detail and submitted for review and approval in accordance with Section 107.

O101.3.1 Review. Construction documents submitted in accordance with this code shall be reviewed for code compliance with the appropriate code provisions in accordance with Section 107.

O101.4 Construction. Construction shall comply with the approved construction documents submitted in accordance with this code, and shall be verified and approved to demonstrate compliance with this code.

O101.4.1 Facility operating policies and procedures. Policies, operations, training and procedures shall comply with approved documents submitted in accordance with this code, and shall be verified and approved to demonstrate compliance with this code.

O101.4.2 Maintenance. Maintenance of the performance based design shall be ensured throughout the life of the building or portion thereof.

O101.4.3 Changes. The owner or the owner's authorized agent shall be responsible to ensure that any change to the facility, process, or system does not increase the hazard level beyond that originally designed without approval and that changes shall be documented in accordance with the code.

O101.5 Documentation. The registered design professional shall prepare appropriate documentation for the project, clearly detailing the approach and rationale for the design submittal, the construction and the future use of the building, facility or process.

O101.5.1 Reports and manuals. The design report shall document the steps taken in the design analysis, clearly identifying the criteria, parameters, inputs, assumptions, sensitivities and limitations involved in the analysis. The design report shall clearly identify bounding conditions, assumptions and sensitivities that clarify the expected uses and limitations of the performance analysis. This report shall verify that the design approach is in compliance with the applicable codes and accepta-

ble methods and shall be submitted for concurrence by the building official prior to the construction documents being completed. The report shall document the design features to be incorporated based on the analysis.

The design report shall address the following:

1. Project scope.

2. Goals and objectives.

3. Performance criteria.

4. Hazard scenarios.

5. Design fire loads and hazards.

6. Final design.

7. Evaluation.

8. Bounding conditions and critical design assumptions.

9. Critical design features.

10. System design and operational requirements.

11. Operational and maintenance requirements.

12. Commissioning testing requirements and acceptance criteria.

13. Frequency of certificate renewal.

14. Supporting documents and references.

15. Preliminary site and floor plans.

O101.5.2 Design submittal. Applicable construction documents shall be submitted to the building official for review. The documents shall be submitted in accordance with the jurisdiction's procedures and in sufficient detail to obtain appropriate permits.

O101.6 Review. Construction documents submitted in accordance with this code shall be reviewed for code compliance with the appropriate code provisions.

O101.6.1 Peer review. The owner or the owner's authorized agent shall be responsible for retaining and furnishing the services of a registered design professional or recognized expert, who will perform as a peer reviewer, where required and approved by the building official.

O101.6.2 Costs. The costs of special services, including contract review, where required by the building official, shall be borne by the owner or the owner's authorized agent.

O101.7 Permits. Prior to the start of construction, appropriate permits shall be obtained in accordance with the jurisdiction's procedures and applicable codes.

O101.8 Verification of compliance. Upon completion of the project, documentation shall be prepared that verifies performance and prescriptive code provisions have been met. Where required by the building official, the registered design professional shall file a report that verifies bounding conditions are met.

O101.9 Extent of documentation. Approved construction documents, the operations and maintenance manual, inspection and testing records, and certificates of occupancy with conditions shall be included in the project documentation of the building official's records.

O101.10 Analysis of change. The registered design professional shall evaluate the existing building, facilities, premises, processes, and contents, and the applicable documentation of the proposed change as it affects portions of the building, facility, premises, processes and contents that were previously designed for compliance under a performance based code. Prior to any change that was not documented in a previously approved design, the registered design professional shall examine the applicable design documents, bounding conditions, operation and maintenance manuals, and deed restrictions.