

# 2012 IECC<sup>®</sup>

## CODE AND COMMENTARY

The complete IECC with  
commentary after each section



# 2012 IECC<sup>®</sup> 2 CODE AND COMMENTARY

2012 International Energy Conservation Code<sup>®</sup> and Commentary

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## PREFACE

The principal purpose of the Commentary is to provide a basic volume of knowledge and facts relating to building construction as it pertains to the regulations set forth in the 2012 *International Energy Conservation Code*<sup>®</sup>. The person who is serious about effectively designing, constructing and regulating buildings and structures will find the Commentary to be a reliable data source and reference to almost all components of the built environment.

As a follow-up to the *International Energy Conservation Code*, we offer a companion document, the *International Energy Conservation Code Commentary*. The basic appeal of the Commentary is thus: it provides in a small package and at reasonable cost thorough coverage of many issues likely to be dealt with when using the *International Energy Conservation Code*—and then supplements that coverage with historical and technical background. Reference lists, information sources and bibliographies are also included.

Throughout all of this, strenuous effort has been made to keep the vast quantity of material accessible and its method of presentation useful. With a comprehensive yet concise summary of each section, the Commentary provides a convenient reference for regulations applicable to the construction of buildings and structures. In the chapters that follow, discussions focus on the full meaning and implications of the code text. Guidelines suggest the most effective method of application and the consequences of not adhering to the code text. Illustrations are provided to aid understanding; they do not necessarily illustrate the only methods of achieving code compliance.

The format of the Commentary includes the full text of each section, table and figure in the code, followed immediately by the commentary applicable to that text. At the time of printing, the Commentary reflects the most up-to-date text of the 2012 *International Energy Conservation Code*. Each section's narrative includes a statement of its objective and intent and usually includes a discussion about why the requirement commands the conditions set forth. Code text and commentary text are easily distinguished from each other. All code text is shown as it appears in the *International Energy Conservation Code*, and all commentary is indented below the code text and begins with the symbol ❖.

Readers should note that the Commentary is to be used in conjunction with the *International Energy Conservation Code* and not as a substitute for the code. **The Commentary is advisory only**; the code official alone possesses the authority and responsibility for interpreting the code.

Comments and recommendations are encouraged, for through your input, we can improve future editions. Please direct your comments to the Codes and Standards Development Department at the Chicago District Office.

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## TABLE OF CONTENTS

### *IECC—COMMERCIAL PROVISIONS*

CHAPTER 1	SCOPE AND ADMINISTRATION.....	C1-1 – C1-16
CHAPTER 2	DEFINITIONS.....	C2-1 – C2-18
CHAPTER 3	GENERAL REQUIREMENTS .....	C3-1 – C3-26
CHAPTER 4	COMMERCIAL ENERGY EFFICIENCY.....	C4-1 – C4-130
CHAPTER 5	REFERENCED STANDARDS.....	C5-1 – C5-8
INDEX .....		INDEX C-1 – INDEX C-8

### *IECC—RESIDENTIAL PROVISIONS*

CHAPTER 1	SCOPE AND ADMINISTRATION.....	R1-1 – R1-16
CHAPTER 2	DEFINITIONS.....	R2-1 – R2-16
CHAPTER 3	GENERAL REQUIREMENTS .....	R3-1 – R3-26
CHAPTER 4	RESIDENTIAL ENERGY EFFICIENCY.....	R4-1 – R4-42
CHAPTER 5	REFERENCED STANDARDS.....	R5-1 – R5-4
INDEX .....		INDEX R-1 – INDEX R-6

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# ***IECC—COMMERCIAL PROVISIONS***

## **TABLE OF CONTENTS**

<b>CHAPTER 1 SCOPE AND ADMINISTRATION</b> .....	<b>C1-1</b>
<b>PART 1—SCOPE AND APPLICATION</b> .....	<b>C1-1</b>
Section	
C101 Scope and General Requirements .....	C1-1
C102 Alternate Materials—Method of Construction, Design or Insulating Systems .....	C1-8
<b>PART 2—ADMINISTRATION AND ENFORCEMENT</b> .....	<b>C1-9</b>
C103 Construction Documents .....	C1-9
C104 Inspections .....	C1-11
C105 Validity .....	C1-13
C106 Referenced Standards .....	C1-13
C107 Fees .....	C1-14
C108 Stop Work Order .....	C1-14
C109 Board of Appeals .....	C1-15
<b>CHAPTER 2 DEFINITIONS</b> .....	<b>C2-1</b>
Section	
C201 General .....	C2-1
C202 General Definitions .....	C2-2
<b>CHAPTER 3 GENERAL REQUIREMENTS</b> .....	<b>C3-1</b>
Section	
C301 Climate Zones .....	C3-2
C302 Design Conditions .....	C3-20
C303 Materials, Systems and Equipment .....	C3-20
<b>CHAPTER 4 COMMERCIAL ENERGY EFFICIENCY</b> .....	<b>C4-1</b>
Section	
C401 General .....	C4-2
C402 Building Envelope Requirements .....	C4-3
C403 Building Mechanical Systems .....	C4-25
C404 Service Water Heating (Mandatory) .....	C4-74
C405 Electrical Power and Lighting Systems (Mandatory) .....	C4-81
C406 Additional Efficiency Package Options .....	C4-111
C407 Total Building Performance .....	C4-116
C408 System Commissioning .....	C4-126



**TABLE OF CONTENTS**

**CHAPTER 5 REFERENCED STANDARDS..... C5-1**

**INDEX..... INDEX C-1**

# Chapter 1[CE]: Scope and Administration

## General Comments

The 2012 edition of the *International Energy Conservation Code*<sup>®</sup> (IECC<sup>®</sup>) represents the culmination of aggressive efforts to increase commercial and residential energy efficiency requirements. Construction enhancements include required energy savings for windows, doors and skylights; thermal envelope efficiency; and increased efficiencies for installed heating, ventilating and air-conditioning (HVAC) equipment for commercial buildings three stories or greater in height. The 2012 edition of the code represents a significant increase in energy efficiency levels over the 2009 edition of the code, which represents a significant increase over the 2006 code in energy efficiency. The aggressive code change proposals are reflective of a new national focus on reduction in energy consumption that stems not only from concerns about our oil reserves, but also from growing concerns over global warming.

## Purpose

Though not stated specifically, the code is applicable to all buildings and structures, and their components and systems that use energy primarily for human comfort. The code does not regulate the energy for industrial equipment for manufacturing or that is needed for items such as computers or coffee pots. The code, therefore, addresses the design of energy-efficient building envelopes, and the selection and installation of energy-efficient mechanical, service water-heating, electrical distribution and illumination systems and equipment in residential and commercial buildings alike.

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## PART 1—SCOPE AND APPLICATION

### SECTION C101 SCOPE AND GENERAL REQUIREMENTS

**C101.1 Title.** This code shall be known as the *International Energy Conservation Code* of [NAME OF JURISDICTION], and shall be cited as such. It is referred to herein as “this code.”

❖ This section directs the adopting jurisdiction to insert the name of the jurisdiction into the code. Because the IECC is a “model” code, it is not an enforceable document until it is adopted by a jurisdiction or agency that has enforcement powers.

**C101.2 Scope.** This code applies to *commercial buildings* and the buildings sites and associated systems and equipment.

❖ The code applies to residential and commercial buildings and the buildings’ site and associated systems and equipment. The definitions for “Residential building,” “Commercial buildings,” and “Building site” will be important in correctly applying the provisions of the code. See the commentary related to the definitions in Chapter 2[CE]. Additional discussion also will be also found in Chapter 4[CE] commentary.

**C101.3 Intent.** This code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative

approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.

❖ This code is broad in its application, yet specific to regulating the use of energy in buildings where that energy is used primarily for human comfort, or heating and cooling of a building to protect the contents. Thus, energy used for commercial or industrial processing is to be considered exempt from the code because that energy is not used for human comfort or conditioning the space. In general, the requirements of the code address the design of all building systems that affect the visual and thermal comfort of the occupants, including:

- Lighting systems and controls.
- Wall, roof and floor insulation.
- Windows and skylights.
- Cooling equipment (air conditioners, chillers and cooling towers).
- Heating equipment (boilers, furnaces and heat pumps).
- Pumps, piping and liquid circulation systems.
- Supply and return fans.
- Service hot water systems (kitchens and lavatories).

## SCOPE AND ADMINISTRATION

- Permanent electric motors (e.g., elevators and escalators).

It does not address the energy used by office equipment such as personal computers, copy machines, printers, fax machines and coffee makers. Nor does it address kitchen equipment in restaurants, commercial kitchens and cafeterias, although water heating, lighting and HVAC energy uses in these types of spaces are covered.

The intent of the code is to define requirements for the portions of a building and building systems that affect energy use in new construction and to promote the effective use of energy. Where code application for a specific situation is in question, the authority having jurisdiction in buildings should favor the action that will promote the effective use of energy. The code official may also consider the cost of the required action compared to the energy that will be saved over the life of that action.

This statement supports flexibility in application of the code requirements. Although many of the requirements are given in a prescriptive format for ease of use, it is not the intent of the code to stifle innovation—especially innovative techniques that conserve energy. Innovative approaches that lead to energy efficiency should be encouraged, even if the approach is not specifically listed in the code or does not meet the strict letter of the code. This principle should be applied to methods for determining compliance with the code and the building construction techniques used to meet the code.

Any design should first be evaluated to see whether it meets the code requirements directly. If an innovative approach is preferred, the applicant is responsible for demonstrating that the innovative concept promotes energy efficiency. Where the literal code requirements have not been satisfied but the applicant claims to meet the intent, the code official will likely have to exercise professional judgment to determine whether the proposed design meets the intent of the code in the interest of energy efficiency (see commentary, Section C103).

**C101.4 Applicability.** Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

- ❖ In cases where the code establishes a specific requirement for a certain condition, that requirement is applicable even if it is less restrictive than a general requirement elsewhere in the code. The most restrictive requirement is to apply where there may be different requirements in the code for a specific issue.

**C101.4.1 Existing buildings.** Except as specified in this chapter, this code shall not be used to require the removal, *alteration* or abandonment of, nor prevent the continued use

and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code.

- ❖ The code is designed to regulate new construction and new work, and is not intended to be applied retroactively to existing buildings, except where existing envelope, lighting, mechanical or service water-heating systems are specifically affected by Section C101.4.3.

This section addresses the fact that, in general, the code does not affect existing buildings. It will permit an addition to be made to an existing building without requiring the existing building to conform to the code. In such a case, the addition is expected to comply with the current code, but it will not require changes for the existing portion. Therefore, the code does not apply retroactively to existing buildings. When an existing building is modified by an addition, alteration, renovation or repair, Section C101.4.3 will provide the guidance and requirements for such changes.

**C101.4.2 Historic buildings.** Any building or structure that is listed in the State or National Register of Historic Places; designated as a historic property under local or state designation law or survey; certified as a contributing resource with a National Register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the National or State Registers of Historic Places either individually or as a contributing building to a historic district by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, are exempt from this code.

- ❖ In some aspects, this is a bit of a continuation of the “existing building” provisions, but it goes even farther—historic buildings are exempt. In earlier editions of the code, this exemption applied only to the exterior envelope of such buildings, and to the interior only in those cases where the ordinance explicitly designated elements of the interior. With the current text, historic buildings are exempt from all aspects of the code. This exemption, however, is not without conditions. The most important criterion for application of this section is that the building must be specifically classified as being of historic significance by a qualified party or agency. Usually, this is done by a state or local authority after considerable scrutiny of the historical value of the building. Most, if not all, states have authorities, such as a landmark commission, as do many local jurisdictions.

Because of the unique issues involved, historic buildings are exempt from the requirements of the code. This exemption could be extended to all parts that are “historic,” including additions, alterations and repairs that would normally be addressed by Section C101.4.3. If the addition, alteration or renovation is not “historic,” then the provisions of Section C101.4.3 should be applied. Consideration of energy conservation and compliance with the code is still of value in historic buildings. In exempting historic buildings, the

code is simply recognizing that energy efficiency may be difficult to accomplish while maintaining the "historic" nature of the building.

**C101.4.3 Additions, alterations, renovations or repairs.**

Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

**Exception:** The following need not comply provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
3. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
4. Construction where the existing roof, wall or floor cavity is not exposed.
5. Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.
6. Replacement of existing doors that separate *conditioned space* from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a *conditioned space* from the exterior shall not be removed.
7. Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.
8. Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.

❖ Simply stated, new work must comply with the current requirements for new work. Any alteration or addition to an existing system involving new work is subject to the requirements of the code. Additions or alterations can place additional loads or different demands on an existing system, and those loads or demands could necessitate changing all or part of the existing system. Additions and alterations must not cause an existing system to be any less in compliance with the code than it was before the changes.

Additions to existing buildings must comply with the code when the addition is within the scope of the code and would not otherwise be exempted (see code text and commentary, Sections C101.4 and

C101.5.2). Additions include new construction, such as a conditioned bedroom, sun space or enclosed porch added to an existing building. Additions also include existing spaces converted from unconditioned or exempt spaces to conditioned spaces. For example, a finished basement, an attic converted to a bedroom or a carport converted to a den are additions. The addition of an unconditioned garage would not be considered within the scope of the code because the code applies to heated or cooled (conditioned) spaces.

Although not specifically defined in the code, building codes typically define an "Addition" as any increase in a building's habitable floor area (which can be interpreted as any increase in the conditioned floor area). For example, an unconditioned garage converted to a bedroom is an addition. If a conditioned floor area is expanded, such as a room made larger by moving out a wall, only the newly conditioned space must meet the code. A flat window added to a room does not increase the conditioned space and thus is not an addition by this definition. If several changes are made to a building at the same time, only the changes that expand the conditioned floor area are required to meet the code. The addition (the newly conditioned floor space) complies with the code if it complies with all of the applicable requirements in Chapter 4[CE]. For example, requirements applicable to the addition of a new room would most likely include insulating the exterior walls, ceiling and floor to the levels specified in the code; sealing all joints and penetrations; installing a vapor retarder in unventilated frame walls, floors and ceilings; identifying installed insulation *R*-values and window *U*-factors; and insulating and sealing any ducts passing through unconditioned portions or within exterior envelope components (walls, ceilings or floors) of the new space. Compliance approaches for additions include:

1. The entire building (the existing building plus the addition) complies with the code. If the building, inclusive of the addition, complies with the code, the addition will also comply, regardless of whether the addition complies alone. For example, a sunroom that does not comply with the code is added to a hotel spa area. If the entire hotel (with the sunroom) complies, the addition also complies.
2. Where approved by the code official, the addition, including possible concurrent renovation, does not result in any increase in the building's overall area-weighted thermal transmittance (UA), or otherwise any increase in annual demand for either fossil fuel or electrical energy supply. The change in UA or energy use can be quantified using any of the commonly used hourly, full-year simulation tools. For example, additions that add rooms while simultaneously upgrading existing HVAC systems, windows



## SCOPE AND ADMINISTRATION

and insulation often reduce the annual energy use or UA of the existing part of the home, more than offsetting the energy use attributed to the added space in the home.

3. The addition itself can comply with the prescriptive methods found in Chapter 4[CE]. This would be permitted due to Sections C101.4.1 and C101.4.3, which provide a simple, prescriptive specification menu for each climate zone that, if followed, will yield a building envelope meeting the requirements of either Table C402.1.2 or C402.2. The components of the building addition must meet the insulation *R*-values, fenestration *U*-factors and SHGC requirements shown in Table C402.1.2 or C402.3.

An existing energy-using system (envelope, mechanical, service water heating, electrical distribution or lighting) is generally considered to be "grandfathered" with code adoption if the criteria for this level are the regulations (or code) under which the existing building was originally constructed. It should be noted that a specific level of safety is dictated by provisions dealing with hazard abatement in existing buildings and maintenance provisions, as contained in the code, the *International Property Maintenance Code*® (IPMC®) and the *International Fire Code*® (IFC®).

The exceptions address situations where the alteration or repair of a structure or element is not required to comply with the provisions of the code. Some of these situations typically are either a normal part of ongoing maintenance of the building, would improve the performance or would not present an opportunity for improved energy savings. All of these exceptions are tied to the fact that they are permitted, provided "the energy use of the building is not increased."

Exception 1 is a fairly self-evident provision. First of all, due to the limited nature of the work, there is little opportunity to make additional changes. This helps to reinforce the statement from the main paragraph that the intent is not to make "the unaltered portion(s) of the existing building or building system" comply with the code. In this case, the addition of a storm window over an existing window will only improve the performance of the existing fenestration.

Exception 2 addresses situations where a rock is inadvertently thrown through a window. When the glass is being replaced, it would not make sense to force an existing window to be changed out so that it could meet the current code requirements. While the existing window may not meet the correct *U*-factor for the climate zone, a replacement in kind should be permitted. Although this provision does not place any requirement on the replacement glass, it would be best if the new glazing at least matched what had been existing. If the replacement is done with a less-efficient glazing product, there could be future problems with excessive heating or cooling through the

glass, or even an increase with condensation and moisture problems. Therefore, if the removed glass was a double-pane, low-emissivity (low-E) glass, it would be unwise (though possibly not prohibited) to replace it with a single pane of regular glass. In this situation, the code official would be able to invoke the fact that the exception is acceptable, provided the energy use of the building is not increased, and request either an equivalent product or documentation to show that the proposed product will not create an increased demand.

Exception 3 is important for a couple of the limitations that it contains. First of all, the provision only applies when the ceiling, wall or floor cavity is "exposed during construction." Therefore, if the cavity is not opened up, then there is no requirement to do anything. If the cavity is exposed, the requirement will only be to "fill" it with insulation. Therefore, the level of insulation is not required to comply with the building thermal envelope requirements, but is instead only required to be "filled" with any type of insulation and not to any specific *R*-value.

Exception 4 will exempt the need to make changes to the building thermal envelope because the building cavities are not exposed.

Exception 5 applies to roofs that are part of the building envelope and typically would have below-deck or above-deck insulation. The second sentence of Exception 5 permits the code-required insulation to be above or below the deck. For a typical light-frame construction (with nonconditioned space), the ceiling is the building thermal envelope and the roof is not; therefore, Exception 5 would not apply. However, if during reroofing the existing ceiling cavities are exposed, then Exception 3 would apply.

**C101.4.4 Change in occupancy or use.** Spaces undergoing a change in occupancy that would result in an increase in demand for either fossil fuel or electrical energy shall comply with this code. Where the use in a space changes from one use in Table C405.5.2(1) or (2) to another use in Table C405.5.2(1) or (2), the installed lighting wattage shall comply with Section C405.5.

❖ When a building undergoes a change of occupancy, energy-using systems (envelope, mechanical, service water heating, electrical distribution or illumination) must be evaluated to determine the effect the change of occupancy has on system performance and energy use. For example, if a mercantile building were converted to a restaurant, additional ventilation would be required for the public based on the increased occupant load. If an existing system serves an occupancy that is different from the occupancy it served when the code went into effect, the mechanical system must comply with the applicable code requirements for a mechanical system serving the newer occupancy. Depending on the nature of the previous occupancy, changing a building's occupancy classification could result in a change to the mechanical, service water-heating, electrical distribu-

tion or illumination systems, or any combination of these.

Buildings undergoing a change of occupancy must meet the applicable requirements of the code when peak demand is increased. For example, if a hotel is converted to multiple-family residential use and the conversion results in an increase in the building's peak connected load (space conditioning, lighting or service water heating), the entire building must be brought into compliance.

When the occupancy changes in a portion of an existing building (residential or commercial) and the new occupancy results in an increase in the peak demand for either fossil fuel or electrical energy supply, the portion of the building associated with the new occupancy must meet the code.

When a permittee claims that a change in occupancy will not increase the peak design rate of energy use for the building, it is the applicant's responsibility to demonstrate that the peak load of the converted building will not exceed the peak load of the original building. Without supporting documentation, the peak load generally must be assumed to increase with a change in occupancy.

It is also important that users realize that under the code there can be a difference between the "change of occupancy" (the way a building is used) and what the *International Building Code*<sup>®</sup> (IBC<sup>®</sup>) deals with when a change of occupancy "classification" occurs. Therefore, if a storage building that has no heating or cooling is modified so that the building is heated to prevent the stock items from freezing, the IBC would not consider this as a change of occupancy because the occupancy classification would still be Group S-1. The code, however, would consider this a change in occupancy because the way the building is used would change, which would result in an increase in the demand for energy.

Regarding lighting, the requirements are based upon the use of a space rather than the occupancy. The specific requirements for lighting for different uses are given in Table C405.5.2(1).

**C101.4.5 Change in space conditioning.** Any nonconditioned space that is altered to become *conditioned space* shall be required to be brought into full compliance with this code.

- ❖ When nonconditioned spaces are converted to conditioned space, the impacts on the community energy resources are the same as new construction. As such, they should be required to meet the minimum standards set by the code for new construction.

**C101.4.6 Mixed occupancy.** Where a building includes both *residential* and *commercial* occupancies, each occupancy shall be separately considered and meet the applicable provisions of IECC—Commercial Provisions or IECC—Residential Provisions.

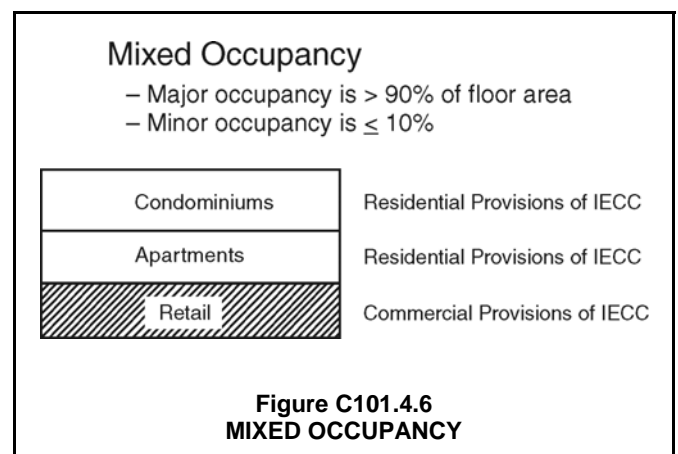
- ❖ A mixed-occupancy building is one that contains both residential and commercial uses (see definitions Chapter 2[CE]). When residential and commercial

uses coexist in a building, each occupancy must be evaluated separately. One tool that is sometimes used in situations where the majority of the space is one occupancy and only a small portion of the floor is different is the accessory area requirements that are found within the IBC. For example, the residential portions of that story must meet the residential requirements of the code, unless 90 percent or more of the floor level is commercial, in which case, the story in question, inclusive of the 10-percent residential may, with the code official's approval, be considered commercial.

For example, consider the three-story apartment building in Commentary Figure C101.4.6, with a portion of the first story leased out to a convenience store (a commercial use). The top two stories are clearly residential because they are devoted solely to residential use and the building is not over three stories high. Though not found within the code, the first story could generally be considered all residential if 10 percent or less of the total floor area is occupied by the store. In this case, the entire first floor is subject to the residential portions of the code. When more than 10 percent of the first story is occupied by the store, the first story is considered a mixed occupancy; the portion of the first story occupied by the store is considered commercial and is subject to the applicable commercial requirements in Chapter 4[CE]. The remainder of the first story is considered residential and must meet the residential requirements found in Chapter 4[RE].

Consider another conceivable situation in which the first story of a four-story building may be one or more retail establishments (or other commercial use). Consider that the remaining stories of this four-story building consist entirely of dwelling units and are classified as residential. This and similar situations can cause confusion over how to apply the code. Is this a commercial building because it is over three stories high, or is it a residential building because it has three stories of dwelling units?

For our current example, the definition of "Residential" makes it clear that the entire building would be



## SCOPE AND ADMINISTRATION

considered commercial and be subject to the requirements of Chapter 4[CE]. The approach is based on the fact that the patterns of energy use generally change in buildings four stories or greater in height, and that the code, as well as its predecessor *Model Energy Code* (MEC) versions, limit residential buildings to a maximum height of three stories above grade. Any structure over three stories is considered a commercial building for purposes of applying the code, regardless of the occupancy classification of the structure. The only exception to this distinction would be single-family or duplex detached residences four stories or greater in height, which is considered rare. See also the definitions and commentary for "Commercial building" and "Residential building" to help clarify the application of the code to mixed-occupancy buildings.

**C101.5 Compliance.** *Residential buildings* shall meet the provisions of IECC—Residential Provisions. *Commercial buildings* shall meet the provisions of IECC—Commercial Provisions.

❖ For commercial and residential buildings more than three stories, the technical requirements of either Chapter 4[CE] or ANSI/ASHRAE/IESNA 90.1 (by way of being a referenced standard in Section C401.2) are to be used to establish compliance with the energy conservation requirements of the code. This section provides the scoping to the various sections and methods of compliance within the code.

The following is an overview of the commercial design methods available in the code: commercial buildings include all buildings, except one- and two-family dwellings, and low-rise, multiple-family residential buildings.

Chapter 4[CE] describes a simplified and enforceable alternative to ANSI/ASHRAE/IESNA 90.1 for all commercial buildings (for more on ANSI/ASHRAE/IESNA 90.1, see commentary, Section C401.2). Envelope compliance for commercial buildings having a glazing area not greater than 40 percent of the above-grade exterior wall area is demonstrated by using the prescriptive tables in Chapter 4[CE]. The tables set the minimum level of thermal performance required for the building envelope (roof, floor and wall insulation, as well as fenestration requirements) based on the building's climate zone location. For buildings having a glazing area greater than 30 percent of the above-grade exterior wall area, envelope compliance must be demonstrated in accordance with Section C407 or ANSI/ASHRAE/IESNA 90.1 (see Section C401.2). Energy code compliance for mechanical systems and HVAC equipment is addressed in Section C403. Buildings served by mechanical systems and equipment not otherwise covered by Section C403 must be evaluated for energy code compliance using Section C407 or ANSI/ASHRAE/IESNA 90.1. Buildings with relatively simple lighting systems, manual switches, occupancy

sensors and dimmers are to be evaluated using the lighting criteria for the entire building or each specific building-area type, as stated in Chapter 4[CE].

When the prescriptive requirements of Chapter 4[CE] are used, each major energy-using subsystem (envelope, mechanical, lighting, service water heating) must comply. Simply put, when a candidate commercial building (or building system) does not meet the prescriptive commercial building criteria in Sections C401, C402, C403, C404 and C405 individually, the candidate building (or building system) must demonstrate compliance under Section C407 or ANSI/ASHRAE/IESNA 90.1. For innovative commercial and high-rise residential building designs, or where more technically sophisticated building envelope, mechanical and lighting systems serve standard building types, consult the applicable requirements of ANSI/ASHRAE/IESNA 90.1 as adopted by reference in Section C402.

Buildings evaluated for compliance under ANSI/ASHRAE/IESNA 90.1 must be designed for the code's basic requirements and either the system/component or the total building performance (TBP) method to show compliance. These design methods are comprehensive and somewhat complex. In fact, the requisite calculations are usually done by design professionals who have extensive experience with detailed energy conservation trade-offs and design methods.

Using the TBP method, proposed designs may use varying amounts and different forms of energy, with total annual energy cost (rather than annual energy usage) as the limiting design parameter. Using the system/component method, either prescriptive or system performance criteria may be used for lighting or exterior envelope compliance, or both, whereas mechanical system compliance is evaluated using only prescriptive criteria.

Note that Section C407 includes a simplified alternative to meeting the TBP methods prescribed by ANSI/ASHRAE/IESNA 90.1 as based on total building performance. In addition to being an alternative building performance approach to that contained in Section 11 of ANSI/ASHRAE/IESNA 90.1, Section C407 now provides a performance-based approach that, if followed, will result in a building design that complies with both the code and ANSI/ASHRAE/IESNA 90.1.

Using the provisions of Section C407, it is possible to establish the annual energy use and cost for a proposed design assuming that it just satisfies the minimum requirements in Chapter 4[CE]. This information can form the basis for evaluating proposed designs based on total building performance. This concept is consistent with the provisions in Chapter 1 of other *International Codes*<sup>®</sup> (I-Codes<sup>®</sup>), as well as Section 13 of ANSI/ASHRAE/IESNA 90.1.

**C101.5.1 Compliance materials.** The *code official* shall be permitted to approve specific computer software, worksheets,



compliance manuals and other similar materials that meet the intent of this code.

- ❖ As mentioned in Section C101.3, the code intends to permit the use of innovative approaches and techniques, provided that they result in the effective use of energy. This section recognizes that there are many federal, state and local programs, as well as computer software, that deal with energy efficiency. Therefore, the code simply states that the code official does have the authority to accept those methods of compliance, provided that they meet the intent of the code. Some of the easiest examples to illustrate this provision are the REScheck™ and COMcheck™ software that are put out by the U.S. Department of Energy (DOE).

**C101.5.2 Low energy buildings.** The following buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this code shall be exempt from the *building thermal envelope* provisions of this code:

1. Those with a peak design rate of energy usage less than  $3.4 \text{ Btu/h} \cdot \text{ft}^2$  ( $10.7 \text{ W/m}^2$ ) or  $1.0 \text{ watt/ft}^2$  ( $10.7 \text{ W/m}^2$ ) of floor area for space conditioning purposes.
2. Those that do not contain *conditioned space*.

- ❖ This section stipulates the conditions that permit a building or structure, or a portion of a building or structure, to be exempt from the code based on the marginal energy savings potential of such low-energy-use structures. This section also shows that there is no justification for exempting building, mechanical, service water-heating or lighting systems from the applicable criteria of the code simply because the building is not heated or cooled, or is partially conditioned. Building, mechanical, service water-heating and lighting systems, and their subsystems, are no less an energy conservation opportunity just because the building or space is unconditioned. Thus, for the buildings that follow in Items 1 and 2, the exemption is intended to apply only to the building thermal envelope requirements.

Item 1 exempts buildings and portions of buildings with low summer and winter peak rates of energy use [below  $3.4 \text{ Btu/h} \cdot \text{ft}^2$  or  $1.0 \text{ W/ft}^2$  ( $10.7 \text{ W/m}^2$ )]. The phraseology, “a peak design rate of energy usage for space conditioning purposes,” refers to the total peak primary energy used for space conditioning, service water heating and lighting for all fuels (electrical, gas, oil, propane, hydrogen, etc.). For example, consider a 100-square-foot ( $9.3 \text{ m}^2$ ) building with no space-conditioning system and having a 100-watt light bulb installed for interior lighting. This building is right at the threshold of  $1.0 \text{ W/ft}^2$  ( $100 \text{ watts}/100 \text{ ft}^2 = 1.0 \text{ W/ft}^2$ ).

Thus, the addition of any space-conditioning equipment that uses more energy than the 100-watt light bulb would require code compliance. The peak rating of an appliance or piece of equipment can be determined by its nameplate rating or the manufacturer’s literature.

Energy from on-site solar, on-site hydroelectric, on-site wind or other nondepletable, renewable source-producing energy at the end-user’s facility (or site) is excluded from the peak rate of energy use. (Renewable energy is considered energy that is not purchased. Nonrenewable, or conventional energy, is energy that is purchased, often from a utility service provider, co-op or municipal power authority. See the definition of “Energy cost” in Chapter 2[CE].) Conventional energy associated with the collection of renewable energy, such as energy used by the pumps and fans serving a solar collector, is included in the peak rate of energy use. When a home has both renewable and conventional systems, the peak rate includes the conventional systems even if the occupants primarily intend to use the renewable systems.

Few buildings designed for human occupancy will qualify for this exemption. The exemption generally applies only to buildings without heating or cooling systems, or portions of buildings that are not heated or cooled, such as unconditioned garages and storage facilities (see commentary, Item 2). If an exemption is claimed for a building, the permittee should provide enough supporting documentation to validate the claim. A list detailing all mechanical equipment, appliances and lighting must be submitted to justify exemption under this section. The list should specifically note the energy sources for heating, cooling, lighting and water heating, including the nameplate input capacities for HVAC and water-heating equipment.

A potential problem can exist when claiming this exemption. It is easy to modify the use of a structure after occupancy without obtaining an additional permit, thereby producing a noncomplying structure. Although Section C101.4.4 will help regulate this problem, some building departments require a signed statement indicating that the permittee has claimed the exemption and that the structure will be brought into compliance with the code if its peak rate of energy use is raised above the maximum at any time thereafter. Each building department must consider what happens or is likely to happen within or to a structure after occupancy when granting this exemption.

Portions of buildings can also qualify for this exemption. Where a portion of a building meets the criteria for this exemption, that portion is not required to comply with the requirements of the code to the extent that Section C101.5.2 permits. Other portions of the building, including the construction assemblies separating conditioned and unconditioned portions, define the limits of the building that must meet the code requirements.

Item 2 indicates that the thermal envelope requirements of the code do not apply to buildings or portions of buildings that are neither heated nor cooled to create a “conditioned space.” Though not stated directly in the code, buildings with space-conditioning systems that use energy entirely from nondepletable, renewable sources also are exempt.



## SCOPE AND ADMINISTRATION

For a room or portion of a building to be considered neither heated nor cooled, the space must not contain:

1. A space-conditioning system designed to serve that space;
2. A space-conditioning register/diffuser or hydronic terminal unit serving the space; or
3. An uninsulated duct or pipe where one would normally be required to be insulated.

In the past, the code only considered a space as being “conditioned” when it was being heated or cooled to keep the temperature within the human comfort range. However, based on the definition for “Conditioned space,” even a space that is heated only to a level to prevent the freezing of the contents would still be considered a conditioned space and, therefore, unable to use the exemption this section provides. The space also must be physically separated from conditioned spaces by the building’s thermal envelope. For example, a sunroom separated from the main house by an insulated door and wall is physically separated from the conditioned space. In this case, the door and wall separating the conditioned space from the sunroom are part of the building thermal envelope and must meet the code. In the case of a sunroom, Florida room, three-season room, etc., even a statement by the permittee that the space-conditioning system will not be used is not sufficient to demonstrate that a space qualifies for the “unconditioned” exception. Any type of added space-conditioning system, such as a small portable heater, would affect compliance. See Chapter 2[CE] and the definition for “Conditioned space.”

### SECTION C102 ALTERNATE MATERIALS—METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

**C102.1 General.** This code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been *approved* by the *code official* as meeting the intent of this code.

❖ This section reinforces Section C101.3, which states that the code is meant to be flexible, as long as the intent of the proposed alternative is to promote the effective use of energy. The code is not intended to inhibit innovative ideas or technological advances. A comprehensive regulatory document, such as an energy code, cannot envision and then address all future innovations in the industry. As a result, a performance code must be applicable to and provide a basis for the approval of an increasing number of newly developed, innovative materials, systems and

methods for which no code text or referenced standards yet exist. The fact that a material, product or method of construction is not addressed in the code is not an indication that the material, product or method is prohibited.

The code official is expected to apply sound technical judgment in accepting materials, systems or methods that, while not anticipated by the drafters of the current code text, can be demonstrated to offer equivalent or better performance. By virtue of its text, the code regulates new and innovative construction practices while addressing the relative safety of building occupants. The code official is responsible for determining whether a requested alternative provides the equivalent level of protection of the public health, safety and welfare as required by the code.

**C102.1.1 Above code programs.** The *code official* or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code. Buildings *approved* in writing by such an energy efficiency program shall be considered in compliance with this code. The requirements identified as “mandatory” in Chapter 4 shall be met.

❖ The purpose of this section is to specifically state that the code official does have the authority to review and accept compliance with another energy program that may exceed that required by the code, as long as the minimum “mandatory” requirements of the code are met. This provision is really a continuation of those stated in Sections C101.3 and C103.1, and the fact that the code does intend to accept alternatives, as long as the end result is an energy-efficient building that is comparable to or better than that required by the code.

This also is a good section to help reinforce the fact that the IECC as a model code is a “minimum” code. Therefore, it establishes the minimum requirement that must be met and anything that exceeds that level is permitted.

While “above code programs” are acceptable because they do exceed the “minimum” requirements of the code, it would not be proper to require compliance with such “above code” programs. Besides the code being the minimum level of acceptable energy efficiency, it is also the maximum efficiency that the code official can require. A building built to the absolute minimum requirement is also the maximum that the code official can demand. It is perfectly acceptable for a designer or builder to exceed the code requirements, but it is not proper for the code official to demand such higher performance. Since the International Code Council (ICC)<sup>®</sup> has deemed that the mandatory requirements should apply to all buildings, it is reasonable that “above code programs” not be allowed to bypass these requirements.

## PART 2—ADMINISTRATION AND ENFORCEMENT

### SECTION C103 CONSTRUCTION DOCUMENTS

**C103.1 General.** Construction documents and other supporting data shall be submitted in one or more sets with each application for a permit. 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 *code official* is authorized to require necessary construction documents to be prepared by a registered design professional.

**Exception:** The *code official* is authorized to waive the requirements for construction documents or other supporting data if the *code official* determines they are not necessary to confirm compliance with this code.

- ❖ In most jurisdictions, the permit application must be accompanied by not less than two sets of construction documents. The code official can waive the requirements for filing construction documents when the scope of the work is minor and compliance can be verified through other means. When the quality of the materials is essential for conformity to the code, specific information must be given to establish that quality.

The code must not be cited, or the term “legal” or its equivalent used as a substitute for specific information. For example, it would be improper for the plans to simply state “windows in accordance with IECC requirements.”

A detailed description of the work covered by the application must be submitted. When the work is “minor,” either in scope or needed description, the code official may use judgment in determining the need for a detailed description. An example of “minor” work that may not involve a detailed description is the replacement of an existing 60-amp electrical service in a single-family residence with a 100-amp service.

The exception permits the code official to determine that construction documents are not necessary when the code official determines that compliance can be obtained and verified without the documents.

**C103.2 Information on construction documents.** Construction documents shall be drawn to scale upon suitable material. Electronic media documents are permitted to be submitted when *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include, but are not limited to, as applicable, insulation materials and their *R*-values; fenestration *U*-factors and SHGCs; area-weighted *U*-factor and SHGC calculations; mechanical system design criteria; mechanical and service water heating system and equipment types, sizes and efficiencies; economizer description; equipment and systems controls; fan motor horsepower (hp) and controls; duct sealing, duct and pipe

insulation and location; lighting fixture schedule with wattage and control narrative; and air sealing details.

- ❖ For a comprehensive plan review that will enable verification of compliance with the code, all code requirements need to be incorporated in the construction documents. Adequate details must be included to allow the code official to verify compliance. A statement on the construction documents, such as, “All insulation levels shall comply with the 2012 edition of the IECC,” is not an acceptable substitute for showing the required information. Note also that the code official is authorized to require additional code-related information as necessary.

For example, insulation *R*-values, and glazing and door *U*-factors must be clearly marked on the building plans, specifications or forms used to show compliance. Where two or more different insulation levels exist for the same component (two insulation levels are used in ceilings), record each level separately on the plans or specifications and clarify where in the building each level of insulation will be installed.

The following discussion is presented for the benefit of both the applicant and the plans examiner.

**Permit Applicant’s Responsibilities.** At permit application, the goal of the applicant is to provide all necessary information to show compliance with the code. If the plans examiner is able to verify compliance in a single review, the permit can be issued and construction may be started without delay.

Depending on whether the prescriptive or performance methods of compliance are used, the amount and detail of the required information may vary. For example, if using the prescriptive method of compliance, the *U*-factor and SHGC may be the only information that is needed to verify fenestration compliance. If the *U*-factor alternative (see Section C402.1.2) or the TBP (see Section C407) is used, then additional information, such as the fenestration sizes and orientation, may be needed to demonstrate compliance.

**Plans Examiner’s Responsibilities.** The plans examiner must review each application for code compliance before a permit is issued. By the owner, designer and contractor knowing what is expected of them early in the process, the building department can increase the likelihood that the approved drawings will comply with the code. This helps the inspector of the construction work.

The biggest challenge for the plans examiner is often determining where the necessary information is and whether the drawings are complete.

A good plan review is essential to ensure code compliance and a successful project. Construction documents are graphic depictions of a legal contract. The more precise and code compliant the documents are, the less room for dispute or conflict. The design professional can then be confident that the intent of the design is communicated. The owner can understand what is to be built. The contractor can scope

## SCOPE AND ADMINISTRATION

the contract appropriate to the project—without unexpected changes or additions. The building department can know what is being approved and what to look for during inspections.

**C103.3 Examination of documents.** The *code official* shall examine or cause to be examined the accompanying construction documents and shall ascertain whether the construction indicated and described is in accordance with the requirements of this code and other pertinent laws or ordinances.

❖ This section describes the required action of the code official in response to a permit application. The code official can delegate review of the construction documents to subordinates.

**C103.3.1 Approval of construction documents.** When the *code official* issues a permit where construction documents are required, the construction documents shall be endorsed in writing and stamped “Reviewed for Code Compliance.” Such *approved* construction documents shall not be changed, modified or altered without authorization from the *code official*. Work shall be done in accordance with the *approved* construction documents.

One set of construction documents so reviewed shall be retained by the *code official*. The other set shall be returned to the applicant, kept at the site of work and shall be open to inspection by the *code official* or a duly authorized representative.

❖ The code official must stamp or otherwise endorse as “Reviewed for Code Compliance” the construction documents on which the permit is based. One set of approved construction documents must be kept on the construction site to serve as the basis for all subsequent inspections. To avoid confusion, the construction documents on the site must be the documents that were approved and stamped. This is because inspections are to be performed with regard to the approved documents, not the code itself. Additionally, the contractor cannot determine compliance with the approved construction documents unless they are readily available. If the approved construction documents are not available, the inspection should be postponed and work on the project halted.

**C103.3.2 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 authorized, 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.

❖ If a permit is issued and construction proceeds at a normal pace and a new edition of the code is adopted by the legislative body, requiring that the building be constructed to conform to the new code is unreasonable. This section provides for the continuity of permits issued under previous codes, as long as such permits are being “actively prosecuted” subsequent to the effective date of the ordinance adopting this edition of the code.

**C103.3.3 Phased approval.** The *code official* shall have the authority to issue a permit for the construction of part of an energy conservation system before the construction documents for the entire system have been submitted or *approved*, provided adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holders of such permit shall proceed at their own risk without assurance that the permit for the entire energy conservation system will be granted.

❖ The code official has the authority to issue a partial permit to allow for the practice of “fast-tracking” a job. Any construction under a partial permit is “at the holder’s own risk” and “without assurance that a permit for the entire structure will be granted.” The code official is under no obligation to accept work or issue a complete permit in violation of the code, ordinances or statutes simply because a partial permit had been issued. Fast-tracking puts unusual administrative and technical burdens on the code official. The purpose is to proceed with construction while the design continues for other aspects of the work. Coordinating and correlating the code aspects into the project in phases requires attention to detail and project tracking so that all code issues are addressed. The coordination of these submittals is the responsibility of the registered design professional in responsible charge.

**C103.4 Amended construction documents.** 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.

❖ The code requires that all work be done in accordance with the approved plans and other construction documents. Where the construction will not conform to the approved construction documents, the documents must be revised and resubmitted to the code official for review and approval. Code officials should maintain a policy that all amendments be submitted for review. Otherwise, a significant change that is not approved could result in an activity that is not in compliance with the code, and therefore cause needless delay and extra expense. The code official must retain one set of the amended and approved plans. The other set is to be kept at the construction site, ready for use by the jurisdiction’s inspection staff.

**C103.5 Retention of construction documents.** One set of *approved* construction documents shall be retained by the *code 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.

❖ Construction documents must be retained in case a question or dispute arises after completion of the project. Unless modified because of state or local statutes, the retention period for the approved construction documents is a minimum of 180 days following the completion of the work, typically the date the certificate of occupancy is issued. Any further retention of plans by the jurisdiction as an archival record



of construction activity in the community is not required by the code.

## SECTION C104 INSPECTIONS

**C104.1 General.** Construction or work for which a permit is required shall be subject to inspection by the *code official*.

❖ When a permit is required by state or local law, the building is subject to an inspection. The code official must determine whether appropriate energy-efficient features and equipment are installed in accordance with the approved construction documents and applicable code requirements.

Generally, a department's administrative rules will list required periodic inspections. Because the majority of energy-efficient construction occurs in steps or phases, periodic inspections are often necessary before portions of these systems are covered by further construction. The exact number of required inspections cannot always be specified. A reinspection may be necessary if violations are noted and corrections are required (see commentary, Section C104.4). If time permits, frequent inspections of some job sites, especially where the work is complex, can be beneficial to detect potential problems before they become too difficult to correct.

An inspector's ongoing challenge is responding to change orders during construction. In any construction project there will be field changes. The call is easy if a more efficient piece of equipment is being substituted for a less efficient one. For the opaque elements, more insulation is generally better. For fenestration, a lower *U*-factor and SHGC is generally better. Unfortunately, changing the glass almost always changes more than one characteristic and it is not always clear whether energy efficiency is being improved. If there is any doubt concerning the impact, the inspector should confer with the plans examiner for the project.

A more difficult change order is one that reduces efficiency. For example, if the proposed substitute fenestration has a higher *U*-factor and SHGC, or if the window area is to be increased, the inspector must check with the plans examiner. The amount of information and the ease of confirming compliance will depend upon whether the prescriptive or performance approach was used initially. In these cases, compliance is based on a combination of the fenestration area, *U*-factor, SHGC, the projection factor, and (if a performance-based analysis has been used) even the opaque wall characteristics. Although there may be enough latitude to decrease the efficiency somewhat, it is not possible to make such a determination without reviewing all the elements and how compliance was initially demonstrated. Whenever there are significant changes such as described in this paragraph, the inspector is expected to request that the applicant submit revised plans, so the plans

examiner can verify compliance and ensure there is a correct record on file in the building department.

An even tougher case is when the contractor has already installed noncomplying equipment without checking with the inspector. For instance, ordinary double glazing may have been installed instead of double glazing with a low-E coating. The inspector should be quite strict for several reasons. First, because most contracts are awarded on a cost-competitive basis, the low-bid company might win the job and then make its profit by installing noncomplying equipment. This would be unfair to the high-bid contractors.

Second, a lenient inspector's job will be more difficult in the future. If a noncomplying contractor skates by this time, that contractor will most likely have additional requests for future projects. In addition, other contractors will also begin to ask for special treatment. Self-policing, which works well if everyone is being treated fairly, will begin to decline.

Finally, there is the situation in which the approved plans do not contain all of the code requirements. If information or notes are missing from the plans, the inspector can, for instance, simply direct the contractor to make the necessary changes in the field (for example, caulk and seal joints).

The inspector's job is more difficult, however, if drawings contain information that is wrong. Perhaps the inspector in a cold climate notices the metal stud wall is not covered with insulating sheathing as is required in that climate and informs the contractor. The contractor responds saying that he or she is following the approved plans, and indeed he or she is. The inspector, as the representative of the code official, is clearly authorized to require the contractor to build the project to code. (If necessary, the inspector can show the contractor the building department note, which says, "Approved subject to errors and omissions." See also Section 104.4 of the IBC.) In this case, it would be appropriate for the inspector to inform the plans examiner of the problem and ask the plans examiner to help solve the problem. The plans examiner may be able to suggest improvements in other areas that would compensate for this shortfall. It is important that the plans examiner and inspector appreciate the challenges of each other's work and the benefits of a team effort.

**C104.2 Required approvals.** Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the *code official*. The *code official*, upon notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or his or her agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected and such portion shall not be covered or concealed until authorized by the *code official*.

❖ The contractor, builder, owner or other authorized party is responsible for arranging and coordinating

## SCOPE AND ADMINISTRATION

required inspections to prevent work from being concealed prior to inspection. For example:

- Insulation must be inspected prior to concealment. Where the insulation is concealed prior to inspection and approval, the code official has the authority to require removal of the concealing components.
- Basement wall insulation may be installed on the exterior of a below-grade basement wall. Where the insulation application is not confirmed prior to backfilling, reinspection is necessary.
- Glazing assembly *U*-factor labels are to be left on until after the building has been inspected for compliance. The applicant is responsible for giving the inspector adequate information on site to verify code-related features, such as window *U*-factor and equipment efficiencies.

After the field inspector has performed the required inspections and observed any required equipment and system tests (or has received written reports of the results of such tests), the code official must determine whether the installation or work is in compliance with all applicable sections of the code. The code official must issue a written notice of approval if the subject work or installation is in apparent compliance with the code. The notice of approval is given to the permit holder and a copy of the notice is retained on file by the code official.

**C104.3 Final inspection.** The building shall have a final inspection and not be occupied until *approved*.

- ❖ To establish compliance with all previously issued correction orders and to determine whether subsequent violations exist, a final inspection is required. The final inspection is conducted after all work is completed. Typically, the final inspection includes all items installed after the rough-in inspection and not concealed in the building construction. Subsequent reinspection is necessary if the final inspection generates a notice of violation (see commentary, Section C104.4). All violations observed during the final inspection must be noted and the permit holder must be advised of them.

Final approval is required prior to issuing the certificate of occupancy and, therefore, before the building may be occupied.

**C104.4 Reinspection.** A building shall be reinspected when determined necessary by the *code official*.

- ❖ The provisions for reinspection could affect the entire structure or a portion of the structure. As an example, under the circumstance where no approval was given to apply interior finish that conceals ducts in an exterior wall, the code official must require removal of the interior finish to verify the ducts are insulated to code.

Reinspections generally occur when some type of violation or correction notice was issued during one of the previous inspections or where the work was not

ready for the inspection. As an example, if the inspector went to the project to conduct an insulation inspection and not all of the insulation was installed at that point, the inspector would need to go back to the project and “reinspect” the insulation to verify that it had been completed. After the reinspection, the inspector would issue the approval (see Section C104.2) to permit the wall or ceiling cavities to be enclosed and, therefore, conceal the insulation.

**C104.5 Approved inspection agencies.** The *code official* is authorized to accept reports of *approved* inspection agencies, provided such agencies satisfy the requirements as to qualifications and reliability.

- ❖ As an alternative to the code official conducting the inspection, he or she is permitted to accept inspections of and reports by approved inspection agencies. Appropriate criteria on which to base approval of inspection agencies can be found in Section 1703 of the IBC.

**C104.6 Inspection requests.** It shall be the duty of the holder of the permit or their duly authorized agent to notify the *code 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.

- ❖ It is the responsibility of the permit holder or other authorized person, such as the contractor performing the work, to arrange for the required inspections when completed work is ready and to allow for sufficient time for the code official to schedule a visit to the site to prevent work from being concealed prior to being inspected. Access to the work to be inspected must be provided, including any special means such as a ladder.

**C104.7 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 *code official* for inspection and testing.

- ❖ This section is a needed administrative provision that seems straightforward enough in that it provides for necessary actions in the event that an item that is inspected or tested is not originally in compliance with the code.

**C104.8 Approval.** After the prescribed tests and inspections indicate that the work complies in all respects with this code, a notice of approval shall be issued by the *code official*.

- ❖ This section provides a needed administrative tool in the form of a notice of approval that the code official issues to indicate completion of an energy conservation installation. While certificates of occupancy for construction are traditionally under the purview of one of the construction codes, the notice of approval will fill a need with regard to application and enforcement of nonbuilding codes.

**C104.8.1 Revocation.** The *code official* is authorized to, in writing, suspend or revoke a notice of approval issued under the provisions of this code 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, premise, or portion thereof is in violation of any ordinance or regulation or any of the provisions of this code.

- ❖ This section provides an important administrative tool by giving the code official the authority to revoke a certificate of completion for the reasons indicated in the text. The code official also may suspend the certificate until any code violations are corrected.

## SECTION C105 VALIDITY

**C105.1 General.** If a portion of this code is held to be illegal or void, such a decision shall not affect the validity of the remainder of this code.

- ❖ This section is applicable when a court of law rules that a portion of the code (or the jurisdiction's energy code) is invalid. Only invalid sections of the code (as established by the court of jurisdiction) can be set aside. This is essential to safeguard the application of the code text to situations in which a provision of the code is declared illegal or unconstitutional. This section preserves the original legislative action that put the legal requirements (energy code) in place.

All sections of the code not judged invalid must remain in effect. Although a dispute over a particular issue (such as an appliance efficiency requirement) may have precipitated the litigation causing the requirement to be found invalid, the remainder of the code must still be considered as being applicable. This is sometimes called the "severability clause" and simply means that the invalid section can be removed from the code without affecting the entire document.

## SECTION C106 REFERENCED STANDARDS

**C106.1 Referenced codes and standards.** The codes and standards referenced in this code shall be those listed in Chapter 5, and such codes and standards shall be considered as part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections C106.1.1 and C106.1.2.

- ❖ The code references many standards promulgated and published by other organizations. A complete list of these standards appears in Chapter 5[CE]. The wording of this section was carefully chosen to establish the edition of the standard that is enforceable under the code.

Although a standard is referenced, its full scope and content are not necessarily applicable. The standard is applicable only to the extent indicated in the text in which the standard is specifically referenced. A referenced standard or the portion cited in the text is an enforceable extension of the code as if the content of the standard was included in the body of the code. The use and applicability of referenced standards are

limited to those portions of the standards that are specifically identified.

**C106.1.1 Conflicts.** Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

- ❖ The use of referenced codes and standards to cover certain aspects of various occupancies and operations rather than write parallel or competing requirements into the code is a long-standing code development principle. Often, however, questions and potential conflicts in the use of referenced codes and standards can arise which can lead to inconsistent enforcement of the code. This section of the code is intended to establish that the provisions of the code would prevail in such a conflict, regardless of the level of stringency.

**C106.1.2 Provisions in referenced codes and standards.** Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code, as applicable, shall take precedence over the provisions in the referenced code or standard.

- ❖ This section expands upon the provisions of Section C106.1.1 by making it clear that even if a referenced standard contains requirements that parallel the code [(or the other referenced section(s)], the provisions of the code (or the other referenced I-Codes) will always take precedence. This proposed section does not intend to take the place of carefully scoped and referenced text for written standards for the I-Codes but, rather, provides the policy underpinnings upon which sound code change proposals can be based.

**C106.2 Conflicting requirements.** Where the provisions of this code and the referenced standards conflict, the provisions of this code shall take precedence.

- ❖ In general, the code takes precedence when the requirements of the standard conflict with, or are less stringent than, those of the code. Although the intent of the code is to be in harmony with referenced standards, the code text generally governs should a conflict occur. One specific situation where caution should be used is when the requirements of the standard are more restrictive.

In such a situation, the first action is to verify the scope of the standard (see commentary, Section C106). After considering the limitations of the scoping, it is also important to review what effect the difference would make. For example, the code would not intend to require a piece of equipment to be installed in a manner that violates its listing, nor would the code intend to create any type of a hazard (see Section C101.3). Therefore, it is possible, given the multitude of products and applications, that there will be situations where the requirements of the standard or listing will take precedence over those found in the code. Such unique situations should be discussed with the code official for approval.



## SCOPE AND ADMINISTRATION

**C106.3 Application of references.** References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

❖ This section provides some information on the use of the code and the conventions used in making references to other portions of the code. By implication then, a reference that is intended to provide information from another code would be required to state what code the reference is from.

**C106.4 Other laws.** The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

❖ This provision is intended to assist the code official in dealing with situations where other laws enacted by the jurisdiction or the state or federal government may be applicable to a condition that also is governed by a requirement in the code. In such circumstances, the requirements of the code would be in addition to that other law that is still in effect, although the code official may not be responsible for its enforcement.

### SECTION C107 FEES

**C107.1 Fees.** A permit shall not be issued until the fees prescribed in Section C107.2 have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

❖ This section requires that all fees be paid prior to permit issuance or release of an amendment to a permit. Since department operations are usually intended to be supported by fees paid by the user of department activities, it is important that these fees are received before incurring any expense.

**C107.2 Schedule of permit fees.** A fee for each permit shall be paid as required, in accordance with the schedule as established by the applicable governing authority.

❖ This section authorizes the establishment of a schedule of fees by the jurisdiction. The fees are usually established by law, such as in an ordinance adopting the code, a separate ordinance or legally promulgated regulation, as required by state or local law and are often based on a valuation of the work to be performed.

**C107.3 Work commencing before permit issuance.** Any person who commences any work before obtaining the necessary permits shall be subject to an additional fee established by the *code official*, which shall be in addition to the required permit fees.

❖ The department will incur certain costs (i.e., inspection time and administrative) when investigating and citing a person who has commenced work without having obtained a permit. This section authorizes the code official to recover those costs by establishing a

fee, in addition to that collected when the required permit is issued, to be imposed on the responsible party.

**C107.4 Related fees.** The payment of the fee for the construction, *alteration*, removal or demolition of work done in connection to or concurrently with the work or activity authorized by a permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

❖ This provision gives the code official a useful administrative tool that makes it clear that all applicable fees of the jurisdiction for regulated work that is done collateral to the work being done under the code's permit, such as sewer connections, water taps, drive-ways, signs, etc., must be paid.

**C107.5 Refunds.** The *code official* is authorized to establish a refund policy.

❖ This section authorizes the code official to establish a policy to regulate the refund of fees, which may be full or partial, typically resulting from the revocation, abandonment or discontinuance of a building project for which a permit has been issued and fees have been collected.

### SECTION C108 STOP WORK ORDER

**C108.1 Authority.** Whenever the *code official* finds any work regulated by this code being performed in a manner either contrary to the provisions of this code or dangerous or unsafe, the *code official* is authorized to issue a stop work order.

❖ This section provides for the suspension of work for which a permit was issued, pending the removal or correction of a severe violation or unsafe condition identified by the code official. Stop work orders are issued when enforcement can be accomplished no other way or when a dangerous condition exists.

**C108.2 Issuance.** The stop work order shall be in writing and shall be given to the owner of the property involved, or to the owner's agent, or to the person doing 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 will be permitted to resume.

❖ This section makes it clear that, upon receipt of a violation notice from the code official, all construction activities identified in the notice must immediately cease, except as expressly permitted to correct the violation.

**C108.3 Emergencies.** Where an emergency exists, the *code official* shall not be required to give a written notice prior to stopping the work.

❖ This section gives the code official the authority to stop the work in dispute immediately when, in his or

her opinion, there is an unsafe emergency condition that has been created by the work. The need for the written notice is suspended for this situation so that the work can be stopped immediately.

**C108.4 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 liable to a fine of not less than [AMOUNT] dollars or more than [AMOUNT] dollars.

❖ This section establishes consequences for when the stop work order is disregarded and the person responsible continues the work that is at issue, other than abatement work. The dollar amounts for the minimum and maximum fines are to be specified in the adopting ordinance.

### SECTION C109 BOARD OF APPEALS

**C109.1 General.** In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The *code official* shall be an ex officio member of said board but shall have no vote on any matter before the board. The board of appeals shall be appointed by the governing body 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 *code official*.

❖ This section provides an aggrieved party with a material interest in the decision of the code official with a process to appeal such a decision before a board of appeals. This provides a forum, other than the court of jurisdiction, in which to review the code official's actions. The intent of the appeal process is not to waive or set aside a code requirement; rather, it is intended to provide a means of reviewing a code official's decision on an interpretation or application of the code.

**C109.2 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 equally good or better form of construction is proposed. The board shall have no authority to waive requirements of this code.

❖ This section establishes the grounds for an appeal that claims that the code official has misinterpreted or misapplied a code provision. The board is not allowed to set aside any of the technical requirements of the code; however, it is allowed to consider alternative methods of compliance with the technical requirements.

**C109.3 Qualifications.** The board of appeals shall consist of members who are qualified by experience and training and are not employees of the jurisdiction.

❖ This section requires that the members of the appeals board are to have experience in building construction and system matters because the decisions of the appeals board are to be based purely on the technical merits involved in an appeal.

### Bibliography

The following resource materials are referenced in this chapter or are relevant to the subject matter addressed in this chapter.

ASHRAE-97, *Handbook of Fundamentals*. Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1997.

ANSI/ASHRAE/IESNA 90.1-93, *Energy Code for Commercial and High-rise Residential Buildings—Based on ANSI/ASHRAE/IESNA 90.1-1989*. Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1993.

NFRC-06, *Certified Products Directory*. Silver Spring, MD: National Fenestration Rating Council, Inc., 2006.



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# Chapter 2[CE]: Definitions

## General Comments

All terms defined in the code are listed alphabetically in Chapter 2[CE]. The words or terms defined in this chapter are considered to be of prime importance in either specifying the subject matter of code provisions or in giving meaning to certain terms used throughout the code for administrative or enforcement purposes. The code user should be familiar with the terms found in this chapter because the definitions are essential to the correct interpretation of the code and because the user might not be aware of the fact that a particular term found in the text is defined.

## Purpose

Codes, by their nature, are technical documents. Literally every word, term and punctuation mark can add to or change the meaning of the intended result. This is even more so with a performance code where the desired result often takes on more importance than the specific words. Furthermore, the code, with its broad scope of applicability, includes terms inherent in a variety of construction disciplines. These terms can often have multiple meanings, depending on the context or discipline being used at the time. For these reasons, a consensus on the specific meaning of terms contained in the code must be maintained. Chapter 2[CE] performs this function by stating clearly what specific terms mean for the purpose of the code.

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## SECTION C201 GENERAL

**C201.1 Scope.** Unless stated otherwise, the following words and terms in this code shall have the meanings indicated in this chapter.

❖ For the purposes of the code, certain abbreviations, terms, phrases, words and their derivatives have the meanings given in Chapter 2[CE]. The code, with its broad scope of applicability, includes terms used in a variety of construction and energy-related disciplines. These terms can often have multiple meanings, depending on their context or discipline. Therefore, Chapter 2[CE] establishes specific meanings for these terms.

**C201.2 Interchangeability.** Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural includes the singular.

❖ Although the definitions contained in Chapter 2[CE] are to be taken literally, gender, number and tense are considered to be interchangeable.

**C201.3 Terms defined in other codes.** Terms that are not defined in this code but are defined in the *International Building Code*, *International Fire Code*, *International Fuel Gas Code*, *International Mechanical Code*, *International Plumb-*

*ing Code* or the *International Residential Code* shall have the meanings ascribed to them in those codes.

❖ When a word or term that is not defined in this chapter appears in the code, other references may be used to find its definition, such as other *International Codes*<sup>®</sup> (I-Codes<sup>®</sup>). Definitions that are applicable in other I-Codes are applicable everywhere the term is used in the code. As stated in both the "Purpose" section above and in the commentary to Section C201.1, a bit of caution is needed when looking at definitions from other codes. Because the context and discipline can vary, it is important to determine that the term does fit within the code context. As an example, the term "accessible" would have a different meaning in the *International Plumbing Code*<sup>®</sup> (IPC<sup>®</sup>) and the *International Mechanical Code*<sup>®</sup> (IMC<sup>®</sup>) versus that of the *International Building Code*<sup>®</sup> (IBC<sup>®</sup>).

**C201.4 Terms not defined.** Terms not defined by this chapter shall have ordinarily accepted meanings such as the context implies.

❖ Another option for defining words or terms not defined here or in other codes is their "ordinarily accepted meanings." The intent of this statement is that a dictionary definition may suffice if the definition is in context. Oftentimes, construction terms used throughout the code may not be defined in Chapter