



IECC®

2015

CODE AND COMMENTARY

The complete IECC with
commentary after each
section



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2015 International Energy Conservation Code® 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 2015 *International Energy Conservation Code*®. 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 2015 *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 Central Regional Office.

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Chapter 1 [CE]: Scope and Administration

General Comments

The 2015 edition of the *International Energy Conservation Code*® (IECC®) is the result 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 2015 edition represents a modest increase in required energy-efficient equipment and design over that of the 2012 edition. The code provides efficiency requirements for many systems not previously in the code. The 2012 edition provided a significant increase in energy efficiency levels over the 2009 edition of the code, which represented a significant increase over 2006 levels. The aggressive code change proposals are reflective of a 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 requirements are specified individually for commercial buildings and residential buildings. This portion of the code addresses commercial buildings. The code does not regulate the energy for industrial equipment for manufacturing or for items such as computers or coffee-pots. The code 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.

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.

❖ This portion of the code applies to commercial buildings, commercial building sites and associated systems and equipment. The definitions for “Residential building,” “Commercial building,” 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 can be found in the commentary to Chapter 4 [CE].

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.

❖ The 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. The code also addresses efficiency of other systems that relate to the use of the space for human “habitation.” In general, the requirements of the code address the design of all building systems that affect the comfort of the occupants and their use of the building, including:

- Lighting systems and controls.
- Wall, roof and floor insulation.
- Windows and skylights.

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- 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).
- Kitchen exhaust systems.
- Refrigeration systems and refrigerated spaces.
- 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 code is intended 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 code official should favor the action that will promote effective energy use. 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 applying code requirements. Although many of the requirements are given in a prescriptive format for ease of use, the code is not intended to stifle innovation—especially 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 building construction techniques used to meet the code and the methods used to approve them.

Any design should first be evaluated to see whether it meets the code requirements directly. Where the literal code requirements have not been satisfied but the applicant claims an innovative approach meets the intent, the code official will likely have to exercise professional judgment to determine the accuracy of that claim (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 restric-

tive requirement is to apply where there may be different requirements in the code for a specific issue.

C101.4.1 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 and a portion of the building otherwise meets the definition of “Residential building,” each occupancy must be evaluated separately.

Commentary Figure C101.4.1 provides an example of a mixed-occupancy building. The figure shows a three-story building with the first story occupied by a convenience store (a commercial use). The top two stories are shown as apartments that are classified as Group R-2 occupancy by the *International Building Code*® (IBC)®. As the total building is not over three stories, its dwelling units meet the definition of “Residential building.” The first story must be evaluated under the commercial provisions and the upper two stories under the residential provisions of the code. The treatment of each segment of the building by the appropriate portion of the code applies regardless of how much of the building meets the commercial versus residential definitions.

However, confusion sometimes arises when considering buildings taller than three stories. If, for example, the building in Commentary Figure C101.4.1 were four stories and the Group R-2 apartments occupied the top three floors, would it be a commercial building because it is over three stories high or is it a residential building because it has three stories of dwelling units? In such an example, the definition of “Residential building” dictates that the entire building would be considered as commercial and be subject to the requirements of Chapter 4 [CE]. That 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 limits residential buildings to a maximum height of three stories above grade. Any structure over three stories is considered a commercial building for purposes of apply-

Mixed Occupancy

Apartments	Residential Provisions of IECC
Apartments	Residential Provisions of IECC
Retail	Commercial Provisions of IECC

**Figure C101.4.1
MIXED OCCUPANCY**

ing the code, regardless of the occupancy classification of the structure. The only exception to this distinction would be single-family or duplex detached residences and townhouses four stories or greater in height. 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 buildings, the technical provisions of Chapter 4 [CE] offer three options for compliance. Two of the options are in Chapter 4 [CE]. The third option is to comply with the requirements of ANSI/ASHRAE/IESNA 90.1. The compliance approach is at the discretion of the building owner and the owner’s designer.

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 is intended to allow 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 has 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).

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 protects the public health, safety and welfare in a manner consistent with code requirements.

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 has the authority to review and accept compliance with another energy program that may exceed code requirements, 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 is intended to allow alternatives, as long as the end result is an energy-efficient building 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. 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)® 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.

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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 where *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, the following as applicable:

1. Insulation materials and their *R*-values.
2. Fenestration *U*-factors and solar heat gain coefficients (SHGCs).
3. Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations.
4. Mechanical system design criteria.
5. Mechanical and service water heating system and equipment types, sizes and efficiencies.
6. Economizer description.
7. Equipment and system controls.
8. Fan motor horsepower (hp) and controls.
9. Duct sealing, duct and pipe insulation and location.
10. Lighting fixture schedule with wattage and control narrative.
11. Location of *daylight* zones on floor plans.
12. 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 2015 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.

In addition to the 12 items listed above, Section C103.2.1 specifically requires that the thermal envelope of the building be clearly shown on the construction drawings submitted for permit.

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 needed to verify fenestration compliance. If the assembly *U*-factor method (see Section C402.1.4) or the total building performance method (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.

Often the biggest challenges for the plans examiner are 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 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.

C103.2.1 Building thermal envelope depiction. The *building's thermal envelope* shall be represented on the construction drawings.

- ❖ The building's thermal envelope is the key design feature in efficient use of energy to condition the indoor environments of a building. Without a clear indication of the location of the thermal envelope, the plans examiner may not be able to quickly review the building's assemblies for compliance with Section C402.

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. The *code official* is authorized to utilize a registered design professional, or other *approved* entity not affiliated with the building design or construction, in conducting the review of the plans and specifications for compliance with the code.

- ❖ 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 as well as third-party reviewers.

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

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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* or his or her designated agent, and such construction or work shall remain accessible and exposed for inspection purposes until *approved*. It shall be the duty of the permit applicant to cause the work to remain accessible and exposed for inspection purposes. Neither the *code official* nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material, product, system or building component required to allow inspection to validate compliance with this code.

❖ Where 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.

The contractor, builder, owner or owner's authorized agent is responsible for arranging and coordinating 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.

C104.2 Required inspections. The *code official* or his or her designated agent, upon notification, shall make the inspections set forth in Sections C104.2.1 through C104.2.6.

❖ This section lists six specific inspections: five during the progressive stages of construction, followed by a final inspection. 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. Depending on the size of the building project, the listed inspections may actually require multiple inspection visits. The exact number of required inspections cannot always be specified. Reinspection may be necessary if violations are noted and corrections are required (see commentary, Section C104.3). Where 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 may be easy where a more efficient piece of equipment is being substituted for a less efficient one; where more insulation is provided, or where fenestration with a lower *U*-factor is installed. Section C103.4 requires that field changes be reflected on revised and approved construction drawings. Compliance with the energy conservation requirements of the code often require a specific "package" of installations; changing one, even where it appears to improve energy efficiency, may upset the balance of the approved design. The amount of information and the ease of confirming compliance will depend on 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 analy-

sis 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.

C104.2.1 Footing and foundation inspection. Inspections associated with footings and foundations shall verify compliance with the code as to *R*-value, location, thickness, depth of burial and protection of insulation as required by the code and *approved* plans and specifications.

❖ See the commentary to Section C104.2.

C104.2.2 Framing and rough-in inspection. Inspections at framing and rough-in shall be made before application of interior finish and shall verify compliance with the code as to types of insulation and corresponding *R*-values and their correct location and proper installation; fenestration properties (*U*-factor, SHGC and VT) and proper installation; and air leakage controls as required by the code and approved plans and specifications.

❖ See the commentary to Section C104.2.

C104.2.3 Plumbing rough-in inspection. Inspections at plumbing rough-in shall verify compliance as required by the code and *approved* plans and specifications as to types of insulation and corresponding *R*-values and protection; required controls; and required heat traps.

❖ See the commentary to Section C104.2.

C104.2.4 Mechanical rough-in inspection. Inspections at mechanical rough-in shall verify compliance as required by the code and *approved* plans and specifications as to installed HVAC equipment type and size; required controls, system insulation and corresponding *R*-value; system and damper air leakage; and required energy recovery and economizers.

❖ See the commentary to Section C104.2.

C104.2.5 Electrical rough-in inspection. Inspections at electrical rough-in shall verify compliance as required by the code and *approved* plans and specifications as to installed lighting systems, components and controls; and installation of an electric meter for each dwelling unit.

❖ See the commentary to Section C104.2.

C104.2.6 Final inspection. The building shall have a final inspection and shall not be occupied until *approved*. The final inspection shall include verification of the installation and proper operation of all required building controls, and documentation verifying activities associated with required *building commissioning* have been conducted and findings of noncompliance corrected. Buildings, or portions thereof, shall not be considered for a final inspection until the *code official* has received a letter of transmittal from the building owner acknowledging that the building owner has received

the Preliminary Commissioning Report as required in Section C408.2.4.

❖ 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 C104.3). 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.

C104.3 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. For 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.

C104.4 Approved inspection agencies. The *code official* is authorized to accept reports of third-party inspection agencies not affiliated with the building design or construction, provided such agencies are *approved* as to qualifications and reliability relevant to the building components and systems they are inspecting.

❖ As an alternative to building department staff conducting the inspections, the code official is permitted to accept inspections of and reports by approved inspection agencies. The code provides general guidance under which the code official can review and approve such agencies. More extensive criteria can be found in IBC Section 1703.

C104.5 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

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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.

C104.6 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made to achieve compliance with this code. The work or installation shall then be resubmitted to the *code official* for inspection and testing.

❖ This section provides for necessary actions in the event that a tested or inspected item is not originally in compliance with the code.

C104.7 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.

C104.7.1 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 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 (the code) in place.

All sections of the code not judged invalid must remain in effect. Although a dispute over a particular issue 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 6, 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 6 [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. In general, the code takes precedence when the requirements of a standard conflict with, or are less stringent than, those of the code. Although the code is intended to be in harmony with referenced standards, the code text generally governs should a conflict occur. This section establishes that, where questions and potential conflicts in the use of referenced codes and standards arise, the provisions of the code prevail 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 on 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 sections), the provisions of the code [or the other referenced *International Codes®* (I-Codes®)] will always take precedence. This section is not intended to take the place of carefully

scoped and referenced text for written standards for the I-Codes but, rather, provides the policy underpinnings on which sound code change proposals can be based.

C106.2 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 outlines the conventions used in making references to other portions of the code. By implication then, references to other codes would be required to specify those codes.

C106.3 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 also governed by a requirement in the code. In such circumstances, the requirements of the code would be in addition to that other law, 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* that 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 obtaining 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 collateral to the work being done under the code's permit, such as sewer connections, water taps, driveways or signs, 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. Where 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, the owner's authorized 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.

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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 as set by the applicable governing authority.

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

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 not have a 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 having a material interest in the decision of the code official with an appeals process. 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 not have 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 were used in the preparation of the commentary for this chapter of the code.

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

ANSI/ASHRAE/IESNA 90.1-13, *Energy Code for Commercial and High-rise Residential Buildings*—Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 2013.

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. Every word, term and punctuation mark can alter a sentence's meaning and, if misused, muddy its intent. Further, 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 in which they are being used.

For these reasons, maintaining a consensus on the specific meaning of terms contained in the code is essential. Chapter 2 [CE] performs this function by stating clearly what specific terms mean for the purpose of the code.

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 Plumbing 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® (I-Codes®). 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*® (IPC®) and the *International Mechanical Code*® (IMC®) versus that of the *International Building Code*® (IBC®).

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. Often, construction terms used throughout the code may not be defined in Chapter 2 [CE] or a dictionary. In such a case, the definitions contained in the referenced standards (see Chapter 6 [CE]) and published textbooks on the subject in question are good resources.

SECTION C202 GENERAL DEFINITIONS

ABOVE-GRADE WALL. See "Wall, above-grade."