

CHAPTER 1

ABOUT THE CODES

A variety of codes regulate the design and construction of buildings and building interiors. In addition, a large number of standards and federal regulations play a major role. The most nationally recognized codes, laws, and standards organizations are described in this chapter. Accessibility codes and regulations will be discussed in Chapter 2. Most of the codes and regulations are referenced and discussed throughout this book as they pertain to the interior of a building.

While reading about each of these codes, standards, and regulations, keep in mind that *not all of them will be enforced by every code jurisdiction*. (See “Definitions” in the Introduction.) The jurisdiction chooses which code publications to use and the edition of each publication. For example, a jurisdiction could decide to adopt the 2015 edition of the *International Building Code (IBC)* or continue to use the 2009 edition, or a jurisdiction could decide to adopt the *NFPA 101, Life Safety Code*, as a stand-alone document or to be used in conjunction with a building code. The jurisdiction could also make a variety of local amendments that add or delete clauses or sections from a code. Knowing which codes are being enforced is necessary in order to research codes for a particular project. (See Chapter 11.)

In addition, each code publication references certain standards; therefore, the standards that will apply depend on the required code publications. The code will indicate the specific edition of the standard that should be followed. For example, all the standards referenced throughout the *IBC* are listed in a separate chapter at the end of the publication; this list includes the year of the publication of each standard. Other standards may not be referenced by a code. Instead, they may be individually required by a jurisdiction or they may be accepted as industry-wide standards. For example, even though some finish and sustainability standards may not be *required* by a local jurisdiction, designers may want to follow them for safety, health, and/or liability reasons. The only regulations that are consistent in every jurisdiction are the regulations that are made mandatory by federal law.

Note

There are two main sets of codes: the ICC codes and the NFPA codes. Many of the ICC codes, such as the *International Building Code (IBC)*, have been widely adopted. Popular NFPA codes include the *Life Safety Code (LSC)* and the *National Electrical Code (NEC)*.

A BRIEF HISTORY

The use of regulatory codes can be traced back as far as the eighteenth century BCE to the *Code of Hammurabi*, a collection of laws governing Babylonia. The *Code of Hammurabi* made the builder accountable for the houses he built. If a wall fell, the code required the builder to fix it at no cost to the owner. If one of his buildings fell and killed someone, the builder would be put to death. In the Old Testament, builders are instructed to build parapets around the roof of a house so they would not be guilty for the death of someone who fell from the roof. After the Great Fire of London in 1666, the Rebuilding of London Act was enacted to require fire resistance qualities in the rebuilding. We have been concerned about the safety of buildings for a long time.

In the United States, the first codes addressed fire prevention. The first building law on record was passed in 1625 in what was then called New Amsterdam (now New York). It governed the types and locations of roof coverings to protect the buildings from chimney sparks. Then, in the 1800s, there were a number of large building fires, including the famous Chicago fire of 1871, which caused many fatalities. As a result, some of the larger U.S. cities developed their own municipal building codes. Some of these requirements are still in use today. In the mid-1800s, the National Board of Fire Underwriters was set up to provide insurance companies with information on which to base their fire damage claims. One of the results was the publication of the 1905 *Recommended Building Code*—a code that helped spark the original three model building codes. Another group that originally represented the sprinkler and fire insurance interests also formed, and in 1896 this body published the first standard for automatic sprinklers (later known as *NFPA 13*). This group went on to become the National Fire Protection Association (NFPA).

The growing awareness of building safety inspired the development of other organizations and additional codes. The first of the original three model code organizations formed in 1915. Later known as the Building Officials and Code Administrators International (BOCA), it produced the *BOCA National Building Code* and other codes. The BOCA codes were generally used in the eastern and mideastern regions of the United States. In 1922, 13 building officials created what eventually became the International Conference of Building Officials (ICBO), which published the *Uniform Building Code* and other uniform codes. These codes were used primarily in the western regions of the United States. A similar group of building officials met in 1940 to form the Southern Building Code Congress International (SBCCI), producing codes for the southern states. These three legacy organizations (BOCA, ICBO, and SBCCI) founded the

International Code Council (ICC) in 1994, later consolidating and putting their effort into one set of codes. Each individual organization eventually stopped producing its own separate code publications.

Meanwhile, the federal government was also creating *regulations*. Initially, most of these laws pertained to government-built and -owned buildings. Today there are federal regulations that also affect private sector buildings. In 1972, Congress passed the Consumer Product Safety Act (CPSA) and formed the Consumer Product Safety Commission (CPSC). The initial goal of the CPSA and the CPSC were to protect the public from unreasonable risks of injury associated with the use of consumer products. They have the power to assist in the development of voluntary standards with industry representatives as well as to declare mandatory standards to be met for a specific industry. These initiatives helped to sponsor the development of a number of independent standards-writing organizations and trade associations. In many cases, industry representatives, various governmental agencies, and consumer groups work together to develop standards that address the safety of products and practices. Many of these affect the building industry. Additional legislation since then has been used to promote this process.

Today, there are various building-related codes in existence in the United States, a wide variety of federal and state regulations, and hundreds of standards organizations and regulatory and trade associations for almost every facet of the industry. Only the most widely recognized ones as they pertain to interior projects are described below to provide the groundwork as they are discussed throughout this book.

CODE PUBLICATIONS

Codes are collections of regulations, ordinances, and other statutory requirements put together by various organizations. Each jurisdiction decides which codes it will follow and enforce. (See more on jurisdictions in Chapter 11.) Once certain codes are adopted, they become law within that jurisdiction.

The ICC produces a complete set of codes, known as the *International Codes*—or *I-Codes*, for short. Many of the I-Codes are used throughout the United States and in other countries including Jamaica, Honduras, and Afghanistan. Other countries use the I-Codes as a basis for their codes, including Haiti, Colombia, Mexico, Saudi Arabia, Abu Dhabi, and others. The interior-related ICC code publications are listed in Figure 1.1. These are the codes that will be discussed throughout this book.

Originally, the National Fire Protection Association (NFPA) concentrated on developing standards as well as a few codes such as the *Life*

Note

In addition to federal regulations, a state may also create its own regulations, which would be required within all jurisdictions of that state.

ICC I-Codes®		NFPA C3-Codes	
IBC ®	International Building Code®	NFPA 5000 ®	Building Construction and Safety Code®
ICC PC ®	ICC Performance Code® for Buildings and Facilities		(performance requirements included in each code)
IFC ®	International Fire Code®	NFPA 1 ®	Fire Code® (previously titled the Uniform Fire Code or UFC)
	(similar requirements found in IBC and IFC)	NFPA 101 ®	Life Safety Code® (LSC)
IPC ®	International Plumbing Code®		
IMC ®	International Mechanical Code®		
	(refers to NEC)	NFPA 70 ®	National Electrical Code® (NEC)
IECC ®	International Energy Conservation Code®	NFPA 900 ®	Building Energy Code® (incorporating ASHRAE 90.1 and 90.2 and referenced by NFPA 500)
IRC ®	International Residential Code® for One- and Two-Family Dwellings		(residential requirements included in other codes)
IEBC ®	International Existing Building Code®		(existing building requirements included in each code)

Figure 1.1 Comparison of code publications. (This chart is a summary of 2015 publications from the International Code Council® and the National Fire Protection Association that pertain to interior projects. Neither the ICC® nor the NFPA assumes responsibility for the accuracy or completeness of this chart.) NFPA 101®, Life Safety Code®, and NFPA 5000®, Building Construction and Safety Code® are registered trademarks of the National Fire Protection Association, Quincy, MA.

Note

The *legacy* codes include the *National Building Code*, *Standard Building Code*, and the *Uniform Building Code*. These codes were used in the United States before the development of the I-Codes and C3-Codes.

Note

Several codes developed by NFPA are widely adopted, including *Life Safety Code (NFPA 101)* and the *National Electrical Code (NFPA 70)*.

Safety Code and the *National Electrical Code*. NFPA now develops over 300 codes and standards, some of which were created in collaboration with other industry organizations. This series of codes is called the *Comprehensive Consensus Codes*—or *C3-Codes*, for short. Currently, the NFPA's collaboration partners include the Western Fire Chiefs Association (WFCA) and the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE). Several of the NFPA codes are summarized in Figure 1.1, although many of the newer ones have not yet been widely adopted.

The ICC and NFPA codes are organized differently. Most of the I-Codes are organized using the *Common Code Format*. The code is arranged by chapters that address various aspects of a building and include specific requirements for each occupancy or building type. The C3-Codes use the *Manual of Style*, where there are several key chapters at the beginning and end of the code and the rest of the chapters are divided by occupancy type. The occupancy chapters allow the code review to start in the chapter that pertains to the project's occupancy type, which then indicates when to reference other chapters.

CODE AND STANDARDS CHANGES

Code and standard organizations have a membership that consists of a wide range of individuals. These often include code officials, design professionals, building users, academics, manufacturers, building owners, consumers, contractors, and others. When changes to an existing standard or new standards are needed, many standards organizations use a *consensus process* developed by the American National Standards Institute (ANSI) called the *ANS process*. This system attempts to assure that the standard is developed by a qualified organization, that groups and individuals who may be directly, materially, or financially affected by the proposal including industry representatives and the public can have input on the proposals, and that there is appropriate due process. It is also intended to balance the process and avoid the dominance from any one group or industry. However, each code and standards organization, including the NFPA and the ICC, has its own specific variations to the process.

The basic process begins with a request for public input for changes to a code or standard. Typically, both members and nonmembers can propose and comment on changes. Once comments are received, they are formulated into a proposal by a technical committee. Then they are published for public comment. Again, members and non-members can typically make comments. These comments are used to modify the proposal to its final form. For NFPA standards, the proposal is then presented and voted on by the membership at their yearly conference for the purpose of making a recommendation to the Standards Council. The Standards Council may be composed of industry representatives but a single industry cannot be heavily represented. This council takes the membership votes into consideration but makes the final decision itself. Appeals can also be made at this point.

The International Code Council (ICC) uses what it calls a *governmental consensus process*, or *open process*, when developing its codes. Much of the process is the same as described above. The main difference is that the final approval of proposals that were not decided on the consent agenda is made by the “governmental” members of the ICC rather than by a small council composed of various professionals. These governmental members consist only of code officials and employees of the governmental agencies that administer and enforce the codes, not industry representatives.

Once a proposed code or standard change is voted on and approved, it is adopted by the organization. When the next full edition of the code or standard is published, it incorporates all the changes into one text.

In the past, the legacy codes catered to certain regions of the country. The current model codes by the ICC and NFPA now take into account the many regional differences found throughout the United States. For example, western states need more restrictive seismic building code provisions to account for the earthquake activity in those areas, and the northern states need codes to account for long periods of below-freezing temperatures. These various requirements are now in the current

Note

Federal agencies may choose to use ICC and NFPA codes to establish safe building practices. But they are not considered “adopted” by the federal agency.

building codes. In some cases, a jurisdiction will make amendments to the code it adopts to create additional requirements unique to its area.

A few states and cities continue to develop their own independent set of codes. More often, jurisdictions that want a specialized code are working with the ICC to revise and amend the base requirements of the *International Building Code (IBC)* or other I-Code to meet their needs. The ICC then publishes the revised code specifically for that jurisdiction as a customized code and under a different title. For instance, the newest adopted set of codes in California is based on 2015 I-Code series and is published as *California Title 24 Codes*. And most recent New Jersey building codes are *2015 IBC, New Jersey Edition*, which is the *IBC* with the approved modifications included. This is also typical for use of the I-Codes in other countries including the Caribbean, Central America, Mexico, and the Middle East. The *Honduras Building Code* and the *Mexico Residential Building Code* are examples. Some jurisdictions have a complete set of unique codes, while others may have just one or two special code publications and use the standard I-Codes for everything else.

Most codes are updated on a three-year cycle, but each jurisdiction has its own schedule for reviewing and adopting the new codes. Not only is it extremely important to know which code publication and standards apply to a project, it is also important to know the edition. (See the inset titled “Reviewing New Code Editions” in Chapter 11.) Each of the codes produced by the ICC and NFPA, as they pertain to interior projects, is described in this section. The various standards are described later in this chapter. Be sure to contact the local jurisdiction to obtain a list of the approved code publications and any other special requirements or addendums. The list of adopted codes can also typically be found on the website of the building code department of the jurisdiction. (See Chapter 11.) Go to both the ICC website (www.iccsafe.org) and the NFPA website (www.nfpa.org) to learn about the latest code adoptions.

Note

When a code is updated, a vertical line in the margin indicates a change from the previous edition and an arrow or bullet in the margin signifies that a section was removed. This allows a quick scan for changes.

Note

A building code including the *IBC* is often used in conjunction with other NFPA codes or standards, including *NFPA 101* and *NEC*.

Building Codes

Building codes direct the construction requirements, building systems, and interior characteristics of a building. They may also place restrictions on hazardous materials or use of equipment within a building. The principal purpose is to ensure the health, safety, and welfare of the people using these buildings, so codes include requirements affecting structural, mechanical, electrical, plumbing, life safety (egress), fire safety (detection, alarm and suppression), natural light and air, accessibility standards, and energy conservation. Although other codes and standards may also be referenced, the building codes address each of these topics.

The most widely adopted building code is the *International Building Code (IBC)* published by ICC. It has been adopted at the state or local level in all 50 states, and most state-specific building codes are now based on the *IBC*. It is also used in several other countries. (See the inset titled “Codes and Standards in Other Countries” in this chapter.) The *IBC* was first published in 2000, with the most current edition published in 2015 and the next edition due in 2018. The NFPA first published the *Building Construction and Safety Code*[®] (*NFPA 5000*[®]) in 2003; however, it is not widely adopted. Its most current editions are 2015 and 2018.

Although there are more than 30 chapters and 13 appendixes in the *IBC* and even more chapters in the *NFPA 5000*, not all of them pertain to the interior of a building. The building interior–related chapters in both the *IBC* and the *NFPA 5000* are summarized in the comparative list in Figure 1.2. The chapters most commonly required for interior projects are listed as follows and are discussed throughout this book. Certain projects may require other sections of the building code to be referenced as well. For example, the information in the chapters on glass and glazing, plastic, or existing structures may also be required. (See Figure 1.2.)

- Use or Occupancy Classifications
- Special Use or Occupancy Requirements
- Types of Construction
- Fire and Smoke Protection Features
- Interior Finishes
- Fire Protection Systems
- Means of Egress
- Accessibility
- Interior Environment
- Plumbing Systems

To cover as much as possible, the building codes frequently reference other codes and standards. These include a plumbing code, a mechanical code, a fire prevention code, an energy conservation code, and an existing structures code, most of which are described later in this chapter. Although many of these topics are listed as chapters in the building codes, the chapters typically refer to another code or standard for complete information. (Refer to Figure 1.1 for a full list of interior-related code publications.) In addition, other nationally recognized standards organizations and publications are referenced by each of the codes. The *IBC* lists all the codes and standards it references in Chapter 35 of the code. (See also the section “Standards Organizations” later in this

Note

When an ICC code is modified for a special edition, such as the *2015 IBC, New Jersey* edition, a double line indicates changes from the original *IBC*.

Note

Because the *IBC* is the most widely adopted building code, this book concentrates on its requirements and its relationship to other code documents.

Note

NFPA 5000 is another building code, but it is not widely adopted as the *IBC*.

Note

Most codes contain appendixes or annexes. These provide clarifying information about the requirements in the code or are available for separate adoption by a jurisdiction.

Note

The National Technology Transfer and Advancement Act of 1996 encouraged use of private sector and voluntary standards. This promoted the use of NFPA and I-Codes by federal agencies such as the OSHA, DOD, DoE, CMS, and others.

IBC (2015) International Building Code	NFPA 5000 (2015) Building Construction & Safety Code	LSC (2015) Life Safety Code™
Chapter 2 Definitions	Chapter 3 Definitions	Chapter 3 Definitions
Separate References separate code: <i>ICC Performance Code for Buildings and Facilities (ICCPC)</i> OR <i>IBC</i> Section 104.11	Chapter 5 Performance-Based Option	Chapter 5 Performance-Based Option
Chapter 3 Use and Occupancy Classification	Chapter 6 Classification of Occupancy, Classification of Hazard of Contents, and Special Operations Varies Multiple chapters (16–30), each on a different occupancy classification	Chapter 6 Classification of Occupancy and Hazard of Contents Varies Multiple (even) chapters (12–42), each on a different new occupancy classification
Separate References separate code: <i>International Residential Code (IRC)</i>	Chapter 22 One- and Two-Family Dwellings	Chapter 24 One- and Two-Family Dwellings
Chapter 4 Special Detailed Requirements Based on Use and Occupancy	Chapter 31 Occupancies in Special Structures Chapter 32 Special Construction Chapter 33 High-Rise Buildings	Chapter 11 Special Structures and High-Rise Buildings
Chapter 5 General Building Heights and Areas	Chapter 7 Construction Types and Height and Area Requirements	(none)
Chapter 6 Types of Construction		
Chapter 7 Fire and Smoke Protection Features	Chapter 8 Fire-Resistive Materials and Construction	Chapter 8 Features of Fire Protection
Chapter 8 Interior Finishes	Chapter 10 Interior Finish	Chapter 10 Interior Finish, Contents, and Furnishings
Chapter 9 Fire Protection Systems	Chapter 55 Fire Protection Systems and Equipment	Chapter 9 Building Service and Fire Protection Equipment
Chapter 10 Means of Egress	Chapter 11 Means of Egress	Chapter 7 Means of Egress
Chapter 12 Interior Environment	Chapter 49 Interior Environment	(none)
Chapter 13 Energy Efficiency	Chapter 51 Energy Efficiency	(none)
Chapter 24 Glass and Glazing	Chapter 46 Glass and Glazing	(none)

Figure 1.2 Comparison of building codes and Life Safety Code®. (This chart is a summary of information contained in the 2015 editions of the International Building Code®, the NFPA 5000®, and the Life Safety Code®. Neither the ICC nor the NFPA assumes responsibility for the accuracy or completeness of this chart.)

IBC (2015) International Building Code	NFPA 5000 (2015) Building Construction & Safety Code	LSC (2015) Life Safety Code™
Chapter 26 Plastic	Chapter 48 Plastics	(none)
Chapter 27 Electrical	Chapter 52 Electrical Systems	(none)
Chapter 28 Mechanical Systems	Chapter 50 Mechanical Systems	(none)
Chapter 29 Plumbing Systems	Chapter 53 Plumbing Systems	(none)
Chapter 34 Existing Structures OR separate code: <i>International Existing Building Code (IEBC)</i>	Chapter 15 Building Rehabilitation	Chapter 43 Building Rehabilitation Varies Multiple (odd) chapters (13–39), each on a different existing occupancy classification
Chapter 35 Referenced Standards	Chapter 2 Referenced Publications	Chapter 2 Referenced Publications

Figure 1.2 (Continued)

chapter.) Since the *IBC* is the most widely used building code, it is the one discussed throughout this book.

Performance Codes

Code requirements can be written in one of two ways: prescriptive or performance. A *prescriptive* code sets out a precise requirement, explaining exactly what must be done to meet the code. A *performance* code, in contrast, provides an objective but not the specifics of how to achieve it. The purpose of performance codes is to allow unique solutions in design and engineering and in the use of materials and systems of construction, and to allow innovative solutions to meet code requirements in ways that can be appropriate to the project but not anticipated by the code. Historically, most code requirements have been written in a prescriptive manner, although performance concepts have been included in the codes for some time. In the *IBC*, an example of this can be found in *Section 104.11*, which is titled “*Alternative materials, design and methods of construction and equipment*” (referred to as “*IBC Section 104.11*” throughout this book). The NFPA codes also recognize an “*equivalency*,” which would be similar to using *Section 104.11* in the *IBC*. In both cases, the final solution must be approved by the code official. (See also the inset titled “*ICC Evaluation Service*” in this chapter.)

The NFPA and the ICC codes provide additional performance-based options to the prescriptive requirements. The ICC developed a separate

code, the *ICC Performance Code for Buildings and Facilities (ICCPC)*, in 2001. Updated most recently in 2015, it is on a three-year revision cycle. The *ICCPC* is meant to be used in conjunction with the *IBC*, as well as most of the other I-Codes. It addresses the overall scope of each of the I-Codes in performance-based language and describes how to use them together. However, the *ICCPC* cannot be used with the other I-Codes unless it is adopted by the code jurisdiction. Currently, it has not been adopted as widely as the prescriptive-based *IBC*. If it has not been adopted, you must work with a code official using *IBC Section 104.11* to integrate performance criteria into the design solution.

Note

A more comprehensive list of code adoptions can be found on the ICC website (www.iccsafe.org) and the NFPA website (www.nfpa.org).

Note

The use of performance codes started in other countries: the United States is one of the last major countries to use them. Australia was one of the first to use them. Other countries that use performance codes include Canada, Japan, the Netherlands, New Zealand, Sweden, and the United Kingdom.

Note

Typically, only a certain aspect of a project will be based on a performance-based code or on the alternative materials, design, and methods section in the *IBC*. The rest of the project would then be designed using standard prescriptive code requirements.

The NFPA, in contrast, does not have a separate performance publication. Instead, the NFPA codes include both performance requirements and prescriptive requirements. For example, Chapter 5 of the *Life Safety Code* is titled “Performance-Based Option.” In addition, the NFPA recommends referencing Chapter 4, which discusses some of the code’s goals, assumptions, and objectives and provides additional insight in using prescriptive-type codes. A jurisdiction that adopts one of the NFPA codes does have the option to exclude Chapter 5, so confirm that the performance requirements are allowed before using them. *NFPA 5000* includes a separate chapter to provide a performance option. In both cases the performance-based requirements set an objective and provide an administrative process to follow for approval of the design solution. Many other countries use performance-based codes as well. Some examples include Australia, United Kingdom, Hong Kong, Japan, and others. (See the inset titled “Codes and Standards in Other Countries” in this chapter.)

A good example of the difference between a prescriptive requirement and a performance criterion can be found in the spacing of guardrail elements. In the *IBC*, the prescriptive requirement specifies that rail elements “shall not have openings which allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required guard height.” This requirement was developed specifically with children in mind. The *ICC Performance Code* does not mandate this narrow spacing. Instead, it specifies “that the openings shall be of an appropriate size and configuration to keep people from falling through based upon the anticipated age of the occupants.” If it can be shown that children are not expected to frequent the building, then different spacing of the guardrail elements may be allowed. An example might be a manufacturing facility. (See Chapter 10 and the inset titled “Performance Codes” for additional information.)

When using performance codes (or alternative methods and materials such as those allowed by *IBC Section 104.11*), it becomes even more important to work with the code official in the early stages

of a project. Performance codes encourage and often require a team approach to the design solution. Additional documentation is often required. Ultimately, the code official must agree that the design and the supporting documentation meet the intent of the code based on the assumptions, parameters, and criteria that were set at the beginning of the project. (See the inset titled “Risk Factors and Hazards in Occupancies” in Chapter 2.)

The use of performance codes may be most effective in addressing unique situations, including the use of new technology, incorporation of sustainable design, and the reuse of existing and historic buildings, which may not easily meet the strict requirement of the prescriptive codes. In most cases, performance codes will apply only to a specific aspect of a project and will not totally replace the required prescriptive codes.

Fire Codes

Both the ICC and NFPA have a fire code. The fire code produced by the ICC was first published in 2000 based on the fire codes of the legacy organizations that formed the ICC, and is called the *International Fire Code (IFC)*. Like the other I-Codes, it is on a three-year revision cycle, with newer editions in 2015 and 2018. Beginning in 2003, NFPA issued a fire code titled *Uniform Fire Code*[®] (*UFC*) or *NFPA 1*[®]. This code merged an original *NFPA 1* with a legacy code by the Western Fire Chief Association (WFCOA). It was revised again in 2012 and is now simply known as the *Fire Code* (or *NFPA 1*). The new version is organized similarly to the other C3-Codes and includes a chapter for performance-based design. Much of *NFPA 1* is taken from various other codes and standards produced by the NFPA, such as the *Life Safety Code*. When a specific requirement comes from another publication, *NFPA 1* references the original document and section.

When adopted by a jurisdiction, a fire code is typically used in conjunction with a building code. The fire code addresses building conditions that are hazardous and could cause possible fire and explosions. This could be due to a number of reasons, such as the type of occupancy or use of the space, the type of materials used or stored, and/or the way certain materials are handled. The fire code becomes even more important with building types that may not be fully covered by the building code. For example, it includes specifics for a paint booth in a car body shop, a commercial kitchen in a restaurant, and a dry-cleaning facility. However, a fire code also has additional general requirements that must be met. For example, it includes information on fire extinguishers as well as interior elements not discussed in the building codes.

Note

ICC-ES Evaluation Reports, ICC-ES Environmental Program, and Product Listings provide evidence that a product meets code requirements and are helpful when using performance codes or the alternative materials, design, and methods sections of the *IBC*.

ICC EVALUATION SERVICE

ICC Evaluation Service (ICC-ES) is a subsidiary of the International Code Council. It evaluates new materials, methods of construction, and testing to make sure they comply with the I-Codes, as well as other codes in the United States. The ICC-ES works closely with various accredited testing laboratories and approved inspection agencies to accomplish this. These laboratories and agencies are reviewed and approved by the International Accreditation Service (IAS), another independent subsidiary of the ICC.

The request to evaluate a product or system often comes from the manufacturer, but others, such as builders, code officials, engineers, architects, and designers, can do so as well. For example, a manufacturer might request an evaluation for a newly developed building product, or a designer might request a job-specific evaluation. The ICC-ES develops acceptance criteria to evaluate the characteristics of the product, the installation of the product, and the conditions of its use to verify that it meets or exceeds the requirements of the codes and standards. Once a product or system is approved, an ICC-ES Evaluation Report is issued and made available to the industry. These reports of evaluated products can be accessed and downloaded for free at www.icc-es.org.

Another ICC-ES evaluation service, the ICC-ES Environmental Program, (formerly known as Sustainable Attributes Verification and Evaluation Program - SAVE®) verifies that a product has been independently tested to meet the sustainable attributes required by *International Green Construction Code (IgCC)*, *International Energy Conservation Code (IECC)*, *California Green Building Code (CALgreen)*, *ASHRAE 189.1*, or as part of green building rating systems such as LEED, Green Building Initiative GBI-01, ICC 700, etc. Also, ICC-ES PMG Listing and ICC-ES Building Products Listing Programs indicate product compliance with the codes specifically in the areas of plumbing, mechanical, and fuel gas and building products.

These evaluation reports and product listings can help designers to use and specify a wider range of innovative, sustainable, and code-compliant products. They are especially helpful as part of a performance-based design or when using the alternative materials, design, and methods sections in the *IBC*. When a designer specifies a product already approved by the ICC-ES, the report/listing provides a third-party validation that the product meets the minimum specified code or standard. This is helpful to the code official reviewing the project (although the code official still has to approve its use). This process also allows manufacturers to gain national recognition of a new product.

Other evaluation services are available as well. For example, some states, such as California and Florida, have developed their own uniform requirements to meet their statewide codes.

There are a few chapters or sections in the fire codes that will be referenced more frequently for interior projects. They include the following:

- Means of Egress
- Fire-Resistance-Rated Construction
- Fire Protection Systems
- Interior Finishes
- Furnishings and Decorative Materials

These are similar to the chapters in the building codes. In addition, the fire codes include a chapter on emergency planning and preparedness, which addresses such things as evacuation plans and fire drills for each type of occupancy. Although this chapter is geared more toward building owners and fire departments, there are certain occupancy provisions that may also affect an interior project, such as signage and keying requirements. Many of the various fire code requirements related to interiors and the chapters listed here are mentioned throughout this book.

Life Safety Code®

The *Life Safety Code (LSC)* was one of the first codes published by NFPA. It is also referred to as *NFPA 101*®. Like the building codes, the *LSC* is typically revised every three years. The most current editions are those of 2015 and 2018, but a jurisdiction may still be using an older version. The *LSC* is not a building code. It is a life safety code that concentrates on problems involving the removal or evacuation of all persons from a building. The purpose of the code is to establish minimum requirements for the design, construction, operation, and maintenance of buildings as required to protect building occupants from danger caused by fire, smoke, and toxic fumes. The difference between the *LSC* and the building codes can also be seen in Figure 1.2. Several *LSC* chapters correspond to those found in the building codes, but since it is not a building code, it does not address all the issues required for the construction of a building. For example, it does not include chapters on accessibility, glazing, or plumbing. Another unique aspect of the *LSC* is that it is used to measure the safety of a building being constructed, an existing building in use and an existing building that is being renovated.

The *LSC* uses the NFPA's *Manual of Style* format. The first part of the *LSC* concentrates on the broad topics of occupancies, means of egress, fire protection, and interior-related items setting the standard requirements. The remainder is divided into chapters by occupancy classification for

Note

The *Life Safety Code* does have another corresponding document, *NFPA 101A, Alternative Approaches to Life Safety*. This document is intended to be used in conjunction with, but not in place of, the *LSC* when alternate solutions are needed.

both new and existing buildings. For example, there is a chapter on new apartment buildings and existing apartment buildings. (This is different from *NFPA 5000*, which has only one chapter per occupancy and puts all existing requirements into one separate chapter.) This distinction between new and existing is made to allow certain requirements (which may have been acceptable in a previous edition) to remain in place or indicate that a condition must meet the standard requirement. Once the occupancy classification and whether the occupancy will be considered new or existing is determined, most of the research will be concentrated in one chapter of the *LSC*. The occupancy chapter will then refer to other chapters as required. (See Chapter 2 for more detail.)

The *LSC* also includes a chapter on alternative performance-based options. This provides the ability to select the requirements that best suit a specific project. (See the section “Performance Codes” earlier in this chapter and the inset titled “Performance Codes” in Chapter 11.) Like other codes, the *LSC* also references additional code and standard publications. These are summarized in Chapter 2 of the *LSC*. (See also the section on the *NFPA* standards later in this chapter.)

The *LSC* is used throughout the United States and in several other countries. It is currently used in at least one jurisdiction in every state and has been adopted statewide by at least 43 states in the United States. (A map of the locations can be found on the *NFPA* website at www.nfpa.org.) It is not uncommon for a jurisdiction to adopt both the *IBC* and the *LSC*. When a jurisdiction requires both, the design must satisfy both sets of requirements. Sometimes a requirement in the *LSC* might conflict with one in the building code. When this occurs, the more restrictive requirement must be met. Or, if necessary, work with the local code official to determine the best way to satisfy the two codes. Throughout this book, many *LSC* requirements are discussed in relation to those found in the *IBC*.

Plumbing Codes

The *International Plumbing Code (IPC)* was the first I-Code published by the ICC, in 1995. The *IPC* is revised every three years. The *Uniform Plumbing Code (UPC)* became part of the *NFPA*’s set of C3-Codes beginning in 2003. It is produced in conjunction with the International Association of Plumbing and Mechanical Officials (IAPMO). The most current versions of the *IPC* and the *UPC* are the 2015 and 2018. In addition, the Plumbing-Heating-Cooling Contractors Association also publishes its *National Standard Plumbing Code (NSPC)*. The newest edition is 2015 and includes requirements to promote sustainable practices. Currently, most code jurisdictions use the *IPC*.

Note

The *IBC* also includes a chapter on plumbing fixtures that duplicates some of the information found in the *IPC*. This chapter and other plumbing requirements are explained in Chapter 7 of this book.

Most of the chapters in the plumbing code are geared to the engineer and the licensed plumbing contractor. In a project requiring plumbing work, collaboration with a licensed engineer who will design the system is usually required. Notice in Figure 1.2 that both building codes have a chapter on plumbing systems as well. These chapters refer to the respective plumbing code. However, in the *IBC*, the plumbing chapter also includes the minimum plumbing facilities section of the *IPC* with the related table. The plumbing fixture table and its related requirements found in the *IPC* are discussed in this book. When designing interior projects, the plumbing code chapter is used primarily to determine the minimum number and type of plumbing fixtures required for a particular occupancy classification. It also includes information on how to locate these fixtures in a building. These requirements as well as the code table are discussed in more detail in Chapter 8.

Mechanical Codes

Similar to the plumbing codes, a mechanical code is also published by the ICC and NFPA. The *International Mechanical Code (IMC)* was first published by the ICC in 1996. The more current editions include the 2015 and 2018 versions. The *IMC* is widely adopted. The *Uniform Mechanical Code (UMC)* became part of the NFPA's set of C3-Codes starting in 2003. Its most current editions are 2015 and 2018. Jurisdictions may choose between the *IMC* and the *UMC*.

Again, as shown in Figure 1.2, each building code has a chapter on mechanical systems. However, this chapter refers to the respective mechanical code. The mechanical codes are geared to mechanical engineers and professional installers. A designer may rarely have to refer to the mechanical codes. However, familiarity with some of the general requirements and terminology is useful when designing an interior project. These are discussed in more detail in Chapter 7.

Electrical Codes

The *National Electrical Code (NEC)*, published by the NFPA, is one of the oldest codes. Originally published in the late 1800s, it is now part of the NFPA C3-Code set. The more current editions include 2014 and 2017. Also known as *NFPA 70*, the *NEC* is the most widely used electrical code and is the basis for electrical codes in almost all code jurisdictions. Although the ICC briefly published a set of administrative provisions for use of the *NEC*, that was phased out. There is no separate electrical code developed by the ICC.

The electrical chapter in the *IBC* and *NFPA 5000* (see Figure 1.2) references the *NEC*. In the *IBC*, this chapter also includes a section on emergency and standby power systems. It is typically the responsibility of an engineer to design electrical systems using the *NEC*. Nevertheless, when designing an interior project, it is necessary to know certain basic electrical code requirements, especially when locating electrical outlets and fixtures and when specifying light fixtures and other equipment. Therefore, it is important to have an understanding of this code (as well as the energy codes, as explained next). The most common requirements are explained in Chapter 9.

Energy Codes

Both the ICC and the NFPA have an energy conservation code that establishes minimum requirements for energy-efficient buildings. The ICC has the *International Energy Conservation Code (IECC)*, which was first published in 1998; the most current editions include 2015 and 2018. It includes prescriptive and performance-related provisions. It also covers both residential and commercial buildings. For commercial buildings, the *IECC* allows the use of Chapter 5 in the *IECC* or *ASHRAE 90.1*. (See below.) A majority of states in the United States currently require use of the *IECC*.

In 2004, the NFPA came out with its first energy conservation code, titled *NFPA 900, Building Energy Code (BEC)*. The most current edition is 2016. The *NFPA 900* establishes the provisions for administering and enforcing two existing ASHRAE energy standards: *ASHRAE 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings* (geared to commercial buildings), and *ASHRAE 90.2, Energy-Efficient Design of New Low-Rise Residential Buildings* (geared to residential homes). On a three-year cycle, both standards were most recently updated in 2013 and 2016. The same requirements are also included in *NFPA 5000*.

In addition, the U.S. Department of Energy (DOE) has established *ASHRAE 90.1* as a requirement under the federal Energy Policy Act (EPAct) of 2005. Originally, the DOE required all states to have energy codes in place that are at least as strict as the 2001 edition of the standard. Since then, the DOE reviews each new edition of *ASHRAE 90.1* and determines if it will become the new standard. If updated, states have two years after that decision to update their energy requirements to meet the new level of energy efficiency to be compliant. As of 2016, the *ASHRAE 90.1-2013* is the standard.

The building codes have a chapter on energy efficiency; however, the chapter simply references the respective energy code. Energy

Note

Although some ISO standards are similar to standards found in the United States, there are often differences. They may seek similar results, for example, but use different equipment and/or means of measuring to determine the result.

Note

ASHRAE 90.1 is a standard geared to energy efficiency in commercial buildings. The DOE requires the use of the 2013 edition throughout the United States. (Newer editions might be required by a state or local code jurisdiction.)

conservation codes address many sustainable aspects of a building, starting with the energy efficiency of the building envelope, which promotes adequate thermal resistance and low air leakage. For example, in an exterior wall the code will specify the quantity and type of glass that can be used and the rating of the wall insulation required. When designing the interior, the energy codes will include requirements to maximize the amount of daylight entering the space, minimize the lighting densities, and require the use of occupant-sensing controls.

The energy codes also cover the design, selection, and installation of energy-efficient mechanical systems, water-heating systems, electrical distribution systems, and illumination systems. These requirements, as well as one of the codes tables in the *IECC*, are further explained in Chapters 8 and 9. Other energy requirements related to the interior of a building are mentioned throughout the book. (See also Appendix A for additional sustainability information.)

Sustainability Codes

Building codes and standards have historically concentrated on the safety of a building and its occupants; however, codes and standards to address the sustainability of the buildings is a fast-growing concept in the United States. Typical codes limit the potential physical hazards in the built environment and provide clear paths to escape dangerous conditions. Sustainability codes and standards, however, focus on how the building's environment and materials affect the occupants while occupying the building and how the construction and existence of the building affect the world around it.

Some of the codes and standards discussed earlier in this chapter incorporate sustainability requirements. The energy codes are a strong example (see preceding section). Other examples include the requirements for water-efficient fixtures and waterless urinals in the *International Plumbing Code (IPC)* and the various provisions for indoor air quality in several of the ICC codes. Some code jurisdictions have incorporated their own sustainability requirements as part of their code process. Some states even require the use of a sustainability rating system, such as LEED or Green Globes (see Appendix A), as part of the design and code process. (See Chapter 11 for more information.) As more jurisdictions and clients require sustainability measures to be incorporated into design and construction, additional sustainability codes and standards will be developed.

CODES AND STANDARDS IN OTHER COUNTRIES

Building codes and standards are used throughout the world to make buildings safe. Many countries develop their own unique sets of building codes. More recently, there has been a growing use of one or more of the I-Codes and/or the National Fire Protection Association codes or standards in other countries. For example, the *International Building Code*, as well as various other I-Codes, has been either adopted by a country or has been used as the base document for their own code publication. In some cases, these model codes are used in conjunction with locally developed requirements as well. For example, the *IBC* is used as the primary document or base document in the Caribbean, Central America, Mexico, Eastern Europe, and the Middle East. You can find a current list on the ICC website.

In Europe and many other countries many of the codes are considered performance-based, especially energy codes. To help foster communication between various countries and code organizations, the Interjurisdictional Regulatory Collaboration Committee (IRCC) was formed in 1997. The IRCC provides a forum to exchange information concerning the support, development, implementation of codes especially as it relates to performance-based codes. (See the inset titled “Performance Codes” in Chapter 11.)

Note

The *IECC* includes both prescriptive requirements and performance criteria.

The first comprehensive sustainability code was produced by the state of California. First adopted by the state in 2008, the most current edition of the *California Green Building Standards Code (CALGreen)* is 2016. In California, it applies to a variety of occupancies and building types, such as state buildings, housing, schools, hospitals, and correctional facilities. It applies to new construction as well as some additions and alterations to existing buildings. It establishes mandatory minimum requirements and provides two tiers of voluntary compliance levels. Local jurisdictions can choose the level to which they will require buildings to exceed the minimum requirements. The *CALGreen* addresses key sustainability elements of a building. Some characteristics such as water conservation and energy efficiency are similar to requirements found in the energy codes. Other requirements include the use of life cycle assessments (LCAs) when selecting building products and monitoring of volatile organic compounds (VOCs) of building materials and finishes define the interior environmental quality. And other sections of the code promote construction waste management, material conservation and site plan effectiveness. (See Appendix A.) This code references private sources and recognized standards including sustainable product certifications to set benchmarks when selecting building materials and products. Application matrices and worksheets are provided to help implement and document sustainable aspects of the project while using the *CALgreen*. Although

CALgreen was developed for buildings in California, it could be used as a source for the development of green codes by other jurisdictions.

The ICC initially collaborated with the National Association of Home Builders (NAHB) to develop the ICC 700, *National Green Building Standard* released in 2008. However, this standard concentrates on residential occupancies. In 2012, the ICC released the *International Green Construction Code (IgCC)* for new and existing commercial projects. Because the ICC based the IgCC on the CALgreen, there are several similarities. The IgCC establishes minimum green requirements for buildings with four voluntary levels of requirements. It is intended to be used with the other I-Codes, including the IECC and ICC-700, the *National Green Building Standard*, and allows ASHRAE Standard 189.1 as an alternate method of compliance. The latest editions are the 2013 and 2015.

The IgCC is comprehensive and covers a wide variety of occupancies and building types. The IgCC also covers a wide range of topics from conservation of materials, water, and energy to land use and environmental quality, as shown in Figure 1.3. It also includes a chapter on existing buildings as well as building operations and maintenance. Like the CALgreen, it uses performance benchmarks throughout the code to emphasize the outcome instead of specific design mandates. In each chapter, the IgCC provides “compliance electives” within each chapter so that a jurisdiction can more easily customize the code to its needs, allowing for regional differences, variation in site locations, and advanced levels of performance. Checklists are provided within the code so that the project designer can also select compliance electives. (See the section “American Society of Heating, Refrigeration, and Air-Conditioning Engineers” later in this chapter.)

This book highlights the sustainability-related codes and standards as they relate to the various topics and code provisions discussed throughout this book. (See the section “Standards Organizations” later in this chapter for information on various sustainability standards.)

Residential Codes

The *International Residential Code (IRC)*, published by the ICC, first became available in 1998. The more current editions include 2015 and 2018. It is the main code used for the construction of single-family and duplex residences and townhouses. It covers the typical residential home that is not more than three stories in height and has a separate means of egress. All other types of residential uses would be regulated by a building code. For example, if working on a house that is more than three stories or an apartment building where there are more than two dwelling units, one would

Note

The ICC *International Green Construction Code* is for use on commercial projects and the ICC 700, *National Green Building Standard*, is for residential occupancies.

Note

The *International Green Construction Code (IgCC)* was developed by ICC, ASTM International and the American Institute of Architects (AIA).

ICC International Green Construction Code (2015)		ANSI/ASHRAE/USGBC/IES Standard 189.1 (2014)	
Chapter 1	Scope and Administration	Section 1	Purpose
		Section 2	Scope
		Section 4	Administration and Enforcement
Chapter 2	Definitions	Section 3	Definitions, Abbreviations, and Acronyms
Chapter 3	Jurisdictional Requirements and Life Cycle Assessment	Section 4	Administration and Enforcement
Chapter 4	Site Development and Land Use	Section 5	Site Sustainability
Chapter 5	Material Resource Conservation and Efficiency	Section 9	The Building's Impact on the Atmosphere, Materials, and Resources
Chapter 6	Energy Conservation, Efficiency and CO2 Emission Reduction	Section 7	Energy Efficiency
Chapter 7	Water Resource Conservation Quality and Efficiency	Section 6	Water Use Efficiency
Chapter 8	Indoor Environmental Quality and Comfort	Section 8	Indoor Environmental Quality (IEQ)
Chapter 9	Commissioning, Operation and Maintenance	Section 10	Construction and Plans for Operation
Chapter 10	Existing Buildings		
Chapter 11	Existing Building Site Development		
Chapter 12	Reference Standards	Section 11	Normative References

Figure 1.3 Comparison of sustainability publications. (This chart is a summary of information contained in the ICC *International Green Construction Code* and the ANSI/ASHRAE/USGBC/IES *Standard 189.1*. The various organizations do not assume responsibility for the accuracy or completeness of this chart.)

Note

Refer to Appendix C for more information on codes for single-family homes.

have to use a building code such as the *IBC* instead of the *IRC*. The *IRC* is a stand-alone code, meaning that it covers all construction aspects of the building without having to refer to other code documents. In addition to the typical building code chapters, it includes complete chapters on mechanical, electrical, plumbing, fuel gas, and energy requirements.

The NFPA does not have a separate residential code. Instead, it covers the building aspects of single-family homes in its other codes. For example, the *Life Safety Code* has an occupancy chapter titled “One- and Two-Family Dwellings.” That chapter provides specific requirements and refers to other chapters in the text that provide exceptions for single-family homes. This chapter also refers to other NFPA codes as well as to multiple NFPA standards that are appropriate for one- and two-family dwellings. If a jurisdiction requires the *IRC* in addition to an NFPA code, the most restrictive requirements should be followed.

(Although this book concentrates more on commercial projects, codes and standards specifically for residential homes are briefly discussed in Appendix C.)

Existing Building Codes

The building codes, as well as the *Life Safety Code*, dedicate an entire chapter to existing buildings. (The *LSC* also includes existing occupancy chapters throughout its text.) However, in 2003 the ICC published the first *International Existing Building Code (IEBC)*. The most current editions are 2015 and 2018. It is dedicated entirely to existing buildings and provides requirements for reasonable upgrades and improvements, depending on the type and extent of the work.

In the 2015 *IBC*, the provisions for work performed in existing buildings were removed from Chapter 34, which had been titled “Existing Structures.” These provisions became the Prescriptive Compliance Method provisions in the *IEBC*. Now, the *IBC* refers to the *IEBC* for this scope of work. In the *IEBC* the extent of work (i.e., repair, alteration, or addition) will determine the level of code compliance required. In some cases, the requirements will be more lenient than those in the building code and may take into consideration what was allowed by previous codes. The *IEBC* also includes both prescriptive and performance-related provisions. All of this is explained in more detail in Appendix B. (Although this book concentrates on codes for new construction, many of the same requirements apply to new work being done in existing buildings. For more detailed information on codes for historic and existing buildings, see Appendix B.)

Note

Design and construction projects in existing buildings typically require the use of the building codes. However, a jurisdiction may also have the option of using the *IEBC*. See Appendix B for more information.

FEDERAL REGULATIONS

A number of federal agencies and departments work with trade associations, private companies, and the general public to develop regulations for building construction. Proposed or updated requirements and policies are initially published in the *Federal Register (FR)*. The *FR* is published daily and includes the newest updates for each federal agency. However, not all rules published in the *FR* are enforceable laws. Typically, a federal agency must review the regulations published in the *FR* and make a formal ruling. Once the regulations are adopted and have become law, they are published in the *Code of Federal Regulations (CFR)*. The *CFR* is revised annually to include all permanent agency rules.

Note

Government regulations apply on a federal, state, or local level. Most of the regulations discussed in this book are federal regulations required throughout the United States. Check for required state and local regulations as well.

The federal government plays a part in the building process in a number of ways. First, it regulates the building of its own facilities. These include federal buildings, Veterans Administration (VA) hospitals, and military establishments, as well as other buildings built with federal funds. The construction of a federal building is technically not subject to state and local building codes and regulations. Instead, each federal agency can develop criteria and regulations for the construction or renovation of buildings used by their agency. However, since the passage of the National Technology Transfer and Advancement Act (NTTAA) of 1995, the federal government has begun to adopt more codes and standards from the private sector instead of creating its own. (NTTAA made federal agencies responsible for using national voluntary consensus standards instead of developing their own, wherever practical.) Many federal agencies have been working with the ICC and NFPA as well as standards organizations such as ASHRAE, using the American National Standards Institute (ANSI) process to adopt existing codes and standards. (See the section “Standards Organizations” later in this chapter.) For example, multiple federal agencies require the use of the *Life Safety Code* and the *International Building Code*. In some cases, federal agencies collaborate with other organizations to develop new documents. Some of these are discussed in this chapter. When working on a federally owned or funded building, contact the appropriate federal agency to determine which codes and standards apply. Keep in mind that more than one federal agency could be involved.

Note

The Occupational Safety and Health Act (OSHA) is another federal regulation affecting building interiors. It stresses the safe installation of materials and equipment to ensure a safe work environment for construction workers and building occupants. It must be strictly observed by building contractors.

Note

The NTTAA gives the National Institute of Standards and Technology (NIST) the authority to assist with coordination between federal agencies and the private sector. To find out more, go to www.nist.gov.

Another way the federal government plays a part in the building process is by passing legislation that supersedes all other state and local codes and standards. Each piece of legislation created by Congress is implemented by rules and regulations adopted by a specific federal agency. When a federal law is passed, it becomes mandatory nationwide; so do the agency rules and regulations. This is typically done to create a uniform level of standards throughout the country. The Americans with Disabilities Act (ADA) is one example. Although there is a wide variety of legislation covering everything from energy to transportation, only the pertinent laws that pertain to the design of interiors are discussed in this section and throughout this book.

Accessibility Legislation

In simple terms, discrimination laws are meant to prevent people from unfairly or unnecessarily being kept from an activity, service, or place. There are several federal discrimination laws that affect buildings and interiors because the built environment can be a significant barrier to

these experiences for persons with a physical disability. These *accessibility* legislations each address a different project type based on the use and who owns or leases the building or space. Each law is supported by a set of guidelines that help architects and designers to design the space and specify interior elements in a way that someone with a disability can visit, occupy and use the space. The goal is that the person can maneuver in the building independently.

There are three major accessibility legislations that affect the design of a building or space. Most projects will be required to be accessible under one of the laws. The Architectural Barrier Act enacted in 1968 addresses federally owned and operated buildings. The Americans with Disability Act of 1991 addresses privately owned and operated buildings. Originally established in 1967, The Fair Housing Act regulates the fair sale and rental of housing but was expanded in 1988 to include issues of accessibility. The development and use of these regulations are discussed in more depth in Chapter 2. Each of these laws have specific technical requirements. These are discussed in the most pertinent chapter and throughout the book.

Energy Policy Act

The Energy Policy Act (EPAct) was enacted by the federal government in 1992 to promote energy efficiency and conservation. Among other things, it amended the requirement of the Energy Conservation and Production Act (ECPA), which mandated the use of the 1989 edition of *ASHRAE/IES 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings*, as the minimum standard for new commercial and high-rise residential buildings and 1992 *Model Energy Code (MEC)* as the minimum standard for new residential buildings. The MEC was replaced by the *International Energy Conservation Code (IECC)* in 1998. The EPAct requires the U.S. Department of Energy (DOE) to review each successive edition of the *ASHRAE/IES 90.1* and the *IECC* for consideration. If the DOE determines that the new edition of the standard will create greater energy efficiency, it must update to the new standard. In 2011, the 2010 edition of the *ASHRAE 90.1* became the standard: in 2016, it was again updated to use the 2013 edition of the *ASHRAE 90.1*. The 2016 edition will be reviewed. The DOE must declare within 12 months whether the new standard will be used. After each update, states have two years to establish energy codes that are equivalent to the current standard. The EPAct also required federal buildings to meet or exceed the required standard.

The EPAct includes legislation that affects labeling requirements for electrical devices, tax deduction provisions for commercial buildings, and specific requirements for federally built and/or funded buildings.

Note

The 2007 Energy Independence and Security Act, required federal facilities to reduce energy use by 30 percent by 2015, eliminate use of fossil fuels by 2030, set a goal that new commercial buildings built after 2025 to be zero-net-energy and to retrofit all pre-2015 buildings to be zero-net-energy by 2050. It also gradually halts the use of inefficient incandescent lamps and requires improved energy standards on numerous products.

The goal of the standard is to make buildings more energy efficient, including lighting efficiency, use of day lighting, and energy efficiency of equipment and building systems and the building envelope. For example, every energy-efficient product purchased by a federal agency is required to be either an ENERGY STAR[®] product or one designated by DOE's Federal Energy Management Program (FEMP). (See Chapter 8.) It also now covers some residential uses such as low-rise hotels and prisons. (See the section "American Society of Heating, Refrigeration, and Air-Conditioning Engineers" later in this chapter.)

Inspection and testing for building compliance is the responsibility of the U.S. Secretary of the Treasury. However, compliance with the EAct is mandated at the state level, which means that jurisdictions will be required to use the approved edition of *ASHRAE 90.1* (or an energy code that references the appropriate edition). The *ASHRAE 90.1* is a compliance option in the *IECC*. Compliance at the project level, therefore, is part of the code process. (See Chapter 10.)

Note

The Department of Homeland Security (DHS) continues to encourage the development and adoption of standards relating to national security. Standards that DHS adopts are not mandatory; however, they may be required if working on a building or space accepting DHS funds.

STANDARDS ORGANIZATIONS

A *standard* is a document that provides requirements, specifications, a recommended practice, a test method, or a desired characteristic that must be met. A standard can apply to a material, product, assembly of materials, or a procedure. Standards are developed by trade associations, government agencies, and standards-writing organizations, and members of these groups are often allowed to vote on specific issues. The size of these groups ranges from a worldwide organization to a small trade association that develops one or two industry-related standards.

By themselves, standards have no legal standing. Instead, they are typically referenced by the codes. The standards become law when the code is adopted by a jurisdiction. (In some cases, a jurisdiction will adopt an individual standard that then supplements the code. For example, some jurisdictions are adopting sustainability standards.) Typically, a code will establish the minimum quality and performance expectations for a particular material, product, assembly, or method by referring to a standard, not including the detailed information in the code text. The standard then sets the detailed conditions or requirements for the material or method. For example, instead of setting specific fire extinguisher requirements, the *IBC* references *NFPA 10, Portable Fire Extinguishers*. *NFPA 10* thus becomes a part of the enforced building code.

When a standard is referenced, the acronym of the standard organization and a standard number are called out, followed by a title that

Note

Each code publication has a chapter listing the standards mentioned throughout its text. The list will indicate which edition of the standard is required. This required standard is sometimes referred to as the *active* standard.

describes the purpose of the standard. For example, *ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials* is an American Society for Testing and Materials standard known as *E84*. As the title suggests, it is a standard method of testing the burning characteristics of building materials. The reference also typically includes the year of the required edition (e.g., *ASTM E84–07* is the 2007 edition of the standard). Although the year might not be used when mentioned within the text, each code publication includes a separate list of all the standards referenced within the text. This list will include the year or edition of the standard to be used. It is important that the correct edition of the standard is met.

The standards organizations that most commonly pertain to interior projects are described in this section. Each develops a wide variety of standards. Some standards may have to be examined in detail prior to designing an interior project. Others may only have to be mentioned in the specifications of the project. The standards that most commonly pertain to interior projects are discussed throughout this book. (See also the inset titled “Industry Standards” in Chapter 9.)

American National Standards Institute

The American National Standards Institute (ANSI) is a private corporation that was founded in 1918 as the American Engineering Standards Committee. It is a coordinator of voluntary standards development. ANSI does not develop standards. Rather, it establishes a method by which standards can be developed and defined; this is known as the *American National Standard (ANS) consensus process*. (See also the inset titled “Code and Standards Changes” in this chapter.)

Presently, more than 220 organizations use the ANS consensus process, which results in over 10,000 standards. Accredited organizations include code and standards organizations, industry trade associations, and sustainability-related organizations. The ICC and NFPA, as well as most of the standards organizations described in this section, use this process to develop new standards. By representing virtually every facet of trade, commerce, organized labor, and the consumer, ANSI’s approval procedures ensure a consensus of interests. They are widely accepted on an international level, and local jurisdictions often require compliance with ANSI standards. Although many standards organizations use the ANS consensus process, using the ANSI designation as part of the standard’s title is optional.

In addition to maintaining a standardization process, ANSI acts as an overall monitor to the standards industry by establishing priorities

Note

Some standards-developing organizations are trade associations specific to an industry. For example, the Business and Institutional Furniture Manufacturers Association (BIFMA) and the Upholstered Furniture Action Council (UFAC) are specific to the finish and furnishings industry.

Note

More recently, additional organizations and trade associations are becoming ANSI accredited and creating new standards to address sustainability. See Appendix A for more information.

and avoiding duplication between different standards. ANSI now also offers third-party certification, which is an important part of sustainability codes and standards. (See Appendix A.)

National Fire Protection Association

The National Fire Protection Association was originally founded in 1896 to develop standards for the early use of sprinklers. Today it is one of the largest standards organizations. It develops and publishes more than 300 different standards, many of which are referenced in the codes and used internationally. Each document is available from NFPA in printed or digital form. Many can be viewed on their website.

As mentioned earlier in this chapter, the NFPA also publishes a full set of codes. All of the NFPA codes, as well as those produced by the ICC, reference the NFPA standards in their text. Many of the NFPA standards are geared to fire protection. Generally, they are designed to reduce the extent of injury, loss of life, and destruction of property during a fire. Their testing requirements cover everything from textiles to fire-fighting equipment and means of egress design. The standards are developed by committees made up of NFPA members using the ANS consensus process. (See the inset titled “Code and Standards Changes” in this chapter.) They are reviewed and updated as needed. Many of the NFPA standards as they relate to building interiors are discussed throughout this book.

Note

When a code requirement varies from that of a standard referenced by the code, the code requirement takes precedence over the standard.

Note

The *IBC* has a chapter dedicated to accessibility requirements, which references the *ICC A117.1* accessibility standard. See Figure 2.1.

International Code Council

The International Code Council (ICC) is best known for its set of I-Codes. However, the ICC can be considered a standards organization as well. It currently has six standards available. Known as I-Standards, the ICC uses the ANS consensus process to create and update them. (See the inset titled “Code and Standards Changes” in this chapter.) The most popular standard is *ICC A117.1, Accessible and Usable Buildings and Facilities* (also referred to as the *ICC A117.1*).

The *ICC A117.1* standard concentrates on the accessibility features in the design of buildings and their interiors, allowing people with disabilities to achieve independence. In addition to the many requirements included in the standard, the *ICC A117.1* standard refers to other industry standards for certain items such as power-operated doors, elevator/escalators, and signaling systems. (This standard will be discussed later in Chapter 2.)

Other ICC standards are more building-type specific, such as the *ICC 300, Bleachers, Folding and Telescopic Seating, and Grandstands*, or

are not interior-related. Originally published in 2008, *ICC 700, National Green Building Standard (NGBS)* was developed in conjunction with and published by the National Association of Home Builders. The *NGBS* was written to coordinate with the I-Codes and was created specifically for residential buildings, including single-family and multi-family homes, home remodeling/additions, and hotels/motels—as long as they are not classified as Institutional Occupancies (as explained in Chapter 2). Many regional and local green initiatives refer to the standard for energy-efficient homes. The standard is also referred to by the *International Green Construction Code (IgCC)*, also developed by the ICC. The most recent edition is 2015. It is the only green residential building rating system approved by ANSI.

Beginning with the 2012 edition, the *ICC 700* is coordinated with the I-Codes including the *International Energy Conservation Code (IECC)*. The *NGBS* is unique in that, in addition to setting minimum requirements, it uses a point system to rate the environmental impact of the design and construction of a building. Similar to LEED or Green Globes green rating systems (see Appendix A), it allows a project to accumulate points as sustainability requirements are incorporated into the project. Points are acquired for lot preparation and design, resource efficiency, energy efficiency, water efficiency, indoor environmental quality, and operation and maintenance. Dedicated chapters are included to address renovations and remodeling projects, including small additions. The standard also allows the design to take two different paths, either a prescriptive path or a performance path. In each case, as more sustainable practices are used, more points are attained so that a building can be classified as one of the four threshold levels: Bronze, Silver, Gold, or Emerald. (See also the sections “Sustainability Considerations” in Appendix A and Appendix C for more information.)

Specific sections of the *NGBS* can be selected by a jurisdiction to establish a minimum level of compliance specific to its needs. For example, a jurisdiction may require all new residential buildings to meet the minimum threshold of Silver. Or, if water conservation is critical in that jurisdiction, the water conservation section of the standard might require a higher Gold rating, whereas the remaining sections require only a Silver rating. Since the thresholds are part of an enforceable standard, the requirements are reviewed by the code official as part of the code process.

ASTM International

The American Society for Testing and Materials (ASTM) is a standards-writing organization formed in 1898 as a nonprofit corporation. In 2002,

Note

Through agreements with standard organizations including ASTM International, NFPA, NSF International and UL, the ICC offers other publications in addition to their own codes and standards.

Note

When using the *NGBS*, the building must be designed to perform at the highest level in each section of the standard before the building as a whole can achieve the next level of recognition.

Note

The largest international standards-setting organization is the International Organization for Standardization (ISO), with national standards bodies in more than 140 countries. The United States is represented in the ISO by ANSI.

it changed its name to ASTM International to reflect its global reach and participation. ASTM International primarily manages the development of standards and the promotion of related technical knowledge received from over 30,000 members around the world. Numerous ASTM committees and subcommittees review and manage this information.

There are more than 12,000 ASTM standards used to assure quality and safety across a broad range of industries, materials, and consumer products. These standards are updated and/or published each year in a multiple-volume *Annual Book of ASTM Standards*. These standards are divided into 15 different categories, 2 of which include construction and textiles. Many of the ASTM standards are referenced in the codes and other reference materials. These standards can be obtained from ASTM International both in print or digitally. In addition, they publish a special grouping of standards for the building construction industry. ASTM International and the ICC have digital collections of ASTM standards that are referenced in the *IBC*, *IRC*, and *IFC*. It is updated every three years to coincide with the publication of the I-Codes. For example, the *ASTM Standards: As Referenced in the 2012 IBC* contains the ASTM standards referenced in the 2012 *IBC*. The NFPA codes reference some of these standards as well.

ASTM International is taking an active role in coordinating the development of sustainable standards. The first two available standards, *E2114, Terminology for Sustainability Relative to the Performance of Buildings*, and *E2129, Practice for Data Collection for Sustainability Assessment of Building Products*, establish the basic vocabulary and methodology for the practice of sustainable design. The standard *ASTM E2432, Guide for General Principles of Sustainability Relative to Buildings* has been instrumental in setting basic principles from which other sustainable standards can be developed. (See also Appendix A.) Although not referenced by the codes, they are used by manufacturers to evaluate new sustainable products and by standards organizations to develop additional sustainable standards. ASTM has also developed the ASTM Product Certification Program to work with manufacturers, distributors, or private brand vendors to have their product tested by a third-party source and confirm that their products conform to one or more standards. It is a voluntary program but the ASTM Directory of Certified Products can help designers to determine if products contribute to the sustainability of a project.

NSF International

The National Sanitation Foundation (NSF), formed in 1944 and now known as NSF International, is a standards organization that focuses on

TESTING AGENCIES AND CERTIFICATION

Standards affect the way building materials and other products are made. Many of these standards are required by the building codes. Others are required by the federal government or a code jurisdiction. For example, many jurisdictions adopt a standard that will require a certain level of sustainable practices but do not have a complete sustainability code. In addition, there are optional industry standards that can be used when specifying a product. These are typically considered “best practices” standards since they are not technically enforced by a jurisdiction.

The codes, standards, and federal regulations typically require that tested and/or certified building materials and products be specified. Manufacturers typically use outside testing agencies to obtain third-party certification of their products. A number of independent testing agencies and certification organizations, in the United States and throughout the world, have been approved to perform these tests. A manufacturer will send the chosen organization either a component or a finished product, which is then tested and evaluated.

Tested products are given a permanent label or certificate to prove that they pass a required standard. Depending on the test and the specific standard, the manufacturer will either attach a label to the product or keep a certificate on file. For example, a fire-rated door typically has a label on the edge of the door; rated glazing are required to have details etched into the glass. Other materials, such as carpets or wallcoverings, might not be easily labeled. Instead, these labels may be located on samples or available from the manufacturer upon request.

Often, these testing agencies and certification organizations have their own mark of approval. Some may have more than one mark. Each mark indicates a different level of approval or certification. It is important to know what each mark indicates on a product when specifying or approving the use of a specific product. It is also important to keep records of the specified products. Examples of common product marks include Underwriters Laboratories (UL), ENERGY STAR[®], WaterSense[®], Green Seal, GREENGUARD, and FSC Certified. Each standards organization will have descriptions and images of their marks on their websites.

food, water, indoor air, and the environment. Using the ANS consensus process, NSF International has developed more than 50 standards. NSF also tests and certifies a wide variety of products, including electrical, fire safety, and plumbing elements. More recently, it has been approved to provide third-party certification for a number of sustainability programs, including the Environmental Protection Agency’s (EPA’s) WaterSense[®] program. (See the inset titled “Federal Sustainability Certifications” in Appendix A.)

Some of the standards created by NSF can be found in the ICC and NFPA codes. More recently, NSF has been creating various sustainability

standards. The first interior finish standard, *NSF 140, Sustainable Carpet Assessment Standard*, was initially published in 2007. The most current edition is 2015. The standard provides criteria for sustainable life cycle practices for carpet from raw material extraction, manufacturing, and use to end-of-life management. NSF has developed and continues to develop other sustainability standards as well, including ones for resilient flooring, wallcovering, and fabric for commercial furnishings. (See the section “Sustainability Considerations” in Chapter 10 for more information.) Copies and links to certain standards are available on both the ICC and NSF websites.

American Society of Heating, Refrigeration, and Air-Conditioning Engineers

The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) came into existence in 1959 with the merger of two engineering groups. ASHRAE is a worldwide standards organization. It sponsors research projects and develops standards for performance levels of HVAC (heating, ventilating, and air conditioning) and refrigeration systems. ASHRAE standards, developed using the ANS consensus process, include uniform testing methods, design requirements, and recommended standard practices. ASHRAE also produces various guides and other special publications to assist with the implementation of its standards.

In the past, ASHRAE standards were typically used by mechanical engineers and refrigerant specialists and installers. More recently, ASHRAE started developing sustainability-related standards. These include *ASHRAE/IESNA 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings*, and *ASHRAE/IESNA 90.2, Energy-Efficient Design of New Low-Rise Residential Buildings*, which were developed in conjunction with the Illuminating Engineering Society of North America (IESNA). These standards, now updated on a three-year cycle, address building elements such as the building envelope, light fixtures and controls, HVAC systems, water heating, and energy management. They are referenced by the ICC and NFPA energy codes and are the basis for most of the energy provisions required in the United States. (See the sections “Energy Codes” and “Energy Policy Act” earlier in this chapter.)

ASHRAE also partnered with the U.S. Green Building Council (USGBC) and IESNA to develop another sustainability standard titled *ASHRAE/USGBC/IES 189.1, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*. Completed in 2009, *ASHRAE 189.1* applies to new commercial buildings and major renovation projects, addressing sustainable sites, water use and energy

Note

Two federally developed labeling systems include ENERGY STAR® for electrical devices and WaterSense® for plumbing fixtures.

Note

In addition to the standards it creates, ASHRAE publishes multiple guides, including the *Advanced Energy Design Guidelines (AEDGs)*. These propose additional ways to exceed the energy efficiency requirements of the latest standards.

efficiency, a building's impact on the atmosphere, materials and resources, indoor environmental quality, and post-occupancy building commissioning and operations planning. It is also a resource for buildings that are intended to exceed the minimum requirement of the energy standard *ASHRAE/IESNA 90.1*. (See Chapter 7.) The ICC and ASHRAE are planning to merge the IgCC and 90.1 into one document. The first edition of this combined standard is planned for release in 2018. Because it is written more like a code than a rating system, *ASHRAE 189.1* can be used by a jurisdiction and/or a building owner that wants to incorporate sustainable practices. It can also assist in meeting the requirement of a green rating system (e.g., LEED, Green Globes). The ICC's *International Green Construction Code (IgCC)* references it as well, providing a jurisdiction with an alternate way to meet the IgCC requirements. (See the section "Sustainability Codes" earlier in this chapter.)

Underwriters Laboratories

Underwriters Laboratories (UL) is both a standards developing organization and a testing agency that lists products. It is the largest and oldest nationally recognized testing laboratory in the United States and has over 170 testing laboratories and certification facilities around the world. It tests many products that could be used in an interior project including building materials, electrical/lighting elements, fire suppression, life safety equipment, security equipment, furniture and bedding.

Typically, UL performs tests on products using an existing standard previously developed by another organization or by UL. If no standard exists, UL will create a new one based on the desired characteristics. More than 1,600 different UL safety standards, created using the ANS consensus process, are published in the *UL Catalog of Standards*. In addition, UL offers a comprehensive volume of standards referenced in the *IBC*. UL standards are referenced in the NFPA codes as well. More recently, UL created a sister company, UL Environment™, to provide third-party certification for a variety of sustainability programs. (See Appendix A.) These services include GREENGUARD, ECOLOGO Certifications, and Environmental Product Declarations (EPD), which help verify and highlight a products level of sustainability. (See Appendix A.)

UL's findings are recognized worldwide. When a product is listed, it receives a permanent label or classification marking that identifies Underwriters Laboratories, the word *classified*, a class rating, and a UL control number. (See the example in Figure 5.14 in Chapter 5 and the inset

Note

USGBC, the creator of the LEED rating system was instrumental in the development of *ASHRAE 189.1*. The standard is structured similarly to LEED, but was written with mandatory code language so that it could be used by a jurisdiction as a supplement to LEED. A building built to the standard would be similar to a LEED Silver-certified building.

Note

UL-labeled products may include country-specific identifiers such as US (United States), C (Canada), S (Japan), and D (Europe) to show that they comply with that country's product safety standards.

UL LABELS

Underwriters Laboratories tests a wide variety of products all over the world. The UL label is the most widely recognized mark of compliance with safety requirements. These safety requirements are based on UL standards as well as standards from other organizations. (See the inset titled “Testing Agencies and Certification” in this chapter.) Most federal, state, and municipal authorities, as well as architects, designers, contractors, and building owners and users, accept and recognize the UL mark.

UL can test whole products, components, materials, and systems, depending on the standard required. Of the close to 20,000 different types of products tested, examples related to interior projects include building materials, finishes, upholstered furniture, electrical products, HVAC equipment, safety devices, and the like. Once the initial product passes a test, it is retested at random to make sure that it continues to function properly.

There are four common types of labels or UL marks a product sold in the United States (US) and/or Canada (C) can receive. (Other marks are more specific to other industries and/or other countries.) The UL website describes them as follows:

1. **Listing Mark:** The most popular, this mark indicates that samples of the product have been tested and evaluated and comply with UL requirements. It is found on a wide variety of appliances and equipment, including alarm systems, extinguishing systems, and light fixtures. The mark generally includes the UL registered name or symbol, the product name, a control number, and the word “listed.”
2. **Classification Mark:** This label may list a product’s properties, limited hazards, and/or suitability for certain uses. It is found on building materials such as fire doors, as well as on industrial equipment. The label includes the UL name or symbol and a statement indicating the extent of the UL evaluation and a control number.
3. **Recognized Component Mark:** This covers the evaluation of a component only, such as electrical parts. The component is later factory-installed in a complete product or system. The label includes a manufacturer’s identification and product model number.
4. **Certificate:** This is used when it is difficult to apply one label to a whole system. The certificate indicates the type of system and the extent of the evaluation. It accompanies the product and is issued to the end user upon installation.

UL has other product-specific marks, which include the Plumbing Mark for plumbing fixtures and fittings, the Security Mark for security-related products, and the Signaling Mark for such items as smoke detectors and fire alarms. Marks specific to other countries include the S Mark in Japan, the D Mark in Europe, the UL-MX Mark in Mexico, the AR-UL Mark in Argentina, and the BR-UL Mark in Brazil.

More recently, UL created the Energy Mark for equipment and appliances that meet specific energy-efficiency requirements. And, in 2007, recognizing the demand for third-party verification of sustainable products, UL created a subsidiary known as UL Environment™, which validates environmental claims and certifies sustainable products. (See Appendix A for more information.)

titled “UL Labels” in this chapter.) UL also catalogs listed products and assemblies in a number of product directories. The directories most likely to pertain to interior projects include *Building Materials*, *Fire Protection Equipment*, and *Fire Resistance*. These directories, which are used to find information about UL-certified products, components, and materials, are published yearly. An electronic version of the directory, known as the *Online Certifications Directory*, is also available online, where it is updated regularly as new information becomes available.

Global Standards

In an effort to globalize standard development and use, many of the U.S. standards organizations have facilities located in or agreements with other countries. Examples include Underwriters Laboratories, NSF International, and ASTM International. In addition, one of the largest global standards-setting organizations outside of the United States is the International Organization for Standardization (ISO), which has representation in more than 157 countries. For example, ISO standards are used extensively in Europe as well as Japan and China. Some ISO standards are referenced by codes in the United States. Unlike U.S.-based standards, which are approved by a membership base made up of individuals, the ISO global standards are approved on a national level with each country getting one vote. (For more information see the insets titled “Code and Standards Changes” in this chapter and ISO Standards for Sustainability in Appendix A.)

The Canadian Engineering Standards Association was originally begun as a standards writing and certification agency for electrical and engineering standards. Reorganized and renamed as the CSA Group, it is now a standard writing, certification, and testing organization. CSA Group is recognized in Canada, the United States, and in many other countries. CSA Group provides certification marks, labels, and product listing to meet various standards, including sustainability and energy efficiency. For example, the U.S. Department of Energy recognizes CSA Group for verification of energy efficiency, including testing for ENERGY STAR® requirements from the Environmental Protection Agency (EPA). Their marks are also recognized by the Occupational Safety and Health Administration (OSHA) for a wide variety of products including electrical, electronics, gas-fired, building, plumbing, and so on.

STATE AND LOCAL CODES

In addition to the typical codes, standards, and federal regulations already mentioned, there may be more specific codes within each

jurisdiction. Some of these regulations are required on a state level. A common example is the energy legislation many states have passed (as explained earlier). Other examples may only apply to specific types of projects, such as schools, day care centers, restaurants, and hospitals. These can be state wide or specific to a city or county. For example, state health codes must typically be followed when working on projects that involve food preparation, such as restaurants. In addition, certain occupancies (e.g., hospitals) have regulations that must be incorporated into the design in order for the facility to obtain a license to operate. These regulations can control room sizes, adjacencies, amenities, and use of spaces with the building. Many state and local jurisdictions have also created “green building programs” that mandate certain buildings to meet specific sustainability standards and/or LEED certification. Zoning regulations that control the use of land within a jurisdiction such as site setbacks, historic preservation rules, and neighborhood conservation restrictions may not typically affect an interior project. (See Chapter 11 and Appendix A.)

This book does not cover these state and local codes, since they are specific to each jurisdiction. However, it is important to consult the jurisdiction of a project for these specific regulations so that they can be appropriately researched and referenced. (See the section “Code Enforcement” in Chapter 11.)

Note

State and local jurisdictions may have additional code requirements and government regulations that must be followed. Consult with the jurisdiction of the project.

Note

The National Conference of States on Building Codes and Standards (NCSBCS) and the National Institute of Building Sciences (NIBS) play a major role in supporting the use of codes or standards.

RESEARCH AND DOCUMENTATION

Depending on the type of interior project and the jurisdiction in which it is located, you could be using any number of the codes, regulations, and standards described in this chapter. If you are uncertain which codes will be enforced, consult the code officials in the jurisdiction of the project or check the website of the jurisdiction for an adopted code list. Remember that not every jurisdiction uses the most current edition of a code and that a jurisdiction may have made amendments to an existing publication. If there are amendments, ask how you can obtain a copy. In some cases, they will be available on line. Before you begin designing any project, you should make a list of the codes and standards that you will need to reference for your project.

If you are not already familiar with the code requirements, it is important to do some research before you begin designing. The following chapters of this book can lead you through the progression of that research for most projects. However, as you work on the project, continue to refer to the list of codes, standards, and regulations to make

sure each of their requirements have been researched and are being incorporated in the design. You will find that as you research the codes, additional standards may be required. Add these to the list.

It is usually a good idea to include this list on your documentation of the project as well. This will identify which codes, standards, and regulations were considered in the design for the permit review and for future reference. (See the Documentation section in Chapter 11.) You can also use the Checklist provided with the online edition of this book to help you document the appropriate information.

 **Note**

To further document your research, you may want to keep copies or snapshots of the sections of the codes that specifically pertain to your project in your electronic or hard copy files. (Refer to Chapter 11.)
