

# Effective Use of the International Fire Code

The *International Fire Code*® (IFC®) is a model code that regulates minimum fire safety requirements for new and existing buildings, facilities, storage and processes. The IFC addresses fire prevention, fire protection, life safety and safe storage and use of hazardous materials in new and existing buildings, facilities and processes. The IFC provides a total approach of controlling hazards in all buildings and sites, regardless of the hazard being indoors or outdoors.

The IFC is a design document. For example, before one constructs a building, the site must be provided with an adequate water supply for fire-fighting operations and a means of building access for emergency responders in the event of a medical emergency, fire or natural or technological disaster. Depending on the building's occupancy and uses, the IFC regulates the various hazards that may be housed within the building, including refrigeration systems, application of flammable finishes, fueling of motor vehicles, high-piled combustible storage and the storage and use of hazardous materials. The IFC sets forth minimum requirements for these and other hazards and contains requirements for maintaining the life safety of building occupants, the protection of emergency responders, and to limit the damage to a building and its contents as the result of a fire, explosion or unauthorized hazardous material discharge.

## Arrangement and Format of the 2012 IFC

Before applying the requirements of the IFC it is beneficial to understand its arrangement and format. The IFC, like other codes published by the International Code Council, is arranged and organized to follow sequential steps that generally occur during a plan review or inspection. The 2012 IFC has been reorganized into 7 Parts as illustrated in the tables below. Each Part represents a broad subject matter and includes the chapters that logically fit under the subject matter of each Part. It is also foreseeable that additional chapters will need to be added in the future as regulations for new processes or operations are developed. Accordingly, the reorganization was designed to accommodate such future chapters by providing reserved (unused) chapters in several of the Parts. This will allow the subject matter parts to be conveniently and logically expanded without requiring a major renumbering of the IFC chapters.

<b>2012 REORGANIZATION OF THE IFC</b>	
<b>Parts and Chapters</b>	<b>Subject Matter</b>
Part I – Chapters 1 and 2	Administrative and definitions
Part II – Chapters 3 and 4	General safety provisions
Part III – Chapters 5 through 11	Building and equipment design features
Part III - Chapters 12 through 19	Reserved for future use
Part IV – Chapters 20 through 36	Special occupancies and operations
Part IV – Chapters 37 through 49	Reserved for future use
Part V – Chapters 50 through 67	Hazardous materials
Part V – Chapters 68 through 79	Reserved for future use
Part VI – Chapter 80	Referenced standards
Part VII - Appendices A through J	Adoptable and informational appendices

<b>2012 IFC CHAPTER REORGANIZATION</b>		
<b>CHAPTER NUMBER 2009</b>	<b>CHAPTER NUMBER 2012</b>	<b>CHAPTER TITLE</b>
1	1	Scope and Administration
2	2	Definitions
3	3	General Requirements
4	4	Emergency Planning and Preparedness
5	5	Fire Service Features
6	6	Building Services and Systems
7	7	Fire-Resistance-Rated Construction
8	8	Interior Finish, Decorative Materials and Furnishings
9	9	Fire Protection Systems
10	10	Means Of Egress
11	20	Aviation Facilities
12	21	Dry Cleaning
13	22	Combustible Dust-Producing Operations
14	33	Fire Safety during Construction and Demolition
15	24	Flammable Finishes
16	25	Fruit and Crop Ripening
17	26	Fumigation and Insecticidal Fogging
18	27	Semiconductor Fabrication Facilities
19	28	Lumber Yards and Woodworking Facilities
20	29	Manufacture of Organic Coatings
21	30	Industrial Ovens
22	23	Motor Fuel-Dispensing Facilities and Repair Garages
23	32	High-Piled Combustible Storage
24	31	Tents and Other Membrane Structures
25	34	Tire Rebuilding and Tire Storage
26	35	Welding and Other Hot Work
27	50	Hazardous Materials—General Provisions
28	51	Aerosols
29	52	Combustible Fibers
30	53	Compressed Gases
31	54	Corrosive Materials
32	55	Cryogenic Fluids
33	56	Explosives and Fireworks
34	57	Flammable and Combustible Liquids
35	58	Flammable Gases and Flammable Cryogenic Fluids
36	59	Flammable Solids
37	60	Highly Toxic and Toxic Materials
38	61	Liquefied Petroleum Gases
39	62	Organic Peroxides

(continued)

<b>2012 IFC CHAPTER REORGANIZATION—continued</b>		
<b>CHAPTER NUMBER 2009</b>	<b>CHAPTER NUMBER 2012</b>	<b>CHAPTER TITLE</b>
40	63	Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids
41	64	Pyrophoric Materials
42	65	Pyroxylin (Cellulose Nitrate) Plastics
43	66	Unstable (Reactive) Materials
44	67	Water-Reactive Solids and Liquids
45	36	Marinas
46	11	Construction Requirements for Existing Buildings
47	80	Referenced Standards
Appendix A-J	Appendix A-J	No changes in reorganization

The IFC requirements for fire-resistive construction, interior finish, fire protection systems, means of egress and construction safeguards are directly correlated to the chapters containing parallel requirements in the IBC, as follows:

<b>IFC Chapter</b>	<b>Subject</b>
7	Fire-resistance-rated construction
8	Interior finish, decorative materials and furnishings
9	Fire protection systems
10	Means of egress
33	Fire safety during construction and demolition

The following is a chapter-by-chapter synopsis of the scope and intent of the provisions of the *International Fire Code*:

## **PART I—ADMINISTRATIVE**

**Chapter 1 Scope and Administration.** This chapter contains provisions for the application, enforcement and administration of subsequent requirements of the code. In addition to establishing the scope of the code, Chapter 1 identifies which buildings and structures come under its purview. Chapter 1 is largely concerned with maintaining “due process of law” in enforcing the regulations contained in the body of the code. Only through careful observation of the administrative provisions can the code official reasonably expect to demonstrate that “equal protection under the law” has been provided.

**Chapter 2 Definitions.** All terms that are defined in the code are listed alphabetically in Chapter 2. While a defined term may be used in one chapter or another, the meaning provided in Chapter 2 is applicable throughout the code.

Where understanding of a term’s definition is especially key to or necessary for understanding of a particular code provision, the term is shown in *italics* wherever it appears in the code. This is true only for those terms that have a meaning that is unique to the code. In other words, the generally understood meaning of a term or phrase might not be sufficient or consistent with the meaning prescribed by the code; therefore, it is essential that the code-defined meaning be known.

Guidance regarding tense, gender and plurality of defined terms as well as guidance regarding terms not defined in this code are also provided.

## **PART II—GENERAL SAFETY PROVISIONS**

**Chapter 3 General Requirements.** The open burning, ignition source, vacant building, miscellaneous storage, roof gardens and landscaped roofs and hazards to fire fighters requirements and precautions, among other general regulations, contained in this chapter are intended to improve premises safety for everyone, including construction workers, tenants, operations and maintenance personnel and emergency response personnel. As with other chapters of the *International Fire Code*, Section 302 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 4 Emergency Planning and Preparedness.** This chapter addresses the human contribution to life safety in buildings when a fire or other emergency occurs. The requirements for continuous training and scheduled fire, evacuation and lockdown drills can be as important as the required periodic inspections and maintenance of built-in fire protection features. The level of preparation by the occupants also improves the emergency responders’ abilities during an emergency. The *International Building Code* (IBC) focuses on built-in fire protection features, such as automatic sprinkler systems, fire-resistance-rated construction and properly designed egress systems whereas this chapter fully addresses the human element. As with other chapters of the *International Fire Code*, Section 402 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

## **PART III—BUILDING AND EQUIPMENT DESIGN FEATURES**

**Chapter 5 Fire Service Features.** The requirements of this chapter apply to all buildings and occupancies and pertain to access roads; access to building openings and roofs; premises identification; key boxes; fire protection water supplies; fire command centers; fire department access to equipment and emergency responder radio coverage in buildings. As with other chapters of the *International Fire Code*, Section 502 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 6 Building Services and Systems.** This chapter focuses on building systems and services as they relate to potential safety hazards and when and how they should be installed. This chapter brings together all building system- and service-related issues for convenience and provides a more systematic view of buildings. The following building services and systems are addressed: fuel-fired appliances (Section 603), emergency and standby power systems (Section 604), electrical equipment, wiring and hazards (Section 605), mechanical refrigeration (Section 606), elevator recall and maintenance (Section 607), stationary storage battery systems (Section 608) and commercial kitchen hoods (Section 609). As with other chapters of the *International Fire Code*, Section 602 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 7 Fire-resistance-rated Construction.** The maintenance of assemblies required to be fire-resistance rated is a key component in a passive fire protection philosophy. Chapter 7 sets forth requirements to maintain required fire-resistance ratings of building elements and limit fire spread. The required maintenance of fire-resistance-rated assemblies and opening protectives is described in Section 703 while Section 704 covers the enclosure requirements for shafts in existing buildings. As with other chapters of the *International Fire Code*, Section 702 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 8 Interior Finish, Decorative Materials and Furnishings.** The overall purpose of Chapter 8 is to regulate interior finishes, decorative materials and furnishings in new and existing buildings so that they do not significantly add to or create fire hazards within buildings. The provisions tend to focus on occupancies with specific risk characteristics, such as vulnerability of occupants, density of occupants, lack of familiarity with the building and societal expectations of importance. This chapter is consistent with Chapter 8 of the *International Building Code* (IBC), which regulates the interior finishes of new buildings. As with other chapters of the *International Fire Code*, Section 802 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 9 Fire Protection Systems.** Chapter 9 prescribes the minimum requirements for active systems of fire protection equipment to perform the functions of detecting a fire, alerting the occupants or fire department of a fire emergency, controlling smoke and controlling or extinguishing the fire. Generally, the requirements are based on the occupancy, the height and the area of the building, because these are the factors that most affect fire-fighting capabilities and the relative hazard of a specific building or portion thereof. This chapter parallels and is substantially duplicated in Chapter 9 of the *International Building Code*; however, this chapter also contains periodic testing criteria that are not contained in the IBC. In addition, the special fire protection system requirements based on use and occupancy found in Chapter 4 of the IBC are duplicated in Chapter 9 of the IFC as a user convenience. As with other chapters of the *International Fire Code*, Section 902 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 10 Means of Egress.** The general criteria set forth in Chapter 10 regulating the design of the means of egress are established as the primary method for protection of people in buildings by allowing timely relocation or evacuation of building occupants. Both prescriptive and performance language is utilized in this chapter to provide for a basic approach in the determination of a safe exiting system for all occupancies. It addresses all portions of the egress system (i.e., exit access, exits and exit discharge) and includes design requirements as well as provisions regulating individual components. The requirements detail the size, arrangement, number and protection of means of egress components. Functional and operational characteristics also are specified for the components that will permit their safe use without special knowledge or effort. The means of egress protection requirements work in coordination with other sections of the code, such as protection of vertical openings (see Chapter 7), interior finish (see Chapter 8), fire suppression and detection systems (see Chapter 9) and numerous others, all having an impact on life safety. Sections 1002 through 1029 are duplicated text from Chapter 10 of the IBC; however, the IFC contains an additional Section 1030 on maintenance of the means of egress system in existing buildings. Retroactive minimum means of egress requirements for existing buildings are now found in Chapter 11 (which was formerly Chapter 46). As with other chapters of the *International Fire Code*, Section 1002 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 11 Construction Requirements for Existing Buildings.** Chapter 11 (which was formerly Chapter 46) applies to existing buildings constructed prior to the adoption of the code and intends to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing for alterations to such buildings that do not comply with the minimum requirements of

the *International Building Code*. Prior to the 2009 edition, its content existed in the IFC but in a random manner that was neither efficient nor user-friendly. In the 2007/2008 code development cycle, a code change (F294-07/08) was approved that consolidated the retroactive elements of IFC/2006 Sections 607, 701, 704, 903, 905, 907 and 3406 (then 2506) and all of then-Section 1027 (Means of Egress for Existing Buildings) into a single chapter for easier and more efficient reference and application to existing buildings. As with other chapters of the *International Fire Code*, Section 1102 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapters 12 through 19.** Reserved for future use.

## **PART IV—SPECIAL OCCUPANCIES AND OPERATIONS**

**Chapter 20 Aviation Facilities.** Chapter 20 (which was formerly Chapter 11) specifies minimum requirements for the fire-safe operation of airports, heliports and helistops. The principal nonflight operational hazards associated with aviation involve fuel, facilities and operations. Therefore, safe use of flammable and combustible liquids during fueling and maintenance operations is emphasized. Availability of portable Class B:C-rated fire extinguishers for prompt control or suppression of incipient fires is required. As with other chapters of the *International Fire Code*, Section 2002 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 21 Dry Cleaning.** The provisions of Chapter 21 (which was formerly Chapter 12) are intended to reduce hazards associated with use of flammable and combustible dry cleaning solvents. These materials, like all volatile organic chemicals, generate significant quantities of static electricity and are thus readily ignitable. Many flammable and nonflammable dry cleaning solvents also possess health hazards when involved in a fire. As with other chapters of the *International Fire Code*, Section 2102 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 22 Combustible Dust-producing Operations.** The requirements of Chapter 22 (which was formerly Chapter 13) seek to reduce the likelihood of dust explosions by managing the hazards of ignitable suspensions of combustible dusts associated with a variety of operations including woodworking, mining, food processing, agricultural commodity storage and handling and pharmaceutical manufacturing, among others. Ignition source control and good housekeeping practices in occupancies containing dust-producing operations are emphasized. As with other chapters of the *International Fire Code*, Section 2202 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 23 Motor Fuel-dispensing Facilities and Repair Garages.** This chapter (which was formerly Chapter 22) provides provisions that regulate the storage and dispensing of both liquid and gaseous motor fuels at public and private automotive, marine and aircraft motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities and repair garages. As with other chapters of the *International Fire Code*, Section 2302 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 24 Flammable Finishes.** Chapter 24 (which was formerly Chapter 15) requirements govern operations where flammable or combustible finishes are applied by spraying, dipping, powder coating or flow-coating processes. As with all operations involving flammable or combustible liquids and combustible dusts or vapors, controlling ignition sources and methods of reducing or controlling flammable vapors or combustible dusts at or near these operations are emphasized. As with other chapters of the *International Fire Code*, Section 2402 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 25 Fruit and Crop Ripening.** Chapter 25 (which was formerly Chapter 16) provides guidance that is intended to reduce the likelihood of explosions resulting from improper use or handling of ethylene gas used for crop-ripening and coloring processes. This is accomplished by regulating ethylene gas generation; storage and distribution systems and controlling ignition sources. Design and construction of facilities for this use are regulated by the *International Building Code* to reduce the impact of potential accidents on people and buildings.

**Chapter 26 Fumigation and Insecticidal Fogging.** This chapter (which was formerly Chapter 17) regulates fumigation and insecticidal fogging operations which use toxic pesticide chemicals to kill insects, rodents and other vermin. Fumigants and insecticidal fogging agents pose little hazard if properly applied; however, the inherent toxicity of all these agents and the potential flammability of some makes special precautions necessary when they are used. Requirements of this chapter are intended to protect both the public and fire fighters from hazards associated with these products. As with other chapters of the *International Fire Code*, Section 2602 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 27 Semiconductor Fabrication Facilities.** The requirements of this chapter (which was formerly Chapter 18) are intended to control hazards associated with the manufacture of electrical circuit boards or microchips, commonly called semiconductors. Though the finished product possesses no unusual hazards, materials commonly associated with semiconductor manufacturing are often quite hazardous and include flammable liquids, pyrophoric and flammable gases, toxic substances and corrosives. The requirements of this chapter are concerned with both life safety and property protection. However, the fire code official should recognize that the risk of extraordinary property damages is far more common than the risk of personal injuries from fire. As with other chapters of the *International Fire Code*, Section 2702 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 28 Lumber Yards and Woodworking Facilities.** Provisions of this chapter (which was formerly Chapter 19) are intended to prevent fires and explosions, facilitate fire control and reduce exposures to and from facilities storing, selling or processing wood and forest products, including sawdust, wood chips, shavings, bark mulch, shorts, finished planks, sheets, posts, poles, timber and raw logs and the hazard they represent once ignited. This chapter requires active and passive fire protection features to reduce on- and off-site exposures, limit fire size and development and facilitate fire fighting by employees and the fire service. As with other chapters of the *International Fire Code*, Section 2802 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 29 Manufacture of Organic Coatings.** This chapter (which was formerly Chapter 20) regulates materials and processes associated with the manufacture of paints as well as bituminous, asphaltic and other diverse compounds formulated to protect buildings, machines and objects from the effects of weather, corrosion and hostile environmental exposures. Paint for decorative, architectural and industrial uses comprises the bulk of organic coating production. Painting and processes related to the manufacture of nonflammable and noncombustible or water-based products are exempt from the provisions of this chapter. The application of organic coatings is covered by Chapter 24. Elimination of ignition sources, maintenance of fire protection equipment and isolation or segregation of hazardous operations are emphasized. As with other chapters of the *International Fire Code*, Section 2902 contains a term that is defined in Chapter 2 and is applicable to the chapter contents.

**Chapter 30 Industrial Ovens.** This chapter (which was formerly Chapter 21) addresses the fuel supply, ventilation, emergency shutdown equipment, fire protection and the operation and maintenance of industrial ovens, which are sometimes referred to as industrial heat enclosures or industrial furnaces. Compliance with this chapter is intended to reduce the likelihood of fires involving industrial ovens which are usually the result of the fuel in use or volatile vapors given off by the materials being heated or to manage the impact if a fire should occur. As with other chapters of the *International Fire Code*, Section 3002 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 31 Tents and Other Membrane Structures.** The requirements in this chapter (which was formerly Chapter 24) are intended to protect temporary as well as permanent tents and air-supported and other membrane structures from fire by regulating structure location and access, anchorage, egress, heat-producing equipment, hazardous materials and operations, combustible vegetation, ignition sources, waste accumulation and requiring regular inspections and certifying continued compliance with fire safety regulations. As with other chapters of the *International Fire Code*, Section 3102 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 32 High-piled Combustible Storage.** This chapter (which was formerly Chapter 23) provides guidance for reasonable protection of life from hazards associated with the storage of combustible materials in closely packed piles or on pallets, in racks or on shelves where the top of storage is greater than 12 feet in height. It provides requirements for identifying various classes of commodities; general fire and life safety features including storage arrangements, smoke and heat venting, fire department access and housekeeping and maintenance requirements. The chapter attempts to define the potential fire severity and, in turn, determine fire and life safety protection measures needed to control, and in some cases suppress, a potential fire. This chapter does not cover miscellaneous combustible materials storage regulated in Section 315. As with other chapters of the *International Fire Code*, Section 3202 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 33 Fire Safety During Construction and Demolition.** Chapter 33 (which was formerly Chapter 14) outlines general fire safety precautions for all structures and all occupancies during construction and demolition operations. In general, these requirements seek to maintain required levels of fire protection, limit fire spread, establish the appropriate operation of equipment and promote prompt response to fire emergencies. Features regulated include fire protection systems, fire fighter access to the site and building, means of egress, hazardous materials storage and use and temporary heating equipment and other ignition sources. With the 2012 reorganization, this chapter now correlates with Chapter 33 of the IBC.

**Chapter 34 Tire Rebuilding and Tire Storage.** The requirements of Chapter 34 (which was formerly Chapter 25) are intended to prevent or control fires and explosions associated with the remanufacture and storage of tires and tire byproducts. Additionally, the requirements are intended to minimize the impact of indoor and outdoor tire storage fires by regulating pile volume and location, segregating the various operations, providing for fire department access and a water supply and controlling ignition sources.

**Chapter 35 Welding and Other Hot Work.** This chapter (which was formerly Chapter 26) covers requirements for safety in welding and other types of hot work by reducing the potential for fire ignitions that usually result in large losses. Several different types of hot work would fall under the requirements found in Chapter 35, including both gas and electric arc methods and any open-torch operations. Many of the activities of this chapter focus on the actions of the occupants. As with other chapters of the *International Fire Code*, Section 3502 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 36 Marinas.** Chapter 36 (which was formerly Chapter 45) addresses the fire protection and prevention requirements for marinas. It was developed in response to the complications encountered by a number of fire departments responsible for the protection of marinas as well as fire loss history in marinas that lacked fire protection. Compliance with this chapter intends to establish safe practices in marina areas, provide an identification method for mooring spaces in the marina, provide fire fighters with safe operational areas and fire protection methods to extend hose lines in a safe manner. As with other chapters of the *International Fire Code*, Section 3602 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapters 37 through 49.** Reserved for future use.

## **PART V—HAZARDOUS MATERIALS**

**Chapter 50 Hazardous Materials—General Provisions.** This chapter (which was formerly Chapter 27) contains the general requirements for all hazardous chemicals in all occupancies. Hazardous chemicals are defined as those that pose an unreasonable risk to the health and safety of operating or emergency personnel, the public and the environment if not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal or transportation. The general provisions of this chapter are intended to be companion provisions with the specific requirements of Chapters 51 through 67 (which were formerly Chapters 28 through 44) regarding a given hazardous material. As with other chapters of the *International Fire Code*, Section 5002 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 51 Aerosols.** Chapter 51 (which was formerly Chapter 28) addresses the prevention, control and extinguishment of fires and explosions in facilities where retail aerosol products are displayed or stored. It is concerned with both life safety and property protection from a fire; however, historically, aerosol product fires have caused property loss more frequently than loss of life. Requirements for storing aerosol products are dependent on the level of aerosol product, level of sprinkler protection, type of storage condition and quantity of aerosol products. As with other chapters of the *International Fire Code*, Section 5102 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 52 Combustible Fibers.** Chapter 52 (which was formerly Chapter 29) establishes the requirements for storage and handling of combustible fibers, including animal, vegetable and synthetic fibers, whether woven into textiles, baled, packaged or loose. Operations involving combustible fibers are typically associated with salvage, paper milling, recycling, cloth manufacturing, carpet and textile mills and agricultural operations, among others. The primary hazard associated with these operations is the abundance of materials and their ready ignitability. As with other chapters of the *International Fire Code*, Section 5202 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 53 Compressed Gases.** This chapter (which was formerly Chapter 30) regulates the storage, use and handling of all flammable and nonflammable compressed gases, such as those that are used in medical facilities, air separation plants, industrial plants, agricultural equipment and similar occupancies. Standards for the design, construction and marking of compressed gas cylinders and pressure vessels are referenced. Compressed gases used in welding and cutting, cryogenic liquids and liquefied petroleum gases are also regulated under Chapters 35, 55 and 61, respectively. Compressed gases that are classified as hazardous materials are also regulated in Chapter 50, which includes general requirements. As with other chapters of the *International Fire Code*, Section 5302 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 54 Corrosive Materials.** Chapter 54 (which was formerly Chapter 31) addresses the hazards of corrosive materials that have a destructive effect on living tissues. Though corrosive gases exist, most corrosive materials are solid and classified as either acids or bases (alkalis). These materials may pose a wide range of hazards other than corrosivity, such as combustibility, reactivity or oxidizing hazards, and must conform to the requirements of the code with respect to all their known hazards. The focus of this chapter is on materials whose primary hazard is corrosivity; that is, the ability to destroy or irreparably damage living tissue on contact. As with other chapters of the *International Fire Code*, Section 5402 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 55 Cryogenic Fluids.** This chapter (which was formerly Chapter 32) regulates the hazards associated with the storage, use and handling of cryogenic fluids through regulation of such things as pressure relief mechanisms and proper container storage. These hazards are in addition to the code requirements that address the other hazards of cryogenic fluids such as flammability and toxicity. These other characteristics are dealt with in Chapter 50 and other chapters, such as Chapter 58 dealing with flammable gases. Cryogenics are hazardous because they are held at extremely low temperatures and high pressures. Many cryogenic fluids, however, are actually inert gases and would not be regulated elsewhere in the code. Cryogenics are used for many applications but specifically have had widespread use in the biomedical field and in space programs. As with other chapters of the *International Fire Code*, Section 5502 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 56 Explosives and Fireworks.** This chapter (which was formerly Chapter 33) prescribes minimum requirements for the safe manufacture, storage, handling and use of explosives, ammunition and blasting agents for commercial and industrial occupancies. These provisions are intended to protect the general public, emergency responders and individuals who handle explosives. Chapter 56 also regulates the manufacturing, retail sale, display and wholesale distribution of fireworks, establishing the requirements for obtaining approval to manufacture, store, sell, discharge or conduct a public display, and references national standards for regulations governing manufacture, storage and public displays. As with other chapters of the *International Fire Code*, Section 5602 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 57 Flammable and Combustible Liquids.** The requirements of this chapter (which was formerly Chapter 34) are intended to reduce the likelihood of fires involving the storage, handling, use or transportation of flammable and combustible liquids. Adherence to these practices may also limit damage in the event of an accidental fire involving these materials. These liquids are used for fuel, lubricants, cleaners, solvents, medicine and even drinking. The danger associated with flammable and combustible liquids is that the vapors from these liquids, when combined with air in their flammable range, will burn or explode at temperatures near normal living and working environment. The protection provided by the code is to prevent the flammable and combustible liquids from being ignited. As with other chapters of the *International Fire Code*, Section 5702 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 58 Flammable Gases and Flammable Cryogenic Fluids.** Chapter 58 (which was formerly Chapter 35) sets requirements for the storage and use of flammable gases. For safety purposes, there is a limit on the quantities of flammable gas allowed per control area. Exceeding these limitations increases the possibility of damage to both property and individuals. The principal hazard posed by flammable gas is its ready ignitability, or even explosivity, when mixed with air in the proper proportions. Consequently, occupancies storing or handling large quantities of flammable gas are classified as Group H-2 (high hazard) by the *International Building Code*. As with other chapters of the *International Fire Code*, Section 5802 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 59 Flammable Solids.** This chapter (which was formerly Chapter 36) addresses general requirements for storage and handling of flammable solids, especially magnesium; however, it is important to note that several other solid materials, primarily metals including, but not limited to, such metals as titanium, zirconium, hafnium, calcium, zinc, sodium, lithium, potassium, sodium/potassium alloys, uranium, thorium and plutonium which, under the right conditions, can be explosion hazards. Some of these metals are almost exclusively laboratory materials but because of where they are used, fire service personnel must be trained to handle emergency situations. Because uranium, thorium and plutonium are also radioactive materials, they present still more specialized problems for fire service personnel. As with other chapters of the *International Fire Code*, Section 5902 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 60 Highly Toxic and Toxic Materials.** The main purpose of this chapter (which was formerly Chapter 37) is to protect occupants, emergency responders and those in the immediate area of the building and facility from short-term, acute hazards associated with a release or general exposure to toxic and highly toxic materials. This chapter deals with all three states of toxic and highly toxic materials: solids, liquids and gases. The code does not address long-term exposure effects of these materials which are addressed by agencies such as the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA). As with other chapters of the *International Fire Code*, Section 6002 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 61 Liquefied Petroleum Gases.** Chapter 61 (which was formerly Chapter 38) establishes requirements for the safe handling, storing and use of LP-gas to reduce the possibility of damage to containers, accidental releases of LP-gas and exposure of flammable concentrations of LP-gas to ignition sources. LP-gas (notably Propane) is well known as a camping fuel for cooking, lighting, heating and refrigerating and also remains a popular standby fuel supply for auxiliary generators as well as being widely used as an alternative motor vehicle fuel. Its characteristic as a clean-burning fuel having resulted in the addition of propane dispensers to service stations throughout the country. As with other chapters of the *International Fire Code*, Section 6102 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 62 Organic Peroxides.** This chapter (which was formerly Chapter 39) addresses the hazards associated with the storage, handling and use of organic peroxides and intends to manage the fire and oxidation hazards of organic peroxides by preventing their uncontrolled release. These chemicals possess the characteristics of flammable or combustible liquids and are also strong oxidizers. This unusual combination of properties requires special storage and handling precautions to prevent uncontrolled release, contamination, hazardous chemical reactions, fires or explosions. The requirements of this chapter pertain to industrial applications in which significant quantities of organic peroxides are stored or used; however, smaller quantities of organic peroxides still pose a significant hazard and, therefore, must be stored and used in accordance with the applicable provisions of this chapter and Chapter 50. As with other chapters of the *International Fire Code*, Section

6202 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 63 Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids.** Chapter 63 (which was formerly Chapter 40) addresses the hazards associated with solid, liquid, gaseous and cryogenic fluid oxidizing materials, including oxygen in home use, and establishes criteria for their safe storage and protection in indoor and outdoor storage facilities, minimizing the potential for uncontrolled releases and contact with fuel sources. Although oxidizers themselves do not burn, they pose unique fire hazards because of their ability to support combustion by breaking down and giving off oxygen. As with other chapters of the *International Fire Code*, Section 6302 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 64 Pyrophoric Materials.** This chapter (which was formerly Chapter 41) regulates the hazards associated with pyrophoric materials, which are capable of spontaneously igniting in the air at or below a temperature of 130°F (54°C). Many pyrophoric materials also pose severe flammability or reactivity hazards. This chapter addresses only the hazards associated with pyrophoric materials. Materials that pose multiple hazards must conform to the requirements of the code with respect to all hazards. As with other chapters of the *International Fire Code*, Section 6402 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 65 Pyroxylin (Cellulose Nitrate) Plastics.** This chapter (which was formerly Chapter 42) addresses the significant hazards associated with pyroxylin (cellulose nitrate) plastics, which are the most dangerous and unstable of all plastic compounds. The chemically bound oxygen in their structure permits them to burn vigorously in the absence of atmospheric oxygen at a rate 15 times greater than comparable common combustibles. Strict compliance with the provisions of this chapter, along with proper housekeeping and storage arrangements, help to reduce the hazards associated with pyroxylin (cellulose nitrate) plastics in a fire or other emergencies.

**Chapter 66 Unstable (Reactive) Materials.** This chapter (which was formerly Chapter 43) addresses the hazards of unstable (reactive) liquid and solid materials as well as unstable (reactive) compressed gases. In addition to their unstable reactivity, these materials may pose other hazards, such as toxicity, corrosivity, explosivity, flammability or oxidizing potential. This chapter, however, intends to address those materials whose primary hazard is unstable reactivity. Materials that pose multiple hazards must conform to the requirements of the code with respect to all hazards. Strict compliance with the provisions of this chapter, along with proper housekeeping and storage arrangements, help to reduce the exposure hazards associated with unstable (reactive) materials in a fire or other emergency. As with other chapters of the *International Fire Code*, Section 6602 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapter 67 Water-reactive Solids and Liquids.** This chapter (which was formerly Chapter 44) addresses the hazards associated with water-reactive materials that are solid or liquid at normal temperatures and pressures. In addition to their water reactivity, these materials may pose a wide range of other hazards, such as toxicity, flammability, corrosiveness or oxidizing potential. This chapter addresses only those materials whose primary hazard is water reactivity. Materials that pose multiple hazards must conform to the requirements of the code with respect to all hazards. Strict compliance with the requirements of this chapter, along with proper housekeeping and storage arrangements, helps to reduce the exposure hazards associated with water-reactive materials in a fire or other emergency. As with other chapters of the *International Fire Code*, Section 6702 contains a list of terms that are defined in Chapter 2 and are applicable to the chapter contents.

**Chapters 68 through 79.** Reserved for future use.

## PART VI—REFERENCED STANDARDS

**Chapter 80 Referenced Standards.** The code contains several references to standards that are used to regulate materials and methods of construction. Chapter 80 (which was formerly Chapter 47) contains a comprehensive list of all standards that are referenced in the code. The standards are part of the code to the extent of the reference to the standard (see Section 102.7). Compliance with the referenced standard is necessary for compliance with this code. By providing specifically adopted standards, the construction and installation requirements necessary for compliance with

the code can be readily determined. The basis for code compliance is, therefore, established and available on an equal basis to the code official, contractor, designer and owner.

Chapter 80 is organized in a manner that makes it easy to locate specific standards. It lists all of the referenced standards, alphabetically, by acronym of the promulgating agency of the standard. Each agency's standards are then listed in either alphabetical or numeric order based upon the standard identification. The list also contains the title of the standard; the edition (date) of the standard referenced; any addenda included as part of the ICC adoption; and the section or sections of this code that reference the standard.

## PART VII—APPENDICES

**Appendix A Board of Appeals.** This appendix contains optional criteria that, when adopted, provides jurisdictions with detailed appeals, board member qualifications and administrative procedures to supplement the basic requirements found in Section 108 of the code. Note that the provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance (see sample ordinance on page xxi).

**Appendix B Fire-flow Requirements for Buildings.** This appendix provides a tool for the use of jurisdictions in establishing a policy for determining fire-flow requirements in accordance with IFC Section 507.3. The determination of required fire flow is not an exact science, but having some level of information provides a consistent way of choosing the appropriate fire flow for buildings throughout a jurisdiction. The primary tool used in this appendix is a table which presents fire flow based on construction type and building area based on the correlation of the Insurance Services Office (ISO) method and the construction types used in the *International Building Code*. Note that the provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance (see sample ordinance on page xxi).

**Appendix C Fire Hydrant Locations and Distribution.** This appendix focuses on the location and spacing of fire hydrants which is important to the success of fire-fighting operations. The difficulty with determining the spacing of fire hydrants is that every situation is unique and has unique challenges. Finding one methodology for determining hydrant spacing is difficult. This particular appendix gives one methodology based on the required fire flow that fire departments can work with to set a policy for hydrant distribution around new buildings and facilities in conjunction with IFC Section 507.5. Note that the provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance (see sample ordinance on page xxi).

**Appendix D Fire Apparatus Access Roads.** This appendix contains more detailed elements for use with the basic access requirements found in IFC Section 503 which gives some minimum criteria, such as a maximum length of 150 feet and a minimum width of 20 feet, but in many cases does not state specific criteria. This appendix, like Appendices B and C, is a tool for jurisdictions looking for guidance in establishing access requirements and includes criteria for multiple-family residential developments, large one- and two-family subdivisions, specific examples for various types of turn-arounds for fire department apparatus and parking regulatory signage. Note that the provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance (see sample ordinance on page xxi).

**Appendix E Hazard Categories.** This appendix contains guidance for designers, engineers, architects, code officials, plans reviewers and inspectors in the classifying of hazardous materials so that proposed designs can be evaluated intelligently and accurately. The descriptive materials and explanations of hazardous materials and how to report and evaluate them on a Material Safety Data Sheet (MSDS) that are contained in this appendix are intended to be instructional as well as informative. Note that this appendix is for information purposes and is not intended for adoption.

**Appendix F Hazard Ranking.** The information in this appendix is intended to be a companion to the specific requirements of Chapters 51 through 67 which regulate the storage, handling and use of all hazardous materials classified as either physical or health hazards. These materials pose diverse hazards, including instability, reactivity, flammability, oxidizing potential or toxicity; therefore, identifying them by hazard ranking is essential. This appendix lists the various hazardous mate-

rials categories that are defined in the code, along with the NFPA 704 hazard ranking for each. Note that the provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance (see sample ordinance on page xxi).

**Appendix G Cryogenic Fluids—Weight and Volume Equivalents.** This appendix gives the fire code official and design professional a ready reference tool for the conversion of the liquid weight and volume of cryogenic fluid to their corresponding volume of gas and vice versa and is a companion to the provisions of Chapter 55 of the code. Note that this appendix is for information purposes and is not intended for adoption.

**Appendix H Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) Instructions.** This appendix is intended to assist businesses in establishing a Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) based on the classification and quantities of materials that would be found on site in storage and/or use. The sample forms and available Material Safety Data Sheets (MSDS) provide the basis for the evaluations. It is also a companion to IFC Sections 407.5 and 407.6 which provide the requirement that the HMIS and HMMP be submitted when required by the fire code official. Note that the provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance (see sample ordinance on page xxi).

**Appendix I Fire Protection Systems—Noncompliant Conditions.** The purpose of this IFC appendix, which was developed by the ICC Hazard Abatement in Existing Buildings Committee, is to provide the fire code official with a list of conditions that are readily identifiable by the inspector during the course of an inspection utilizing the *International Fire Code*. The specific conditions identified in this appendix are primarily derived from applicable NFPA standards and pose a hazard to the proper operation of the respective systems. While these do not represent all of the conditions that pose a hazard or otherwise may impair the proper operation of fire protection systems, their identification in this adoptable appendix will provide a more direct path for enforcement by the fire code official. Note that the provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance (see sample ordinance on page xxi).

**Appendix J Building Information Sign.** This new appendix replaces the emergency responder communications facilities provisions which previously occupied Appendix J and that have been relocated to Section 510 in the 2012 edition. It provides design, installation and maintenance requirements for a Building Information Sign (BIS), a fire service tool to be utilized in the crucial, initial response of fire fighters to a structure fire. The BIS placard is designed to be utilized within the initial response time frame of an incident to assist fire fighters in their tactical size-up of a situation as soon as possible after arrival on the scene of a fire emergency. The BIS design is in the shape of a fire service Maltese Cross symbol and includes five spaces (the four wings plus the centerpiece of the cross symbol) in which information is placed about the tactical considerations of construction type and hourly rating, fire protection systems, occupancy type, content hazards and special features which could affect tactical decisions and operations. Note that the provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance (see sample ordinance on page xxi).

