Understanding & Utilizing
the International Fire Code

NATIONAL VOLUNTEER FIRE COUNCIL
ORG. 1976
Supporting Those Who Serve

ICC
INTERNATIONAL CODE COUNCIL

This guide is intended for use by volunteer fire chiefs, officers, and firefighters to create a basic understanding of how to use a model fire safety code to ensure an acceptable level of safety for both the public and firefighters.

Ensuring safety in the built environment from natural and man-made perils is a detailed technical process that is essential in reducing instances of death and injury. The intent of this guide is to break down the process to allow for a better understanding of how model codes are created and updated on a regular basis. It explains how to be involved in the code development process at the national level and details the importance of involvement at the community level.

Model building construction codes and fire safety codes developed by the International Code Council (ICC) are coordinated to create a systematic approach to building safety. It is important to remember that the codes need to be updated, improved, and refined by code users. Codes only improve public and firefighter safety when they are adopted and consistently enforced by knowledgeable code officials and firefighters.

In an effort to assist volunteer departments, this guide focuses on several components of the International Fire Code (IFC) and provides easy-to-use checklists. It serves as guidance based on fire code requirements for fire hydrant location, proper water main size, proper access for fire apparatus and fire lanes, and more. The guide also addresses pre-incident planning and code requirements for commercial and vacant buildings.

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This guide was made possible by the Federal Emergency Management Agency through Fire Prevention and Safety Grant # EMW-2012-FP-00267.

Introduction

The International Code Council® (ICC) is a U.S.-based membership association dedicated to developing model codes and standards used in the design, build, and compliance process to construct safe, sustainable, affordable, and resilient structures. The ICC Codes are used to construct residential and commercial buildings to ensure they remain safe throughout their useful life. All 50 states and the District of Columbia have adopted the International Codes (I-Codes) at the state or jurisdictional level. Many federal agencies, Guam, Puerto Rico, and the U.S. Virgin Islands use or reference the I-Codes. It is the mission of the ICC to provide the highest quality codes, standards, products, and services for all concerned with the safety and performance of the built environment.

Model building and fire safety codes directly impact both public and firefighter safety. Model codes establish the minimum safety levels for structures based on how the building is constructed and how it is occupied. The use of the building determines the relative risks. For example, buildings that contain hazardous materials or flammables pose one of the highest risks and therefore have the most stringent construction and fire safety requirements to comply with the I-Codes. Buildings that are used by a large number of people, such as theaters or sports arenas, are called "Assembly Occupancies" and have very stringent code requirements because of the life hazard associated with this type of building if a disaster were to occur. High-rise buildings, underground buildings, or windowless buildings also have special requirements because of the challenges these types of facilities have for firefighters.

One of the best ways for the fire service to achieve an acceptable level of safety is to participate in the model code development process and encourage their community leaders to adopt and enforce the most current codes and standards. The I-Codes are a complete set of comprehensive, coordinated codes for all aspects of construction, meaning the building code works hand-in-hand with the fire safety code. Building to code protects occupants from natural and man-made hazards such as fire, flood, wind, snow, etc. The fire code ensures that fire protection systems required in the building code are properly installed, tested, and maintained for the life cycle of the building.

While the terms "codes" and "standards" are often used interchangeably, a code tells you what needs to be done, while a standard tells you how to do it. The code might state that specific levels of fire protection are mandatory (the "when and where") and then reference a standard that details how that fire protection feature should be designed, installed, tested, and maintained (the "how to"). For example, the I-Codes require Assembly Occupancies to have fire alarm and fire sprinkler systems. The code also requires those systems to comply with the National Fire Protection Association (NFPA) standards for Fire Alarms (NFPA 72) and Fire Sprinkler Systems (NFPA 13). The I-Codes reference numerous standards from various standard development organizations. In fact, the International Fire Code (IFC) references nearly 100 NFPA and other standards.

The I-Codes are revised and updated every three years to strike a balance between advances in public and first responder safety, the latest technology, new installation techniques, new building products, and economics.

The three-year updates often include code changes based on proposals from ICC Code Action Committees (CAC) and Regional Work Groups (RWG). These committees are responsible to bring forth ideas and write them as code change proposals with the assistance of ICC staff. These proposals may represent changes to the I-Codes on any fire safety subject including those of concern to the fire service. In the 2015 I-Code development cycle, the Fire-CAC submitted a total of 64 code change proposals with a 77 percent success rate.

Participation by National Volunteer Fire Council (NVFC) representatives on fire code committees is extremely important to the effectiveness of future I-Code editions to ensure public and first responder safety. The technical and practical expertise of firefighters and fire prevention personnel along with design professionals, builders, contractors, labor representatives, and other organizations interested in building safety are vital to producing the highest quality model codes and standards to ensure safety in the built environment.

Through a Memorandum of Understanding between the NVFC and the ICC, the volunteer fire service is represented on Fire Code Regional Work Groups that meet periodically to create and submit code change proposals aimed at preventing fires, reducing injury and death from fire, and reducing risks to firefighters when battling buildings fires. The fire station is simply a staging area; the work environment is the actual building being attacked by fire. This guide will help to improve firefighter safety in the work environment with simple, yet vital, steps.

Contact the NVFC or your ICC state representative if you are interested applying to serve on a Regional Work Group or Code Action Committee. Visit **www.iccsafe.org/gr/Pages/gr-map**.aspx to find your representative.

Code Development Process Overview

The Codes and the Process

The I-Codes are model codes published by the ICC and developed by ICC Members to provide minimum safeguards for homes, buildings, and other structures. ICC uses the governmental consensus process to develop its codes. It is an open, inclusive process that allows input from all individuals and groups, including experts in fire safety and prevention, building construction, energy, and sustainability. Committees hear all code change proposals. Final decisions are made by ICC Voting Members – both Governmental and Honorary Members – including representatives from the NVFC.

This single set of codes offers substantial advantages to all building professionals and the public. Code officials, architects, engineers, designers, and contractors can work with a consistent set of codes with consistent requirements. Manufacturers can put their efforts into research and development rather than designing products to meet multiple sets of codes. As a result, they can focus on being more competitive in global markets. Uniform education and certification programs also benefit and can be used globally. The ICC code development process is critical to gaining the trust and confidence of the building and construction industry. The ICC code development process allows all jurisdictions, regardless of size, to benefit from the expertise of thousands of professionals. The cost to include this level of expertise and manage the process would be prohibitive for individual jurisdictions.

The Foundation

Governmental Consensus

The ICC code development process includes open forums of public debate with built-in safeguards to prevent domination by vested interests. The system ensures fairness, controls against conflicts of interest, and prevents vested economic interests from determining outcomes of code change proposals. The key mechanisms that govern the ICC governmental consensus process include the following.

Open Public Forums

- All forums are open to the public at no cost.
- Anyone can submit a code change proposal and testify at the hearings.
- All views are considered by the code committees prior to a vote.

Decision Transparency

- All testimony and committee recommendations are made in public hearings.
- All final code change proposal decisions are made by public safety officials in an open hearing followed by remote voting through cdpACCESS.

Representation of Interests

- Wide-ranging representation with full disclosure of conflicts of interest.
- One-third of a committee's members must be ICC Governmental Members with no financial or other vested interests.
- You don't have to be an ICC member to serve on a committee.

Due Process

- There are equal opportunities for rebuttal.
- Committees consider all views, objections, and the cost impact of all code change proposals.
- All who attend can testify.

Appeals Process

- There is an open appeal process.
- Appeals are considered per due process.

Majority Consensus

- A simple majority from the committee decides the initial action of the proposed code change.
- ICC assembly action allows Members to challenge the action of the committee.
- All final code change proposal decisions are made by public safety officials.

The People

The ICC Code Development Committee

The make up of ICC Code Development Committees includes:

- Fire, building, plumbing, electrical, mechanical, and energy code officials
- Design professionals and consultants
- Trade association representatives
- Builders and contractors
- Manufacturers and suppliers
- Government agency representatives
- Any qualified individual with a vested interest

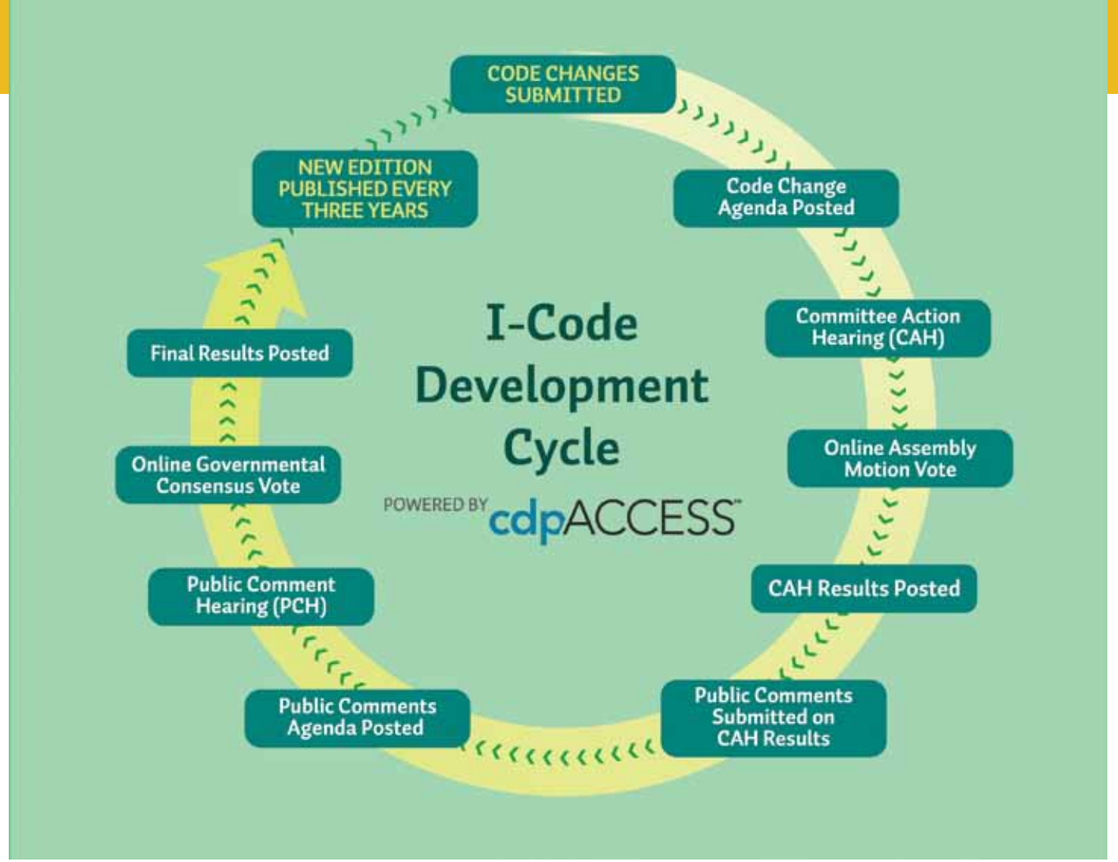
A minimum of one-third of a committee's members are required to be regulators who are experts in their fields. The final determination of code provisions is primarily in the hands of public safety officials who hold a public trust, have no vested interest, and can legitimately represent the public interest.

The Process

ICC Code Development

The ICC code development process is the framework to develop consensus codes as part of regulatory system for the built environment that is effective, efficient, and meets government, industry, public health, safety, and welfare needs. The objectives of the code development process are to:

- Recognize and evaluate in a timely manner technological developments that may affect construction techniques/ regulations
- Host an open debate and democratic discussion of proposals
- Present the final determination of code-text modifications
- Create an opportunity for building, plumbing, electrical, mechanical, fire, sustainability, and energy professionals to react to and share lessons and experiences learned in the field



The Eight-Step I-Code Development Cycle

The eight-step ICC code development process demonstrates a continuous cycle that adjusts to the changing times of the world we live in, incorporates the latest lessons learned in the construction industry, and keeps up with technological changes that help us protect communities and build a safer world. ICC publishes new editions of the code every three years.

Step 1: Code Changes Submitted

Any interested person may submit a code change proposal. Before code changes are due for the current cycle, an announcement is posted on the ICC web site (www.iccsafe.org) and in other media, including a notice in the Federal Register.

Step 2: Code Changes Posted

Code change proposals are posted at least 30 days prior to the public hearing.

Step 3: Committee Action Hearing (Public Hearing)

The Committee Action Hearing is a public meeting open to all parties. Anyone can attend, testify, and take part in debates. There is no cost to attend or participate in the hearing, which can also be viewed via webcast. During the Committee Action Hearing, interested parties can present their views including the cost, benefits, and impact of the code change proposals. The hearing includes the following steps:

- **Floor Discussion** - The code change proposals are considered and discussed at the floor discussion.
- **Committee Action** - The code development committee makes a recommendation on the code change proposal disposition.
- **Assembly Action** - ICC Members in attendance can challenge committee actions when approved by vote results in an automatic public comment.

Step 4: Committee Action Hearing Results Posted

The results of the public hearing are posted not less than 60 days prior to the Public Comment Hearing.

Step 5: Public Comments Sought on Committee Action Hearing Results

Any interested person can submit comments on the results of the Committee Action Hearing to challenge Committee Action or Assembly Action. This public comment process provides an opportunity to consider specific support for or objections to the results of the public hearings.

Step 6: Public Comments Posted

Code changes that received a public comment as well as code changes that had a successful assembly action are posted in the Public Comment Agenda at least 30 days prior to the Public Comment consideration. The proposed changes receiving neither an assembly action nor a public comment will be block voted on by simple majority at the Public Comment Hearing.

Step 7: Public Comment Hearing

Eligible voters consisting of designated Governmental Member Voting Representatives and Honorary Members cast votes on the final determination of all code change proposals presented in a code development cycle. The Public Comment Hearings strive to be fair, objective, and allow no proprietary interests to unduly influence their outcomes. The Public Comment Hearing is open to the public and also webcast with streaming video and audio.

Step 8: New Edition is Published

The final actions on all proposed code changes are incorporated in the next edition of the applicable I-Code. The ICC Board has determined that new editions of the codes are to be published every three years. Each new edition will incorporate the results of the code development activity since the last edition.

ICC Cloud-Based Code Development Process

cdpACCESS™ is the new, cloud-based tool built exclusively for ICC's code development process (cdp). Once referred to as remote voting, cdpACCESS is much more than that. With cdpACCESS, you can create code change proposals and submit them online. Details are available at **cdpACCESS.com**.

Adoption of Model Codes by States, Cities, and Other Jurisdictions

How a Code Becomes a Law

A model code becomes law when adopted by a government entity (state legislature, state agency, county board, city council, etc.). When adopted, properties within the adopting jurisdiction are required to comply with the codes.

Model Code Advantages

Based on building science, technical knowledge, and past experiences, model building codes provide protection from man-made and natural disasters, guarding public health and reducing property losses. Safe buildings are achieved through proper design and construction practices in concert with a code administration program that ensures compliance.

Economic Benefits of Model Codes

Model codes keep construction costs down by facilitating uniformity in the construction industry that allows building and materials manufacturers to do business on a larger scale resulting in cost savings. Codes also help protect real estate investments by providing a minimum level of quality and safety, which can result in lower insurance costs.

What Code Applies

The primary objective of a building code is to provide maximum safety, guard public health, and provide energy efficiency in new construction. Existing structures generally are required to meet the code that was in place when the property was built. However, newer codes may apply to an existing building when it is altered or a permit is required. A change in occupancy may also impact which code applies. There are exceptions, usually in the fire or residential codes, where new requirements may be applied to existing structures.

The International Fire Code (IFC) is a companion code to the International Building Code (IBC). The IFC includes the requirements for the design, installation, and testing of fire protection systems for new construction and is in coordination with the IBC. The IFC is also a maintenance code. It includes provisions to ensure buildings are maintained to the same level of fire safety as when they were built.

For public access to the IFC, visit **http://publicecodes.cyberregs.com**. To purchase a copy of the IFC, visit **http://shop.iccsafe.org**.

International Fire Code

This section will start with an explanation of the intent and scope of the IFC and then move into key portions of the codes that can be used at the local department level. These include Commercial Site Plan Review, Commercial Building Pre-Incident Planning, and Vacant Buildings.

For navigation purposes, IFC code text in this guide will be noted with this symbol:

IFC commentary text will be noted with this symbol:

Both code text and commentary text are excerpted directly from the 2012 IFC.

Intent of the IFC

Intent. The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises, and to provide safety to firefighters and emergency responders during emergency operations.

Code requirements regulate conditions that are likely to cause or contribute to fires or explosions; endanger life or property if a fire occurs or contribute to the spread of a fire. The intent of the code is to regulate conditions related to the health, safety and welfare of the public, the fire fighters and other emergency responders called upon to conduct emergency operations in or on any building, structure or premises.

Fire is always a concern, whether a building is under construction, occupied, vacant, or undergoing renovation, restoration, expansion, or demolition.

The IFC utilizes a systematic approach to achieve the minimum level of safety to which building owners must comply. Building owners may elect to go above the minimum requirements to further enhance safety. Code officials and firefighters can encourage these decisions with education and a positive, non-confrontational approach.

Building construction and fire safety codes are one component of comprehensive community risk reduction (CCRR). Think about CCRR as an expanded or all-hazards approach to public fire prevention programs. CCRC encompasses "5 E's":

- Engineering
- Education
- Enforcement
- Economic Incentive
- Emergency Response

The engineering component is primarily codes and standards driven. Emergency response is the last component and needed only when the first four have failed to prevent an incident. To help achieve code compliance, education and economic incentive are examples of voluntary compliance while enforcement is the mandatory application of the code's requirements.

For this guide, the focus is on basic code requirements for engineering and safe practices, and how a volunteer firefighter (who is NOT a code enforcement officer) can use education and economic incentive to impact community risk reduction as it pertains to preventing or mitigating fire risks.

Scope of the IFC

Scope. This code establishes regulations affecting or relating to structures, processes, premises and safeguards regarding:

1. The hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices;
2. Conditions hazardous to life, property or public welfare in the occupancy of structures or premises;
3. Fire hazards in the structure or on the premises from occupancy or operation;
4. Matters related to the construction, extension, repair, alteration or removal of fire suppression or alarm systems; and
5. Conditions affecting the safety of fire fighters and emergency responders during emergency operations.

The code does not attempt to achieve perfection by requiring every conceivable or available safeguard for every structure, premises, or operation within the scope of the code; rather, the code seeks to establish a minimum acceptable safety level to balance the many factors that must be considered, including loss statistics, relative hazard and the economic and social impact. The code is maintained through the use of a democratic code development process so that everyone affected by these minimum requirements has an equal opportunity to present his or her concern, both for and against any of the requirements.

Commercial Site Plan Review

The IFC requires adequate fire department access and other fire service features to ensure firefighters can quickly locate a building, access a building site, and enter a building during an emergency. Many of these features require fire department input to ensure the responding fire department's apparatus and equipment will work safety and efficiently with the type and location of those features incorporated into the building's design. The best opportunity for fire department input is during the initial design phase of a commercial building project – the site plan review. The jurisdiction wishes to ensure the building is built to the local construction and fire safety codes, so a thorough site plan review is an important first step to ensuring that level of safety.

Pre-incident planning is a recognized best practice in the fire service to prepare for an emergency at buildings in the response area. Effective pre-incident planning allows the fire department to review building hazards and response tactics well in advance of a potential fire or emergency response. It allows for decision-making before the stress of making decisions in an emergency. The pre-incident plan should start with the receipt of a commercial site plan for fire department review and input.

The following code text and commentary comes from Chapter 5 of the IFC:

Fire Service Features

General Comments

The requirements of Chapter 5 of the IFC apply to all occupancies and pertain to access roads, access to building openings and roofs, premises identification, key boxes, hazards to firefighters, fire protection water supplies, fire command centers, and fire department access to equipment.

Purpose

This chapter contains the requirements for fire service access to the property that is to be protected, including access roads, security devices, and access through openings in the building.

The chapter also addresses firefighter hazards, the requirements for a fire department command center and firefighter access to equipment, such as fire suppression equipment, air-handling equipment, emergency power equipment and access to the roof. In addition, this chapter addresses the fire protection water supply.

Fire Apparatus Access Roads

503.1 Where required. Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3.

This section introduces the requirements for dedicated fire apparatus access roads serving new and relocated buildings in the jurisdiction. The requirements are to be established in coordination with the local fire service to accommodate the jurisdiction's fire apparatus and equipment. The intent of these requirements is to provide the fire department with sufficient access to buildings to enable efficient fire suppression and rescue operations.

503.2.1 Dimensions. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

The dimensions in this section are established to give fire apparatus continuous and unobstructed access to buildings and facilities. This section requires that the unobstructed width of a fire apparatus access road must not be less than 20 feet (6096 mm). The intent of the minimum 20 foot (6096 mm) width is to provide space for fire apparatus to pass one another during fireground operations.

The need to pass may occur when engines are parked for hydrant hook-up, laying hose, or when trucks are performing aerial ladder operations. When an engine company is connected to a fire hydrant parallel to the curb using a front suction connection and using a side-discharge port on the pump, the horizontal distance that is needed to make a no-kink bend in the discharge fire hose can be considerable, especially when a large-diameter hose (LDH) is being used.

The roadway width needed to accommodate such a common operational scenario would be the width of the apparatus plus the no-kink bending radius of the discharge hose, leaving minimal roadway width for other apparatus to squeeze by if needed. Including adjacent road shoulders in the 20 foot (6096 mm) width measurement could yield substandard and inadequate driving surfaces for apparatus and, as such, they are not to be included in the minimum width.

The minimum vertical clearance of 13 feet, 6 inches (4115 mm) is the standard clearance used for highway bridges and underpasses. The vertical clearance requirement would apply in cases where a building or portion of a building, such as a canopy or porte-cochere, projects over all or a portion of the required width of the fire apparatus access road. Conversely, if the full required width of the fire apparatus access road is provided outside of the footprint of the projecting building element, the vertical clearance requirement would not apply.

It is not the intent of this section that all projecting elements be constructed with a 13-foot, 6-inch (4115 mm) vertical clearance, regardless of whether they encroach upon the required width of a fire apparatus access road.

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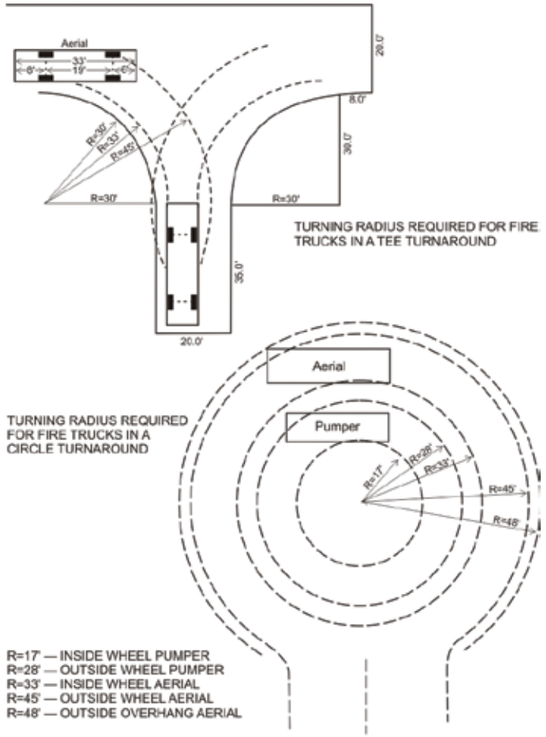


For SI: 1 foot = 304.8.

503.2.4 Turning radius. The required turning radius of a fire apparatus access road shall be determined by the fire code official.

The turning radius of an access road should be based on the turning radius of the anticipated responding emergency vehicles and must be approved by the fire code official.

503.2.5 Dead ends. Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) in length shall be provided with an approved area for turning around fire apparatus.

In consideration of the hazards inherent in attempting to back emergency vehicles, especially larger ones such as tower ladders, out of a long dead-end roadway, this section intends to create a safer situation by requiring that dead-end access roads over 150-feet long (45 720 mm) be equipped with an approved turnaround designed for the largest anticipated emergency-response vehicles.

Premises Identification

505.1 Address identification. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background.

Where required by the fire code official, address numbers shall be provided in additional approved locations to facilitate emergency response. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches (101.6 mm) high with a minimum stroke width of 0.5 inch (12.7 mm). Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address numbers shall be maintained.

Buildings must be provided and maintained with address identification that is easily identifiable by emergency responders from the emergency response vehicle. This should include the backs of buildings that face alleys or roads, since the emergency response unit may often be directed to the back entrance to a building. The back door of each tenant space responders to find. Temporary street signs must be installed before construction begins and replaced later with permanent signs.

505.2 Street or road signs. Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles. Signs shall be of an approved size, weather resistant and be maintained until replaced by permanent signs.

Construction zones must have temporary street signs installed before construction begins and replaced later with permanent signs. The names of streets in new developments may not be on maps, making them difficult to locate.

Fire Protection Water Supplies

507.1 Required water supply. An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

This section requires that adequate fire protection water be provided to the premises upon which new buildings are constructed or onto which a building is moved, from either outside of the jurisdiction or another location within the jurisdiction. Note that this section states that the water supply must be capable of supplying the required fire flow to the premises; however, the means by which the fire flow is supplied is determined by the policies of the jurisdiction, such as a pumper taking suction from a hydrant, tanker or lake (also see Appendices B and C in the IFC for further information on fire flows and fire hydrants).

NOTE: In addition to the IFC Appendices, information about determining adequate fire flow can be found in the NFPA Fire Protection Handbook.

Fire flow. Fire flow requirements for buildings or portions of buildings and facilities shall be determined by an approved method.

Appendix B of the IFC is an example of a method for determining fire flow and its duration that could be approved by the fire code official. Table B105.1 bases fire flow on the type of construction and the square footage of the fire area. All calculations in the table are based on a 20-pounds-per-square-inch (psi) residual pressure.

509.2 Equipment access. Approved access shall be provided and maintained for all fire protection equipment to permit immediate safe operation and maintenance of such equipment. Storage, trash and other materials or objects shall not be placed or kept in such a manner that would prevent such equipment from being readily accessible.

This section requires immediate access to, and working space around, all fire suppression, protection, and detection system devices and control elements necessary for fire department use. It further prohibits obstruction of such equipment by materials or objects that may prevent such equipment from being immediately accessed by emergency responders.

Table B105.1(1)

Required Fire-Flow for One- and Two-Family Dwellings, Group R-3 and R-4 Buildings and Townhouses

Fire-Flow Calculation Area (square feet)	Automatice Sprinkler System (Design Standard)	Minimum Fire-Flow (gallons per minute)	Flow Duration (hours)
0-3,600	No automatic sprinkler system	1.000	1
3,601 and greater	No automatic sprinkler system	Value in Table BI05.1(2)	Duration in Table BI05.1(2) at the required fire-flow rate
0-3,600	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	500	1/2
3,601 and greater	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	1/2 value in Table BI05.1(2)	1

For SI: 1 square foot = 0.0929 m², 1 gallon per minute = 3.785 L/m.

Note that detailed fire-flow rate information for structures over 3,601 square feet without automatic sprinkler systems can be found in Reference Table B105.1(2) in Appendix B of the IFC.

Notes

Commercial Site Plan Review Checklist

Use the following pre-planning checklist to ensure commercial sites in your jurisdiction meet the qualifications needed for effective emergency response.

Fire Apparatus Access

- ❍ **Paved road to within 150 ft. of the building**
- ❍ **Road width at least 20 ft. (pumper) and 24 ft. (Ariel)**
- ❍ **Vertical clearance at least 13 ½ ft.**
- ❍ **Road capable of supporting weight of fire apparatus (What is the maximum gross weight of your heaviest vehicle?)**
- ❍ **Turning radius appropriate for your apparatus**
- ❍ **Dead-end roads longer than 150 ft. have an approved turn-a-round**
- ❍ **Angles of approach and departure (slope/grade) within limits of your fire apparatus**
- ❍ **Any security gates or obstructions have an alternate means of access**
- ❍ **Any traffic calming devices (speed humps, raised pedestrian crosswalks, etc.) are reviewed and approved**
- ❍ **Building has a properly designated Fire Lane – No Parking zones that align with your department SOPs**
- ❍ **Apparatus access is provided to access all fire hydrants and fire sprinkler/stand-pipe FDCs (Fire Department Connections)**

Premise Identification

- ❍ **Street name provided and street signs installed at start of construction**
- ❍ **Building address provided and visible from the fire apparatus access road**

Water Supply (municipal system available)

- ❍ **Water main size adequate to provide estimated fire flow (GPM)**
- ❍ **Fire hydrant spacing is adequate based on length of supply hose carried on first due pumper**
- ❍ **Fire hydrant threads correct**

Water Supply (no municipal system available)

- ❍ **Alternate water supply provided (draftable body of water, drafting hydrant, cistern, water tank, etc.) with adequate capacity (fire flow GPM X duration in hours)**

Fire Department Connection (FDC)

- ❍ **Location of FDC is accessible and coordinated with department SOP**
- ❍ **Location of FDC is not within 10 ft. of hazard (i.e. utilities, open stairwell, unprotected windows, etc.)**

Notes

Commercial Building Pre-Incident Planning

As part of your pre-incident planning, it is recommended that the following information be gathered and recorded for commercial buildings:

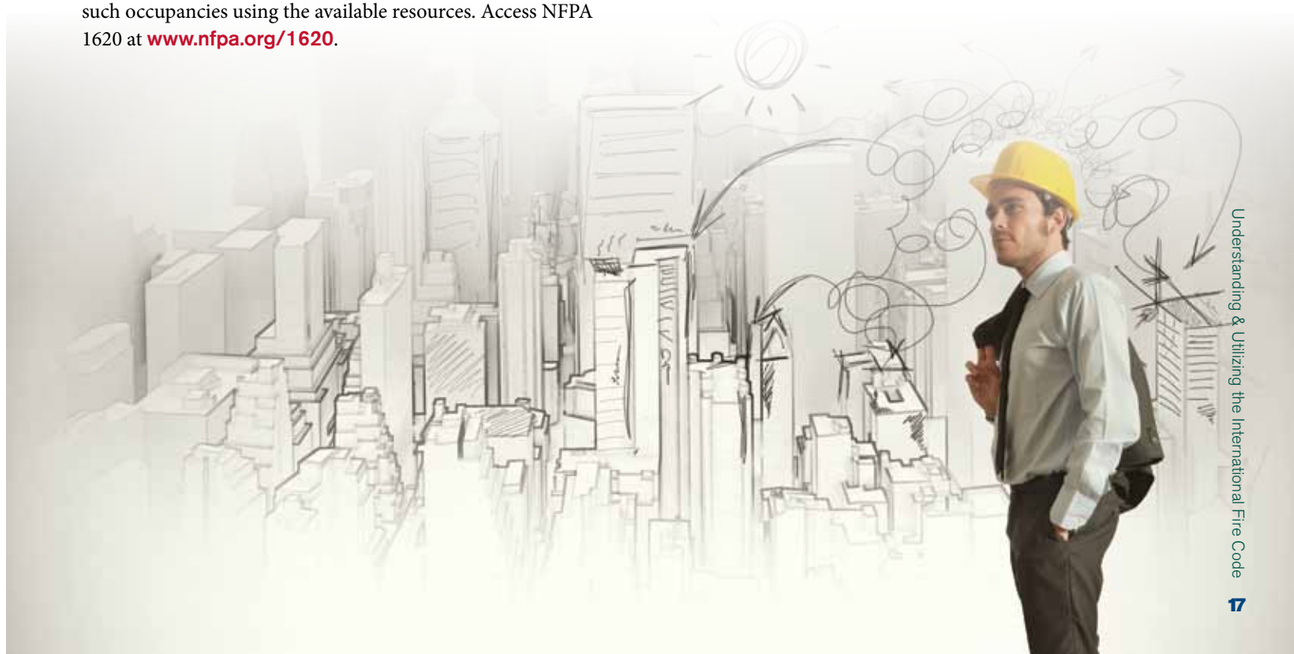
1. Building address, company name, and occupancy classification
2. Emergency contact information for building owner and/or key holder
3. Site plan map showing building size (square footage and number of stories), access routes, fire hydrant locations, fire department connections for sprinkler or standpipe systems, utility shut-off locations, building access doors, and rapid entry key box location
4. Type of building construction
5. Fire protection features (i.e., fire alarm, fire sprinkler, or fixed-extinguishing system)
6. Copy of the building Fire Safety and Evacuation Plan
7. Tier II hazardous material inventory form
8. Any other hazards or issues of special note to responding firefighters

Be sure to reference *NFPA 1620 Standard for Pre-Incident Planning*, which provides criteria for evaluating the protection, construction, and operational features of specific occupancies to develop a pre-incident plan that should be used by responding personnel to manage fires and other emergencies in such occupancies using the available resources. Access NFPA 1620 at **www.nfpa.org/1620**.

Building Information Card

The IFC requires owners of high-rise buildings to provide the fire code official with the following information. The Building Information Card (BIC) may be an actual card, possibly laminated, or an electronic application for the storage and display of the required information. An approved BIC contains, but is not limited to, the following information:

1. General building information that includes:
   - Property name
   - Address
   - The number of floors in the building (above and below grade)
   - Use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor)
   - Estimated building population (i.e., day, night, weekend)
2. Building emergency contact information that includes:
   - A rapid entry box (i.e., Knox™ Box)
   - A list of the building's emergency contacts (e.g., building manager, building engineer, etc.) and their respective work phone number, cell phone number, and e-mail address
3. Building construction information that includes:
   - The type of building construction (Type I, II, III, IV or V)



4. Exit stair information that includes:
   - Number of exit stairs in the building
   - Each exit stair designation and floors served
   - Location where each exit stair discharges
   - Exit stairs that are pressurized
   - Exit stairs provided with emergency lighting
   - Each exit stair that allows reentry
   - Exit stairs providing roof access

5. Elevator information that includes:
   - Number of elevator banks
   - Elevator bank designation
   - Elevator car numbers and respective floors that they serve
   - Location of elevator machine rooms
   - Location of sky lobby
   - Location of freight elevator banks

6. Building services and system information that includes:
   - Location of mechanical rooms
   - Location of building management system
   - Location and capacity of all fuel oil tanks
   - Location of emergency generator
   - Location of natural gas service

7. Fire protection system information that includes:
   - Locations of standpipes
   - Location of fire pump room
   - Location of fire department connections (FDC)
   - Floors protected by automatic sprinklers
   - Location of different types of automatic sprinkler systems installed (e.g., dry, wet, pre-action, etc.)

8. Hazardous material information that includes:
   - Location of hazardous material
   - Name and quantity of hazardous material

The IFC requires detailed record keeping and reporting with regard to hazardous materials. The following code text and commentary outlines the relevant provisions:

407.2 Material Safety Data Sheets. Material Safety Data Sheets (MSDS) for all hazardous materials shall be either readily available on the premises as a paper copy, or where approved, shall be permitted to be readily retrievable by electronic access.

MSDS provide critical information about individual chemicals and their related hazards. This section requires that these data sheets be readily available on the premises or, where equivalent access can be achieved, as approved by the fire code official, they may be retrievable by electronic means. This allows availability for review by both employees and emergency responders. An appropriate location may be the security room at a facility or perhaps the main office. These sheets can potentially play a role in an emergency response. For example, if a chemical is noted as being water reactive on the MSDS, depending on the level of water reactivity, applying water to that spill may not be appropriate.

Note: MSDS sheets are now called Safety Data Sheets. For more information, visit: **www.iccsafe.org/gr/Documents/OSHA-GHS-FactSheet.pdf**

407.5 Hazardous Materials Inventory Statement. Where required by the fire code official, each application for a permit shall include a Hazardous Materials Inventory Statement (HMIS) in accordance with Section 5001.5.2.

NOTE: An HMIS is further described in Chapter 50 of the IFC but is essentially a document listing all the hazardous materials found on site. This documentation includes information such as the type of material, amount, specific hazards associated with the material, and how it is used. All of this information can be very important for emergency planning and preparedness. An HMIS is required only if the fire code official specifically requires one. See IFC Appendix H for further information on HMIS and HMMP preparation.

Building Walk-Through

A building walk-through is a tour of a building with the permission of the owner or manager. The purpose is to familiarize firefighters with the layout, fire protection features operation, and hazards or issues of concern/interest. It allows critical information about the building to be gathered and documented prior to a future emergency response. The following, as defined by Section 509 of the IFC, should be checked when performing a building walk-through:

Fire Protection and Utility Equipment Identification and Access

509.1 Identification. Fire protection equipment shall be identified in an approved manner. Rooms containing controls for air-conditioning systems, sprinkler risers and valves, or other fire detection, suppression or control elements shall be identified for the use of the fire department. Approved signs required to identify fire protection equipment and equipment location shall be constructed of durable materials, permanently installed and readily visible.

In an emergency, it is vitally important that the fire department and other emergency responders be able to quickly locate and access critical controls for fire protection systems. Obstructed or poorly marked equipment can cause delays in firefighting operations while firefighters locate other hose stations and stretch additional hose, for example. Valves and other controls are often located in rooms or other enclosures and their location must be clearly identified with written or pictographic signs, which must be clearly visible and legible. Signs using the NFPA 170 symbols for fire protection equipment can provide standardized markings throughout a jurisdiction.

White reflective symbols on a red reflective background are effective. For exterior signs, heavy-gage, sign-grade aluminum is recommended. Interior signs may be constructed of plastic, light-gage aluminum or other approved durable, water-resistant material. As a general rule, fire protection piping, cabinets, enclosures, wiring, equipment and accessories are red or are identified by red or red/white markings. The manner of identification is subject to the approval of the fire code official.

509.1.1 Utility identification. Where required by the fire code official, gas shutoff valves, electric meters, service switches and other utility equipment shall be clearly and legibly marked to identify the unit or space that it serves. Identification shall be made in an approved manner, readily visible and shall be maintained.

This section provides the fire code official with the authority to require utility identification for services serving multi-unit/multi-building properties, including facilities, campuses, strip malls, business parks, residential properties and similar locations where identification of utilities is considered essential to emergency responders. Note that this section does not prescribe any particular design requirements for the utility identification markings in order to satisfy the requirements. It should be recognized that the intent of the markings is to provide an easily understood and consistent tool to emergency responders who must secure utilities during emergency operations.

Jurisdictions should develop a policy to ensure that utility identification markings are prepared in a standard, consistent format to avoid confusing responders, and provide the minimum information required so they can correctly and efficiently utilize them.

509.2 Equipment access. Approved access shall be provided and maintained for all fire protection equipment to permit immediate safe operation and maintenance of such equipment. Storage, trash and other materials or objects shall not be placed or kept in such a manner that would prevent such equipment from being readily accessible.

This section requires immediate access to and working space around all fire suppression, protection, and detection system devices and control elements necessary for fire department use. It further prohibits obstruction of such equipment by materials or objects that may prevent such equipment from being immediately accessed by emergency responders.

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Commercial Building Checklist

As firefighters and officers, you understand how to do a size-up at every incident and are taught to maintain situational awareness. You can (and should) apply these skills whenever you are in a commercial building. This could be on an EMS run, when doing your personal shopping, or even dining at a local restaurant.

If you observe any of the following fire code violations, you should note the building, day, and time you observed the violation and report your observations to the local fire inspector or fire marshal. If you don't know who that is, make it a point to find out and introduce yourself.

It is not recommended that you approach the building owner or manager directly unless you have some legal authority to do so; for example, a fire chief addressing a serious fire threat. Based on your fire service experience, if something looks or feels unsafe, it probably is. You may not know the code section, but your fire inspector or fire marshal will.

Be on the lookout for these common violations:

- ❍ **Locked, chain/padlocked, or blocked exits (required exits will have a "Exit" sign above it)**
- ❍ **Storage of portable propane tanks within a building**
- ❍ **Storage of gasoline or flammable liquid inside a building in an improper container or outside of a proper flammable liquid storage cabinet**
- ❍ **Excessive accumulations of dust (i.e. sawdust or other fine materials)**
- ❍ **Overloaded electrical outlets or excessive use of extension cords**
- ❍ **Space heaters within 3 ft. of any combustible (i.e. waste basket or curtain)**
- ❍ **Fire extinguishers are present but have an expired Inspection Tag (annual inspection)**
- ❍ **Fire Alarm Control Panel (FACP) is not in "trouble" or "silence" mode**
- ❍ **Fire Sprinkler System: control valve is OPEN and System has not been inspected quarterly**
- ❍ **Occupancies like restaurants, nightclubs, or theaters are overcrowded – "Maximum Occupancy" signs are required to be conspicuously posted**
- ❍ **Commercial kitchen fixed-extinguishing systems have not been inspected every six months**
- ❍ **Commercial kitchen hoods have grease buildup**
- ❍ **Fire hydrants and FDCs are not accessible or obstructed**
- ❍ **Merchandise or other items stored is more than 2 ft. below the ceiling in non-sprinkler buildings and more than 18 inches below ceiling in sprinkler-ready buildings**
- ❍ **Oily rags are stored in a metal container with lid closed or stored outdoors**
- ❍ **The building address is not clearly visible from the street**

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Vacant Buildings

Vacant and abandoned buildings are significant hazards to firefighters and detract from communities. The IFC imposes numerous requirements for vacant or abandoned buildings, including requiring a Building Placard to provide critical decision-making information to the incident commander. This section provides a simple checklist highlighting these requirements and links to other best practices when dealing with vacant structures, both before a fire and during the incident.

The main focus of the IFC requirements is to ensure these buildings are safe and secure, to eliminate the potential for fire ignition, and to help keep responders safe during an incident.

The following code text and commentary from the IFC highlights important information related to vacant structures.

Definition

SECTION 311
VACANT PREMISES

Vacant buildings or portions of buildings that are open at doors or windows pose fire safety and criminal trespass hazards to a community and are correctly declared to be unsafe buildings in Section 110.1.1.Such premises are often called an "attractive nuisance" to neighborhood children who may enter them to play or to other persons who may enter seeking shelter from the elements or to engage in potential criminal activities.

Placarding System

311.5 Placards. Any vacant or abandoned buildings or structures determined to be unsafe pursuant to Section 110 of this code relating to structural or interior hazards shall be marked as required by Sections 311.5.1 through 11.5.5.

Vacant or abandoned buildings are often of questionable structural integrity and have a very high probability of intentionally set fires. When fires occur in these buildings, they present a host of unusual hazards to firefighters. Since the buildings are uninhabited, fires may develop for significant periods of time before they are detected and reported.

In December 1999, six firefighters died after they became lost in a six-floor, maze-like, cold-storage and warehouse building while searching for two reportedly trapped people and fire extension. In the wake of this tragedy, the National Institute for Occupational Safety and Health (NIOSH) conducted a Fatality Assessment and Control Evaluation (FACE) as part of its Firefighter Fatality Investigation and Prevention Program. NIOSH issued its findings in report FACE-99-F47 in September of the year 2000. NIOSH investigators concluded that to reduce the risk of similar occurrences fire departments should, among other recommendations, implement a program to "identify dangerous vacant buildings by affixing warning placards to entrance doorways or other openings where firefighters may enter." In order to improve firefighter safety when responding to incidents in buildings that have structural safety issues and have been declared to be unsafe due to being vacant or abandoned, this section establishes a placarding system that will assist incident commanders in making personnel and equipment deployment decisions.

311.5.1 Placard location. Placards shall be applied on the front of the structure and be visible from the street. Additional placards shall be applied to the side of each entrance to the structure and on penthouses.

Prominent positioning of the warning placards where they can be readily seen by the first-in fire companies or other emergency responders will assist in the initial incident size-up and resource assignments.

311.5.2 Placard size and color. Placards shall be 24 inches by 24 inches (610 mm by 610 mm) minimum in size with a red background, white reflective stripes and a white reflective border. The stripes and border shall have a 2-inch (51 mm) minimum stroke.

In order to be truly effective in conveying the critical information about a building's structural stability, the placards must be fabricated so as to be in bold contrast to their mounting surface. The required reflectivity will enhance placard visibility under low ambient lighting conditions where flashlights, spotlights or emergency vehicle warning lights may be the only operating light-emitting source.

311.5.3 Placard date. Placards shall bear the date of their application to the building and the date of the most recent inspection.

Including the date of placard posting and the most recent inspection information on the placard will assist the incident commander in verifying the validity and currency of the building's status.

311.5.4 Placard symbols. The design of the placards shall use the following symbols:

1. ☐ This symbol shall mean that the structure had normal structural conditions at the time of marking.
2. ▨ This symbol shall mean that structural or interior hazards exist and interior fire-fighting or rescue operations should be conducted with extreme caution.
3. ☒ This symbol shall mean that structural or interior hazards exist to a degree that consideration should be given to limit firefighting to exterior operations only, with entry only occurring for known life hazards.
4. Vacant marker hazard identification symbols: The following symbols shall be used to designate known hazards on the vacant building marker. They shall be placed directly above the symbol.

   4.1 R/O—Roof open

   4.2. S/M—Stairs, steps and landing missing

   4.3. F/E—Avoid fire escapes

   4.4. H/F—Holes in floor

The placard symbols required by this section are intended to provide clear and readily interpretable operational information to the incident commander relative to the level of structural hazard posed to fire suppression personnel in the conduct of rescue and firefighting operations as of the inspection date included on the placard. By labeling the various degrees of hazards, the incident commanders can restrict operations to strictly defensive or cautiously offensive operations.

Abandoned Building Toolbox

The International Association of Arson Investigators (IAAI) has a resource program called the Abandoned Building Toolbox. The objective of the project was to develop materials to assist public officials in dealing with vacant or abandoned buildings within their jurisdictions. Materials developed as part of the project were targeted toward the safety of fire suppression forces involved in fighting fires in vacant or abandoned buildings and the reduction of incendiary fires involving these properties. The Toolbox includes background materials, presentations, lesson plans, speaker notes, and support materials. Visit **www.firearson.com** to access this resource.

Fire departments should work with their local building official, fire inspector or fire marshal, utilities, local police, neighborhood watch, and the building owner (if cooperative) to mitigate the potential hazards associated with structures.

Vacant/Abandoned Building Checklist

The following checklist can be used to help reduce the risks of vacant buildings within your jurisdiction.

- ❍ **Building is completely and properly secured – doors locked or boarded, windows closed and locked or boarded without any open access points allowing unauthorized access to the building**
- ❍ **All fire protection systems are in service and operational, especially fire sprinkler systems**
- ❍ **All fire walls are intact and fire doors closed**
- ❍ **All hazardous materials are removed from the buildings**
- ❍ **All combustible materials are removed from the buildings**
- ❍ **If deemed unsafe, the building has a placard as required by the IFC**
- ❍ **If practical, gas and electric to the building is shut-off by the appropriate utility**
- ❍ **A routine drive-by of the premises is done periodically to inspect the security and to ensure placards are maintained**

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Conclusion

The adoption, administration, and enforcement of current model construction and fire safety codes is needed to ensure a minimal level of safety in the built environment. Effective fire code administration is essential for the safety and well-being of emergency responders.

It is important to understand how a model code, such as the IFC, is developed and how you can play an important role in the revision and adoption process. It is equally important that firefighters understand the provisions and concepts of the IFC that have a direct impact on safety. With a basic understanding of the fire code and the checklists included in this guide, fire departments and firefighters are now better prepared to recognize serious fire code violations, provide input concerning new commercial building projects, and prepare meaningful and accurate pre-incident plans for commercial buildings in their response area.

Ensuring fire code compliance is essential in preventing fires, lessening damages, and keeping responders safe. We hope this guide has provided you with the knowledge and tools necessary to be a proactive fire code official for your department and your community.

Resources

International Code Council
www.iccsafe.org

Complimentary Public Access to ICC Codes
http://publicecodes.cyberregs.com/icod/IC-P-2012-000019.htm

National Volunteer Fire Council
www.nvfc.org

National Fire Protection Association
www.nfpa.org

OSHA Fire Service Features Manual
http://www.osha.gov/Publications/fire_features3256.pdf

MSDS Hazardous Materials Fact Sheet
http://www.iccsafe.org/gr/Documents/OSHA-GHS-FactSheet.pdf

National Volunteer Fire Council
7852 Walker Drive, Suite 390
Greenbelt, MD 20770

www.nvfc.org

Washington DC Governmental Affairs Office
500 New Jersey Avenue, NW
6th Floor
Washington, DC 20001

www.iccsafe.org

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