

IFGC[®]

INTERNATIONAL
FUEL GAS
CODE[®]

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2021



2021 International Fuel Gas Code®

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PREFACE

Introduction

The *International Fuel Gas Code*® (IFGC®) establishes minimum requirements for fuel gas systems and gas-fired appliances using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and new fuel gas system and appliance designs. This 2021 edition is fully compatible with all of the International Codes® (I-Codes®) published by the International Code Council® (ICC®), including the *International Building Code*® (IBC®), *International Energy Conservation Code*® (IECC®), *International Existing Building Code*® (IEBC®), *International Fire Code*® (IFC®), *International Green Construction Code*® (IgCC®), *International Mechanical Code*® (IMC®), *International Plumbing Code*® (IPC®), *International Private Sewage Disposal Code*® (IPSDC®), *International Property Maintenance Code*® (IPMC®), *International Residential Code*® (IRC®), *International Swimming Pool and Spa Code*® (ISPSC®), *International Wildland-Urban Interface Code*® (IWUIC®), *International Zoning Code*® (IZC®) and *International Code Council Performance Code*® (ICCPC®).

The I-Codes, including the IFGC, are used in a variety of ways in both the public and private sectors. Most industry professionals are familiar with the I-Codes as the basis for laws and regulations in communities across the US and in other countries. However, the impact of the codes extends well beyond the regulatory arena, as they are used in a variety of nonregulatory settings, including:

- Voluntary compliance programs such as those promoting sustainability, energy efficiency and disaster resistance.
- The insurance industry, to estimate and manage risk, and as a tool in underwriting and rate decisions.
- Certification and credentialing of individuals involved in the fields of building design, construction and safety.
- Certification of building and construction-related products.
- US federal agencies, to guide construction in an array of government-owned properties.
- Facilities management.
- “Best practices” benchmarks for designers and builders, including those who are engaged in projects in jurisdictions that do not have a formal regulatory system or a governmental enforcement mechanism.
- College, university and professional school textbooks and curricula.
- Reference works related to building design and construction.

In addition to the codes themselves, the code development process brings together building professionals on a regular basis. It provides an international forum for discussion and deliberation about building design, construction methods, safety, performance requirements, technological advances and innovative products.

Development

This 2021 edition presents the code as originally issued, with changes reflected in the 2003 through 2018 editions and further changes approved by the ICC Code Development Process through 2020 and standard revisions correlated with ANSI Z223.1-2021. A new edition such as this is promulgated every 3 years.

This code is founded on principles intended to establish provisions consistent with the scope of a fuel gas code that adequately protects public health, safety and welfare; provisions that do not unnecessarily increase construction costs; provisions that do not restrict the use of new materials, products or methods of construction; and provisions that do not give preferential treatment to particular types or classes of materials, products or methods of construction.

Format

The IFGC is segregated by section numbers into two categories, “code” and “standard,” coordinated and incorporated into a single document. The sections that are “code” are designated by the acronym “IFGC” next to the main section number (e.g., Section 101). The sections that are “standard” are designated by the acronym “IFGS” next to the main section number (e.g., Section 304). A subsection may be individually redesignated as an “IFGS” section where it is located under an “IFGC” main section.

Maintenance

The IFGC is kept up to date through the review of proposed changes submitted by code enforcement officials, industry representatives, design professionals and other interested parties. Proposed changes are carefully considered through an open code development process in which all interested and affected parties may participate.

The ICC Code Development Process reflects principles of openness, transparency, balance, due process and consensus, the principles embodied in OMB Circular A-119, which governs the federal government’s use of private-sector standards. The ICC process is open to anyone; there is no cost to participate, and people can participate without travel cost through the ICC’s cloud-based app, cdpAccess®. A broad cross section of interests are represented in the ICC Code Development Process. The codes, which are updated regularly, include safeguards that allow for emergency action when required for health and safety reasons.

In order to ensure that organizations with a direct and material interest in the codes have a voice in the process, the ICC has developed partnerships with key industry segments that support the ICC’s important public safety mission. Some code development committee members were nominated by the following industry partners and approved by the ICC Board.

- American Gas Association (AGA)
- American Institute of Architects (AIA)

The code development committees evaluate and make recommendations regarding proposed changes to the codes. Their recommendations are then subject to public comment and council-wide votes. The ICC’s governmental members—public safety officials who have no financial or business interest in the outcome—cast the final votes on proposed changes.

The contents of this work are subject to change through the code development cycles and by any governmental entity that enacts the code into law. For more information regarding the code development process, contact the Codes and Standards Development Department of the ICC.

While the I-Code development procedure is thorough and comprehensive, the ICC, its members and those participating in the development of the codes disclaim any liability resulting from the publication or use of the I-Codes, or from compliance or noncompliance with their provisions. The ICC does not have the power or authority to police or enforce compliance with the contents of this code.

Code Development Committee Responsibilities (Letter Designations in Front of Section Numbers)

In each code development cycle, proposed changes to this code are considered at the Committee Action Hearings by the International Fuel Gas Code Development Committee, whose action constitutes a recommendation to the voting membership for final action on the proposed change. Proposed changes to a code section that has a number beginning with a letter in brackets are considered by a different code development committee. For example, proposed changes to code sections that have [BS] in front of them (e.g., [BS] 302.1) are considered by the IBC—Structural Code Development Committee at the Committee Action Hearings.

The bracketed letter designations for committees responsible for portions of this code are as follows:

[A] = Administrative Code Development Committee

[BF] = IBC—Fire Safety Code Development Committee

[BG] = IBC—General Code Development Committee

[BS] = IBC—Structural Code Development Committee

[E] = International Energy Conservation Code Development Committee

[F] = International Fire Code Development Committee

[M] = International Mechanical Code Development Committee

[P] = International Plumbing Code Development Committee

For the development of the 2024 edition of the I-Codes, there will be two groups of code development committees and they will meet in separate years, as shown in the following Code Development Hearings Table.

Code change proposals submitted for code sections that have a letter designation in front of them will be heard by the respective committee responsible for such code sections. Because different committees hold Committee Action Hearings in different years, proposals for the IFGC will be heard by committees in both the 2021 (Group A) and the 2022 (Group B) code development cycles.

For example, every section of Chapter 1 of this code is designated as the responsibility of the Administrative Code Development Committee, and that committee is part of the Group B code hearings. This committee will conduct its code development hearings in 2022 to consider all code change proposals for Chapter 1 of this code and proposals for Chapter 1 of all I-Codes except the IECC, IRC and IgCC. Therefore, any proposals received for Chapter 1 of this code will be assigned to the Administrative Code Development Committee for consideration in 2022.

It is very important that anyone submitting code change proposals understands which code development committee is responsible for the section of the code that is the subject of the code change proposal. For further information on the Code Development Committee responsibilities, please visit the ICC website at www.iccsafe.org/current-code-development-cycle.

CODE DEVELOPMENT HEARINGS

Group A Codes (Heard in 2021, Code Change Proposals Deadline: January 11, 2021)	Group B Codes (Heard in 2022, Code Change Proposals Deadline: January 10, 2022)
<p align="center">International Building Code</p> <ul style="list-style-type: none"> – Egress (Chapters 10, 11, Appendix E) – Fire Safety (Chapters 7, 8, 9, 14, 26) – General (Chapters 2–6, 12, 27–33, Appendices A, B, C, D, K, N) 	<p>Administrative Provisions (Chapter 1 of all codes except IECC, IRC and IgCC; IBC Appendix O; the appendices titled “Board of Appeals” for all codes except IECC, IRC, IgCC, ICCPC and IZC; administrative updates to currently referenced standards; and designated definitions)</p>
<p align="center">International Fire Code</p>	<p align="center">International Building Code</p> <ul style="list-style-type: none"> – Structural (Chapters 15-25, Appendices F, G, H, I, J, L, M)
<p align="center">International Fuel Gas Code</p>	<p align="center">International Existing Building Code</p>
<p align="center">International Mechanical Code</p>	<p align="center">International Energy Conservation Code—Commercial</p>
<p align="center">International Plumbing Code</p>	<p align="center">International Energy Conservation Code—Residential</p> <ul style="list-style-type: none"> – IECC—Residential – IRC—Energy (Chapter 11)
<p align="center">International Property Maintenance Code</p>	<p align="center">International Green Construction Code (Chapter 1)</p>
<p align="center">International Private Sewage Disposal Code</p>	<p align="center">International Residential Code</p> <p>– Existing Building (Chapters 1–10, Appendices AE, AF, AH, AJ, AK, AL, AM, AO, AQ, AR, AS, AT, AU, AV, AW)</p>
<p align="center">International Residential Code</p> <ul style="list-style-type: none"> – IRC—Mechanical (Chapters 12–23) – IRC—Plumbing (Chapters 25–33, Appendices AG, AI, AN, AP) 	
<p align="center">International Swimming Pool and Spa Code</p>	
<p align="center">International Wildland-Urban Interface Code</p>	
<p align="center">International Zoning Code</p>	

Note: Proposed changes to the ICCPC will be heard by the code development committee noted in brackets [] in the text of the ICCPC.

Marginal Markings

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2018 edition. Deletion indicators in the form of an arrow (➔) are provided in the margin where an entire section, exception or table has been deleted or an item in a list of items or a row of a table has been deleted.

A single asterisk [*] placed in the margin indicates that text or a table has been relocated within the code. A double asterisk [**] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code. The following table indicates such relocation in the 2021 edition of the IFGC.

RELOCATIONS

2021 LOCATION	2018 LOCATION
104.8	103.4
104.8.1	103.4.1
107.1	106.3.1
107.2	106.5
108	107.4–107.4.1
109	106.6–106.6.1
110	107.5–107.6
111	110
112	107.1–107.3.3
113	109
115	108

Coordination of the International Codes

The coordination of technical provisions is one of the strengths of the ICC family of model codes. The codes can be used as a complete set of complementary documents, which will provide users with full integration and coordination of technical provisions. Individual codes can also be used in subsets or as stand-alone documents. To make sure that each individual code is as complete as possible, some technical provisions that are relevant to more than one subject area are duplicated in some of the model codes. This allows users maximum flexibility in their application of the I-Codes.

Italicized Terms

Terms italicized in code text, other than document titles, are defined in Chapter 2. The terms selected to be italicized have definitions that the user should read carefully to better understand the code. Where italicized, the Chapter 2 definition applies. If not italicized, common-use definitions apply.

Adoption

The ICC maintains a copyright in all of its codes and standards. Maintaining copyright allows the ICC to fund its mission through sales of books, in both print and electronic formats. The ICC welcomes adoption of its codes by jurisdictions that recognize and acknowledge the ICC's copyright in the code, and further acknowledge the substantial shared value of the public/private partnership for code development between jurisdictions and the ICC.

The ICC also recognizes the need for jurisdictions to make laws available to the public. All I-Codes and I-Standards, along with the laws of many jurisdictions, are available for free in a nondownloadable form on the ICC's website. Jurisdictions should contact the ICC at adoptions@iccsafe.org to learn how

to adopt and distribute laws based on the IFGC in a manner that provides necessary access, while maintaining the ICC's copyright.

To facilitate adoption, several sections of this code contain blanks for fill-in information that needs to be supplied by the adopting jurisdiction as part of the adoption legislation. For this code, please see:

Section 101.1. Insert: [NAME OF JURISDICTION]

Section 115.4. Insert: [SPECIFY OFFENSE] [AMOUNT] [NUMBER OF DAYS]

Effective use of the International Fuel Gas Code

The IFGC is a model code that regulates the design and installation of fuel gas distribution piping and systems, appliances, appliance venting systems, combustion air provisions, gaseous hydrogen systems and motor vehicle gaseous-fuel-dispensing stations. The definition of fuel gas includes natural, liquefied petroleum and manufactured gases and mixtures of these gases.

The purpose of the code is to establish the minimum acceptable level of safety and to protect life and property from the potential dangers associated with the storage, distribution and usage of fuel gases and the byproducts of combustion of such fuels. The code also protects the personnel that install, maintain, service and replace the systems and appliances addressed by this code.

With the exception of Section 401.1.1, the IFGC does not address utility-owned piping and equipment (i.e., anything upstream of the point of delivery). See the definition of "Point of delivery" and Section 501.8 for other code coverage exemptions.

The IFGC is primarily a specification-oriented (prescriptive) code with some performance-oriented text. For example, Section 503.3.1 is a performance statement, but Chapter 5 contains prescriptive requirements that will cause Section 503.3.1 to be satisfied.

The IFGC applies to all occupancies including one- and two-family dwellings and townhouses. The IRC is referenced for coverage of one- and two-family dwellings and townhouses; however, in effect, the IFGC provisions are still applicable because the fuel gas chapter in the IRC (Chapter 24) is composed entirely of text extracted from the IFGC. Therefore, whether using the IFGC or the IRC, the fuel gas provisions will be identical. The IFGC does not apply to piping systems that operate at pressures in excess of 125 psig for natural gas and 70 psig for LP-gas (note exception in Section 402.7).

The general Section 105.2 and the specific Sections 304.8, 402.3, 503.5.5 and 503.6.10 allow combustion air provisions, pipe sizing and chimney and vent sizing to be performed by approved engineering methods as alternatives to the prescriptive methods in the code.

ARRANGEMENT AND FORMAT OF THE 2021 IFGC

The format of the IFGC allows each chapter to be devoted to a particular subject, with the exception of Chapter 3, which contains general subject matters that are not extensive enough to warrant their own independent chapter.

The following table lists those subjects. The ensuing chapter-by-chapter synopsis details the scope and intent of the provisions of the IFGC.

CHAPTER TOPICS

Chapters	Subjects
1-2	Administration and Definitions
3	General Regulations
4	Gas Piping Installation
5	Chimneys and Vents
6	Specific Appliances
7	Gaseous Hydrogen
8	Referenced Standards
Appendix A	Gas Piping Capacities and Sizing
Appendix B	Venting System Sizing
Appendix C	Venting Exit Terminals
Appendix D	Safety Inspection of Existing Appliances
Appendix E	Board of Appeals

Chapter 1 Scope and Administration

Chapter 1 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 requirements contained in the body of this 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. 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 is provided.

Chapter 3 General Regulations

Chapter 3 contains broadly applicable requirements related to appliance location and installation, appliance and systems access, protection of structural elements and clearances to combustibles, among others. This chapter also covers combustion air provisions for gas-fired appliances.

Chapter 4 Gas Piping Installations

Chapter 4 covers the allowable materials for gas piping systems and the sizing and installation of such systems. It also covers pressure regulators, appliance connections and overpressure protection devices. Gas piping systems are sized to supply the maximum demand while maintaining the supply pressure necessary for safe operation of the appliances served.

Chapter 5 Chimneys and Vents

Chapter 5 regulates the design, construction, installation, maintenance, repair and approval of chimneys, vents, venting systems and their connections to gas-fired appliances. Properly designed chimneys, vents and venting systems are necessary to conduct to the outdoors the flue gases produced by the combustion of fuels in appliances. The provisions of this chapter are intended to minimize the hazards associated with high temperatures and potentially toxic and corrosive combustion gases. This chapter addresses all of the factory-built and site-built chimneys, vents and venting systems used to vent all types and categories of appliances. It also addresses direct-vent appliances, integral vent appliances, side-wall mechanically vented appliances and exhaust hoods that convey the combustion byproducts from cooking and other process appliances.

Chapter 6 Specific Appliances

Chapter 6 addresses specific appliances that the code intends to regulate. Each main section applies to a unique type of gas-fired appliance and specifies the product standards to which the appliance must be listed. The general requirements found in Chapters 1 through 5 also apply and the sections in Chapter 6 add the special requirements that are specific to each type of appliance.

Chapter 7 Gaseous Hydrogen Systems

Chapter 7 is specific to gaseous hydrogen generation, storage, distribution and utilization systems, appliances and equipment. Note that hydrogen is not within the definition of "Fuel gas," but it is, nonetheless, commonly used as a fuel for fuel-cell power generation and fuel-cell powered motor vehicles. The scope of Chapter 7 is not limited to any particular use of hydrogen (see Sections 633 and 634). Hydrogen systems have unique potential hazards because of the specific gravity of the gas, its chemical effect on materials and the fact that it is not odorized.

Chapter 8 Referenced Standards

Chapter 8 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. 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 8 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 on 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.

Appendix A Sizing and Capacities of Gas Piping

This appendix is informative and not part of the code. It provides design guidance, useful facts and data and multiple examples of how to apply the sizing tables and sizing methodologies of Chapter 4.

Appendix B Sizing of Venting Systems Serving Appliances Equipped with Draft Hoods, Category I Appliances and Appliances Listed for Use with Type B Vents

This appendix is informative and not part of the code. It contains multiple examples of how to apply the vent and chimney tables and methodologies of Chapter 5.

Appendix C Exit Terminals of Mechanical Draft and Direct-vent Venting Systems

This appendix is informative and not part of the code. It consists of a figure and notes that visually depict code requirements from Chapter 5 for vent terminals with respect to the openings found in building exterior walls.

Appendix D Recommended Procedure for Safety Inspection of an Existing Appliance Installation

This appendix is informative and not part of the code. It provides recommended procedures for testing and inspecting an appliance installation to determine if the installation is operating safely and if the appliance is in a safe condition.

Appendix E Board of Appeals

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance. This appendix provides criteria for Board of Appeals members and procedures by which the Board of Appeals should conduct its business.

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