



2019 OREGON MECHANICAL SPECIALTY CODE

Based on the 2018 International Mechanical Code®
and the 2018 International Fuel Gas Code®



2019 Oregon Mechanical Specialty Code

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PREFACE

Introduction

The *International Mechanical Code*® (IMC®) establishes minimum requirements for mechanical systems using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and new mechanical designs. This 2018 edition is fully compatible with all of the *International Codes*® (I-Codes®) published by the International Code Council® (ICC®), including the *International Building Code*®, *International Energy Conservation Code*®, *International Existing Building Code*®, *International Fire Code*®, *International Fuel Gas Code*®, *International Green Construction Code*®, *International Plumbing Code*®, *International Private Sewage Disposal Code*®, *International Property Maintenance Code*®, *International Residential Code*®, *International Swimming Pool and Spa Code*®, *International Wildland-Urban Interface Code*®, *International Zoning Code*® and *International Code Council Performance Code*®.

The I-Codes, including this *International Mechanical Code*, 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 of laws and regulations in communities across the U.S. 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.
- U.S. 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 2018 edition presents the code as originally issued, with changes reflected in the 2003 through 2015 editions and further changes approved by the ICC Code Development Process through 2016. 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 mechanical 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.

Maintenance

The *International Mechanical Code* 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, cdp-Access®. 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 Institute of Architects (AIA)
- National Association of Home Builders (NAHB)

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 International Code Council.

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.

Marginal Markings

- ➔ = Indicates where an entire section, paragraph, exception or table has been deleted or an item in a list of items or a table has been deleted from the 2015 edition of the International Code.
- | = Indicates a technical change from the requirements of the 2015 edition of the International Code.
- > = Indicates IMC and IFGC model code language deleted by Oregon. Appendix C is IFGC model code language with some modification by Oregon.
- || = Indicates a State of Oregon amendment has been made to the International Code.

Minor changes such as section renumbering and removal of references to International Codes are not indicated with a double rule in the margin.

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

Word and terms defined in Chapter 2, Definitions, are italicized where they appear in code text and the Chapter 2 definitions applies. Where such words and terms are not italicized, common-use definitions apply. The words and terms selected have code-specific definitions that the user should read carefully to facilitate better understanding of the code.

EFFECTIVE USE OF THE OREGON MECHANICAL SPECIALTY CODE

The *Oregon Mechanical Specialty Code* (OMSC), based on the *International Mechanical Code*® (IMC®), is a model code that regulates the design and installation of mechanical systems, appliances, appliance venting, duct and ventilation systems, combustion air provisions, hydronic systems and solar systems. 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 installation and operation of mechanical systems. The code also protects the personnel that install and replace the systems and appliances addressed by this code.

The OMSC is primarily a prescriptive code with some performance text. The code relies heavily on product specifications and listings to provide much of the appliance and equipment installation requirements. The general Section 105.2 and the exception to Section 403.2 allow designs and installations to be performed by approved engineering methods as alternatives to the prescriptive methods in the code.

The format of the OMSC 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.

Chapter 1 Scope and Administration. Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. A mechanical code, like any other code, is intended to be adopted as a legally enforceable document and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the jurisdiction having authority and also establish the rights and privileges of the design professional, contractor and property owner.

Chapter 2 Definitions. Chapter 2 is the repository of the definitions of terms used in the body of the code. Codes are technical documents and every word and term can impact the meaning of the code text and the intended results. The code often uses terms that have a unique meaning in the code and the code meaning can differ substantially from the ordinarily understood meaning of the term as used outside of the code.

The terms defined in Chapter 2 are deemed to be of prime importance in establishing the meaning and intent of the code text that uses the terms. The user of the code should be familiar with and consult this chapter because the definitions are essential to the correct interpretation of the code and because the user may not be aware that a term is defined.

Chapter 3 General Regulations. Chapter 3 contains broadly applicable requirements related to appliance location and installation, appliance and systems access, protection of structural elements, condensate disposal and clearances to combustibles, among others.

Chapter 4 Ventilation. Chapter 4 includes means for protecting building occupant health by controlling the quality of indoor air and protecting property from the effects of inadequate ventilation. In some cases, ventilation is required to prevent or reduce a health hazard by removing contaminants at their source.

Ventilation is both necessary and desirable for the control of air contaminants, moisture and temperature. Habitable and occupiable spaces are ventilated to promote a healthy and comfortable environment for the occupants. Uninhabited and unoccupied spaces are ventilated to protect the building structure from the harmful effects of excessive humidity and heat. Ventilation of specific occupancies is necessary to minimize the potential for toxic or otherwise harmful substances to reach dangerously high concentrations in air.

Chapter 5 Exhaust Systems. Chapter 5 provides guidelines for reasonable protection of life, property and health from the hazards associated with exhaust systems, air contaminants and smoke development in the event of a fire. In most cases, these hazards involve materials and gases that are flammable, explosive, toxic or otherwise hazardous. Where contaminants are known to be present in quantities that are irritating or harmful to the occupants' health or are hazardous in a fire, both naturally and mechanically ventilated spaces must be equipped with mechanical exhaust systems capable of collecting and removing the contaminants.

This chapter contains requirements for the installation of exhaust systems, with an emphasis on the structural integrity of the systems and equipment involved and the overall impact of the systems on the fire safety performance of the building. It includes requirements for the exhaust of commercial kitchen grease- and smoke-laden air, hazardous fumes and toxic gases, clothes dryer moisture and heat and dust, stock and refuse materials.

Chapter 6 Duct Systems. Chapter 6 of the code regulates the materials and methods used for constructing and installing ducts, plenums, system controls, exhaust systems, fire protection systems and related components that affect the overall performance of a building's air distribution system and the reasonable protection of life and property from the hazards associated with air-moving equipment and systems. This chapter contains requirements for the installation of supply, return and exhaust air systems. Specific exhaust systems are also addressed in Chapter 5. Information on the design of duct systems is limited to that in Section 603.2. The code is very much concerned with the structural integrity of the systems and the overall impact of the systems on the fire safety and life safety performance of the building. Design considerations such as duct sizing, maximum efficiency, cost effectiveness, occupant comfort and convenience are the responsibility of the design professional. The provisions for the protection of duct penetrations of wall, floor, ceiling and roof assemblies are extracted from the *Building Code*.

Chapter 7 Combustion Air. Complete combustion of solid and liquid fuel is essential for the proper operation of appliances, for control of harmful emissions and for achieving maximum fuel efficiency.

The specific combustion air requirements provided in previous editions of the code have been deleted in favor of a single section that directs the user to NFPA 31 for oil-fired appliance combustion air requirements and the manufacturer's installation instructions for solid-fuel burning appliances. For gas-fired appliances, the provisions of Appendix C of this code are applicable.

Chapter 8 Chimneys and Vents. Chapter 8 is intended to regulate the design, construction, installation, maintenance, repair and approval of chimneys, vents and their connections to solid and liquid fuel-burning appliances. The requirements of this chapter are intended to achieve the complete removal of the products of combustion from fuel-burning appliances and equipment. This chapter includes regulations for the proper selection, design, construction and installation of a chimney or vent, along with appropriate measures to minimize the related potential fire hazards. A chimney or vent must be designed for the type of appliance or equipment it serves. Chimneys and vents are designed for specific applications depending on the flue gas temperatures and the type of fuel being burned in the appliance. Chimneys and vents for gas-fired appliances are covered in Appendix C of this code.

Chapter 9 Specific Appliances, Fireplaces and Solid Fuel-burning Equipment. Chapter 9 sets minimum construction and performance criteria for fireplaces, appliances and equipment and provides for the safe installation of these items. It reflects the code's intent to specifically address all of the types of appliances that the code intends to regulate. Other regulations affecting the installation of solid fuel-burning fireplaces, appliances and accessory appliances are found in Chapters 3, 6, 7, 8, 10, 11, 12, 13 and 14.

Chapter 10 Boilers, Water Heaters and Pressure Vessels. Chapter 10 presents regulations for the proper installation of boilers, water heaters and pressure vessels to protect life and property from the hazards associated with those appliances and vessels. It applies to all types of boilers and pressure vessels, regardless of size, heat input, operating pressure or operating temperature.

Because pressure vessels are closed containers designed to contain liquids, gases or both under pressure, they must be designed and installed to prevent structural failures that can result in extremely hazardous situations. Certain safety features are therefore provided in Chapter 10 to reduce the potential for explosion hazards.

Chapter 11 Refrigeration. Chapter 11 contains regulations pertaining to the life safety of building occupants. These regulations establish minimum requirements to achieve the proper design, construction, installation and operation of refrigeration systems. Refrigeration systems are a combination of interconnected components and piping assembled to form a closed circuit in which a refrigerant is circulated. The system's function is to extract heat from a location or medium, and to reject that heat to a different location or medium. This chapter establishes reasonable safeguards for the occupants by defining and mandating practices that are consistent with the practices and experience of the industry.

Chapter 12 Hydronic Piping. Hydronic piping includes piping, fittings and valves used in building space conditioning systems. Applications include hot water, chilled water, steam, steam condensate, brines and water/antifreeze mixtures. Chapter 12 contains the provisions that govern the construction, installation, alteration and repair of all hydronic piping systems that affect reliability, serviceability, energy efficiency and safety.

Chapter 13 Fuel Oil Piping and Storage. Chapter 13 regulates the design and installation of fuel oil storage and piping systems. The regulations include reference to construction standards for above-ground and underground storage tanks, material standards for piping systems (both above-ground and underground) and extensive requirements for the proper assembly of system piping and components. The *Building Code* covers subjects not addressed in detail here. The provisions in this chapter are intended to prevent fires, leaks and spills involving fuel oil storage and piping systems.

Chapter 14 Solar Thermal Systems. Chapter 14 establishes provisions for the safe installation, operation and repair of solar energy systems used for space heating or cooling, domestic hot water heating or processing. Although such systems use components similar to those of conventional mechanical equipment, many of these provisions are unique to solar energy systems.

Chapter 15 Referenced Standards. Chapter 15 lists all of the product and installation standards and codes that are referenced throughout Chapters 1 through 14. As stated in Section 102.8, these standards and codes become an enforceable part of the code (to the prescribed extent of the reference) as if printed in the body of the code. Chapter 15 provides the full title and edition year of the standards and codes in addition to the address of the promulgators and the section numbers in which the standards and codes are referenced.

Appendix A Chimney Connector Pass-throughs. Appendix A provides figures that illustrate various requirements in the body of the code. Figure A-1 illustrates the chimney connector clearance requirements of Table 803.10.4.

Appendix B Recommended Permit Fee Schedule. Appendix B provides a sample permit fee schedule for mechanical permits. The local jurisdiction can adopt this appendix and fill in the dollar amounts in the blank spaces to establish their official permit fee schedule. The ICC does not establish permit fees because the code is adopted throughout the country and there are vast differences in operating budgets between different parts of the country, as well as between large and small municipalities within the same region.

EFFECTIVE USE OF APPENDIX C—FUEL GAS

The format of Appendix C allows each section to be devoted to a particular subject, with the exception of Sections C301 through C310, which contain general subject matters. The administrative provisions of the *Oregon Mechanical Specialty Code* shall apply to this appendix.

Sections C101 through C103 Scope and Administration. Sections C101 through C103 establish the limits of applicability of the appendix and describe how the appendix is to be applied and enforced. These provisions establish the authority and duties of the building official appointed by the local municipality and also establish the rights and privileges of the design professional, contractor and property owner.

Sections C201 and C202 Definitions. Sections C201 and C202 are the repository of the definitions of terms used in the body of the appendix. The defined terms are deemed to be of prime importance in establishing the meaning and intent of the text that uses the terms. The user of this appendix should be familiar with and consult these definitions because they are essential for correct interpretation and because the user may not be aware that a term is defined.

Sections C301 through C310 General Regulations. Sections C301 through C310 contain broadly applicable requirements related to appliance location and installation, appliance and systems access, protection of structural elements, and clearances to combustibles, among others. These sections also cover combustion air provisions for gas-fired appliances.

Sections C401 through C417 Gas Piping Installations. Sections C401 through C417 cover the allowable materials for gas piping systems and the sizing and installation of such systems. They also cover 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.

Sections C501 through C506 Chimneys and Vents. Sections C501 through C506 regulate 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. These sections address 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.

Sections C601 through C636 Specific Appliances. Sections C601 through C636 address specific appliances that the appendix 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 the previous Appendix C sections also apply and these sections add the special requirements that are specific to each type of appliance.

Sections C701 through C708 Gaseous Hydrogen Systems. Sections C701 through C708 are 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 these sections is not limited to any particular use of hydrogen. 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.

Section C801 Referenced Standards. Section C801 lists all of the product and installation standards and codes that are referenced throughout Appendix C. As stated in Section C102.8, these standards and codes become an enforceable part of the code (to the prescribed extent of the reference) as if printed in the body of the code. Chapter C801 provides the full title and edition year of the standards and codes in addition to the address of the promulgators and the section numbers in which the standards and codes are referenced.

Appendix C-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 Sections C401 through C417.

Appendix C-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 Sections C501 through C506.

Appendix C-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 Sections C501 through C506 for vent terminals with respect to the openings found in building exterior walls.

Appendix C-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.

TABLE OF CONTENTS

CHAPTER 1	SCOPE AND ADMINISTRATION .. 1	405	Systems Control	39
PART 1—SCOPE AND APPLICATION..... 1		406	Ventilation of Uninhabited Spaces	39
Section		407	Ambulatory Care Facilities and Group I-2 Occupancies.	39
101	General.			
102	Applicability			
PART 2—ADMINISTRATION AND ENFORCEMENT..... 3		CHAPTER 5	EXHAUST SYSTEMS	45
103	Department of Mechanical Inspection.	Section		
104	Duties and Powers of the Building Official.	501	General	45
105	Approval	502	Required Systems	46
106	Permits	503	Motors and Fans	52
107	Inspections and Testing	504	Clothes Dryer Exhaust.	53
108	Violations.....	505	Domestic Cooking Exhaust Equipment	54
109	Board of Appeals.....	506	Commercial Kitchen Hood Ventilation System Ducts and Exhaust Equipment	55
110	Temporary Equipment, Systems and Uses	507	Commercial Kitchen Hoods	60
CHAPTER 2	DEFINITIONS..... 13	508	Commercial Kitchen Makeup Air.....	63
Section		509	Fire Suppression Systems	64
201	General.	510	Hazardous Exhaust Systems	64
202	General Definitions	511	Dust, Stock and Refuse Conveying Systems.	66
CHAPTER 3	GENERAL REGULATIONS..... 25	512	Subslab Soil Exhaust Systems.....	67
Section		513	Smoke Control Systems	67
301	General.....	514	Energy Recovery Ventilation Systems	71
302	Protection of Structure.....	CHAPTER 6	DUCT SYSTEMS	73
303	Equipment and Appliance Location.....	Section		
304	Installation	601	General	73
305	Piping Support	602	Plenums	74
306	Access and Service Space	603	Duct Construction and Installation	76
307	Condensate Disposal	604	Insulation.....	78
308	Clearance Reduction	605	Air Filters	78
309	Temperature Control	606	Smoke Detection Systems Control	79
310	Heating and Cooling Load Calculations	607	Duct and Transfer Openings	79
CHAPTER 4	VENTILATION..... 35	CHAPTER 7	COMBUSTION AIR..... 85	
Section		Section		
401	General.....	701	General	85
402	Natural Ventilation.....	CHAPTER 8	CHIMNEYS AND VENTS..... 87	
403	Mechanical Ventilation	Section		
404	Enclosed Parking Garages.....	801	General	87
		802	Vents	88
		803	Connectors.....	89

TABLE OF CONTENTS

804	Direct-vent, Integral Vent and Mechanical Draft Systems	90
805	Factory-built Chimneys	91
806	Metal Chimneys	92

CHAPTER 9 SPECIFIC APPLIANCES, FIREPLACES AND SOLID FUEL-BURNING EQUIPMENT . . . 93

Section

901	General	93
902	Masonry Fireplaces	93
903	Factory-built Fireplaces	93
904	Pellet Fuel-burning Appliances	93
905	Fireplace Stoves and Room Heaters	93
906	Factory-built Barbecue Appliances	93
907	Incinerators and Crematories	93
908	Cooling Towers, Evaporative Condensers and Fluid Coolers	93
909	Vented Wall Furnaces	94
910	Floor Furnaces	94
911	Duct Furnaces	95
912	Infrared Radiant Heaters	95
913	Clothes Dryers	95
914	Sauna Heaters	95
915	Engine and Gas Turbine-powered Equipment and Appliances	95
916	Pool and Spa Heaters	95
917	Cooking Appliances	95
918	Forced-air Warm-air Furnaces	96
919	Conversion Burners	96
920	Unit Heaters	96
921	Vented Room Heaters	96
922	Kerosene and Oil-fired Stoves	96
923	Small Ceramic Kilns	96
924	Stationary Fuel Cell Power Systems	97
925	Masonry Heaters	97
926	Gaseous Hydrogen Systems	97
927	Evaporative Cooling Equipment	97
928	High-volume Large-diameter Fans	97
929	Solid Fuel-burning Devices	97

CHAPTER 10 BOILERS, WATER HEATERS AND PRESSURE VESSELS 99

Section

1001	General	99
1002	Water Heaters	99
1003	Boilers and Pressure Vessels	99
1004	Permits Required	99
1005	Detailed Requirements	99
1006	Expansion Tanks	100
1007	Safety or Relief Valve Discharge	100
1008	Gas Pressure Regulators	100
1009	Clearance for Access	100
1010	Boiler Room Enclosures	100
1011	Floors	100
1012	Chimneys or Vents	100
1013	Drainage	100
1014	Fuel Supply Piping	100
1015	Air for Combustion and Ventilation	100
1016	Steam and Hot Water Piping	100

CHAPTER 11 REFRIGERATION 101

Section

1101	General	101
1102	System Requirements	101
1103	Refrigeration System Classification	102
1104	System Application Requirements	102
1105	Machinery Room, General Requirements	109
1106	Machinery Room, Special Requirements	110
1107	Refrigerant Piping	111
1108	Field Test	112

CHAPTER 12 HYDRONIC PIPING 115

Section

1201	General	115
1202	Material	115
1203	Joints and Connections	116
1204	Pipe Insulation	118
1205	Valves	118
1206	Piping Installation	118
1207	Transfer Fluid	119
1208	Tests	119

1209	Embedded Piping	119	C307	Condensate Disposal	168
1210	Plastic Pipe Ground-source Heat Pump Loop Systems.	119	C308	Clearance Reduction (IFGS)	169
CHAPTER 13	FUEL OIL PIPING AND STORAGE.	123	C309	Electrical	169
Section			C310	Electrical Bonding (IFGS).	169
1301	General.	123	C401	Gas Piping Installations.	172
1302	Material	123	C402	Pipe Sizing (IFGS)	172
1303	Joints and Connections	123	C403	Piping Materials (IFGS)	210
1304	Piping Support	124	C404	Piping System Installation.	212
1305	Fuel Oil System Installation.	124	C405	Piping Bends and Changes in Direction (IFGS)	214
1306	Oil Gauging	124	C406	Inspection, Testing and Purging (IFGS)	215
1307	Fuel Oil Valves	125	C407	Piping Support.	216
1308	Testing	125	C408	Drips and Sloped Piping	216
CHAPTER 14	SOLAR THERMAL SYSTEMS.	127	C409	Shutoff Valves.	216
Section			C410	Flow Controls	217
1401	General.	127	C411	Appliance and Manufactured Home Connections	218
1402	Design and Installation	127	C412	Liquefied Petroleum Gas Motor Vehicle Fuel-dispensing Facilities	219
1403	Heat Transfer Fluids	129	C413	Compressed Natural Gas Motor Vehicle Fuel-dispensing Facilities	219
1404	Labeling	129	C414	Supplemental and Standby Gas Supply.	219
CHAPTER 15	REFERENCED STANDARDS.	131	C415	Piping Support Intervals (IFGS)	219
APPENDIX A	CHIMNEY CONNECTOR PASS-THROUGHS	145	C416	Fuel-gas Equipment and Installations in Manufactured Structure (Mobile Home or Recreational Vehicle) Parks	220
APPENDIX B	RECOMMENDED PERMIT FEE SCHEDULE.	147	C417	Overpressure Protection Devices (IFGS)	220
INDEX		149	C501	Chimneys and Vents	222
APPENDIX C	FUEL GAS	155	C502	Vents	223
Section			C503	Venting of Appliances (IFGS).	223
C101	Scope and Administration	155	C504	Sizing of Category I Appliance Venting Systems (IFGS)	233
C102	Inspections and Testing	155	C505	Direct-vent, Integral Vent, Mechanical Vent and Ventilation/Exhaust Hood Venting	237
C103	Temporary Equipment, Systems and Uses	156	C506	Factory-built Chimneys.	237
C201	Fuel Gas Definitions	157	C601	Specific Appliances.	258
C202	Definitions	157	C602	Decorative Appliances for Installation in Fireplaces	258
C301	General Regulations.	162	C603	Log Lighters	258
C302	Structural Safety.	162	C604	Vented Gas Fireplaces (Decorative Appliances)	258
C303	Appliance Location	162	C605	Vented Gas Fireplace Heaters	258
C304	Combustion, Ventilation and Dilution Air (IFGS)	163	C606	Incinerators and Crematories.	258
C305	Installation	166	C607	Commercial-industrial Incinerators.	258
C306	Access and Service Space	167	C608	Vented Wall Furnaces	258
			C609	Floor Furnaces.	258

TABLE OF CONTENTS

C610	Duct Furnaces	259
C611	Nonrecirculating Direct-fired Industrial Air Heaters	259
C612	Recirculating Direct-fired Industrial Air Heaters	260
C613	Clothes Dryers	260
C614	Clothes Dryer Exhaust	260
C615	Sauna Heaters	260
C616	Engine and Gas Turbine-powered Equipment	260
C617	Pool and Spa Heaters	261
C618	Forced-air Warm-air Furnaces	261
C619	Conversion Burners	261
C620	Unit Heaters	262
C621	Unvented Room Heaters	262
C622	Vented Room Heaters	262
C623	Cooking Appliances	262
C624	Water Heaters	263
C625	Refrigerators	263
C626	Gas-fired Toilets	263
C627	Air-conditioning Appliances	263
C628	Illuminating Appliances	264
C629	Small Ceramic Kilns	264
C630	Infrared Radiant Heaters	264
C631	Boilers	265
C632	Reserved	265
C633	Stationary Fuel-cell Power Systems	265
C634	Chimney Damper Opening Area (IFGS)	265
C635	Gaseous Hydrogen Systems	265
C636	Outdoor Decorative Appliances	265
C701	Gaseous Hydrogen Systems	266
C702	General Definitions	266
C703	General Requirements	266
C704	Piping, Use and Handling	267
C705	Testing of Hydrogen Piping Systems	268
C706	Location of Gaseous Hydrogen Systems	269
C707	Operation of Gaseous Hydrogen Systems	269
C708	Design of Liquefied Hydrogen Systems Associated with Hydrogen Vaporization Operations	269
C801	Referenced Standards	270

APPENDIX C-A SIZING AND CAPACITIES OF GAS PIPING (IFGS) 275

APPENDIX C-B SIZING OF VENTING SYSTEMS SERVING APPLIANCES EQUIPPED WITH DRAFT HOODS, CATEGORY I APPLIANCES AND APPLIANCES LISTED FOR USE WITH TYPE B VENTS (IFGS) 285

APPENDIX C-C EXIT TERMINALS OF MECHANICAL DRAFT AND DIRECT-VENT VENTING SYSTEMS (IFGS) 295

APPENDIX C-D RECOMMENDED PROCEDURE FOR SAFETY INSPECTION OF AN EXISTING APPLIANCE INSTALLATION (IFGS) 297

INDEX 303