

# PREFACE

## Introduction

Internationally, code officials recognize the need for a modern, up-to-date mechanical code addressing the design and installation of mechanical systems through requirements emphasizing performance. The *International Mechanical Code*®, in this 2009 edition, is designed to meet these needs through model code regulations that safeguard the public health and safety in all communities, large and small.

This comprehensive mechanical code establishes minimum regulations 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 2009 edition is fully compatible with all 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 Plumbing Code*®, *ICC Performance Code*®, *International Private Sewage Disposal Code*®, *International Property Maintenance Code*®, *International Residential Code*®, *International Urban-Wildland Interface Code*™ and *International Zoning Code*®.

The *International Mechanical Code* provisions provide many benefits, among which is the model code development process that offers an international forum for mechanical professionals to discuss performance and prescriptive code requirements. This forum provides an excellent arena to debate proposed revisions. This model code also encourages international consistency in the application of provisions.

## Development

The first edition of the *International Mechanical Code* (1996) was the culmination of an effort initiated in 1994 by a development committee appointed by the ICC and consisting of representatives of the three statutory members of the International Code Council at that time, including: Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO) and Southern Building Code Congress International (SBCCI). The intent was to draft a comprehensive set of regulations for mechanical systems consistent with and inclusive of the scope of the existing model codes. Technical content of the latest model codes promulgated by BOCA, ICBO and SBCCI was utilized as the basis for the development. This 2009 edition presents the code as originally issued, with changes approved through the ICC Code Development Process through 2008. 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.

## Adoption

The *International Mechanical Code* is available for adoption and use by jurisdictions internationally. Its use within a governmental jurisdiction is intended to be accomplished through adoption by reference in accordance with proceedings establishing the jurisdiction’s laws. At the time of adoption, jurisdictions should insert the appropriate information in provisions requiring specific local information, such as the name of the adopting jurisdiction. These locations are shown in bracketed words in small capital letters in the code and in the sample ordinance. The sample adoption ordinance on page ix addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

## Maintenance

The *International Mechanical Code* is kept up to date through the review of proposed changes submitted by code enforcing 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 contents of this work are subject to change both through the Code Development Cycles and the governmental body that enacts the code into law. For more information regarding the code development process, contact the Code and Standard Development Department of the International Code Council.

While the development procedure of the *International Mechanical Code* assures the highest degree of care, ICC and ICC’s members and those participating in the development of this code do not accept any liability resulting from compliance or noncompliance with the provisions because ICC and its members do not have the power or authority to police or enforce compliance with the contents of this code. Only the governmental body that enacts the code into law has such authority.

## Letter Designations in Front of Section Numbers

In each code development cycle, proposed changes to this code are considered at the Code Development Hearing by the International Mechanical 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 whose number begins with a letter in brackets are considered by a different code development committee. For instance, proposed changes to code sections which have the letter [B] in front (for example, [B] 309.1), are considered by one of the International Building Code development committees at the Code Development Hearing. Where this designation is applicable to the entire content of a main section of the code, the designation appears at the main section number and title and is not repeated at every subsection in that section.

The content of sections in this code which begin with a letter designation are maintained by another code development committee in accordance with the following:

- [B] = International Building Code Development Committee;
- [EC] = International Energy Conservation Code Development Committee;
- [F] = International Fire Code Development Committee; and
- [FG] = International Fuel Gas Code Development Committee.

## Marginal Markings

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2006 edition. Deletion indicators ( ➤ ) are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or in a table has been deleted.

## Italicized Terms

Selected terms set forth in Chapter 2, Definitions, are italicized where they appear in code text. Such terms are not italicized where the definition set forth in Chapter 2 does not impart the intended meaning in the use of the term. The terms selected have definitions which the user should read carefully to facilitate better understanding of the code.

# Effective Use of the International Mechanical Code

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, maintain, service and replace the systems and appliances addressed by this code.

The IMC 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 IMC 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, occu-

pant 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 *International 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 the *International Fuel Gas 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 the *International Fuel Gas Code*.

**Chapter 9 Specific Appliances, Fireplaces and Solid Fuel-burning Appliances.** 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 *International Fire Code*® (IFC®) 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 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 Combustion Air Openings and Chimney Connector Pass-throughs.** Appendix A provides figures that illustrate various requirements in the body of the code. Figures A-1 through A-4 illustrate typical combustion air requirements. Figure A-5 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.

# ORDINANCE

The *International Codes* are designed and promulgated to be adopted by reference by ordinance. Jurisdictions wishing to adopt the 2009 *International Mechanical Code* as an enforceable regulation governing plumbing systems should ensure that certain factual information is included in the adopting ordinance at the time adoption is being considered by the appropriate governmental body. The following sample adoption ordinance addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

## SAMPLE ORDINANCE FOR ADOPTION OF THE INTERNATIONAL MECHANICAL CODE ORDINANCE NO. \_\_\_\_\_

An ordinance of the [JURISDICTION] adopting the 2009 edition of the *International Mechanical Code*, regulating and governing the design, construction, quality of materials, erection, installation, alteration, repair, location, relocation, replacement, addition to, use or maintenance of mechanical systems in the [JURISDICTION]; providing for the issuance of permits and collection of fees therefor; repealing Ordinance No. \_\_\_\_\_ of the [JURISDICTION] and all other ordinances and parts of the ordinances in conflict therewith.

The [GOVERNING BODY] of the [JURISDICTION] does ordain as follows:

Section 1. That a certain document, three (3) copies of which are on file in the office of the [TITLE OF JURISDICTION'S KEEPER OF RECORDS] of [NAME OF JURISDICTION], being marked and designated as the *International Mechanical Code*, 2009 edition, including Appendix Chapters [FILL IN THE APPENDIX CHAPTERS BEING ADOPTED], as published by the International Code Council, be and is hereby adopted as the Mechanical Code of the [JURISDICTION], in the State of [STATE NAME] regulating and governing the design, construction, quality of materials, erection, installation, alteration, repair, location, relocation, replacement, addition to, use or maintenance of plumbing systems as herein provided; providing for the issuance of permits and collection of fees therefor; and each and all of the regulations, provisions, penalties, conditions and terms of said Mechanical Code on file in the office of the [JURISDICTION] are hereby referred to, adopted, and made a part hereof, as if fully set out in this ordinance, with the additions, insertions, deletions and changes, if any, prescribed in Section 2 of this ordinance.

**Section 2.** The following sections are hereby revised:

Section 101.1. Insert: [NAME OF JURISDICTION]

Section 106.5.2. Insert: [APPROPRIATE SCHEDULE]

Section 106.5.3. Insert: [PERCENTAGES IN TWO LOCATIONS]

Section 108.4. Insert: [OFFENSE, DOLLAR AMOUNT, NUMBER OF DAYS]

Section 108.5. Insert: [DOLLAR AMOUNT IN TWO LOCATIONS]

**Section 3.** That Ordinance No. \_\_\_\_\_ of [JURISDICTION] entitled [FILL IN HERE THE COMPLETE TITLE OF THE ORDINANCE OR ORDINANCES IN EFFECT AT THE PRESENT TIME SO THAT THEY WILL BE REPEALED BY DEFINITE MENTION] and all other ordinances or parts of ordinances in conflict herewith are hereby repealed.

**Section 4.** That if any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The [GOVERNING BODY] hereby declares that it would have passed this ordinance, and each section, subsection, clause or phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses and phrases be declared unconstitutional.

**Section 5.** That nothing in this ordinance or in the Mechanical Code hereby adopted shall be construed to affect any suit or proceeding impending in any court, or any rights acquired, or liability incurred, or any cause or causes of action acquired or existing, under any act or ordinance hereby repealed as cited in Section 2 of this ordinance; nor shall any just or legal right or remedy of any character be lost, impaired or affected by this ordinance.

**Section 6.** That the [JURISDICTION'S KEEPER OF RECORDS] is hereby ordered and directed to cause this ordinance to be published. (An additional provision may be required to direct the number of times the ordinance is to be published and to specify that it is to be in a newspaper in general circulation. Posting may also be required.)

**Section 7.** That this ordinance and the rules, regulations, provisions, requirements, orders and matters established and adopted hereby shall take effect and be in full force and effect [TIME PERIOD] from and after the date of its final passage and adoption.

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## CHAPTER 15

# REFERENCED STANDARDS

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section 102.8.

<b>ACCA</b>	Air Conditioning Contractors of America 2800 Shirlington Road, Suite 300 Arlington, VA 22206	Referenced in code section number
Standard Reference Number	Title	
Manual D—95	Residential Duct Systems . . . . .	.603.2
183—2007	Peak Cooling and Heating Load Calculations in Buildings Except Low-Rise Residential Buildings. . . . .	.312.1

<b>AHRI</b>	Air-Conditioning, Heating and Refrigeration Institute 4100 North Fairfax Drive, Suite 200 Arlington, VA 22203	Referenced in code section number
Standard Reference Number	Title	
700—99	Purity Specifications for Fluorocarbon and Other Refrigerants . . . . .	.1102.2.2.3

<b>ANSI</b>	American National Standards Institute 11 West 42nd Street New York, NY 10036	Referenced in code section number
Standard Reference Number	Title	
Z21.8—1994 (R2002)	Installation of Domestic Gas Conversion Burners . . . . .	.919.1

<b>ASHRAE</b>	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 1791 Tullie Circle, NE Atlanta, GA 30329	Referenced in code section number
Standard Reference Number	Title	
ASHRAE—2005	ASHRAE Fundamentals Handbook—2005 . . . . .	.603.2
15—2004	Safety Standard for Refrigeration Systems . . . . .	.1101.6, 1108.1
34—2004	Designation and Safety Classification of Refrigerants . . . . .	.202, 1102.2.1, 1103.1
62.1—2004	Ventilation for Acceptable Indoor Air Quality. . . . .	.403.3.2.3.2

<b>ASME</b>	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990	Referenced in code section number
Standard Reference Number	Title	
B1.20.1—1983 (R2006)	Pipe Threads, General Purpose (Inch) . . . . .	.1203.3.5, 1303.3.3
B16.3—2006	Malleable Iron Threaded Fittings, Classes 150 & 300 . . . . .	Table 1202.5
B16.5—2003	Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24— . . . . .	Table 1202.5
B16.9—2003	Factory Made Wrought Steel Butt-welding Fittings . . . . .	Table 1202.5
B16.11—2005	Forged Fittings, Socket-welding and Threaded. . . . .	Table 1202.5
B16.15—2006	Cast Bronze Threaded Fittings . . . . .	Table 1202.5

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**ASME—continued**

B16.18—2001 (Reaffirmed 2005)	Cast Copper Alloy Solder Joint Pressure Fittings . . . . .	513.13.1, Table 1202.5
B16.22—2001 (Reaffirmed 2005)	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings . . . . .	513.13.1, Table 1202.5
B16.23—2002 (Reaffirmed 2006)	Cast Copper Alloy Solder Joint Drainage Fittings DWV . . . . .	Table 1202.5
B16.24—2001	Cast Copper Alloy Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500 . . . . .	Table 1202.5
B16.26—2006	Cast Copper Alloy Fittings for Flared Copper Tubes . . . . .	Table 1202.5
B16.28—1994	Wrought Steel Butt welding Short Radius Elbows and Returns . . . . .	Table 1202.5
B16.29—2001	Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings-DWV . . . . .	Table 1202.5
B31.9—04	Building Services Piping . . . . .	1201.3
BPVC—2004	Boiler & Pressure Vessel Code . . . . .	1004.1, 1011.1
CSD-1—2004	Controls and Safety Devices for Automatically Fired Boilers . . . . .	1004.1

**ASSE**

American Society of Sanitary Engineering  
901 Canterbury, Suite A  
Westlake, OH 44145

Standard Reference Number	Title	Referenced in code section number
1017—03	Performance Requirements for Temperature Actuated Mixing Values for Hot Water Distribution Systems . . . . .	1002.2.2

**ASTM**

ASTM International  
100 Barr Harbor Drive  
West Conshohocken, PA 19428

Standard Reference Number	Title	Referenced in code section number
A 53/A 53M—06a	Specification for Pipe, Steel, Black and Hot-dipped, Zinc-coated Welded and Seamless . . . . .	Table 1202.4, Table 1302.3
A 106/A106M—06a	Specification for Seamless Carbon Steel Pipe for High-Temperature Service . . . . .	Table 1202.4, Table 1302.3
A 126—04	Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings . . . . .	Table 1202.5
A 254—97 (2002)	Specification for Copper Brazed Steel Tubing . . . . .	Table 1202.4, Table 1302.3
A 420/A 420M—07	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service . . . . .	Table 1202.5
A 539—99	Specification for Electric-Resistance-Welded Coiled Steel Tubing for Gas and Fuel Oil Lines . . . . .	Table 1302.3
B 32—04	Specification for Solder Metal . . . . .	1203.3.3
B 42—02e01	Specification for Seamless Copper Pipe, Standard Sizes . . . . .	513.13.1, 1107.5.2, Table 1202.4, Table 1302.3
B 43—98(2004)	Specification for Seamless Red Brass Pipe, Standard Sizes . . . . .	513.13.1, 1107.5.2, Table 1202.4, Table 1302.3
B 68—02	Specification for Seamless Copper Tube, Bright Annealed . . . . .	513.13.1
B 75—02	Specification for Seamless Copper Tube . . . . .	Table 1202.4, Table 1302.3
B 88—03	Specification for Seamless Copper Water Tube . . . . .	513.13.1, 1107.5.3, Table 1202.4, Table 1302.3
B 135—02	Specification for Seamless Brass Tube . . . . .	Table 1202.4, Table 1302.3
B 251—02e01	Specification for General Requirements for Wrought Seamless Copper and Copper-alloy Tube . . . . .	513.13.1, Table 1202.4
B 280—03	Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service . . . . .	513.13.1, 1107.4.3, Table 1302.3
B 302—02	Specification for Threadless Copper Pipe, Standard Sizes . . . . .	Table 1202.4, Table 1302.3
B 813—00e01	Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube . . . . .	1203.3.3
C 315—07	Specification for Clay Flue Liners and Chimney Pots . . . . .	801.16.1, Table 803.10.4
C 411—05	Test Method for Hot-surface Performance of High-temperature Thermal Insulation . . . . .	604.3
D 56—05	Test Method for Flash Point by Tag Closed Tester . . . . .	202
D 93—07	Test Method for Flash Point of Pensky-Martens Closed Cup Tester . . . . .	202
D 1527—99(2005)	Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80 . . . . .	Table 1202.4
D 1693—07	Test Method for Environmental Stress-Cracking of Ethylene Plastics . . . . .	Table 1202.4
D 1785—06	Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe, Schedules 40, 80 and 120 . . . . .	Table 1202.4
D 2235—04	Specifications for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings . . . . .	1203.3.4
D 2241—05	Specification for Poly (Vinyl Chloride)(PVC) Pressure-rated Pipe (SDR-Series) . . . . .	Table 1202.4
D 2282—99(2005)	Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR) . . . . .	Table 1202.4
D 2412—02	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-plate Loading . . . . .	603.8.3
D 2447—03	Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter . . . . .	Table 1202.4

ASTM—continued

D 2466—06	Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe Fittings, Schedule 40. . . . .	Table 1202.5
D 2467—06	Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe Fittings, Schedule 80. . . . .	Table 1202.5
D 2468—96a	Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40. . . . .	Table 1202.5
D 2513—07a	Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings . . . . .	Table 1202.4
D 2564—04e01	Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems . . . . .	1203.3.4
D 2657—07	Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings. . . . .	1203.15.1
D 2683—04	Specification for Socket-type Polyethylene Fittings for Outside Diameter-controlled Polyethylene Pipe and Tubing. . . . .	Table 1202.4, 1203.15.1
D 2837—04e01	Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products . . . . .	Table 1202.4
D 2846/D 2846M—06	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot and Cold Water Distribution Systems . . . . .	Table 1202.4, 1203.3.4
D 2996—01(2007)e01	Specification for Filament-wound Fiberglass (Glass Fiber Reinforced Thermosetting Resin) Pipe . . . . .	Table 1302.3
D 3035—06	Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter. . . . .	Table 1202.4
D 3278—96(2004)e01	Test Methods for Flash Point of Liquids by Small Scale Closed-cup Apparatus . . . . .	202
D 3261—03	Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing . . . . .	1203.15.1
D 3309—96a(2002)	Specification for Polybutylene (PB) Plastic Hot and Cold Water Distribution Systems . . . . .	Table 1202.4, 1203.10.1
D 3350—06	Specification for Polyethylene Plastics Pipe and Fittings Materials. . . . .	Table 1202.4
E 84—07	Test Method for Surface Burning Characteristics of Building Materials . . . . .	202, 510.8, 602.2.1, 602.2.1.5, 604.3, 1204.1
E 119—07	Test Method for Fire Tests of Building Construction and Materials . . . . .	607.5.2, 607.5.5, 607.6.1, 607.2.1
E 136—04	Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C . . . . .	202
E 814—06	Test Method for Fire Tests of Through-penetration Fire Stops . . . . .	506.3.10.2, 506.3.10.3
E 1509—04	Specification for Room Heaters, Pellet Fuel-burning Type . . . . .	904.1
E 2231—04	Standard Practice For Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics. . . . .	604.3, 1204.1
E 2336-04	Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems. . . . .	506.3.6, 506.3.10.2
F 438—04	Specification for Socket Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40. . . . .	Table 1202.5
F 439—06	Specification for Socket Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80. . . . .	Table 1202.5
F 441/F 441M—02	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80. . . . .	Table 1202.4
F 442/F 442M—99(2005)	Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR). . . . .	Table 1202.4
F 493—04	Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings. . . . .	1203.3.4
F 876—06	Specification for Crosslinked Polyethylene (PEX) Tubing. . . . .	Table 1202.4
F 877—07	Specification for Crosslinked Polyethylene (PEX) Plastic Hot and Cold Water Distribution Systems . . . . .	Table 1202.4, Table 1202.5
F 1055—98(2006)	Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Fittings . . . . .	Table 1202.4, 1203.15.2
F 1281—07	Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe . . . . .	Table 1202.4
F 1282—06	Standard Specification for Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe . . . . .	Table 1202.4
F 1476—(2006)	Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications . . . . .	1203.3.7
F 1924—05	Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing . . . . .	1203.15.3
F 1974—04	Standard Specification for Metal Insert Fittings for Polyethylene/Aluminum/Polyethylene and Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure Pipe . . . . .	Table 1202.5
F 2389—06	Specification for Pressure-Rated Polypropylene Piping Systems . . . . .	Table 1202.4, Table 1202.5
F 2623—07	Standard Specification for Polyethylene of Raised Temperature (PE-RT) SDR 9 Tubing1. . . . .	Table 1202.4

American Welding Society  
 550 N.W. LeJeune Road  
 P.O. Box 351040  
 Miami, FL 33135



Standard Reference Number	Title	Referenced in code section number
A5.8—2004	Specifications for Filler Metals for Brazing and Braze Welding. . . . .	1203.3.1, 1303.3.1

**REFERENCED STANDARDS**

**AWWA**

American Water Work Association  
6666 West Quincy Avenue  
Denver, CO 80235

Standard Reference Number	Title	Referenced in code section number
C110/A21.10—03	Standard for Ductile Iron & Gray Iron Fittings, 2 inches Through 48 inches for Water . . . . .	Table 1202.5
C115/A21.15—99	Standard for Flanged Ductile-iron Pipe with Ductile Iron or Grey-iron Threaded Flanges . . . . .	Table 1202.4
C151/A21.51—02	Standard for Ductile-Iron Pipe, Centrifugally Cast for Water . . . . .	Table 1202.4
C153/A21.53—00	Standard for Ductile-Iron Compact Fittings for Water Service . . . . .	Table 1202.5

**CSA**

Canadian Standards Association  
5060 Spectrum Way  
Mississauga, Ontario, Canada L4W 5N6

Standard Reference Number	Title	Referenced in code section number
B137.9-M91 CAN/CSA	Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-Pipe Systems. . . . .	Table 1202.4
B137.10—02	Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene Composite Pressure-Pipe Systems. . . . .	Table 1202.4
ANSI CSA America FC1-03	Stationary Fuel Cell Power Systems . . . . .	.924.1

**DOL**

Department of Labor  
Occupational Safety and Health Administration  
c/o Superintendent of Documents  
US Government Printing Office  
Washington, DC 20402-9325

Standard Reference Number	Title	Referenced in code section number
29 CFR Part 1910.1000 (1974)	Air Contaminants . . . . .	.502.6
29 CFR Part 1910. 1025	Toxic and Hazardous Substances . . . . .	.502.19

**FS**

Federal Specifications\*  
General Services Administration  
7th & D Streets  
Specification Section, Room 6039  
Washington, DC 20407

Standard Reference Number	Title	Referenced in code section number
WW-P-325B (1976)	Pipe, Bends, Traps, Caps and Plugs; Lead (for Industrial Pressure and Soil and Waste Applications. . . . .	Table 1202.4

\*Standards are available from the Supt. of Documents, U.S. Government Printing Office, Washington, DC 20402-9325.

**ICC**

International Code Council, Inc.  
500 New Jersey Ave, NW  
6th Floor  
Washington, DC 20001

Standard Reference Number	Title	Referenced in code section number
IBC—09	International Building Code® . . . . .	.201.3, 202, 301.12, 301.14, 301.15, 302.1, 302.2, 304.7, 304.10, 308.8, 308.10, 401.4, 401.6, 406.1, 502.10, 502.10.1, 504.2, 506.3.3, 506.3.10, 506.3.12.2, 506.4.1, 509.1, 510.6, 510.6.3, 510.6.2, 510.7, 511.1.5, 513.1, 513.2, 513.3, 513.4.3, 513.5, 513.5.2, 513.5.2.1, 513.6.2, 513.10.5, 513.12, 513.12.2, 513.20, 602.2.1.5.1, 602.2.1.5.2, 602.3, 603.1, 603.10, 604.5.4, 607.1.1, 607.3.2.1, 607.5.1, 607.5.2, 607.5.3, 607.5.4, 607.5.4.1, 607.5.5, 607.5.5.1, 607.6, 607.6.2, 701.4.1, 701.4.2, 801.3, 801.16.1, 801.18.4, 902.1, 908.3, 908.4, 910.3, 925.1, 1004.6, 1105.1, 1206.4, 1402.4, 1402.4.1
IEBC—09	International Existing Building Code® . . . . .	.101.2
IECC—09	International Energy Conservation Code® . . . . .	.202, 301.2, 303.3, 312.1, 603.9, 604.1, 1204.1, 1204.2

ICC—continued

IFC—09	International Fire Code® . . . . .	201.3, 310.1, 311.1, 502.4, 502.5, 502.7.2, 502.8.1, 502.9.5, 502.9.5.2, 502.9.5.3, 502.9.8.2, 502.9.8.3, 502.9.8.5, 502.9.8.6, 502.10, 502.10.3, 502.16.2, 509.1, 510.2.1, 510.2.2, 510.4, 511.1.1 513.12.3, 513.15, 513.16, 513.17, 513.18, 513.19, 513.20.2, 513.20.3, 606.2.1, 908.7, 1101.9, 1105.3, 1106.5, 1106.6, 1301.1, 1301.2
IFGC—09	International Fuel Gas Code® . . . . .	101.2, 201.3, 301.3, 701.1, 801.1, 901.1, 906.1, 1101.5
IPC—09	International Plumbing Code® . . . . .	201.3, 301.8, 512.2, 908.5, 1002.1, 1002.2, 1002.3, 1005.2, 1006.6, 1008.2, 1009.3, 1101.4, 1201.1, 1206.2, 1206.3, 1401.2
IRC—09	International Residential Code® . . . . .	101.2

**IIAR**

International Institute of Ammonia Refrigeration  
1110 North Glebe Road  
Arlington, VA 22201

Standard Reference Number	Title	Referenced in code section number
2—99 (with Addendum A-2005)	Addendum A to Equipment, Design, and Installation of Ammonia Mechanical Refrigerating Systems . . . . .	1101.6

**MSS**

Manufacturers Standardization Society of the Valve & Fittings Industry, Inc.  
127 Park Street, N.E.  
Vienna, VA 22180

Standard Reference Number	Title	Referenced in code section number
SP-69—2002	Pipe Hangers and Supports—Selection and Application . . . . .	305.4

**NAIMA**

North American Insulation Manufacturers Association  
44 Canal Center Plaza, Suite 310  
Alexandria, VA 22314

Standard Reference Number	Title	Referenced in code section number
AH116—02	Fibrous Glass Duct Construction Standards . . . . .	603.5, 603.9

**NFPA**

National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02169-7471

Standard Reference Number	Title	Referenced in code section number
30A—08	Code for Motor Fuel-dispensing Facilities and Repair Garages. . . . .	304.6
31—06	Installation of Oil-burning Equipment . . . . .	801.2.1, 801.18.1, 801.18.2, 920.2, 922.1, 1308.1
37—06	Stationary Combustion Engines and Gas Turbines . . . . .	915.1, 915.2
58—08	Liquefied Petroleum Gas Code . . . . .	502.9.10
69—08	Explosion Prevention Systems . . . . .	510.8.3
70—08	National Electrical Code . . . . .	301.7, 306.3.1, 306.4.1, 511.1.1, 513.11, 513.12.1, 602.2.1.1, 1106.3, 1106.4
72—07	National Fire Alarm Code . . . . .	606.3
82—04	Incinerators and Waste and Linen Handling Systems and Equipment . . . . .	601.1
91—04	Exhaust Systems for Air Conveying of Vapors, Gases, and Noncombustible Particulate Solids . . . . .	502.9.5.1, 502.17
92B—05	Smoke Management Systems in Malls, Atria and Large Spaces . . . . .	513.8
211—06	Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances . . . . .	806.1
262—07	Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-handling Spaces . . . . .	602.2.1.1
704—07	Identification of the Hazards of Materials for Emergency Response . . . . .	502.8.4, Table 1103.1, 510.1
853—07	Installation of Stationary Fuel Power Plants . . . . .	924.1
8501—97	Single Burner Boiler Operation . . . . .	1004.1
8502—99	Prevention of Furnace Explosions/Implosions in Multiple Burner Boiler-furnaces . . . . .	1004.1
8504—96	Atmospheric Fluidized-bed Boiler Operation . . . . .	1004.1

**REFERENCED STANDARDS**



Sheet Metal & Air Conditioning Contractors National Assoc., Inc.  
4201 Lafayette Center Drive  
Chantilly, VA 20151-1209

Standard Reference Number	Title	Referenced in code section number
SMACNA/ANSI—2005	HVAC Duct Construction Standards—Metal and Flexible (2005)	603.4, 603.9
SMACNA—03	Fibrous Glass Duct Construction Standards	603.5, 603.9



Underwriters Laboratories, Inc.  
333 Pfingsten Road  
Northbrook, IL 60062-2096

Standard Reference Number	Title	Referenced in code section number
17—94	Vent or Chimney Connector Dampers for Oil-fired Appliances—with Revisions through September 1999	803.6
103—01	Factory-built Chimneys, Residential Type and Building Heating Appliance—with Revisions through June 2006	805.2
127—96	Factory-built Fireplaces—with Revisions through November 2006	805.3, 903.1, 903.3
174—04	Household Electric Storage Tank Water Heaters—with Revisions through May 2006	1002.1
181—05	Factory-made Air Ducts and Air Connectors—with Revisions through December 1998	512.2, 603.5, 603.6.1, 603.6.2, 604.13
181A—05	Closure Systems for Use with Rigid Air Ducts and Air Connectors—with Revisions through December 1998	603.9
181B—05	Closure Systems for Use with Flexible Air Ducts and Air Connectors—with Revisions through December 1998	603.9
207—01	Refrigerant-containing Components and Accessories, Nonelectrical—with Revisions through November 2004	1101.2
263—03	Standard for Fire Test of Building Construction and Materials	607.5.2, 607.5.5, 607.6.1
268—06	Smoke Detectors for Fire Prevention Signaling Systems—with Revisions through October 2003	606.1
268A—98	Smoke Detectors for Duct Applications—with Revisions through April 2006	606.1
343—97	Pumps for Oil-Burning Appliances—with Revisions through May 2006	1302.7
391—2006	Solid-fuel and Combination-fuel Central and Supplementary Furnaces	918.1
412—04	Refrigeration Unit Coolers—with Revisions through February 2007	1101.2
471—06	Commercial Refrigerators and Freezers—with Revisions through March 2006	1101.2
508—99	Industrial Control Equipment—with Revisions through July 2005	307.2.3
536—97	Flexible Metallic Hose—with Revisions through June 2003	1302.8
555—06	Fire Dampers—with Revisions through January 2002	607.3
555C—06	Ceiling Dampers	607.3.1
555S—99	Smoke Dampers—with Revisions through July 2006	607.3.1
586—96	High-efficiency, Particulate, Air Filter Units—with Revisions through August 2004	605.2
641—95	Type L Low-temperature Venting Systems—with Revisions through August 2005	802.1
710—95	Exhaust Hoods for Commercial Cooking Equipment—with Revisions through February 2007	507.1
710B—04	Recirculating Systems	507.1
723—03	Standard for Test for Surface Burning Characteristics of Building Materials—with Revisions through May 2005	510.8, 602.2.1, 602.2.1.5, 604.3, 1204.1
726—95	Oil-fired Boiler Assemblies—with Revisions through March 2006	916.1, 1004.1
727—06	Oil-fired Central Furnaces	918.1
729—03	Oil-fired Floor Furnaces—with Revisions through January 1999	910.1
730—03	Oil-fired Wall Furnaces—with Revisions through January 1999	909.1
731—95	Oil-fired Unit Heaters—with Revisions through February 2006	920.1
732—95	Oil-fired Storage Tank Water Heaters—with Revisions through February 2005	1002.1
737—96	Fireplace Stoves—with Revisions through January 2000	905.1
762—03	Outline of Investigation for Power Ventilators for Restaurant Exhaust Appliances	506.5.1
791—06	Residential Incinerators	907.1
834—04	Heating, Water Supply and Power Boilers Electric—with Revisions through March 2006	1004.1
858—05	Household Electric Ranges—with Revisions through April 2006	917.1
867—00	Electrostatic Air Cleaners—with Revisions through May 2004	605.2
875—04	Electric Dry Bath Heater—with Revisions through March 2006	914.2
896—93	Oil-burning Stoves—with Revisions through May 2004	917.1, 922.1
900—04	Air Filter Units	605.2
923—02	Microwave Cooking Appliances—with Revisions through February 2006	914.2

UL—continued

959—01	Medium Heat Appliance Factory-built Chimneys—with Revisions through September 2006 . . . . .	805.5
1240—05	Electric Commercial Clothes . . . . .	.913.1
1261—01	Electric Water Heaters for Pools and Tubs—with Revisions through June 2004. . . . .	.916.1
1453—04	Electric Booster and Commercial Storage Tank Water Heaters—with Revisions through May 2006. . . . .	1002.1
1482—96	Solid-fuel Type Room Heaters—with Revisions through November 2006 . . . . .	.905.1
1777—04	Chimney Liners . . . . .	.801.16.1, 801.18.4
1812—05	Standard for Ducted Heat Recovery Ventilators—with Revisions through January 2006 . . . . .	.927.1
1815—01	Standard for Nonducted Heat Recovery Ventilators—with Revisions through January 2006 . . . . .	.927.2
1820—04	Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics . . . . .	.602.2.1.3
1887—04	Fire Tests of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics . . . . .	.602.2.1.2
1978—95	Grease Ducts . . . . .	.506.3.2
1995—05	Heating and Cooling Equipment . . . . .	.911.1, 918.1, 918.3, 1101.2
2158—97	Electric Clothes Dryers—with Revisions through May 2004 . . . . .	.504.6.3, 913.1
2162—01	Outline of Investigation for Commercial Wood-fired Baking Ovens—Refractory Type . . . . .	.917.1
2200—04	Stationery Engine Generator Assemblies . . . . .	.915.1
2221—01	Tests of Fire Resistive Grease Duct Enclosure Assemblies . . . . .	.506.3.10.3