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# INTERNATIONAL GREEN CONSTRUCTION CODE™

PUBLIC VERSION 2.0, NOVEMBER 2010  
*Water Efficiency Provisions\**

*\*this document consists of provisions extracted directly from the IGCC PV 2.0 and is designed for ease of access to its water-related provisions. The document will not be revised separately from the IGCC. Rather, any changes made to the water provisions in the IGCC itself will automatically convey to future versions of this document.*



THE AMERICAN  
INSTITUTE  
OF ARCHITECTS



**INTERNATIONAL GREEN CONSTRUCTION CODE™**  
**PUBLIC VERSION 2.0**  
*Water Efficiency Provisions*

**Publication Date: November 2010**

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**INTERNATIONAL CODE COUNCIL, INC.**

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## Introduction

All levels of government and Building Safety Professionals recognize the need for a mandatory baseline of codes addressing green construction, providing a framework linking sustainability with safety and performance. The *International Green Construction Code*<sup>™</sup>, in Public Version 2.0, is designed to meet these needs through model code regulations that promote safe and sustainable construction in an integrated fashion with the ICC Family of Codes. This *International Green Construction Code –Water Efficiency Provisions* document collects the provisions related to the efficient use of water and water conservation into a single document. It is ideal for users who wish to rapidly deploy the most advanced water efficiency codes, providing real water savings without giving up flexibility and ease of use.

This code establishes minimum water efficiency and conservation regulations for buildings and systems using prescriptive and performance-related provisions, working as an overlay to the I-Codes. For example, the requirements of the 2012 *International Energy Conservation Code* were targeted as a baseline for the *International Green Construction Code* energy provisions that can be increased through the selection of “Jurisdictional Requirements” and “Project Electives.” It is founded on the principle that a model code must address the market segments beyond those captured by rating systems or other evaluation guides, and therefore, must be enforceable, useable, and adoptable.

The *International Green Construction Code –Water Efficiency Provisions* provides many benefits, among which is the model code development process that offers an international forum for building professionals to discuss the science and performance of buildings and systems. This forum provides an excellent arena to debate improvements to the ICC Family of Codes and Standards. The ICC system promotes the mission of the ICC and consistency in the application of codes worldwide.

ASHRAE and its Standard 189 development partners, the U.S. Green Building Council (USGBC) and the Illuminating Engineering Society (IES), support the adoption of the *International Green Construction Code* (IGCC). ASHRAE/USGBC/IES Standard 189.1 is a Jurisdictional Compliance Option of the IGCC.

You can find more information about the IGCC at <http://www.iccsafe.org/cs/IGCC/Pages/default.aspx>

For information or questions specific to the Water Efficiency Provisions document, contact the ICC Plumbing, Mechanical and Fuel Gas Group at [pmgresourcecenter@iccsafe.org](mailto:pmgresourcecenter@iccsafe.org)

## Development

Public Version 2.0 of the *International Green Construction Code* was issued on November 3, 2010 after the Public Comments submitted to Public Version 1.0 were considered by the IGCC Public Comment Committee at the Public Hearings held in Rosemont, IL, August 14 – 21, 2010. Public Version 2.0 contains the changes to Public Version 1.0 suggested in the Public Comments that were approved or approved with modifications by the Committee (see “Revision Indicators” on page IV). The hearing was conducted in accordance with the “2010 IGCC Public Comment Hearing Procedures” as published on page vi of the *2010 Public Comments to Public Version 1.0 of the International Green Construction Code*. The complete set of public comments and the report of hearing can be found at <http://www.iccsafe.org/cs/IGCC/Pages/PublicVersionDevelopment.aspx>. This *International Green Construction Code –Water Efficiency Provisions* document extracts the water efficiency and conservation provisions verbatim from throughout Public Version 2.0 of the *International Green Construction Code* in a single document.

Public Version 1.0 of the *International Green Construction Code* was developed in 2010 by the Sustainable Building Technology Committee (SBTC) appointed by the ICC Board of Directors, with the American Institute of Architects and ASTM International as Cooperating Sponsors. The SBTC was a broad based committee representing a balance of interests consistent with the ICC Governmental Consensus process and revised OMB Circular A-119 which establishes policies on Federal use and development of voluntary consensus codes and standards.

## 2012 Edition of the IGCC

Proposed revisions to Public Version 2.0 will be in the form of code changes which will be processed in accordance with ICC’s Code Development Process (as outlined in Council Policy #28 comprised of Code Development and Final Action Hearings in 2011, resulting in the 2012 *International Green Construction*

Code. A code change proposal form is available for download at <http://www.iccsafe.org/cs/IGCC/Pages/PublicVersionDevelopment.aspx>. Upon release of the 2012 *International Green Construction Code*, a new version of the *Water Efficiency Provisions* document will also be developed and released.

### **Adoption**

The *International Green Construction Code –Water Efficiency Provisions* Public Version 2.0 is available as a resource document to guide 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 adoption 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 Green Construction Code* will be 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 will be carefully considered through an open code development process in which all interested and affected parties may participate. The *International Green Construction Code –Water Efficiency Provisions* will be updated from subsequent versions of the *International Green Construction Code*.

For more information regarding the code development process, contact: ICC at 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 or [pmgresourcecenter@iccsafe.org](mailto:pmgresourcecenter@iccsafe.org)

While the development procedure of the *International Green Construction Code* and *International Green Construction Code – Water Efficiency Provisions* assures the highest degree of care, the ICC, AIA, ASTM International and their members and those participating in the development of this code do not accept any liability resulting from compliance or noncompliance with the provisions given herein, for any restrictions imposed on materials or processes, or for the completeness of the text. ICC, AIA, and ASTM International do not have 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 the code are considered at the Code Development Hearings by the applicable ICC 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 [B] in front of them (e.g., [B] 202 – definition of “~~Addition~~”) are considered by the ICC Building Code Development Committee at the code development hearings.

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

[E] = International Energy Conservation Code Development Committee;  
[EB] = International Existing Building Code Development Committee;  
[F] = International Fire Code Development Committee;  
[FG] = International Fuel Gas Code Development;  
[M] = International Mechanical Code Development; and  
[P] = International Plumbing Code Development Committee

### **Revision Indicators**

Shading of a section in this Public Version 2.0 indicates that the section has changed from the requirements of Public Version 1.0. Deletion indicators in the form of an arrow (➔) are provided on a blank line of the page on the left side where an entire section, paragraph, exception or table has been deleted, or an item in a list of items has been deleted.

*Developed by*  
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## **ROADMAP TO THE *INTERNATIONAL GREEN CONSTRUCTION CODE – WATER EFFICIENCY PROVISIONS***

Chapter 3 is the core of the *International Green Construction Code*. It is formatted to: facilitate the customization of this code to address local issues; provide options for construction which exceed the minimum requirements of this code; and provide for the implementation of best practices. Table 302.1, which addresses jurisdictional choices, and Table 303.1, which introduces the concept of project electives, are fundamental to the understanding and use of this code.

Table 302.1 is designed to allow the local jurisdiction to meet regional goals and priorities by determining whether certain provisions are to be mandatory and whether enhanced energy performance or reduced plumbing fixture flow rates will be required for compliance with this code. This table also references ASHRAE 189.1 as a compliance path option.

Table 302.1 also requires that the local jurisdiction indicate a value between 1 and 14 as the minimum number of project electives that must be satisfied in order to comply with this code. Project electives are the vehicles by which this code encourages the consideration and implementation of environmentally beneficial practices that might not be appropriate as strict mandatory requirements in some scenarios. They are also used to encourage construction and performance which exceeds the minimum requirements of this code.

All of the provisions of this code, other than those selected by the jurisdiction in Table 302.1 and those designated as project electives, are mandatory as applicable. The section numbers listed in Table 302.1 become mandatory for all buildings in the jurisdiction only where the jurisdiction indicates such applicability in Table 302.1. Project electives, however, become mandatory only where they are selected or chosen by the owner or registered design professional and are indicated in Table 303.1, Project Electives Checklist. The primary functions of the checklist are to: a) give guidance to owners and design professionals as to what project electives are available to choose from, b) to inform the code official as to which project electives have been selected or chosen by the design professional and must, therefore, be complied with and enforced as if they were mandatory requirements and c) to encourage environmental performance that exceeds the minimum requirements of this code.

As an example, provisions of this code have been designated as project electives where mandatory compliance might not be feasible, but where that provision was, nonetheless, important to identify as an option from an environmental perspective. For example, it would be unreasonable to mandate that all buildings be constructed on a brownfield site, as that would preclude the construction of buildings on sites that were not brownfields. However, it is quite reasonable to allow the practice. Therefore, Section 407.2.5, which regulates brownfield sites, is designated as a project elective.

Buildings designed with higher energy performance or lower plumbing fixture flow rates than required by the jurisdiction in Table 302.1, or buildings that incorporate options, are credited with project electives in Table 303.1. Thus the concept of project electives facilitates the option of buildings performance that is higher than the minimum required by the *International Green Construction Code –Water Efficiency Provisions*.

Where a specific building project does not trigger the application of a mandatory provision, or where the jurisdiction has not selected a provision in Table 302.1 as mandatory in their jurisdiction, related project electives have been created to allow the implementation of the practice in those scenarios. For example, since Section 403.3, bicycle parking and storage, is not mandatory for buildings with an area of 2,500 square feet or less, the related project elective, Section 407.3.2, allows the application of the provision to smaller structures by allowing the design professional to select the provision as a project elective.

Provisions which are designated as project electives have been grouped in dedicated sections at the end of Chapters 4 through 9 so that they may be readily identified, and the Project Electives Checklist contained in Table 303.1 ties all project elective strategies from all chapters together in one location.

All sections which are not designated as jurisdictional choices in Table 302.1 or project electives in Table 303.1 are mandatory as applicable. This concept is reinforced in the general provisions at the beginning of Chapters 4 through 11. The vast majority of the provisions of this code are mandatory as applicable in the spirit of all other International Codes.

## ORDINANCE

The International Codes are designed and promulgated to be adopted by reference by ordinance. Jurisdictions wishing to adopt the *International Green Construction Code™- Water Efficiency Provisions* as an enforceable regulation governing structures and premises 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. For more information on adoption of the *International Green Construction Code™- Water Efficiency Provisions* contact [pmgresourcecenter@iccsafe.org](mailto:pmgresourcecenter@iccsafe.org)

### SAMPLE ORDINANCE FOR ADOPTION OF THE INTERNATIONAL GREEN CONSTRUCTION CODE – WATER EFFICIENCY PROVISIONS ORDINANCE NO. \_\_\_\_\_

An ordinance of the [JURISDICTION] adopting the *International Green Construction Code™- Water Efficiency Provisions*, regulating and governing the impact of buildings and structures on the environment in the [JURISDICTION]; providing for the issuance of permits and collection of fees thereof; 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 Green Construction Code*, including Appendix Chapters [FILL IN THE APPENDIX CHAPTERS BEING ADOPTED] (see *International Green Construction Code –Water Efficiency Provisions* Section 101.2.1), as published by the International Code Council, be and is hereby adopted as the Water Efficient Construction Code of the [JURISDICTION], in the State of [STATE NAME] for regulating and governing the impact of buildings and structures on the environment as herein provided; providing for the issuance of permits and collection of fees thereof; and each and all of the regulations, provisions, penalties, conditions and terms of said Water Efficient Construction 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]

Table 302.1. Insert: [JURISDICTIONAL REQUIREMENTS].

**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 International Green Construction Code – Water Efficient Provisions 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 3 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.

# CHAPTER 1

## ADMINISTRATION

[Portions Omitted]

### SECTION 102 APPLICABILITY

**102.1 General.** This code is an overlay to the other International Codes. This code is not intended to be used as a standalone construction regulation document or to abridge or supersede safety, health or environmental requirements under other applicable codes or ordinances. A *jurisdiction* intending to adopt this code without other ICC-Codes is advised to make a detailed review of locally adopted codes to ensure that they adequately correlate with this code.

**102.1.1 Code Conflicts.** Where there is a conflict between a general requirement and a specific requirement of this code, the specific requirement shall be applicable. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most practical and effective requirement to meet the intent of the code shall govern.

**102.1.2 Innovative Approaches.** It is intended that the provisions of this code provide flexibility to allow and encourage the use of innovative approaches, techniques and technology to achieve compliance with the intent of the code.

**102.2 Other laws.** The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

**102.3 Application of references.** References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

**102.4 Referenced codes and standards.** The codes listed in Sections 102.4.2 through 102.4.12, the codes and standards referenced elsewhere in this code, and those referenced standards listed in Chapter 12, shall be considered as part of the requirements of this code to the prescribed extent of each such reference. It is the expressed intent of this code to require higher minimum standards relating to *building* performance than the corresponding minimum standards set by the referenced codes and standards, and in such cases, the higher minimum standards of this code shall take precedence.

**102.4.1 Conflicting provisions.** Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code or the International Codes listed in Section 102.3, the provisions of this code or the International Codes listed in Section 102.4, as applicable, shall take precedence over the provisions in the referenced code or standard.

**102.4.2 Building.** The provisions of the *International Building Code* shall apply to the extent that such provisions establish minimum requirements to safeguard public health, safety and general welfare through structural strength, means of egress facilities, sanitation, adequate light and *ventilation*, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations. The provisions of Chapter 1 of the *International Building Code* shall also apply.

**102.4.3 Fuel Gas.** The provisions of the *International Fuel Gas Code* shall apply to the installation, *alteration, repair* and replacement of gas piping systems and components, gas appliances and related accessories as covered in this code. These requirements apply to gas piping systems extending from the point of delivery to the inlet connections of appliances and the installation and operation of gas appliances and related accessories.

**102.4.4 Mechanical.** The provisions of the *International Mechanical Code* shall apply to the installation, *alterations, repairs* and replacement of mechanical systems, equipment, appliances, fixtures, fittings and appurtenances, including ventilating, heating, cooling, air-conditioning and refrigeration systems, incinerators and other energy-related systems.

**102.4.5 Plumbing.** The provisions of the *International Plumbing Code* shall apply to the installation, *alteration, repair* and replacement of plumbing systems, including equipment, appliances, fixtures, fittings, appurtenances, and medical gas systems.

**102.4.6 Property maintenance.** The provisions of the *International Property Maintenance Code* shall apply to *existing structures* and premises; equipment and facilities; light, *ventilation*, space heating, sanitation, life and fire safety hazards; responsibilities of owners, operators and occupants; and occupancy of existing premises and *structures*.

**102.4.7 Fire prevention.** The provisions of the *International Fire Code* shall apply to matters affecting or relating to: *structures*, processes and premises from the hazard of fire and explosion arising from the storage, handling or use of *structures*, materials or devices; conditions hazardous to life, property or public welfare in the occupancy of *structures* or premises; and the construction, extension, *repair, alteration* or removal of fire suppression and alarm systems or fire hazards in the *structure* or on the premises from occupancy or operation.

**102.4.8 Energy.** The provisions of the *International Energy Conservation Code* shall apply to matters governing the design and construction of *buildings* for the effective use of energy.

**102.4.9 Wildland-urban interface.** The provisions of the *International Wildland-Urban Interface Code* shall apply to matters related to the mitigation of risk to life and *structures* from intrusion of fire from wildland fire exposures and fire exposures from adjacent *structures* and to mitigate *structure* fires from spreading to wildland fuels.

**102.4.10 Performance.** The provisions of the *International Code Council Performance Code* shall be permitted to apply to matters related to the approval of alternative materials and methods and to innovative approaches to code compliance.

**102.4.11 Existing buildings.** The provisions of the *International Existing Building Code* shall apply to matters governing the design and construction of *additions, alterations* or renovations of existing *buildings* as well as to changes in occupancy to the extent that such provisions establish minimum requirements to safeguard public health, safety and general welfare through structural strength, *means of egress* facilities, sanitation, adequate light and *ventilation*, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

**102.4.12 Zoning.** The provisions of the *International Zoning Code* shall apply to matters governing zoning requirements related to the scope of this code.



**102.5 Partial invalidity.** In the event that any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions.

**102.6 Existing structures.** The legal occupancy of any *structure* existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, *the International Building Code, the International Existing Building Code, the International Property Maintenance Code* or the *International Fire Code*, or as is deemed necessary by the *code official* for the general safety and welfare of *building* occupants and the public.

**102.7 Mixed occupancy buildings.** In mixed occupancy *buildings*, each portion of a *building* shall comply with the specific requirements of this code applicable to each specific occupancy.

## PART 2 --- ADMINISTRATION AND ENFORCEMENT

### SECTION 103 DUTIES AND POWERS OF THE CODE OFFICIAL

**103.1 General.** The *code official* established in the *International Building Code* is hereby authorized and directed to enforce the provisions of this code. The *code official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions and how this code relates to other applicable codes and ordinances. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code and other applicable codes and ordinances. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code or other applicable codes and ordinances.

**103.2 Applications and permits.** The *code official* shall enforce compliance with the provisions of this code as part of the enforcement of other applicable codes and regulations, including the referenced codes listed in 102.4.

**103.3 Notices and orders.** The *code official* shall issue all necessary notices or orders to ensure compliance with this code.

**103.4 Inspections.** The *code official* shall make inspections, as required to determine code compliance, or the *code official* shall have the authority to accept reports of inspection by *approved agencies* or individuals. The *code official* is authorized to engage such expert opinion as deemed necessary to report upon unusual technical issues that arise, subject to the approval of the appointing authority.

### SECTION 104 CONSTRUCTION DOCUMENTS

**104.1 Information on construction documents.** *Construction documents* shall be dimensioned and drawn upon suitable material. Electronic media documents are permitted to be submitted where *approved* by the *code official*. *Construction documents* shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that such work will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the *code official*. The *construction documents* shall contain a listing of the applicable *project electives* in accordance with Section 303, and shall include the applicable *commissioning* requirements in accordance with Section 903. Where special conditions exist, the *code official* is authorized to require additional *construction documents*.

### SECTION 105 APPROVAL

**105.1 General.** This code is not intended to prevent the use of any material, method of construction, design, system, or innovative approach not specifically prescribed herein, provided that such construction, design, system or innovative approach has been *approved* by the *code official* as meeting the intent of this code and all other applicable laws, codes and ordinances.

**105.2 Approved materials and equipment.** Materials, equipment, devices and innovative approaches *approved* by the *code official* shall be constructed, installed and maintained in accordance with such approval.

**105.2.1 Used materials, products and equipment.** The use of used materials, products and equipment that meet the requirements of this code for new materials is permitted. Used equipment and devices shall be permitted to be reused subject to the approval of the *code official*.

**105.3 Modifications.** Wherever there are practical difficulties involved in carrying out the provisions of this code, the *code official* shall have the authority to grant modifications for individual cases, upon application of the owner or owner's representative, provided the *code official* shall first find that special individual reason makes the strict letter of this code impractical and that the modification is in compliance with the intent and purpose of this code and that such modification does not lessen the minimum requirements of this code. The details of granting modifications shall be recorded and entered in the files of the department.

**105.4 Alternative materials, design, innovative approach and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design, innovative approach, or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design, innovative approach or method of construction shall be reviewed and *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, design, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code. The details of granting the use of alternative materials, designs, innovative approach and methods of construction shall be recorded and entered in the files of the department.

**105.4.1 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from *approved sources*.

**105.4.2 Tests.** Wherever there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the *code official* shall have the authority to require tests as evidence of compliance to be made at no expense to the *jurisdiction*. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the *code official* shall approve the testing procedures. Tests shall be performed by an *approved agency*. Reports of such tests shall be retained by the *code official* for the period required for retention of public records.

**105.5 Compliance materials.** The *code official* shall be permitted to approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code.

## SECTION 106 PERMITS

**106.1 Required.** Any owner or authorized agent who intends to construct, enlarge, *alter, repair*, move, demolish, or change the occupancy of a *building or structure*, or to erect, install, enlarge, alter, repair, remove, convert or replace any energy, electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the *code official* and obtain the required *permit* under the applicable code or regulation relevant to the intended work. Separate *permits* shall not be issued under this code. Exemptions from *permit* requirements shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other applicable laws, codes or ordinances of this *jurisdiction*.

## SECTION 107 FEES

**107.1 Fees.** Fees for *permits* shall be paid as required, in accordance with the schedule as established by the applicable governing authority for the intended work prescribed in an application.

## SECTION 108 BOARD OF APPEALS

**108.1 General.** Appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code shall be made to the Board of Appeals created under the applicable *International Code* of governing regulation.

**108.2 Limitations on authority.** An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted there under have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall have no authority to waive requirements of this code.

**108.3 Qualifications.** The members of the board of appeals related to interpretation of this code shall be qualified by experience and training in the matters covered by this code and shall not be employees of the *jurisdiction*.

## **SECTION 109 CERTIFICATE OF OCCUPANCY**

**109.1 Use and occupancy.** *Buildings* or *structures* shall not be used or occupied, and changes in the existing occupancy classification of a *building* or *structure* or portion thereof shall not be made, until the *code official* has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the *jurisdiction*.

**109.2 Certificate issued.** After the *code official* inspects the *building* or *structure* and finds no violations of the provisions of this code or other laws that are enforced by the department of *building safety*, the *code official* shall issue a certificate of occupancy in accordance with the provisions of the *International Building Code*. The certificate of occupancy shall include a stipulation in accordance with Item 12 of Section 111.2 of the *International Building Code* that post occupancy requirements are to be completed in accordance with Chapter 9 of this code.

**109.3 Temporary occupancy.** The *code official* is authorized to issue a temporary certificate of occupancy before the completion of the entire work covered by the permit, provided that the building or structure or portion thereof is safe to occupy.

## CHAPTER 2

# DEFINITIONS

### SECTION 201 GENERAL

**201.1 Scope.** Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

**201.2 Interchangeability.** Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

**201.3 Terms defined in other codes.** Where terms are not defined in this code and are defined in the *International Building Code, International Energy Conservation Code, International Fire Code, International Fuel Gas Code, International Mechanical Code or International Plumbing Code*, such terms shall have the meanings ascribed to them as in those codes.

**201.4 Terms not defined.** Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.

### SECTION 202 DEFINITIONS

**95<sup>th</sup> PERCENTILE RAINFALL EVENT.** The rainfall event having a precipitation total greater than or equal to 95 percent of all rainfall events during a 24-hour period on an annual basis.

**A-WEIGHTED SOUND LEVEL.** Sound pressure level in *decibels* measured with a sound level *meter* using an A-weighted network.

**[B] ADDITION.** An extension or increase in floor area or height of a *building* or *structure*.

**[B] ALTERATION.** Any construction or renovation to an *existing structure* other than *repair* or *addition*.

**[B] APPROVED SOURCE.** An independent person, firm or corporation, *approved* by the *code official*, who is competent and experienced in the application of engineering principles to materials, methods or systems analyses.

**[B] APPROVED AGENCY.** An established and recognized agency regularly engaged in conducting tests or furnishing *commissioning* services, where such agency has been *approved*.

**[E] AUTOMATIC.** Self-acting, operating by its own mechanism when actuated by some impersonal influence, such as a change in current strength, pressure, temperature or mechanical configuration (see ~~–Manual?~~).

**[P] BACKWATER VALVE.** A device or valve installed in the system drain piping which prevents drainage or waste from backing up into the system and causing contamination or flooding.

**[M] BTU.** Abbreviation for British thermal unit, which is the quantity of heat required to raise the temperature of 1 pound (454 g) of water 1 F (0.56 C) (1 Btu = 1055 J).

**[B] BUILDING.** Any *structure* used or intended for supporting or sheltering any use or occupancy, including the energy using systems and site sub-systems powered through the building's electrical service.

**BUILDING COMMISSIONING (BCx).** A process that verifies and documents that the selected building systems have been designed, installed, and function according to the owner's project requirements and construction documents, and to minimum code requirements except as noted herein.

**BUILDING SITE.** A *lot*, or a combination of adjoining *lots*, that are being developed and maintained subject to the provisions of this code. A *building* site shall be permitted to include public ways, private roadways, bikeways and pedestrian ways that are developed as an element of the total development.

**CHANGE OF OCCUPANCY.** A change in the purpose or level of activity within a *building* that involves a change in application of the requirements of this code.

**CODE OFFICIAL.** The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

**COLLECTION PIPE.** Unpressurized pipe used within the collection system that drains *rainwater* to the *storage tank* by gravity.

**CONSTRUCTED-COMPACTED SUBSOIL.** Subsoils that are compacted through any of the following: clearing, grading, smearing and topsoil removal such that the infiltrative capacity of the soils or the bulk density of the soils is significantly altered in comparison to the reference soil properties.

**[B] CONSTRUCTION DOCUMENTS.** Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a *building permit*.

**CONTROL.** A specialized *automatic* or *manual* device or system used to regulate the operation of lighting, equipment or appliances.

**DECIBELS (dB).** Term used to identify ten times the common logarithm of the ratio of two like quantities proportional to the power of energy.

**DETENTION.** The short-term storage of stormwater on a site in order to regulate the runoff from a given rainfall event and to control discharge rates to reduce the impact on downstream stormwater systems.

**DISTRIBUTION PIPE.** Pressurized or non-pressure piping used within the plumbing system of a building to deliver rainwater or graywater from the storage tank or pump to the point of use.

**ENERGY STAR.** A joint program of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) designed to identify and promote energy-efficient products and practices.

**[M] EQUIPMENT.** All piping, ducts, vents, control devices and other components of systems other than appliances which are permanently installed and integrated to provide control of environmental conditions for buildings. This definition shall also include other systems specifically regulated in this code.

➔

**[B] EXISTING STRUCTURE.** A *structure* erected prior to the date of adoption of the appropriate code, or one for which a legal *building permit* has been issued.

**[P] GRAYWATER.** Untreated wastewater that has not come into contact with wastewater from water closets, urinals, kitchen sinks, or dishwashers. Graywater includes but is not limited to wastewater from bathtubs, showers, lavatories, clothes washers, and laundry trays.

**INLET FILTER.** A screen, grid or other device installed on a gutter, downspout system or at another location upstream of the *storage tank*. The filter passes liquids and retains solids.

**INVASIVE PLANT SPECIES:** Species that are not native to the ecosystem under consideration and that cause or are likely to cause economic or environmental harm or harm to human, animal or plant health. Consideration for inclusion as an invasive species shall be permitted to include, but shall not be limited to, those species identified on:

1. City, county or regional lists (when listing occurs through a vetted, transparent process and has been accepted by city, county or regional stakeholders, respectively).
2. State Noxious Weeds laws,

3. Federal Noxious Weeds laws.

**[B] JURISDICTION.** The governmental unit that has adopted this code under due legislative authority.

**[B] LABEL.** An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material, and the name and identification of an *approved agency* and that indicates that the representative sample of the product or material has been tested and evaluated by an *approved agency*.

**[B] LABELED.** Equipment, materials or products to which has been affixed a *label*, seal, symbol or other identifying *mark* of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-*labeled* items and whose *labeling* indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

**[B] LOT.** A portion or parcel of land considered as a unit.

**[B] LOT LINE.** A line dividing one *lot* from another, or from a street or any public place.

**[E] MANUAL.** Capable of being operated by personal intervention (see –Automatic”).

**METER.** A water volume measuring device used to collect data and indicate water usage abnormalities. Such devices are provided by the water purveyor or the *building* owner.

**MUNICIPAL RECLAIMED WATER.** Wastewater that has been reclaimed, recycled, reused or treated by a municipality for specific *non-potable* uses.

**NATIVE PLANT SPECIES.** A species that naturally occurs in a specific area, defined by using the best scientific knowledge of that region. Consideration for inclusion as a native species shall be permitted to include, but is not limited to, those species identified in any of the following:

1. City, county and regional lists.
2. State laws.
3. Federal laws.

**NON-POTABLE WATER.** Water not safe for drinking, personal or culinary utilization.

**OUTLET FILTER.** Devices that are located downstream of a *storage tank* and utilize screens, cartridges or other media to provide a level of filtration appropriate for the intended use of the water.

**[B] PERMIT.** An official document or certificate issued by the *jurisdiction* which authorizes performance of a specified activity.

**POTABLE WATER.** Water free from impurities present in amounts sufficient to cause disease or harmful physiological effects and conforming to the bacteriological and chemical quality requirements of the Public Health Service Drinking Water Standards or the regulations of the public health authority having jurisdiction.

**PROJECT ELECTIVE.** The provisions contained in Sections 407, 508, 613, 710 and 809 for which compliance is not mandatory unless selected under Section 303.1 for a specific *building* project. The minimum total number of *project electives* that must be selected and complied with is indicated in Table 302.1.

**RAINWATER.** Water from natural precipitation that was not contaminated by use.

**RAINWATER COLLECTION AND CONVEYANCE SYSTEM.** *Rainwater* collection system components extending between the collection surface and the *storage tank* that convey collected *rainwater*, usually through a gravity system.

**RECEIVING WATERS.** Groundwater, creeks, streams, rivers, lakes or other water bodies that receive treated or untreated wastewater or stormwater, including water from combined sewer systems and stormwater drains.

**RECLAIMED WATER.** *Non-potable* water that has been derived from the treatment of wastewater by a facility or system licensed or permitted to produce water meeting the *jurisdiction's* water requirements for its intended uses. Also known as *Recycled Water*.”

**REGISTERED DESIGN PROFESSIONAL.** An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or *jurisdiction* in which the project is to be constructed.

**REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE:** *A registered design professional* engaged by the owner to review and coordinate certain aspects of the project, as determined by the *building official*, for compatibility with the design of the building or structure, including submittal documents prepared by others, deferred submittal documents and phased submittal documents.

**RENEWABLE ENERGY SOURCE, ON-SITE.** Energy derived from solar radiation, wind, waves, tides, landfill gas, biomass, or the *geothermal energy*. The energy system providing on-site renewable energy is located on or adjacent to the *building site*, and generate energy for use on the *building site*.

**[B] REPAIR.** The reconstruction or renewal of any part of an existing *building* or building site for the purpose of its maintenance.



**RETENTION (STORMWATER).** The permanent holding of stormwater on a site, preventing the water from leaving the site as surface drainage and allowing for use of the water on site, or loss of the water through percolation, evaporation or absorption by vegetation.

**ROOF WASHER.** A device or method for removal of sediment and debris from collection surface by diverting initial rainfall from entry into the *storage tank*. Also referred to as a First Flush Device.

**SOLAR THERMAL EQUIPMENT.** A device that uses solar radiation to heat water or air for use within the facility for service water heating, space heating or space cooling.

**STORAGE TANK (GRAYWATER OR RAINWATER).** A fixed container for holding water at atmospheric pressure for subsequent reuse as part of a plumbing or irrigation system.

**TERTIARY STANDARDS.** Standards, practices or policies that ensure that waste water has been treated to achieve a level of quality that is safe for release into the environment, such as, but not limited to, release into seas, rivers, lakes and the ground.

**TOPSOIL.** The upper, outmost layer of soil having the highest concentration of *organic matter* and microorganisms and where the majority of biological soil activity occurs.

**TURFGRASS.** Grasses that are regularly mowed and, as a consequence, form a dense growth of leaf blades, shoots and roots.

**VEGETATIVE ROOF.** An assembly of interacting components designed to waterproof and normally insulate a building's top surface that includes, by design, vegetation and related landscaping elements.

**Extensive vegetative roof.** A low profile roof with a growing medium less than 8 inches in depth, composed of plants that can thrive in a rooftop environment with limited water, shallow roots and sparse nutrients.

**Intensive vegetative roof.** A high profile roof with a growing medium 8 inches or more in depth that can support a wide range of vegetables, shrubs and small trees.

**WASTE ENERGY RECOVERY.** The application and use of systems and equipment to capture and reuse any form of energy that would otherwise be discarded and not otherwise be used by the *building* and its systems.

**WATERSENSE.** A program of the U.S. Environmental Protection Agency (EPA) designed to identify and promote water-efficient products and practices.

## CHAPTER 3

# JURISDICTIONAL REQUIREMENTS AND PROJECT ELECTIVES

### SECTION 301 GENERAL

**301.1 Scope.** This chapter contains: requirements that are specific to and selected by the *jurisdiction*; elective requirements that are specific to the project and selected by the owner.

**301.2 Jurisdictional Requirements and Project Electives.** This chapter requires that the *jurisdiction* indicate in Table 302.1 whether specific provisions are mandatory for all *buildings* regulated by this code and, where applicable, the level of compliance required. This chapter also contains *project electives*, as listed in Table 303.1, that become mandatory only as selected and indicated by the owner for the specific project. All other provisions of this code shall be mandatory as applicable.

### SECTION 302 JURISDICTIONAL REQUIREMENTS

**302.1 Requirements determined by the jurisdiction.** The *jurisdiction* shall indicate the following information in Table 302.1 for inclusion in its code adopting ordinance:



1. The *jurisdiction* shall indicate the minimum number of *project electives* that must be incorporated into all projects, as modified by Section 303.2.
2. Where “Yes” or “No” boxes are provided, the *jurisdiction* shall check the box to indicate “Yes” where that section or appendix is to be enforced as a mandatory requirement in the *jurisdiction*, or “No” where that section or appendix is *not* to be enforced as a mandatory requirement in the *jurisdiction*.



**TABLE 302.1  
REQUIREMENTS DETERMINED BY THE JURISDICTION**

Section	Section Title or Description and Directives	Jurisdictional Requirements
→		
<b>CH 3. JURISDICTIONAL REQUIREMENTS AND PROJECT ELECTIVES</b>		
302.1 (1)	Project Electives – The jurisdiction shall indicate a number between 1 and 5 to establish the minimum total number of project electives that must be satisfied.	_____
<b>CH 4. SITE DEVELOPMENT AND LAND USE</b>		
→		
402.3.2	Stormwater management	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>CH 7. WATER RESOURCE CONSERVATION AND EFFICIENCY</b>		
→		
702.1.2	Enhanced plumbing fixture and fitting flow rate tier.	<input type="checkbox"/> Tier 1 <input type="checkbox"/> Tier 2
702.7	Municipal reclaimed water.	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>CH 9. COMMISSIONING, OPERATION AND MAINTENANCE</b>		
904.1.1.1	Periodic reporting	<input type="checkbox"/> Yes <input type="checkbox"/> No

Section	Section Title or Description and Directives	Jurisdictional Requirements	
<b>CH 10. EXISTING BUILDINGS</b>			
→			
1006.4	Evaluation of existing buildings	<input type="checkbox"/> Yes	<input type="checkbox"/> No

### SECTION 303 PROJECT ELECTIVES

**303.1 Electives required.** A total of not less than the number of *project electives* as indicated by the jurisdiction in Section 302.1(1) of Table 302.1 shall be selected by the owner. Such *project electives* shall be applied as mandatory requirements to the project and shall be indicated to the *code official* by means of completion of Table 303.1. Electives identified by the jurisdiction as being “not available” are not available for selection.

**303.2 Additional elective.** Where required in accordance with Section 705.1, the total number of *project electives* indicated in Table 302.1 shall be increased by one.

**303.3 Applicability to existing buildings.** *Project electives* shall be applicable to existing *buildings* only where such *buildings* are evaluated in accordance with Section 1007.4.

**303.4 Project electives checklist.** The submitted *construction documents* shall include a completed copy of Table 303.1 indicating which *project electives* that the owner has selected as a means to comply with Section 303.1. The total number of *project electives* selected shall be in accordance with the minimum number of *project electives* indicated by the *jurisdiction* in Table 302.1. The *Project electives* selected shall be applied and enforced as mandatory requirements.

**TABLE 303.1  
PROJECT ELECTIVES CHECKLIST**

Section	Description	Check the corresponding box to indicate each project elective selected.	Jurisdictional determination of non-availability
<b>CH 4. SITE DEVELOPMENT AND LAND USE</b>			
407.2.10	Native plant landscaping	<input type="checkbox"/>	<input type="checkbox"/>
407.2.11	Site restoration	<input type="checkbox"/>	<input type="checkbox"/>
<b>CH 7. WATER RESOURCE CONSERVATION AND EFFICIENCY</b>			
710.2.1	Fixture flow rates are one tier above that required by Table 302.1	<input type="checkbox"/>	<input type="checkbox"/>
710.2.1	Fixture flow rates are two tiers above that required by Table 302.1.	<input type="checkbox"/> (2 Electives <sup>a</sup> )	<input type="checkbox"/>
710.3	On-site wastewater treatment	<input type="checkbox"/>	<input type="checkbox"/>
710.4	Non-potable outdoor water supply	<input type="checkbox"/>	<input type="checkbox"/>
710.5	Non-potable water for plumbing fixture flushing	<input type="checkbox"/>	<input type="checkbox"/>
710.6	Automatic fire sprinkler system	<input type="checkbox"/>	<input type="checkbox"/>
710.7	Non-potable water supply to fire pumps	<input type="checkbox"/>	<input type="checkbox"/>
710.8	Non-potable water for industrial process makeup water	<input type="checkbox"/>	<input type="checkbox"/>
710.9	Efficient hot water distribution system	<input type="checkbox"/>	<input type="checkbox"/>
710.10	Non-potable water for cooling tower makeup water	<input type="checkbox"/>	<input type="checkbox"/>
710.11	Graywater collection	<input type="checkbox"/>	<input type="checkbox"/>

Section	Description	Check the corresponding box to indicate each project elective selected.	Jurisdictional determination of non-availability

a. Where multiple electives are shown in the table in the form “~~x~~(electives)”, “~~x~~” indicates the number of credits to be applied for that elective to the total number of *project electives* required by the jurisdiction as shown in Section 302.1(3) of Table 302.1.

# CHAPTER 4

## SITE DEVELOPMENT AND LAND USE

### SECTION 401 GENERAL

[Portions Omitted]

**402.3.2 Stormwater management.** Where this section is indicated to be applicable in Table 302.1, stormwater management systems, including, but not limited to, infiltration, evapo-transpiration; *rainwater* harvest and runoff reuse; shall be provided and maintained on the *building site*. Stormwater management systems shall address the increase in runoff that would occur resulting from development on the *building site* and shall either:

1. Manage rainfall on-site and size the management system to retain, at a minimum, the volume of a single storm which is equal to the *95th percentile rainfall event* and all smaller storms and maintain the predevelopment natural temperature of the runoff; or
2. Maintain or restore the pre-development stable, natural runoff hydrology of the site throughout the development or redevelopment process. Post construction runoff rate, volume, duration, and temperature shall not exceed predevelopment rates. The stormwater management system design shall be based, in part, on a hydrologic analysis of the *building site*.

The stormwater management system shall not redirect or concentrate off-site discharge that would cause increased erosion or other drainage related damage to adjoining *lots* or public property.

**402.3.3 Landscape irrigation systems.** Irrigation of exterior landscaping shall comply with Sections 402.3.3.1 and 402.3.3.2.

**402.3.3.1 Water for outdoor landscape irrigation.** Water used for outdoor landscape irrigation shall be non-potable and shall comply with Section 406.2.



**Exceptions:** *Potable* water is permitted to be used as follows:

1. During the establishment phase of newly planted landscaping. The establishment phase shall be not longer than the following:
  - 1.1. 3 years for trees
  - 1.2. 2 years for shrubs
  - 1.3. 1 year for herbaceous cover plants
2. To irrigate food production.
3. To supplement *non-potable* water irrigation of shade trees provided in accordance with Section 404.2.3.

4. *Potable* water is permitted for landscape irrigation where *approved* by local ordinance or regulation.



**402.3.3.2 Irrigation system design and installation.** Landscape irrigation systems shall be designed and installed to provide the minimum amount of irrigation required for maintenance of vegetation in the landscaping of the building site. The systems shall utilize one or more of the following: drip irrigation, subsurface, subsoil and surface irrigation. The irrigation system shall be divided into zones based on the water needs of the plant materials. Landscape irrigation systems shall not direct water onto building exterior surfaces, foundations or exterior paved surfaces.

**402.3.4 Outdoor ornamental fountains and water features.** Outdoor ornamental fountains and other water features constructed or installed on a *building site* shall be supplied with either municipally reclaimed or collected *rainwater* complying with Section 406.2. Signage in accordance with Section 706.2 shall be posted at each outdoor fountain and water feature where *non-potable* water is used.

**402.3.5.7 Turfgrass.** Not more than 40 percent of the area of the vegetated area of the building site shall be planted with turfgrass. Calculations of the percentage shall not include vegetative roof areas, areas not external to the building, and areas not on the ground plane of the building.

**Exception:** For schools and recreational facilities, the area dedicated to athletic fields is excluded from the calculation of the vegetated area.

## SECTION 406 DETAILED SITE DEVELOPMENT REQUIREMENTS

**406.1 General.** The provisions of this section shall govern the design and installation of site development systems and use of materials.

**406.2 Non-potable water systems for irrigation systems.** Non-potable water systems used for irrigation shall comply with the graywater, municipal reclaimed water and collected rainwater provisions of this section.

**406.2.1 Graywater systems.** *Graywater* systems used for landscape irrigation purposes shall be limited to subsurface and surface irrigation applications. The *retention* time for surface irrigation shall be 24 hours or less. *Graywater* to be used in *graywater* irrigation shall comply with the provisions of Section 708 other than Sections 708.6 and 708.12.6.5. Subsurface *graywater* systems shall be in accordance with Section 406.3. *Graywater* shall be filtered by a 100 micron or finer filter. The control panel for the *graywater* irrigation system shall be provided with signage in accordance with Section 706.2.

**406.2.2 Municipal reclaimed water.** *Municipal reclaimed water* used for landscape irrigation purposes shall be limited to subsurface applications. *Reclaimed water* used in irrigation systems shall comply with the provisions of Section 709 except for Section 709.5. *Reclaimed water* shall be filtered by a 100 micron or finer filter. The control panel for the *reclaimed water* irrigation system shall be provided with signage in accordance with Section 706.2

**Exception:** Subject to the approval of the *code official* based on the extent of purification occurring in reclamation process, *municipal reclaimed water* shall be permitted in sprinkler irrigation applications.

**406.2.3 Collected rainwater.** *Rainwater* collected on the surface of the *building site*, or from the roof surfaces of the *building*, and used for landscape irrigation purposes shall not be limited regarding the method of application. *Rainwater* collected from elevated *building* locations that is to be used in *building site* irrigation, shall be in compliance with the provisions of Section 707 other than Sections 707.6, 707.12.1, 707.12.1.1 and 707.12.7.4.

**406.3 Subsurface graywater irrigation systems.** Gravity subsurface gray water irrigation systems, where provided in accordance with Section 402.3.3.1, shall be designed and installed in accordance with Sections 406.3.1 through 406.3.6. *Graywater* collection and storage systems shall comply with this section and the provisions of Section 708 other than Sections 708.6 and 708.12.6.5.

**406.3.1 Estimating graywater discharge.** The irrigation system shall be sized in accordance with the gallons-per-day-per-occupant number based on the type of fixtures connected to the *graywater* system. The discharge shall be calculated by the following equation:

$$C = (A \times B) - D \quad \text{(Equation 4-1)}$$

Where:

*A* = Number of occupants:

Residential—For dwelling units regulated by this code in accordance with Section 101.2, the number of occupants shall be determined by the actual number of occupants, but not less than two occupants for one bedroom and one occupant for each additional bedroom.

Commercial—Number of occupants for buildings without dwelling units shall be determined by the *International Building Code*

*B* = Estimated flow demands for each occupant:

Residential— For dwelling units regulated by this code in accordance with Section 101.2, 25 gallons per day (94.6 Lpd) per occupant for showers, bathtubs and lavatories and 15 gallons per day (56.7 Lpd) per occupant for clothes washers or laundry trays.

Commercial—For buildings, without dwelling units, based on type of fixture or water use records minus the discharge of fixtures other than those discharging gray water.

*C* = Estimated gallons *graywater* discharge based on the total number of occupants.

*D* = Estimated gallons of *graywater* to be used within the interior of the *building*.

**406.3.2 Percolation tests.** The permeability of the soil in the proposed absorption system shall be determined by percolation tests or permeability evaluation.

**406.3.2.1 Percolation tests and procedures.** At least three percolation tests in each system area shall be conducted. The holes shall be spaced uniformly in relation to the bottom depth of the proposed absorption system. More percolation tests shall be made where necessary, depending on system design.

**406.3.2.1.1 Percolation test hole.** The test hole shall be dug or bored. The test hole shall have vertical sides and a horizontal dimension of 4 inches to 8 inches (102 mm to 203 mm). The bottom and sides of the hole shall be scratched with a sharp-pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches (51 mm) of gravel or coarse sand.

**406.3.2.1.2 Test procedure, sandy soils.** The hole shall be filled with clearwater to a minimum of 12 inches (305 mm) above the bottom of the hole for tests in sandy soils. The time for this amount of water to seep away shall be determined, and this procedure shall be repeated if the water from the second filling of the hole seeps away in 10 minutes or less. The test shall proceed as follows:

1. Water shall be added to a point not more than 6 inches (152 mm) above the gravel or coarse sand.
2. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of 1 hour.
3. Where 6 inches (152 mm) of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches (152 mm). Where 6 inches (152 mm) of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch (7.2 s/mm) shall be reported.
4. The final water level drop shall be used to calculate the percolation rate.

Soils not meeting the above requirements shall be tested in accordance with Section 406.3.2.1.3.

**406.3.2.1.3 Test procedure, other soils.** The hole shall be filled with clear water, and a minimum water depth of 12 inches (305 mm) shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter, the soil shall be allowed to swell not less than 16 hours or more than 30 hours. Immediately after the soil swelling period, the measurements for determining the percolation rate shall be made as follows:

1. Any soil sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches (152 mm) above the gravel or coarse sand.
2. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours, unless two successive water level drops do not vary by more than 1/16 inch (1.59 mm). At least three water level drops shall be observed and recorded.
3. The hole shall be filled with clear water to a point not more than 6 inches (152 mm) above the gravel or coarse sand whenever it becomes nearly empty. Adjustments of the water level shall not be made during the three measurement periods except to the limits of the last measured water level drop.
4. When the first 6 inches (152 mm) of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for 1 hour. The water depth shall not exceed 5 inches (127 mm) at any time during the measurement period.
5. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

**406.3.2.1.4 Mechanical test equipment.** Mechanical percolation test equipment shall be of an *approved* type.

**406.3.3 Permeability evaluation.** Soil shall be evaluated for estimated percolation based on soil structure and texture in accordance with accepted soil evaluation practices. Borings shall be made in accordance with Section 406.3.2.1 for evaluating the soil.

**406.3.4 Subsurface landscape irrigation site location.** The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any water well or reservoir on the same or adjoining *lots*. Where this is not possible, the irrigation system shall be located so that surface water drainage from the *building site* is not directed toward a well or reservoir. The soil absorption system shall be located with a minimum horizontal distance between various elements as indicated in Table 406.3.4 and as provided in Section 708.14.7. Surface water shall be diverted away from any soil absorption site on the same or adjoining *lots*.

**TABLE 406.3.4  
LOCATION OF GRAYWATER SYSTEM**

ELEMENT	MINIMUM HORIZONTAL DISTANCE (feet)
	IRRIGATION DISPOSAL FIELD
Buildings	2
Lot lines other than lot lines adjoining public ways	5
Water wells	100
Streams, lakes and wetlands	50
Critical root zone (CRZ) of protected trees	2
Seepage pits	5
Septic tanks	5
Water service	5
Public water main	10

For SI: 1 minute per inch = min/25.4 mm,

**406.3.5 Installation.** Absorption systems shall be installed in accordance with Sections 406.3.5.1 through 406.3.5.5 to provide landscape irrigation without surfacing of *graywater*. Excavations shall not encroach upon the critical root zone (CRZ) of protected trees.

**406.3.5.1 Absorption area.** The total absorption area required shall be computed from the estimated daily *graywater* discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated *graywater* discharge divided by the design-loading rate from Table 406.3.5.1.

**TABLE 406.3.5.1  
DESIGN LOADING RATE**

PERCOLATION RATE (minutes per inch)	DESIGN LOADING FACTOR (gallons per square foot per day)
Less than 10	1.2
10 to less than 30	0.8
30 to less than 45	0.72
45 and greater	0.4

For SI: 1 minute per inch = min/25.4 mm,  
1 gallon per square foot = 40.7 L/m<sup>2</sup>.

**406.3.5.2 Seepage trench excavations.** Seepage trench excavations shall be a minimum of 1 foot (304 mm) to a maximum of 5 feet (1524 mm) wide. Trench excavations shall be spaced a minimum of 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom of the trench area (width) multiplied by the length of pipe. Individual seepage trenches shall be a maximum of 100 feet (30 480 mm) in *developed length*.

**406.3.5.3 Seepage bed excavations.** Seepage bed excavations shall be a minimum of 5 feet (1524 mm) wide and have more than one *distribution pipe*. The absorption area of a seepage bed shall be computed by using the bottom of the trench area. *Distribution piping* in a seepage bed shall be uniformly spaced a maximum of 5 feet (1524 mm) and a minimum of 3 feet (914 mm) apart, and a maximum of 3 feet (914 mm) and a minimum of 1 foot (305 mm) from the sidewall or headwall.

**406.3.5.4 Excavation and construction.** The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated where the soil is so wet that such material rolled between the hands forms a soil wire. All smeared or compacted soil surfaces in the sidewalls or bottom of seepage trench or bed excavations shall be scarified to the depth of smearing or compaction and the loose material removed. Where rain falls on an open excavation, the soil shall be left until sufficiently dry so a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

**406.3.5.5 Aggregate and backfill.** A minimum of 6 inches of aggregate ranging in size from 1/2 to 2-1/2 inches (12.7 mm to 64 mm) shall be laid into the trench below the *distribution piping* elevation. The aggregate shall be evenly distributed a minimum of 2 inches (51 mm) over the top of the *distribution pipe*. The aggregate shall be covered with *approved* synthetic materials or 9 inches (229 mm) of uncompacted marsh hay or straw. *Building* paper shall not be used to cover the aggregate. A minimum of 9 inches (229 mm) of soil backfill shall be provided above the covering.

**406.3.6 Distribution piping.** *Distribution piping* shall be not less than 3 inches (76 mm) in diameter. The top of the *distribution pipe* shall be not less than 8 inches (203 mm) below the original surface. The slope of the *distribution pipes* shall be a minimum of 2 inches (51 mm) and a maximum of 4 inches (102 mm) per 100 feet (30 480 mm).



[Portions Omitted]

## SECTION 407 PROJECT ELECTIVES

**407.1 General.** Section 407 shall regulate *project electives* related to natural resource conservation and *building site* development. *Project electives* shall not be mandatory unless selected by the owner and indicated in the Project Elective Checklist required by Section 303.1.

[Portions Omitted]

**407.2.10 Native plant landscaping project elective.** Where new landscaping is installed as part of a site plan or within the building site, and where 75 percent or more of the newly landscaped area is planted with native species, the landscaping shall be recognized as a project elective.

**407.2.11 Site restoration project elective.** Previously developed sites that restore 25 percent or more of the non-building footprint building site area with native or adaptive vegetation shall be recognized as a project elective.

## SECTION 607 BUILDING MECHANICAL SYSTEMS

[Portions Omitted]

**607.5 Piping insulation.** Piping, including valves, fittings and piping system components, shall be thermally insulated in accordance with Table 607.5. *Building* cavities and interstitial framing spaces shall be large enough to accommodate the combined diameter of the pipe plus the insulation, plus the full thickness of the insulation plus any other objects in the cavity that the piping must cross.

**Exceptions:**

1. Piping conveying fluids having a design operating temperature range between 60°F and 105°F.
2. Piping conveying fluids not heated or cooled such as roof and condensate drains, cold water supply, and natural gas piping.
3. Where heat gain or heat loss will not increase energy usage such as liquid refrigerant piping.
4. Piping having an outside diameter or 1 inch or less, associated with strainers, control valves, and balancing valves.

**TABLE 607.5  
MINIMUM PIPE INSULATION THICKNESS<sup>a</sup>**

Fluid	Conductivity Btu-in./(h-ft <sup>2</sup> -F)	Wall Thickness <sup>d</sup> of Pipe Insulation Relative to Nominal Pipe Diameter <sup>b,c</sup>
Hot Water	0.22 – 0.29	At least the Same
Chilled Water	0.22 – 0.28	At least the Same

- a. Piping with a nominal diameter larger than ¼ inch shall be insulated.
- b. The proportions in this column apply to all nominal pipe diameters greater than ¼ inch and less than or equal to 2 inches. For nominal pipe diameters larger than 2 inches, outside diameter, the minimum wall thickness of the insulation shall be equal to the wall thickness required for 2 inch pipe.
- c. For insulation outside the stated conductivity range, the minimum thickness shall be determined as follows:  $T = r[(1 + t/r)K/k - 1]$ .  
Where:  
T = minimum insulation thickness inches.  
r = actual outside radius of pipe inches.  
t = insulation thickness listed in the table for applicable fluid temperature and pipe size.  
K = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature (Btu·in./h·ft<sup>2</sup>·°F)  
k = the upper value of the conductivity range listed in the table for the applicable fluid temperature.
- d. These thicknesses are based on energy efficiency considerations only.

## SECTION 608 BUILDING SERVICE WATER HEATING SYSTEMS

[Portions Omitted]

**608.3 Pools, hot tubs and spas.** Pools, hot tubs and spas shall meet the efficiency requirements of the *International Energy Conservation Code*.

**608.3.1 Pools in conditioned space.** For pools that are located within the conditioned space, not less than 25 percent of the annual energy consumption of pool operation and not less than 50 percent of the peak design space heating, *ventilation*, and cooling requirements for the space in which the pool is located shall be met by at least one of the following:

1. An on-site renewable energy system(s)
2. A heat recovery system.

**608.3 Rough-ins for future solar hot water pre-heat.** Plumbing, electrical and control systems shall be designed and constructed in accordance with Sections 608.5.1 and 608.5.2 to provide for the future installation of a solar

water heating system that will be capable of providing not less than 50 percent of the energy needed for all systems listed below:

1. Service Water Heating for kitchen, laundry and bathing.
2. Pool Water Heating.
3. Spa Water Heating.
4. Hot Tub Water Heating.

**Exception:** Solar water heating equipment is not required at building sites where solar insolation totals not more than 3.5 (kW/m<sup>2</sup>/day) in accordance with Table 611.4.

**608.5.1 Solar thermal hot water system piping rough-in.** Conduit, sleeve or other pathway shall be installed not less than two runs of piping from the future site for *solar thermal* to the location of the service water heating equipment. The conduit(s), sleeve(s) or other pathway(s) shall have internal dimensions large enough to allow the piping and insulation to be easily installed, removed and replaced. The minimum diameter of the piping shall be ¾ inch nominal and the tubing shall be certified to handle sustained temperatures above 180F. Insulation shall be sized in accordance with Section 607.5.

**608.5.2 Solar electric hot water system electrical rough-in.** Conduit not less than ¾ inch in size shall be installed from the future site for solar electric to the electric service panel or room that provides the electric service to the water heating equipment that will be served by the solar electric hot water system. Conduit not less than ¾ inches in size shall be installed to provide for control wiring.

**608.5.2.1 Conduit size.** Conduit not less than ¾ inch in size shall be installed from the future *solar thermal* or solar electric site to the location of the service water heating equipment and the *storage tank* to provide for control wiring.

**608.5.2.2 Terminations.** Conduits, sleeves and pathways installed in accordance with this section shall terminate near the *solar thermal* or solar electric sites and shall be readily accessible.

**608.5.2.3 Space for future storage tank.** Space for a future storage tank shall be identified and reserved. This space shall be large enough to accommodate storage for a *solar thermal* system sized to provide 50 percent solar fraction, with an area of not less than ten square feet.

**608.6 Waste water energy recovery system.** The following *building* types shall be provided with a waste water heat recovery system that will preheat all of the incoming water used for all hot water functions by not less than 10 °F (5.6 C):

1. Group A-2, Restaurants and Banquet halls;
2. Group F, Laundries;
3. Group R-1, Boarding houses (transient), Hotels (transient), Motels (transient);
4. Group R-2 *buildings*; and
5. Group A-3, Health Clubs and Spas
6. Group I-2, Hospitals, Mental hospitals and Nursing homes.

**Exception:** Single-story, slab-on grade and single-story, on crawl-space *buildings*.

**608.7 Service water heating piping insulation.** Service water heating piping shall be thermally insulated in accordance with Table 607.5. Where hot water *distribution piping* is installed within attics and crawlspaces, the insulation shall continue to cover the pipe for a distance of at least 6 inches (152 mm) beyond the *building thermal envelope*. Where hot water *distribution piping* is installed within walls, the insulation must completely surround the pipe with not less than 1 inch of insulation. Where hot water piping is installed in a wall of insufficient width to accommodate the pipe and insulation levels of Table 607.5, the insulation thickness shall be permitted to have the maximum thickness that the wall can accommodate, but not less than ½-inch thick.

**Exceptions:**

1. Factory-installed piping within service water heating equipment tested and rated in accordance with Section 607.5.
2. Piping conveying fluids not heated or cooled such as cold water supply, and natural gas piping.
3. Hot water supply piping exposed under sinks, lavatories and similar fixtures.
4. Hot water *distribution piping* buried within blown-in or sprayed roof/ceiling insulation, such as fiberglass or cellulose, where the insulation completely and continuously surrounds the pipe.

**608.7.1 Buried piping.** Service hot water piping installed within a slab or below grade shall be insulated in accordance with Section 608.7 and shall be placed within a physically protective, waterproof channel or sleeve having internal dimensions large enough such that the piping and insulation can be removed and replaced, and maintain its dimensional integrity during and after construction.

**Exception:** Where the insulation manufacturer stipulates that the pipe insulation will maintain its insulating value in underground applications in damp soil where installed according to the manufacturer's instructions. This exception does not apply to piping that runs under *building* slabs.

**608.8 Circulating hot water systems.** Circulating hot water systems shall be provided with an *automatic* or readily accessible *manual* switch to turn off the hot water circulating pump when not in use. Controls that allow continuous, timer, or water temperature-initiated operation of a circulating pump are prohibited. Gravity or thermosyphon circulation loops are prohibited. Pumps on circulating hot water systems shall be activated on demand by either a hard-wired or wireless activation control of one of the following types:

1. A normally-open, momentary contact switch.
2. Motion sensors that make momentary contact when motion is sensed. After the signal is sent, the sensor shall go into a lock out mode for not less than 5 minutes to prevent sending a signal to the electronic controls while the circulation loop is still hot.
3. A flow switch.
4. A door switch.

The controls for the pump shall be electronic and operate on the principal of shutting off the pump with a rise in temperature. Electronic controls shall have a lock-out to prevent operation exceeding 105°F degrees in the event of failure of the device that senses temperature rise. The electronic controls shall have a lock out mode for not more than 5 minutes that prevents extended operation of the pump if the sensor fails or is damaged.

## CHAPTER 7

# WATER RESOURCE CONSERVATION AND EFFICIENCY

### SECTION 701 GENERAL

**701.1 Scope.** The provisions of this chapter shall establish the means of conserving water used indoors, outdoors and in wastewater conveyance.

### SECTION 702 FIXTURES, FITTINGS, EQUIPMENT AND APPLIANCES

**702.1 Fitting and fixture consumption.** A schedule of plumbing fixtures and fixture fittings shall be provided that demonstrates compliance with all of the following:

1. The maximum water consumption of fixtures and fittings shall comply with the flow rates specified in Table 702.1 for the fixtures and fittings listed therein.
2. The aggregate *potable* water consumption of fixtures and fittings shall be at least 20 percent less than the reference value calculated in accordance with Section 702.1.1.

**Exceptions:** The following fixtures and devices shall not be required to comply with the reduced flow rates of this section.

1. Blowout design water closets having a maximum water consumption of 2.8 gallons (10.4 L) per flush.
2. Clinical sinks having a maximum water consumption of 4.5 gallons (17 L) per flush.
3. Service sinks, bath valves, pot fillers, laboratory faucets, utility faucets, and other fittings designed primarily for filling operations.

**702.1.1 Aggregate fixture and fitting water consumption calculation.** The aggregate consumption of all fixtures and fittings shall be calculated in accordance with Tables 702.1.1(1) and 702.1.1(2) for the purpose of demonstrating compliance with the aggregate consumption requirement in Sections 702.1 and 702.1.2. Table 702.1.1(1) is to be used first to calculate the reference water use and Table 702.1.1(2) is then to be used to calculate the required reduction in that reference water use. The percentage of reduction of the total water use shall be calculated in accordance with equation 7-1.

Consumption for each fixture or fitting type = (flow rate) x (duration) x (daily uses per occupant) x (number of occupants). The aggregate fixture and fitting consumption is equal to the sum of the consumption values for each fixture and fitting located in the occupancy.

$$\text{Percent reduction} = [(R-D)/R] \times 100 \quad \text{(Equation 7-1)}$$

Where:

R= Total reference water use determined from Table 702.1.1(1)

D= Total design water use determined from Table 702.1.1(2)

**TABLE 702.1  
MAXIMUM FIXTURE AND FITTING FLOW RATES  
FOR REDUCED WATER CONSUMPTION**

<b>FIXTURE OR FIXTURE FITTING TYPE</b>	<b>MAXIMUM FLOW RATE</b>
Showerhead <sup>e</sup>	2.0 gpm <sup>b</sup> and WaterSense labeled
Lavatory faucet and bar sink -private	1.5 gpm <sup>c</sup> and WaterSense labeled
Lavatory faucet-public (metered)	0.25 gpc <sup>d</sup>
Lavatory faucet-public (nonmetered)	0.5 gpm <sup>c</sup>
Kitchen faucet-private	2.2 gpm <sup>c</sup>
Kitchen and bar sink faucets in other than dwelling units and guest rooms	2.2 gpm <sup>c</sup>
Urinal	0.5 gpf and WaterSense labeled or nonwater urinal
Water closet	1.6 gallons per flush <sup>a</sup>
Water closet-private	1.28 gpf and WaterSense labeled
Prerinse Spray Valves	1.3 gpm <sup>c</sup>
Drinking Fountains (manual)	0.7 gpm <sup>c</sup>
Drinking Fountains (metered)	0.25 gpc <sup>d</sup>

- a. The effective flush volume of a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.
- b. Flow rate at a pressure of 45 and 80 psi.
- c. Flow rate at a pressure of 60 psi.
- d. Gallons per cycle
- e. Includes hand showers, body sprays, rainfall panels and jets. Showerhead(s) shall be supplied by *automatic* compensating valves that comply with ASSE 1016 or ASME A112.18.1/CSA B125.1 and that are specifically designed to function at the flow rate of the showerheads being used.

**TABLE 702.1.1(1)  
REFERENCE FIXTURE AND SUPPLY FITTING WATER CONSUMPTION  
To Calculate Baseline Water Use Projections**

<b>Plumbing Fixture or Supply Fitting</b>	<b>Flow Rate or Volume<sup>b</sup></b>	<b>Duration</b>	<b>Daily Uses Per Occupant</b>	<b>Occupants<sup>n</sup></b>	<b>Daily Volume Gallon per day</b>
Shower head <sup>a</sup> in dwelling units and guest rooms	2.5 gpm <sup>e</sup>	8.5 min.	1	Note c	
Lavatory faucet, private and in dwelling units and guest rooms	2.2 gpm <sup>d</sup>	0.25 min.	3		
Lavatory, public (metered)	0.25 gpc <sup>f</sup>	1 cycle	3		
Lavatory, public (nonmetered)	0.5 gpm <sup>d</sup>	0.25 min.	3		
Kitchen and bar sink faucets	2.2 gpm <sup>d</sup>	4 min.	1		
Urinal	1.0 gpc <sup>f</sup>	1 cycle	2/male		
Water closet in other than dwelling units and guest rooms	1.6 gpc <sup>f</sup>	1 cycle	1/male <sup>g</sup>	males	
			3/female	females	
Water closet in dwelling units and guest rooms <sup>i</sup>	1.6 gpc <sup>f</sup>	1 cycle	6/male	males	
			6/female	females	
				Total Reference Water Use (R) (gal/day)	
For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.					

- a. A hand-held shower spray is considered to be a showerhead.
- b. Consumption tolerances shall be determined from referenced standards.
- c. For shower heads, the number of occupants shall be based upon the anticipated number of shower users. Residential and hotels shall presume 1 shower per occupant per day. Residential occupancy as regulated by the code in accordance with Section 101.2.
- d. Flow at 60 psi
- e. Flow at 80 psi
- f. Gallons per cycle (gpc)
- g. The daily use per male occupant shall be 3 where urinals are not installed
- h. The number of occupants shall be that number used to determine the required number of plumbing fixtures in accordance with the International Plumbing Code.
- i. Residential occupancies as regulated by this code in accordance with Section 101.2

**TABLE 702.1.1(2)**  
**DESIGN FIXTURE AND SUPPLY FITTING WATER CONSUMPTION**  
**To Calculate Water Use Reduction Compared to Baseline Projections**

Plumbing Fixture or Supply Fitting	Flow Rate or Volume <sup>b</sup>	Duration	Daily Uses Per Occupant	Occupants	Daily Volume Gallon per day
Shower head or shower spa <sup>a</sup>		8.5 min.	1	Note c	
Lavatory faucet, private in dwelling units and guest rooms <sup>g</sup>		0.25 min.	3		
Lavatory, public (metered)		1 cycle	3		
Lavatory, public (nonmetered)		0.25 min.	3		
Kitchen and bar sink faucets		4 min.	1		
Urinal		1 cycle	2/male		
Water closet <sup>d</sup> In other than dwelling units and guest rooms <sup>g</sup>	1.6 gpc	1 cycle	1/male <sup>e</sup>	males	
			3/female	females	
Water closet <sup>d</sup> In dwelling units and guest rooms <sup>g</sup>	1.28 gpc	1 cycle	6/male	males	
			6/female	females	
				Total Design Water Use (D)(gal/day)	

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

- a. Includes hand showers, body sprays, rainfall panels and jets. Showerhead(s) shall be supplied by automatic compensating valves that comply with ASSE 1016 or ASME A112.18.1/CSA B125.1 and that are specifically designed to function at the flow rate of the showerheads being used.
- b. Consumption tolerances shall be determined from referenced standards.
- c. For shower heads, the number of occupants shall be based upon the anticipated number of shower users.
- d. Tank type and pressure assist High-Efficiency Water Closets (HETs) shall be certified to the current WaterSense High-Efficiency Toilet Specification.
- e. The daily use per male occupant shall be 3 where urinals are not installed.
- f. The number of occupants shall be that number used to determine the required number of plumbing fixtures in accordance with the *International Plumbing Code*.
- g. Residential occupancies as regulated by this code in accordance with Section 101.2.

**702.1.2 Additional reductions.** The provisions for Tier 1 and Tier 2 maximum fixture flow rates shall be applicable where indicated in Table 302.1. The specific requirements for Tier 1 and Tier 2 fixture and fitting consumption shall be as follows:

**Tier 1.** A schedule of plumbing fixtures and fixture fittings shall be provided that demonstrates that fixture and fitting consumption meets the applicable reduced flow rates specified in Table 702.1 and that demonstrates a 30 percent reduction in the reference aggregate fixture and fitting *potable* water consumption calculated in accordance with Section 702.1.1.

**Tier 2.** A schedule of plumbing fixtures and fixture fittings shall be provided that demonstrates that fixture and fitting consumption meets the applicable reduced flow rates specified in Table 702.1 and that demonstrates a 40 percent reduction in the reference aggregate fixture and fitting *potable* water consumption calculated in accordance with Section 702.1.1.

**702.1.3 Reduction prohibited.** The flow rates for emergency and decontamination fixtures and fittings shall not be reduced below the specifications of ANSI/ISEA Z358.1.

**702.2 Combination tub and shower valves.** Tub spout leakage from combination tub and shower valves that occurs when the outlet flow is diverted to the shower shall be not more than 0.1 gpm, measured in accordance with the requirements of ASME A112.18.1/CSA B125.1.

**702.3 Food establishment pre-rinse spray heads.** Food establishment pre-rinse spray heads shall have a maximum flow rate in accordance with Table 702.1 and shall shut off *automatically* when released.

**702.4 Drinking fountain controls.** Drinking fountains equipped with *manually* controlled valves shall shutoff *automatically* upon the release of the valve. *Metered* drinking fountains shall comply with the flow volume specified in Table 702.1.

**702.5 Nonwater urinal connection.** The fixture drain for nonwater urinals shall connect to a branch drain that serves one or more lavatories, water closets or water-using urinals that discharge upstream of such urinals.

**702.6 Appliances.** Sections 702.6.1 through 702.6.4 shall regulate appliances that are not related to space conditioning.

**702.6.1 Clothes washers.** Clothes washers shall be Energy Star *labeled*.

**702.6.2 Ice makers.** Ice makers shall not be water cooled. Ice makers shall comply with the requirements of the Energy Star Program for commercial ice machines.

**702.6.3 Food steamers.** Food steamers shall consume not more than 2.0 gal (7.5 L) per hour in the full operational mode.

**702.6.4 Dishwashers.** Dishwashers shall be Energy Star *labeled* or shall be in accordance with Table 702.6.4.

**TABLE 702.6.4  
MAXIMUM WATER CONSUMPTION FOR  
COMMERCIAL DISHWASHERS**

DISHWASHER TYPE	SANITATION METHOD	
	HIGH TEMPERATURE (gallons per rack)	CHEMICAL (gallons per rack)
Conveyor	0.7	0.62
Door	0.95	1.16
Under Counter	0.9	0.98

**702.7 Municipal reclaimed water.** Where required by Table 302.1 and where *municipal reclaimed water* is accessible and allowed for such use by the laws, rules and ordinances applicable in the *jurisdiction*, it shall be supplied to water closets, water-supplied urinals, water-supplied trap primers and applicable industrial uses.

**702.8 Efficient hot water distribution systems.** The volume of water in the piping between the source of hot water and the hot water outlets of individual showers, combination tub-showers, sink, lavatory fixture fittings and hose bibbs delivering hot water shall not exceed 80 ounces (2.35 L). The volume of water contained in fixture branch piping that connects to a hot water circulation loop or electrically heat-traced pipe shall not exceed 24 ounces (0.7 L). The volume shall be calculated in accordance with Section 702.8.2.

**702.8.1 Circulating hot water systems.** Circulating hot water systems shall be provided with an *automatic* or readily accessible *manual* switch to turn off the hot water circulating pump when hot water is not required by users.

**702.8.2 Volume calculation.** The volume of water between the source of hot water and a given outlet shall be calculated by adding the internal volume of all piping, fittings, valves, *meters*, and manifolds between the source and the connection to unit shutoff valves, shower valves, or combination tub-shower valves, as applicable. The volume contained within flexible water supply connectors installed between the supply pipe

and the fixture fitting and the volume within the fixture fitting shall not be included in the volume calculation. Piping volumes shall be calculated using Table 702.8.2. Where water is supplied by a circulating hot water system or an electrically heat-traced pipe, the hot water source shall be considered to be the loop or the heat -traced pipe, and the volume shall include the fitting on the loop that supplies the fixture branch.

**TABLE 702.8.2  
INTERNAL VOLUME OF  
VARIOUS TYPES OF WATER DISTRIBUTION PIPE AND TUBING**

Nominal Pipe or Tube Size (inch)	PIPE OR TUBING MATERIAL								
	COPPER (Type)			CPVC			PE	PEX	
	M	L	K	CTS SDR 11	SCH 40	SCH 80	AL-PE	CTS SDR 9	-AL-PEX
	LIQUID OUNCES PER FOOT OF LENGTH								
3/8	1.06	0.97	0.84	NA	1.17	0.86	0.63	0.64	0.63
1/2	1.69	1.55	1.45	1.25	1.89	1.46	1.31	1.18	1.31
3/4	3.43	3.22	2.90	2.67	3.38	2.74	3.39	2.35	3.39
1	5.81	5.49	5.17	4.43	5.53	4.56	5.56	3.91	5.56
1 1/4	8.70	8.36	8.09	6.61	9.66	8.24	8.49	5.81	8.49
1 1/2	12.18	11.83	11.45	9.22	13.20	11.38	13.88	8.09	13.88
2	21.08	20.58	20.04	15.79	21.88	19.11	21.48	13.86	21.48

**702.9 Trap priming water.** Potable water shall not be used for trap priming purposes where a *municipal reclaimed water* distribution system or a *graywater* distribution system is provided.

**702.9.1 Filtration required.** *Non-potable* water utilized by pressurized trap primer devices shall be filtered by a 100 micron or finer filter.

**702.9.2 Labeling and signage.** Each trap primer device utilizing *non-potable* water shall be provided with signage in accordance with Section 706.2.

**702.10 Makeup water supply.** Onsite *non-potable* water supply systems, such as on-site *reclaimed water*, *graywater* and rain water harvest systems, shall be supplied with municipal-reclaimed makeup water except that *potable* water shall be supplied where *municipal reclaimed water* is not accessible or is not allowed for such use by the laws, rules and ordinances applicable in the *jurisdiction*.

**702.11 Water powered pumps.** Water-powered pumps shall not be used as the primary means of removing ground water from sumps. Where used as an emergency backup pump for the primary pump, the primary pump shall be an electrically-powered pump and the water-powered pump shall be equipped with an auditory alarm that indicates when the water-powered pump is operating. The alarm shall have a minimum sound pressure level rating of 85 dB measured at a distance of ten feet.

**702.12 Food service handwashing faucets.** Faucets for handwashing sinks in food service preparation and serving areas shall be of the self-closing type.

**702.13 Dipper wells.** The water supply to a dipper well shall have a shutoff valve and flow control valve. Water flow into a dipper well shall not exceed 1 gpm (3.78 lpm) at a supply pressure of 60 psi (413.7 kPa).

**702.14 Automated vehicle wash facilities.** Not less than 50 percent of the water used for the rinsing phase of the wash cycle at automated vehicle wash facilities shall be collected to be reused for the washing phase. Towel and chamois washing machines shall have high-level water cut-offs.

**702.15 Self-service vehicle wash facilities.** Spray wand nozzles used at self-service vehicle wash facilities shall discharge not more than 3 gpm (11.4 lpm). Faucets for chamois wringer sinks shall be of the self closing type.

**702.16 Vehicle washing facilities.** Wastewater from reverse osmosis water treatment systems installed in vehicle washing facilities shall discharge to the washing phase water holding tank.

**702.17 Covers.** Spas shall be provided with vapor-retardant covers. Installed covers shall be in continuous contact with the rim surface of the spa.

**702.18 Splash troughs.** Swimming pool splash troughs shall discharge to the pool water system.

**702.19 Covers.** Swimming pools shall be provided with vapor-retardant covers.

**702.20 Food water disposers.** The water flow into a commercial food waste disposer in a food establishment shall be controlled by a load sensing device such that the water flow does not exceed 1 gpm under no-load operating conditions and 8 gpm under full-load operating conditions.

**702.21 Combination ovens.** Combination ovens shall consume not more than 10 gallons per hour (38 Lph) in any operational mode. Water consumption shall be tested in accordance with the requirements of ASTM F1639.

**702.22 Autoclaves and sterilizers.** Autoclaves and sterilizers requiring condensate tempering systems shall be of the type that does not require potable water to be blended with the discharge water to reduce the temperature of discharge.

**702.22.1 Vacuum autoclaves and sterilizers.** Vacuum sterilizers shall be prohibited from utilizing venturi-type vacuum mechanisms using water.

**702.23 Liquid ring vacuum pumps.** Except where the discharge is contaminated with hazardous materials or pathogens, the discharge water from liquid ring vacuum pumps shall be recovered for reuse within the pump or for other onsite applications.

**702.24 Film processors.** The cooling water discharge from water-cooled film processors shall be recovered and reused within the processor or for other onsite applications.

## **SECTION 703 HVAC SYSTEMS AND EQUIPMENT**

**703.1 Hydronic closed systems.** Closed loop hydronic heating and cooling systems, and ground-source heat pump systems shall not be connected to a *potable* makeup water supply.

**703.2 Humidification systems.** Except where greater humidity is required for medical, agricultural, archival or scientific research purposes, humidification systems shall be disabled and locked-out when the relative humidity in the space served is greater than 55 percent.  
space served is 55% and higher.

**703.3 Condensate coolers and tempering.** *Potable* water shall not be used to reduce the temperature of waste water such as steam condensate and boiler blow-down water.

**703.4 Condensate drainage recovery.** Where a *non-potable* water source, such as a *graywater* or rain water collection system, is installed on site, or water features or fountains are installed within the *building*, cooling system condensate shall be collected and discharged to such collection system, water feature or fountain.

**703.5 Heat exchangers.** *Potable* water shall not be used as a coolant in any heat exchanger except where the *potable* water is recirculated.

**703.6 Humidifier discharge.** Water discharge from flow-through type humidifiers and from the draining and flushing operations of other types of humidifiers shall be collected for reuse where a collection and reuse system exists.

**703.7 Cooling Towers, Evaporative Condensers and Fluid Coolers.** Cooling towers, evaporative condensers, and fluid coolers shall be installed in accordance with the requirements of Section 908 of the *International Mechanical Code*.

**703.7.1 Location.** Cooling towers, evaporative condensers and fluid coolers shall be located on the property as required for buildings in accordance with the *International Building Code* and shall be located so as to prevent the discharge vapor plumes from entering occupied spaces. Plume discharges shall be not less than 5 feet (1524 mm) above and 20 feet (6096 mm) away from any ventilation inlet to a building.

**703.7.2 Once-Through Cooling.** The use of potable water for once-through or single-pass cooling operations is prohibited.

**703.7.3 Metering.** The metering of mechanical systems, system components, equipment and appliances shall be conducted in accordance with Section 705.2.

**703.7.4 Controllers and Alarms.** Cooling towers, evaporative condensers, and fluid coolers shall be equipped with conductivity controllers and overflow alarms.

**703.7.5 Drift.** Cooling towers, evaporative condensers and fluid coolers shall produce drift losses of not greater than 0.002 percent of the recirculated water volume for counter-flow systems, and not greater than 0.005 percent of the recirculated water for cross-flow systems.

**703.7.6 Water Quality.** Where non-potable water is used within cooling towers, evaporative condensers and fluid coolers, it shall conform to the water quality and treatment requirements of the jurisdiction having authority and the water chemistry guidelines recommended by the equipment manufacturers.

**703.7.7 Discharge.** The discharge water from cooling towers used for air conditioning systems shall meet the requirements for cycles of concentration in Table 703.7.7. Where the discharge water is not captured for reuse, it shall be discharged and treated in accordance with jurisdictional requirements, if applicable.

**Exception:** Discharge water with total dissolved solids in excess of 1,500 mg (1,500 ppm/L), or silica in excess of 120 ppm (120 mg/L) measured as silicon dioxide shall not be required to meet the minimum cycles of concentration specified in Table 703.7.7.

**TABLE 703.7.7  
MINIMUM CYCLES OF CONCENTRATION FOR DISCHARGE WATER**

MAKEUP WATER TOTAL HARDNESS (mg/L)*	MINIMUM CYCLES OF CONCENTRATION
< 200	5
>200	3.5

\*Total hardness concentration expressed as calcium carbonate.

**703.8 Wet-Hood Exhaust Scrubber Systems.** Where wet-hood exhaust scrubber systems are used, they shall incorporate a water recirculation system. The makeup water supplies for such systems shall be metered in accordance with Section 705.2.

**703.8.1 Washdown Systems.** Hoods incorporating washdown or rinsing systems for perchloric acid and similar chemicals shall utilize self-closing valves. Such systems shall be designed to drain automatically after each washdown process has been completed.

**703.8.2 Water Sources.** Where suitable non-potable water is available, makeup water supplies to the recirculation system of wet-hood exhaust scrubbers shall utilize non-potable water of a water quality appropriate for the application.

## **SECTION 704 WATER TREATMENT DEVICES AND EQUIPMENT**

**704.1 Water softeners.** Water softeners shall comply with Sections 704.1.1 through 704.1.4.

**704.1.1 Demand initiated regeneration.** Water softeners shall be equipped with demand- initiated regeneration control systems. Such control systems shall automatically initiate the regeneration cycle after determining the depletion, or impending depletion of softening capacity.

**704.1.2 Water consumption.** Water softeners shall have a maximum water consumption during regeneration of 5 gal (18.9 L) per 1000 grains of hardness removed as measured in accordance with NSF 44.

**704.1.3 Waste connections.** Waste water from water softener regeneration shall not discharge to *reclaimed water* collection systems and shall discharge in accordance with the *International Plumbing Code*.

**704.1.4 Efficiency and listing.** Water softeners that regenerate in place, that are connected to the water system they serve by piping not exceeding 1 ¼ inch in diameter, or that have a volume of 3 cubic feet (0.085 m<sup>3</sup>) or more of cation exchange media shall have a rated salt efficiency of not less than 4,000 grains of total hardness exchange per pound of salt (477 g of total hardness exchange per kg of salt), based on sodium chloride equivalency and shall be listed as compliant with NSF/ANSI 44. All other water softeners shall have a rated salt efficiency of not less than 3,500 grains of total hardness exchange per pound of salt (477 g of total hardness exchange per kg of salt), based on sodium chloride equivalency.

**704.2 Reverse osmosis water treatment systems.** Point-of-use reverse osmosis treatment systems shall comply with NSF 58. The discharge pipe from a reverse osmosis drinking water treatment unit shall connect to the *building* drainage system in accordance with Section 611.2 of the *International Plumbing Code*. Point-of-use reverse osmosis systems shall be equipped with an automatic shutoff valve that prevents the production of reject water when there is no demand for treated water.

## **SECTION 705 SPECIFIC WATER CONSERVATION MEASURES**

**705.1 Indoor ornamental fountains and water features.** Where indoor ornamental fountains, indoor water features or permanent indoor irrigation systems are supplied by *potable water*, the *building* that contains them shall comply with one additional *project elective* from Section 710. This shall be in addition to the requirements of Table 302.1.

**705.2 Metering.** Water *meters* shall be required for *building* water consumed from any source. Each *potable* and reclaimed source, and each onsite water system, shall be *metered* separately. *Meters* shall be installed in accordance with the requirements of the *International Plumbing Code*. Each *meter* shall be required to be capable of communicating water consumption data remotely.

**705.2.1 Metering.** All *potable* and *non-potable* water supplied to the applications listed in Table 705.2.1 shall be individually *metered* in accordance with the requirements indicated in Table 705.2.1. Similar appliances and equipment shall be permitted to be grouped and supplied from piping connected to a single *meter*.

## SECTION 706 NON-POTABLE WATER REQUIREMENTS

**706.1 Scope.** The provisions of this section shall govern the use of *non-potable* water and the construction, installation, and design of systems utilizing *non-potable* water. The use and application of *non-potable* water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.

**706.2 Signage required.** Where *non-potable* water is used for a water use application, signage shall be provided that reads as follows: “Non-potable water is utilized for [application name]. Caution: non-potable water. DO NOT DRINK.” The words shall be legibly and indelibly printed on a sign constructed of corrosion-resistant waterproof material. The letters of the words shall be not less than 0.5 inches in height and of a color in contrast to the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure 706.2 shall appear on the signage required by this section. The required location of the signage and pictograph shall be in accordance with the applicable section of this code that requires the use of *non-potable* water.

**706.3 Water quality.** *Non-potable* water for each end use application shall meet the minimum water quality requirements as established for the application by the laws, rules and ordinances applicable in the *jurisdiction*.

**TABLE 705.2.1  
METERING REQUIREMENTS**

APPLICATION	REQUIREMENTS
Irrigation	Irrigation systems that are automatically controlled shall be <i>metered</i> .
Tenant Spaces	Tenant spaces that consume water shall be <i>metered</i> individually.
Onsite Water Collection Systems	The makeup water lines supplying onsite water collection systems shall be <i>metered</i> .
Ornamental Water Features	Ornamental water features with a permanently installed water supply shall be required to utilize a <i>meter</i> on makeup water supply lines.
Pools and Spas	Indoor and outdoor pools and spas shall be required to utilize a <i>meter</i> on makeup water supply lines.
Cooling Towers	Cooling towers or groups of towers shall be required to utilize a <i>meter</i> on makeup water and blow-down water supply lines.
Steam Boilers	The makeup water supply line to steam boilers having a rating of 1,000,000 BTU/h or greater shall be <i>metered</i> .
Industrial Processes	Industrial processes consuming more than 1,000 gallons per day on average shall be <i>metered</i> individually.
Evaporative Coolers	Evaporative coolers supplying in excess of 0.6 gpm, on average, makeup water shall be.
Fluid Coolers and Chillers	Water-cooled fluid coolers and chillers that do not utilize closed-loop recirculation shall be <i>metered</i> .
Roof Spray Systems	Roof spray systems for irrigating vegetated roofs or thermal conditioning shall be <i>metered</i> .



**Figure 706.2 Pictograph – DO NOT DRINK**

**SECTION 707  
RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS.**

**707.1 Scope.** The provisions of this section shall govern the construction, installation, *alteration*, and *repair* of *rainwater collection and conveyance systems*.

**707.2 Permits.** *Permits* shall be required for the construction, installation, *alteration*, and *repair* of *rainwater collection and conveyance systems*. *Construction documents*, engineering calculations, diagrams, and other such data pertaining to the *rainwater collection and conveyance system* shall be submitted with each application for *permit*.

**707.3 Potable water connections.** Where a *potable* system is connected to a *rainwater collection and conveyance system*, the *potable* water supply shall be protected against backflow in accordance with Section 608 of the *International Plumbing Code*.

**707.4 Non-Potable water connections.** Where *non-potable* water from different sources is combined in a system, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

**707.5 Installation.** Except as provided for in this section, all systems shall be installed in compliance with the provisions of the *International Plumbing Code* and manufacturer's instructions.

**707.6 Applications.** Untreated *rainwater* shall be utilized in accordance with Section 702 and local codes. Treated *rainwater* shall be utilized in accordance with Section 706 or *potable* water provisions of the *International Plumbing Code*, as applicable, and as permitted by local codes.

**707.7 Approved components and materials.** Piping, plumbing components, and materials used in the collection and conveyance systems shall be manufactured of material *approved* for the intended application and compatible with any disinfection and treatment systems used.

**707.8 Insect and vermin control.** Inlets and vents to the system shall be protected to prevent the entrance of insects and vermin into *storage tanks* and piping systems. Screens installed on vent pipes, inlets, and overflow pipes shall have an aperture of not greater than 1/16 inch and shall be close-fitting. Screen materials shall be compatible with contacting system components and shall not accelerate corrosion of system components.

**707.9 Drainage.** Water drained from the *roof washer* or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the *storage tank* and discharge in a location that will not cause erosion or damage to property. *Roof washers* and debris excluders shall be provided with an automatic means of self draining between rain events, and shall not drain onto roof surfaces.

**707.10 Freeze protection.** Where sustained freezing temperatures occur, provisions shall be made to keep *storage tanks* and the related piping from freezing.

**707.11 Trenching requirements.** All water service piping, including piping containing *rainwater*, shall be separated from the *building sewer* by 5 feet (1524 mm) of undisturbed or compacted earth. Water service pipes, *potable* and *non-potable*, shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried *rainwater* collection and *distribution piping* shall comply with the requirements of Section 306 of the *International Plumbing Code* for support, trenching, bedding, backfilling, and tunneling.

**Exceptions:**

1. The required separation distance shall not apply where the bottom of the water service pipe within 5 feet (1524 mm) of the sewer is a minimum of 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials shall comply with the *International Plumbing Code* for such applications.
2. Water service pipe is permitted to be located in the same trench with a *building sewer*, provided such sewer is constructed of materials that comply with the *International Plumbing Code* for such installations.
3. The required separation distance shall not apply where a *potable* or *non-potable* water service pipe crosses a sewer pipe provided the water service pipe is sleeved to at least 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing with pipe materials that comply with the *International Plumbing Code* for such applications.
4. Irrigation piping located outside of a *building* and downstream of the backflow preventer is not required to meet the trenching requirements where *rainwater* is used for outdoor applications.

**707.12 Rainwater catchment and collection systems.** The design of *rainwater collection and conveyance systems* shall conform to accepted engineering practice.

**707.12.1 Collection surface.** *Rainwater* shall be collected only from above-ground impervious roofing surfaces constructed from *approved* materials. Collection of water from vehicular parking or pedestrian surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including but not limited to evaporative coolers, water heaters, and solar water heaters shall not discharge onto *rainwater* collection surfaces.

**707.12.1.1 Potable water applications.** Where collected water is to be treated to *potable* water standards, wood or cedar shake roofing materials, roofing materials treated with biocides, and lead flashing is prohibited on collection surfaces. Painted surfaces are acceptable only where paint has been certified to ensure that the toxicity level of the paint is acceptable for drinking water contact. Lead, chromium or zinc based paints are not permitted on *rainwater* collection surfaces. Flat roofing products shall be certified to NSF P151. *Rainwater* shall not be collected from vegetated roof systems.

**707.12.2 Debris excluders.** Downspouts and leaders shall be connected to a *roof washer* and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected *rainwater* with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.

**707.12.3 Roof gutters and downspouts.** Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the *rainwater* quality for the desired end use. Joints shall be made water-tight. Where the collected *rainwater* is to be used for *potable* applications, gutters and downspouts shall be constructed of materials *approved* for drinking water applications and flashing and joints shall not be made of lead.

**707.12.3.1 Slope.** Roof gutters, leaders, and *rainwater* collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than 1/8 inch per foot along their entire length, and shall not permit the collection or pooling of water at any point.

**Exception:** Siphonic drainage systems installed in accordance with the manufacturer's installation instructions shall not be required to have slope.

**707.12.3.2 Size.** Gutters and downspouts shall be installed and sized in accordance with Section 1106.6 of the *International Plumbing Code* and local rainfall rates.

**707.12.3.3 Cleanouts.** Cleanouts shall be provided in the water conveyance system so as to allow access to all filters, flushes, pipes and downspouts.

**707.12.4 Collection pipe materials.** In *buildings* where *rainwater collection and conveyance systems* are installed, drainage piping *approved* for use within plumbing drainage systems shall be utilized to collect *rainwater* and convey it to the *storage tank*. Vent piping *approved* for use within plumbing venting systems shall be utilized for all vents within the *rainwater* system. Drains to a storm water discharge shall use *approved* waste piping.

**707.12.4.1 Joints.** Collection piping conveying *rainwater* shall utilize joints *approved* for use with the *distribution piping* and appropriate for the intended applications as specified in the *International Plumbing Code*.

**707.12.4.2 Size.** Collection piping conveying *rainwater* from collection surfaces shall be sized in accordance with local Chapter 11 of the *International Plumbing Code* and local rainfall rates.

**707.12.4.3 Labeling and marking.** Additional marking of *rainwater* collection piping shall not be required beyond that required for sanitary drainage, waste, and vent piping by the *International Plumbing Code*.

**707.12.5 Filtration.** Collected *rainwater* shall be filtered to the level required for the intended end use. Filters shall be accessible for inspection and maintenance.

**707.12.6 Disinfection.** Where the intended application and initial quality of the collected *rainwater* requires disinfection or other treatment or both, the collected *rainwater* shall be treated as needed to ensure that the required water quality is delivered at the point of use.

**707.12.7 Storage tank.** The design of the *storage tank* shall be in accordance with Sections 707.12.7.1 through 707.12.7.11.

**707.12.7.1 Location.** *Storage tanks* shall be installed either above or below grade. Above grade *storage tanks* shall be protected from direct sunlight and shall be constructed using opaque, UV resistant materials including, but not limited to, heavily tinted plastic, lined metal, concrete, wood, or painted to prevent algae growth, or shall have specially constructed sun barriers including but not limited to installation in garages, crawlspaces, or sheds. *Storage tanks* and their manholes shall not be located directly under any soil or waste piping or any source of contamination. *Rainwater storage tanks* shall be located with a minimum horizontal distance between various elements as indicated in Table 707.12.7.1.

**TABLE 707.12.7.1  
LOCATION OF RAINWATER STORAGE TANKS**

Element	Minimum Horizontal Distance from Storage Tank (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

**707.12.7.2 Materials.** Where water is collected onsite, it shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. Where collected water is to be treated to *potable* water standards, tanks shall not be constructed of recycled materials and shall be constructed of materials in accordance with the *International Plumbing Code*. *Storage tanks* shall be constructed of materials compatible with the type of disinfection system used to treat water upstream of the tank and used to maintain water quality within the tank.

**707.12.7.2.1 Wooden tanks.** *Wooden storage tanks* shall not be required to have a liner. Where a tank is lined and used for potable water, the liner shall be NSF approved. Where unlined tanks are used, the species of wood shall be decay resistant and untreated.

**707.12.7.3 Foundation and supports.** *Storage tanks* shall be supported on a firm base capable of withstanding the storage tank's weight when filled to capacity. Where earthquake loads are applicable in accordance with the *International Building Code*, above-ground collection tank supports shall be designed and installed for the seismic forces in accordance with the *International Building Code*.

**707.12.7.3.1 Ballast.** Where the soil can become saturated, an underground *storage tank* shall be ballasted, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the *storage tank* weight when full, consistent with bearing capability of adjacent soil.

**707.12.7.3.2 Structural support.** When installed below grade, *storage tank* installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when filled with water or empty.

**707.12.7.4 Makeup water.** Where an uninterrupted supply is required for the intended application, *potable* or municipally supplied reclaimed or recycled water shall be provided as a source of makeup water for the *storage tank*. The *potable* or reclaimed or recycled water supply shall be protected against backflow by means of an air gap not less than 4 inches (102 mm) above the overflow or an *approved* backflow device in accordance with the *International Plumbing Code*. There shall be a full-open valve located on the makeup water supply line to the *storage tank*. Inlets to *storage tank* shall be controlled by fill valves or other automatic supply valves installed so as to prevent the tank from overflowing and to prevent the water from dropping below a predetermined level.

**707.12.7.5 Overflow.** The *storage tank* shall be equipped with an overflow pipe having the same or larger area as the sum of the areas of all tank inlet pipes. The overflow pipe shall be trapped and shall be discharged in a manner consistent with storm water runoff requirements of the *jurisdiction* and at a sufficient distance from the tank to avoid damaging the tank foundation. The overflow drain shall not be equipped with a shutoff valve. A minimum of one cleanout shall be provided on each overflow pipe in accordance with Section 708 of the *International Plumbing Code*.

**707.12.7.6 Access.** A minimum of one access opening shall be provided to allow inspection and cleaning of the tank interior. All access openings to *storage tanks* and other vessels shall have an *approved* locking device or shall otherwise be protected from unauthorized access. Below grade *storage tanks*, located outside of the *building*, shall be provided with either a manhole not less than 24 inches (610 mm) square or a manhole with an inside diameter of not less than 24 inches (610 mm). Manholes shall extend not less than 4 inches above ground or shall be gasketed and bolted to prevent water infiltration. Finish grade shall be sloped away from the manhole to divert surface water from the manhole. Each manhole cover shall have an effective locking device. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be a minimum of 4 inches (102 mm) above the finished grade level. The service port shall have an effective locking cover or a brass cleanout plug.

**Exception:** *Storage tanks* having a volume of less than 800 gallons and installed below grade shall not be required to be equipped with a manhole where provided with a service port that is not less than 8 inches (203 mm) in diameter.

**707.12.7.7 Venting.** Tanks shall be provided with a vent sized in accordance with the *International Plumbing Code* and based on the diameter of the tank influent pipe. Tank vents shall not be connected to sanitary drainage system vents.

**707.12.7.8 Inlets.** *Storage tank* inlets shall be designed to introduce water into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the *storage tank*.

**707.12.7.9 Outlets.** Outlets shall be located at least 4 inches (102 mm) above the bottom of the *storage tanks* and shall not skim water from the surface.

**707.12.7.10 Drain.** A drain shall be located at the lowest point of aboveground storage tanks and shall discharge in a manner consistent with the storm water runoff requirements of the *jurisdiction* and at a sufficient distance from the tank to avoid damaging the tank foundation. A minimum of one cleanout shall be provided on each drain pipe in accordance with Section 708 of the *International Plumbing Code*.

**707.12.7.11 Labeling and signage.** Each *storage tank* shall be *labeled* with its rated capacity and the location of the upstream bypass valve. *Storage tanks* shall bear signage that reads as follows: ~~CAUTION: NON-POTABLE WATER – DO NOT DRINK.~~ Where an opening is provided that could allow the entry of personnel, the opening shall bear signage that reads as follows: ~~DANGER – CONFINED SPACE.~~ Markings shall be indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material mounted on the tank or shall be indelibly printed on the tank. The letters of words shall be not less than 0.5 inches in height and shall be of a color that contrasts with the background on which they are applied.

**707.12.8 Valves.** Valves shall be supplied in accordance with Sections 707.12.8.1 and 707.12.8.2.

**707.12.8.1 Influent diversion.** A means shall be provided to divert *storage tank* influent to allow maintenance and *repair* of the *storage tank* system.

**707.12.8.2 Backwater valve.** *Backwater valves* shall be installed on each overflow and tank drain pipe. *Backwater valves* shall be installed so that access is provided to the working parts for service and *repair*.

**707.12.9 Roof washer.** A sufficient amount of *rainwater* shall be diverted at the beginning of each rain event, and not allowed to enter the *storage tank*, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize *storage tank* water contamination. The *roof washer* shall not rely on *manually* operated valves or devices, and shall operate

automatically. Diverted *rainwater* shall not be drained to the roof surface, and shall be discharged in a manner consistent with the storm water runoff requirements of the *jurisdiction*. *Roof washers* shall be accessible for maintenance and service.

**707.12.10 Vent piping.** *Storage tanks* shall be provided with a vent in accordance with the requirements of Section 707.12.7.7. Vents shall be sized in accordance with the *International Plumbing Code*, based on the aggregate diameter of *storage tank* influent pipe(s). Vents shall be protected from contamination by means of a U-bend installed with the opening directed downward or an *approved* cap. Vent outlets shall extend a minimum of 4" above grade, or as necessary to prevent surface water from entering the *storage tank*. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section 707.8.

**707.12.11 Pumping and control system.** Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform *repair*, maintenance and cleaning. Where collected *rainwater* is to be treated to *potable* water standards, the pump and all other pump components shall be *listed* and *approved* for use with *potable* water systems. Pressurized water shall be supplied at a pressure appropriate for the application and within the range specified by the *International Plumbing Code*. Where water could be supplied at an excessive pressure, a pressure-reducing valve shall be installed in accordance with the requirements of the *International Plumbing Code*.

**707.12.11.1 Standby power.** Where required for the intended application, automatically activated standby power, capable of powering all essential treatment and pumping systems under design conditions shall be provided.

**707.12.11.2 Inlet control valve alarm.** Make-up water systems shall be fitted with a warning mechanism that alerts the user to a failure of the inlet control valve to close correctly. The alarm shall activate before the water within the *storage tank* begins to discharge into the overflow system.

**707.12.11.3 Water-pressure reducing valve or regulator.** Where the *rainwater* pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the *rainwater* distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8 of the *International Plumbing Code*.

**707.12.12 Distribution pipe.** *Distribution piping* shall comply with Sections 707.12.12.1 through 707.12.12.4.

**707.12.12.1 Materials.** *Distribution piping* conveying *rainwater* shall conform to the standards and requirements specified by the *International Plumbing Code* for *non-potable* or *potable* water, as applicable.

**707.12.12.2 Joints.** *Distribution piping* conveying *rainwater* shall utilize joints *approved* for use with the *distribution piping* and appropriate for the intended applications as specified in the *International Plumbing Code*.

**707.12.12.3 Size.** *Distribution piping* conveying *rainwater* water shall be sized in accordance with the *International Plumbing Code* for the intended application or.

**707.12.12.4 Labeling and marking.** *Non-potable rainwater distribution piping* shall be of the color purple and shall be embossed or integrally stamped or marked with the words: "CAUTION: NONPOTABLE WATER – DO NOT DRINK" or shall be installed with a purple identification tape or wrap. Identification tape shall be at least 3 inches wide and have white or black lettering on purple field stating "CAUTION: NON-POTABLE WATER – DO NOT DRINK". Identification tape shall be installed on top of *non-potable rainwater distribution pipes*, fastened at least every 10

feet to each pipe length and run continuously the entire length of the pipe. Lettering shall be readily observable within the room or space where the piping is located.

**Exception:** Piping located outside of the *building* and downstream of the backflow preventer is not required to be purple where *rainwater* is used for outdoor applications.

**707.13 Tests and inspections.** Tests and inspection shall be performed in accordance with Sections 707.13.1 through 707.13.10.

**707.13.1 Drainage and vent tests.** The testing of *rainwater* collection piping, overflow piping, vent piping and *storage tank* drains shall be conducted in accordance with Section 312 of the *International Plumbing Code*.

**707.13.2 Drainage and vent final test.** A final test shall be applied to the *rainwater* collection piping, overflow piping, *storage tank*, and tank vent piping in accordance with Section 312.4 of the *International Plumbing Code*.

**707.13.3 Water supply system test.** The testing of makeup water supply piping and *rainwater distribution piping* shall be conducted in accordance with Section 312.5 of the *International Plumbing Code*.

**707.13.4 Inspection and testing of backflow prevention assemblies.** The testing of backflow preventers and *backwater valves* shall be conducted in accordance with Section 312.10 of the *International Plumbing Code*.

**707.13.5 Inspection vermin and insect protection.** All inlets and vents to the system shall be inspected to ensure that each is protected to prevent the entrance of insects or vermin into *storage tank* and piping systems in accordance with Section 707.8.

**707.13.6 Roof gutter inspection and test.** Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section 707.12.3. Gutters shall be tested by pouring a minimum of one gallon of water into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.

**707.13.7 Roofwasher test.** Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section 707.12.9 shall be verified.

**707.13.8 Storage tank tests.** *Storage tanks* shall be tested in accordance with the following:

1. *Storage tanks* shall be filled with water to the overflow line prior to and during inspection. All seams and joints shall be left exposed and the tank shall remain water tight without leakage for a period of 24 hours.
2. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and verify that there are no leaks.
3. Following a successful test of the overflow, the water level in the tank shall be reduced to a level that is at 2 inches below the makeup water trigger point by using the tank drain. The tank drain shall be observed for proper operation. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified. Water shall not be drained from the overflow at any time during the refill test.

**707.13.9 Supply pressure test.** The static water pressure at the point of use furthest from the supply shall be verified to be within the range required for the application, in accordance with Section 707.12.11.

**707.13.10 Water quality test.** The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.

**707.14 Operation and maintenance manuals.** Operations and maintenance materials shall be supplied in accordance with 707.14.1 through 707.14.4.

**707.14.1 Manual.** A detailed operations and maintenance manual shall be supplied in hardcopy form with all *rainwater* collection systems.

**707.14.2 Schematics.** The manual shall include a detailed system schematic, the locations of all system components, and a list of all system components including manufacturer and model number.

**707.14.3 Maintenance procedures.** The manual shall provide a maintenance schedule and procedures for all system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.

**707.14.4 Operations procedures.** The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

**707.15 System abandonment.** If the owner of a *rainwater collection and conveyance system* elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with the following:

1. All system piping connecting to a utility-provided water system shall be removed or disabled.
2. The *rainwater distribution piping* system shall be replaced with an *approved potable* water supply piping system. Where an existing *potable* pipe system is already in place, the fixtures shall be connected to the existing system.
3. The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

**707.16 Potable water applications.** Where collected *rainwater* is to be used for *potable* water applications, all materials contacting the water shall comply with NSF 61.

**707.16.1 Water quality testing.** Collected *rainwater* water shall be tested. Accumulated water to be tested shall be the result of not less than two rainfall events. Testing shall be in accordance with Sections 707.16.1.1 through 707.16.1.3.

**707.16.1.1 Test methods.** Water quality testing shall be performed in accordance with the latest edition of *Standard Methods for the Examination of Water and Wastewater* published by the American Public Health Association.

**707.16.1.1.1 Tests required.** Accumulated *rainwater* shall be tested for *Escherichia coli*, total coliform, heterotrophic bacteria and cryptosporidium.

**707.16.1.2 Test frequency.** The testing of accumulated *rainwater* shall be performed prior to the *rainwater* system being connected to *potable rainwater* distribution system and annually thereafter.

**707.16.1.3 Test records.** Test records shall be retained for not less than two years.

## SECTION 708 GRAYWATER SYSTEMS

**708.1 Scope.** The provisions of this section shall govern the construction, installation, *alteration*, and *repair* of *graywater* reuse systems.

**708.2 Permits.** *Permits* shall be required for the construction, installation, *alteration*, and *repair* of *graywater* systems. *Construction documents*, engineering calculations, diagrams, and other such data pertaining to the *graywater* system shall be submitted with each application for *permit* in accordance with the laws, rules and ordinances applicable in the *jurisdiction*.

**708.3 Potable water connections.** Where a *potable* water system is connected to a *graywater* system, the *potable* water supply shall be protected against backflow in accordance with Section 608 of the *International Plumbing Code*.

**708.4 Non-potable water connections.** Where *non-potable* water from different sources is combined in a system, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

**708.5 Installation.** Except as provided for in this section, all systems shall be installed in compliance with the provisions of the *International Plumbing Code* and manufacturer's instructions, as applicable.

**708.6 Applications.** Untreated *graywater* shall be utilized in accordance with Section 702 and local codes. Treated *graywater* shall be utilized in accordance with Section 706 and as permitted by local codes.

**708.7 Approved components and materials.** The piping, plumbing components, and materials used in *graywater* systems shall be manufactured of material *approved* for the intended application and compatible with any disinfection and treatment systems used.

**708.8 Insect and vermin control.** The inlets and vents to the system shall be protected to prevent insects and vermin from entering *storage tanks* and piping systems. Screens installed on vent pipes and overflow pipes shall have an aperture not greater than 1/16 inch and shall be close-fitting. Screen materials shall be compatible with contacting system components and shall not accelerate corrosion of system components

**708.9 Freeze protection.** Where sustained freezing temperatures occur, provisions shall be made to keep *storage tanks* and the related piping from freezing.

**708.10 Trenching requirements.** Water service piping, including piping containing *graywater*, shall be separated from the *building sewer* by 5 feet (1524 mm) of undisturbed or compacted earth. *Graywater* piping shall be separated from *potable* water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. *Non-potable* water service pipes shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried *graywater* piping shall comply with the requirements of Section 306 of the *International Plumbing Code* for support, trenching, bedding, backfilling, and tunneling.

### **Exceptions:**

1. The required separation distance shall not apply where the bottom of the *graywater* service pipe within 5 feet (1524 mm) of the sewer is a minimum of 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials comply with the requirements of the *International Plumbing Code* for such applications.
2. The required separation distance shall not apply where the bottom of the *potable* water service pipe within 5 feet (1524 mm) of the *graywater* pipe is a minimum of 12 inches (305 mm) above the top of the highest point of the *graywater* pipe and the pipe materials comply with the requirements of the *International Plumbing Code* for such applications.

3. Water service pipe is permitted to be located in the same trench with a *building* sewer, provided that such sewer is constructed of materials that comply with the requirements of the *International Plumbing Code* for such applications.
4. The required separation distance shall not apply where a *potable* or *non-potable* water service pipe crosses a sewer pipe provided that the water service pipe is sleeved to at least 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing with pipe materials that comply with the requirements of the *International Plumbing Code* for such applications.
5. The required separation distance shall not apply where a *potable* water service pipe crosses a *graywater* pipe provided that the *potable* water service pipe is sleeved for a distance of at least 5 feet (1524 mm) horizontally from the centerline of the *graywater* pipe on both sides of such crossing with pipe materials that comply with the requirements of the *International Plumbing Code* for such applications.
6. Irrigation piping located outside of a *building* and downstream of the backflow preventer is not required to meet the trenching requirements where *graywater* is used for outdoor applications.

**708.11 System abandonment.** If the owner of a *graywater* system elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with the following:

1. All system piping connecting to a utility-provided water system shall be removed or disabled.
2. *Storage tanks* shall be secured against accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

**708.12 Graywater systems.** The design of the *graywater* system shall conform to accepted engineering practice.

**708.12.1 Graywater sources.** *Graywater* reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers, and laundry trays. Water from other *approved non-potable* sources including swimming pool backwash operations, air conditioner condensate, *rainwater*, cooling tower blow-down water, foundation drain water, steam system condensate, fluid cooler discharge water, food steamer discharge water, combination oven discharge water, industrial process water, and fire pump test water shall also be permitted to be collected for reuse by *graywater* systems, as *approved* by the *code official* and as appropriate for the intended application.

**708.12.1.1 Prohibited graywater sources.** Wastewater containing urine or fecal matter shall not be diverted to *graywater* systems and shall discharge to the sanitary drainage system of the *building* or premises in accordance with the *International Plumbing Code*. Water from reverse osmosis system reject water, water softener discharge water, kitchen sink wastewater, dishwasher wastewater, and wastewater discharged from wet-hood scrubbers shall not be collected for reuse within a *graywater* system.

**708.12.2 Traps.** Traps serving fixtures and devices discharging wastewater to *graywater* reuse systems shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm). Where a trap seal is subject to loss by evaporation, a trap seal primer valve shall be installed in accordance with the *International Plumbing Code*.

**708.12.3 Collection pipe.** *Graywater* reuse systems shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey untreated *graywater*. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the *graywater* system. Drains to the sanitary sewer shall use *approved* waste piping.

**708.12.3.1 Joints.** Collection piping conveying untreated *graywater* shall utilize joints *approved* for use with the *distribution piping* and appropriate for the intended applications as specified in the *International Plumbing Code*.

**708.12.3.2 Size.** Collection piping conveying *rainwater* from collection surfaces shall be sized in accordance with storm drainage sizing requirements specified in the *International Plumbing Code*.

**708.12.3.3 Labeling and marking.** Additional marking of untreated *graywater* collection piping shall not be required beyond that required for sanitary drainage, waste, and vent piping by the *International Plumbing Code*.

**708.12.4 Filtration.** Collected *graywater* shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gage or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

**708.12.5 Disinfection.** Where the intended application for collected *graywater* requires disinfection or other treatment or both, collected *graywater* shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Untreated *graywater* shall be retained in collection reservoirs for a maximum of 24 hours in accordance with Section 708.12.6.1.

**708.12.6 Storage tank.** The design of the *storage tank* shall be in accordance with Sections 708.12.6.1 through 708.12.6.12.

**708.12.6.1 Sizing.** The holding capacity of the *storage tank* shall be sized in accordance with the anticipated demand. Where *graywater* is to be used in untreated form for groundwater recharge or subsurface irrigation, the *storage tank* shall be sized to limit the retention time of *graywater* to a maximum of 24 hours.

**708.12.6.2 Location.** *Storage tanks* shall be installed above or below grade. Above grade *storage tanks* shall be protected from direct sunlight and shall be constructed using opaque, UV resistant, materials such as, but not limited to, heavily tinted plastic, lined metal, concrete, wood, or painted to prevent algae growth, or shall have specially constructed sun barriers including but not limited to installation in garages, crawlspaces, or sheds. *Storage tanks* and their manholes shall not be located directly under any soil or waste piping or any source of contamination. *Graywater storage tanks* shall be located with a minimum horizontal distance between various elements as indicated in Table 708.12.6.2. *Storage tanks* containing untreated *graywater* shall be located a minimum horizontal distance of 5 feet from *buildings*, in addition to the requirements in Table 708.12.6.2.

**TABLE 708.12.6.2  
LOCATION OF GRAYWATER STORAGE TANKS**

Element	Minimum Horizontal Distance from Storage Tank (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5
Water wells	50
Streams and lakes	50
Water service	5
Public water main	10

**708.12.6.3 Materials.** Where collected onsite, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The *storage tank* shall be constructed of materials compatible with any disinfection systems used to treat water upstream of the tank and with any systems used to maintain water quality within the tank.

**708.12.6.3.1 Wood tanks.** Wooden *storage tanks* that are not equipped with a makeup water source shall be provided with a flexible liner.

**708.12.6.4 Foundation and supports.** *Storage tanks* shall be supported on a firm base capable of withstanding the *storage tank's* weight when filled to capacity. Where earthquake loads are applicable in accordance with the *International Building Code*, above-ground collection reservoir supports shall be designed and installed for the seismic forces in accordance with the *International Building Code*.

**708.12.6.4.1 Ballast.** Where the soil can become saturated, an underground *storage tank* shall be ballasted, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the *storage tank* weight when full, consistent with the bearing capability of adjacent soil.

**708.12.6.4.2 Structural support.** Where installed below grade, *storage tank* installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when filled with water or empty.

**708.12.6.5 Makeup water.** Where an uninterrupted supply is required for the intended application, *potable* or municipally supplied reclaimed/recycled water shall be provided as a source of makeup water for the *storage tank*. The *potable* or reclaimed/recycled water supply shall be protected against backflow by means of an air gap not less than 4 inches (102 mm) above the overflow or an *approved* backflow device in accordance with the *International Plumbing Code*. There shall be a full-open valve located on the makeup water supply line to the *storage tank*. Inlets to *storage tank* shall be controlled by fill valves or other automatic supply valves installed so as to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. Where makeup water is provided, the water level shall not be permitted to drop below the *graywater* inlet or the intake of any attached pump.

**708.12.6.6 Overflow.** The *storage tank* shall be equipped with an overflow pipe having the same or larger area as the sum of the areas of all reservoir inlet pipes. The overflow pipe shall be trapped and shall be indirectly connected to the sanitary drainage system. The overflow drain shall not be equipped with a shutoff valve. A minimum of one cleanout shall be provided on each overflow pipe in accordance with Section 708 of the *International Plumbing Code*.

**708.12.6.7 Access.** A minimum of one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below grade *storage tanks*, located outside of the *building*, shall be provided with either a manhole not less than 24 inches (610 mm) square or a manhole with an inside diameter not less than 24 inches (610 mm) and extending not less than 4 inches above ground. Finished grade shall be sloped away from the manhole to divert surface water from the manhole. Each manhole cover shall have an effective locking device. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be a minimum of 4 inches (102 mm) above the finished grade level. The service port shall have an effective locking cover or a brass cleanout plug.

**Exception:** *Storage tanks* under 800 gallons in volume installed below grade shall not be required to be equipped with a manhole, but shall have a service port not less than 8 inches (203 mm) in diameter.

**708.12.6.8 Venting.** The tank shall be provided with a vent sized in accordance with the *International Plumbing Code* and based on the diameter of the tank influent pipe. The reservoir vent shall not be connected to sanitary drainage system vents.

**708.12.6.9 Inlets.** *Storage tank* inlets shall be designed to introduce water into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the *storage tank*.

**708.12.6.10 Outlets.** Outlets shall be located at least 4 inches (102 mm) above the bottom of the *storage tank*, and shall not skim water from the surface.

**708.12.6.11 Drain.** A drain shall be located at the lowest point of the *storage tank* and shall be indirectly connected to the sanitary drainage system. The total area of all drains shall not be smaller than the total area of all overflow pipes. A minimum of one cleanout shall be provided on each drain pipe in accordance with Section 708 of the *International Plumbing Code*.

**708.12.6.12 Labeling and signage.** Each *storage tank* shall be *labeled* with its rated capacity and the location of the upstream bypass valve. The contents of *storage tanks* shall be identified with the words “CAUTION: NON-POTABLE WATER – DO NOT DRINK” Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, “DANGER – CONFINED SPACE.” Markings shall be indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material mounted on the tank or shall be indelibly printed on the tank. The letters of the words shall be not less than 0.5 inches in height and shall be of a color in contrast with the background on which they are applied.

**708.12.7 Valves.** Valves shall be supplied in accordance with Sections 708.12.7.1 and 708.12.7.2.

**708.12.7.1 Bypass valve.** One three-way diverter valve certified to NSF 50 or other *approved* device shall be installed on *graywater* collection piping upstream of each *storage tank*, or drainfield, as applicable, to divert untreated *graywater* sources to the sanitary sewer to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections Bypass valves shall be *labeled* to indicate the direction of flow, connection and *storage tank* or drainfield connection. Bypass valves shall be installed in accessible locations. Two shutoff valves shall not be installed to serve as a bypass valve.

**708.12.7.2 Backwater valve.** *Backwater valves* shall be installed on each overflow and tank drain pipe. *Backwater valves* shall be installed so that access is provided to the working parts for service and *repair*.

**708.12.8 Vent piping.** *Storage tanks* shall be provided with a vent in accordance with the requirements of Section 708.12.6.8. Vents shall be sized in accordance with the *International Plumbing Code*, based on the aggregate diameter of *storage tank* influent pipes. Open vents shall be protected from contamination by means of a U-bend installed with the opening directed downward or an *approved* cap. Vent outlets shall extend a minimum of 4 inches above grade, or as necessary to prevent surface water from entering the *storage tank*. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section 708.8.

**708.12.9 Pumping and control system.** *Mechanical equipment* including pumps, valves and filters shall be accessible and removable in order to perform *repair*, maintenance and cleaning. Pressurized water shall be supplied at a pressure appropriate for the application and within the range specified by the *International Plumbing Code*. Where water could be supplied at an excessive pressure, a pressure-reducing valve shall be installed in accordance with the requirements of the *International Plumbing Code*.

**708.12.9.1 Standby power.** Where required for the intended application, automatically activated standby power, capable of powering all essential treatment and pumping systems under design conditions shall be provided.

**708.12.9.2 Inlet control valve alarm.** Make-up water systems shall be provided with a warning mechanism that alerts the user to a failure of the inlet control valve to close correctly. The alarm shall activate before the water within the collection reservoir *storage tank* begins to discharge into the overflow system.

**708.12.9.3 Water-pressure reducing valve or regulator.** Where the *graywater* pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the *graywater* distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8 of the *International Plumbing Code*.

**708.12.10 Distribution pipe.** *Distribution piping* shall comply with Sections 708.12.10.1 through 708.12.10.4.

**708.12.10.1 Materials.** *Distribution piping conveying graywater shall conform to standards and requirements specified by the International Plumbing Code for non-potable water.*

**708.12.10.2 Joints.** *Distribution piping conveying graywater shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in the International Plumbing Code.*

**708.12.10.3 Size.** *Distribution piping conveying graywater water shall be sized in accordance with the International Plumbing Code for the intended application or applications.*

**708.12.10.4 Labeling and marking.** *All graywater distribution piping shall be either the color purple and embossed or integrally stamped or marked –CAUTION: NONPOTABLE WATER – DO NOT DRINK” or shall be installed with a purple identification tape or wrap. Identification tape shall be at least 3 inches wide and have white or black lettering on purple field stating –CAUTION: NON-POTABLE WATER – DO NOT DRINK”. Identification tape shall be installed on top of graywater distribution pipes, fastened at least every 10 feet to each pipe length and run continuously the entire length of the pipe. Lettering shall be readily observable within the room or space where the piping is located.*

**Exception:** *Outside of the building, purple piping is not required downstream of the backflow preventer where graywater is used for outdoor applications.*

**708.13 Tests and inspections.** *Tests and inspections shall be performed in accordance with Sections 708.13.1 through 708.13.9.*

**708.13.1 Drainage and vent test.** *A pressure test shall be applied to the graywater collection piping, overflow piping, storage tank, storage tank drainage piping and tank vent piping in accordance with Section 312 of the International Plumbing Code.*

**708.13.2 Drainage and vent final test.** *A final test shall be applied to the graywater collection piping, overflow piping, storage tank, and tank vent piping in accordance with Section 312.4 of the International Plumbing Code.*

**708.13.3 Water supply system test.** *The testing of makeup water supply piping and rainwater distribution piping shall be conducted in accordance with Section 312.5 of the International Plumbing Code.*

**708.13.4 Inspection and testing of backflow prevention assemblies.** *The testing of backflow preventers and backwater valves shall be conducted in accordance with Section 312.10 of the International Plumbing Code.*

**708.13.5 Inspection vermin and insect protection.** *Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section 708.8.*

**708.13.6 Storage tank tests.** *Storage tanks shall be tested in accordance with all of the following:*

- 1. Storage tanks shall be filled with water to the overflow line prior to and during inspection. All seams and joints shall be left exposed and the tank shall remain water tight without leakage for a period of 24 hours.*
- 2. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and verify that there are no leaks.*
- 3. Following the successful test of the overflow, the water level in the tank shall be reduced to a point 2 inches below the makeup water trigger point using the tank drain. The tank drain shall be observed for proper operation. The makeup water system shall be observed to verify proper operation, and successful automatic shutoff of the system at the refill threshold. Water shall not be drained from the overflow at any time during the refill test.*

**708.13.7 Supply pressure test.** The static water pressure at the point of use furthest from the supply shall be verified to be within the range required for the application, in accordance with Section 707.12.11.

**708.13.8 Water quality test.** The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.

**708.14 Operation and maintenance manuals.** Operations and maintenance materials shall be supplied with *graywater* systems in accordance with Sections 708.14.1 through 708.14.4.

**708.14.1 Manual.** A detailed operations and maintenance manual shall be supplied in hardcopy form with all *graywater* systems.

**708.14.2 Schematics.** The manual shall include a detailed system schematic, locations of all system components, and a list of all system components including manufacturer and model number.

**708.14.3 Maintenance procedures.** The manual shall provide a maintenance schedule and procedures for all system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.

**708.14.4 Operations procedures.** The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

## **SECTION 709 RECLAIMED WATER SYSTEMS**

**709.1 Scope.** The provisions of this section shall govern the construction, installation, *alteration*, and *repair* of systems supplying *non-potable reclaimed water*.

**709.2 Permits.** *Permits* shall be required for the construction, installation, *alteration*, and *repair* of *reclaimed water* systems. *Construction documents*, engineering calculations, diagrams, and other such data pertaining to the reclaimed system shall be submitted with each application for *permit*.

**709.3 Potable water connections.** Connections between a *reclaimed water* system and a *potable* water system shall be protected against backflow in accordance with Section 608 of the *International Plumbing Code*.

**709.4 Installation.** Except as provided for in this section, systems shall be installed in compliance with the provisions of the *International Plumbing Code* and manufacturer's instructions, as applicable.

**709.5 Applications.** *Reclaimed water* shall be utilized in accordance with Section 706 and local codes.

**709.6 Approved components and materials.** Piping, plumbing components, and material used in the *reclaimed water* systems shall be manufactured of material *approved* for the intended application.

**709.7 Water-pressure reducing valve or regulator.** Where the *reclaimed water* pressure supplied to the *building* exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the *reclaimed water* distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8 of the *International Plumbing Code*.

**709.8 Trenching requirements.** Water service piping, including piping containing *reclaimed water*, shall be separated from the *building sewer* by 5 feet (1524 m) of undisturbed or compacted earth. *Reclaimed water* piping shall be separated from *potable* water piping underground by 5 feet (1524 m) of undisturbed or compacted earth. *Reclaimed water* service pipes shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried *reclaimed water* piping shall comply with the requirements of Section 306 of the *International Plumbing Code* for support, trenching, bedding, backfilling, and tunneling.

## Exceptions:

1. The required separation distance shall not apply where the bottom of the *reclaimed water* service pipe within 5 feet (1524 mm) of the sewer is a minimum of 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials comply with the requirements of the *International Plumbing Code* for the application.
2. The required separation distance shall not apply where the bottom of the *potable* water service pipe within 5 feet (1524 mm) of the *reclaimed water* pipe is a minimum of 12 inches (305 mm) above the top of the highest point of the *reclaimed water* pipe and the pipe materials comply with the requirements of the *International Plumbing Code* for the application.
3. Water service pipe is permitted to be located in the same trench with a *building* sewer, provided such sewer is constructed of materials that comply with the requirements of the *International Plumbing Code* for the application.
4. The required separation distance shall not apply where a *potable* or *non-potable* water service pipe crosses a sewer pipe provided the water service pipe is sleeved to at least 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing with pipe materials that comply with the requirements of the *International Plumbing Code* for the application.
5. The required separation distance shall not apply where a *potable* water service pipe crosses a *reclaimed water* pipe provided the *potable* water service pipe is sleeved to at least 5 feet (1524 mm) horizontally from the *reclaimed water* pipe centerline on both sides of such crossing with pipe materials that comply with the requirements of the *International Plumbing Code* for the application.

**709.9 Reclaimed water systems.** The design of the *reclaimed water* systems shall conform to *accepted engineering practice*.

**709.9.1 Distribution pipe.** *Distribution piping* shall comply with Sections 709.9.1.1 through 709.9.1.4.

**709.9.1.1 Materials.** *Distribution piping conveying reclaimed water* shall conform to standards and requirements specified by the *International Plumbing Code*.

**709.9.1.2 Joints.** *Distribution piping conveying reclaimed water* shall utilize joints *approved* for use with the *distribution piping* and appropriate for the intended applications as specified in the *International Plumbing Code*.

**709.9.1.3 Size.** *Distribution piping conveying reclaimed water* shall be sized in accordance with the *International Plumbing Code* for the intended application.

**709.9.1.4 Labeling and marking.** *Reclaimed water distribution piping* shall be either the color purple and embossed or integrally stamped or marked “CAUTION: NONPOTABLE WATER – DO NOT DRINK” or be installed with a purple identification tape or wrap. Identification tape shall be at least 3 inches wide and have white or black lettering on purple field stating “CAUTION: NONPOTABLE WATER – DO NOT DRINK”. Identification tape shall be installed on top of *reclaimed water distribution pipes*, fastened at least every 10 feet to each pipe length and run continuously the entire length of the pipe. Lettering shall be readily observable within the room or space where the piping is located.

**Exception:** Outside of the *building*, purple piping is not required downstream of the backflow preventer where *reclaimed water* is used for outdoor applications.

**709.10 Tests and inspections.** Tests and inspections shall be performed in accordance with Sections 709.10.1 and 709.10.2.

**709.10.1 Water supply system test.** The testing of makeup water supply piping and *reclaimed water distribution piping* shall be conducted in accordance with Section 312.5 of the *International Plumbing Code*.

**709.10.2 Inspection and testing of backflow prevention assemblies.** The testing of backflow preventers shall be conducted in accordance with Section 312.10 of the *International Plumbing Code*.

## **SECTION 710 PROJECT ELECTIVES**

**710.1 General.** Section 710 contains *project electives* related to water conservation and efficiency. *Project electives* shall not be mandatory unless selected by the owner or *registered design professional* and indicated in the Project Elective Checklist required by Section 303.1.

**710.2 Indoor water use.** This section contains *project electives* related to indoor water use.

**710.2.1 Water conservation tier project electives.** Each water conservation tier above that mandated in Table 302.1 shall be recognized as an individual *project elective*.

**710.3 On-site wastewater treatment project elective.** Where projects are intended to qualify for an on-site wastewater treatment *project elective* in accordance with Section 303.4, all wastewater from the *building* shall be treated on-site to *tertiary standards* and reused on site.

**710.4 Non-potable outdoor water supply project elective.** Where projects are intended to qualify for a *non-potable* outdoor water supply *project elective* in accordance with Section 303.4, sillcocks, hose bibs, wall hydrants, yard hydrants, and other outdoor outlets shall be supplied by *non-potable* water. Such outlets shall be located in a locked vault or shall be operable only by means of a removable key.

**710.4.1 Labeling and signage.** Each outlet shall be provided with signage in accordance with Section 706.2.

**710.5 Non-potable water for plumbing fixture flushing water project elective.** Where projects are intended to qualify for a *non-potable* water for plumbing fixture flushing *project elective* in accordance with Section 303.4, *non-potable* water shall be used for flushing water closets and urinals.

**710.5.1 Water quality.** *Non-potable* water for water closet and urinal flushing shall meet minimum water quality requirements as established for indoor flushing applications by local codes and regulations. Where chlorine is used for disinfection, the *non-potable* water shall contain not more than 4 mg/L of chloramines or free chlorine. Where ozone is used for disinfection, the *non-potable* water shall not contain gas bubbles having elevated levels of ozone at the point of use.

**710.5.2 Filtration required.** *Non-potable* water utilized for water closet and urinal flushing applications shall be filtered by a 100 micron or finer filter.

**710.5.3 Labeling and signage.** The entries to rooms having water closets or urinals that are supplied with *non-potable* water shall be provided with signage in accordance with Section 706.2.

**710.6 Automatic fire sprinkler system project elective.** Where projects are intended to qualify for an automatic fire sprinklers system *project elective* in accordance with Section 303.4, automatic fire sprinkler systems shall be supplied with *non-potable* water from an on-site *rainwater* collection system. Such *rainwater* collection system shall comply with Section 707. The requirements of Sections 710.6.1 and 710.6.2 shall apply to the fire sprinkler system and the on-site *rainwater* collection system.

**710.6.1 Emergency power.** An emergency power system complying with Chapter 27 of the *International Building Code* shall be provided for powering the pump and controls for the on-site *rainwater* collection system.

**710.6.2 Source volume indication.** The fire command center for the *building* shall be equipped with a device that indicates the volume of *non-potable* water contained in the collection reservoir. The indicator shall be *approved* and shall be in compliance with NFPA 72.

**710.7 Non-potable water supply to fire pumps project elective.** Where projects are intended to qualify for a *non-potable* water supply to fire pumps *project elective* in accordance with Section 303.4, one or more fire pumps shall be located within 200 feet of a source of reclaimed or recycled water of sufficient quality, pressure, and capacity for fire pump applications and the fire pumps shall be connected to such source of reclaimed or recycled water. The connections shall be in accordance with Section 403.3.2 of the *International Building Code*.

**710.7.1 Labeling and signage.** Fire pumps connected to a *non-potable* water supply shall have signage in accordance with Section 706.2 provided at the *building's* fire command center and at each fire pump.

**710.8 Non-potable water for industrial process makeup water project elective.** Where projects are intended to qualify for a *non-potable* water for industrial process makeup water *project elective* in accordance with Section 303.4, industrial processes requiring makeup water shall utilize *non-potable* water except where the process requires *potable* water for proper functioning.

**710.8.1 Labeling and signage.** All rooms containing process equipment supplied with *non-potable* water shall be provided with signage in accordance with Section 706.2.

**710.9 Efficient hot water distribution system project elective.** Where projects are intended to qualify for an efficient hot water distribution *project elective* in accordance with Section 303.4, the volume of water in the piping between the source of hot water and the hot water outlets of shower, sink and lavatory fixture fittings shall not exceed 64 ounces (1.89 L). The volume of water contained in fixture branch piping that connects to a hot water circulation loop or electrically heat-traced pipe shall not exceed 24 ounces (0.47 L). The volume shall be calculated in accordance with Section 710.9.1.

**710.9.1 Volume calculation.** The volume of water between the source of hot water and a given outlet shall be calculated by adding the internal volume of all piping, fittings, valves, *meters*, and manifolds between the source and the outlet. Piping volumes shall be calculated using Table 702.8.2. Where water is supplied by a circulating hot water system or an electrically heat-traced pipe, the hot water source shall be considered to be the loop or the heat -traced pipe, and the volume shall include the fitting on the loop that supplies the fixture branch.

**710.10 Non-potable water for cooling tower makeup water project elective.** Where projects are intended to qualify for a *non-potable* water for cooling tower makeup water *project elective* in accordance with Section 303.4, *non-potable* water shall be utilized for cooling tower makeup water in accordance with the requirements of Section 706.3.

**710.11 Graywater collection project elective.** Where projects are intended to qualify for a *graywater* collection *project elective* in accordance with Section 303.4, wastewater from lavatories, showers, bathtubs, clotheswashers, and laundry trays shall be collected for reuse onsite in accordance with Section 708.

## CHAPTER 9

# COMMISSIONING, OPERATION AND MAINTENANCE

### SECTION 901 GENERAL

**901.1 Scope.** The provisions of this chapter are intended to facilitate the pre- and post- occupancy *commissioning*, operation and maintenance of *buildings* constructed in accordance with this code in a manner that is consistent with the intent of other provisions of this code, and to further that goal through the education of *building* owners and maintenance personnel with regard to related best operating and management practices.

### SECTION 902 APPROVED AGENCY

**902.1 Approved agency.** An *approved agency* shall provide all of the information necessary for the *code official* to determine that the agency meets the applicable requirements. The *code official* shall be permitted to be the *approved agency*.

**902.1.1 Independence.** An *approved agency* shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.

**902.1.2 Equipment.** An *approved agency* shall have adequate equipment to perform the required *commissioning*. The equipment shall be periodically calibrated.

**902.1.3 Personnel.** An *approved agency* shall employ experienced personnel educated in conducting, supervising and evaluating tests and *commissioning*.

### SECTION 903 COMMISSIONING

**903.1 General.** Where application is made for construction as described in this section, the *registered design professional in responsible charge* or *approved agency* shall perform *commissioning* during construction and after occupancy as required by Table 903.1. Where Table 903.1 specifies that *commissioning* is to be done on a periodic basis, the *registered design professional in responsible charge* shall provide a schedule of periodic *commissioning* with the submittal documents that shall be reviewed and *approved* by the *code official*.

The *approved agency* shall be qualified and shall demonstrate competence, to the satisfaction of the *code official*, for the *commissioning* of the particular type of construction or operation. The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the *approved agency* provided those personnel meet the qualification requirements of this section to the satisfaction of the *code official*. The *approved agency* shall provide written documentation to the *code official* demonstrating competence and relevant experience or training. Experience or training shall be considered relevant where the documented experience or training is related in complexity to the same type of *commissioning* activities for projects of similar complexity and material qualities.

**903.1.1 Pre occupancy report requirement.** The *approved agency* shall keep records of the *commissioning* required by Table 903.1. The *approved agency* shall furnish *commissioning* reports to the owner and the *registered design professional in responsible charge* and, upon request, to the *code official*. Reports shall indicate that work was or was not completed in conformance to *approved construction documents*. Discrepancies shall be brought to the immediate attention of the contractor for correction. where discrepancies are not corrected, they shall be brought to the attention of the owner, *code official* and to the *registered design professional in responsible charge* prior to the completion of that phase of the work. Prior

to the issuance of a Certificate of Occupancy, a final *commissioning* report shall be submitted to and accepted by the *code official*.

**903.1.2 Post occupancy report requirement.** Post occupancy *commissioning* shall occur as specified in the applicable sections of this code. A post occupancy *commissioning* report shall be provided to the owner within 30 months after the Certificate of Occupancy is issued for the project and shall be made available to the *code official* upon request.

**TABLE 903.1  
COMMISSIONING PLAN**

Construction or System requiring Verification	Pre Occ.	Post Occ.	Method	Occurrence		Section/ Ref. Std.
				Pre Occ.	Post Occ.	
<b>Chapter 4: Site development and land use</b>						
Landscape irrigation systems	X	None	Field inspection	Installation	None	402.3.3 406.6
Topsoil and Vegetation Protection Measures; Setbacks from protected areas	X	None	Field inspection and report	Installation of measures, prior to other site disturbance	None	402.3
Soil Percolation Test	X	None	Field Inspection and report	Prior to installation of <i>graywater</i> irrigation system	None	406.2.2
Stormwater management system operation	None	X	Field Inspection		24 months	402.3.2
<b>Chapter 7: Water</b>						
Water Quality Tests						
Rainwater System		X	Field testing and verification	None	707.16.1	707.16.1
Graywater System		X	Field testing and verification	None	708.13.8	708.13.8

**SECTION 904  
BUILDING OPERATIONS, MAINTENANCE AND OWNER EDUCATION**

**904.1 General.** The operations and maintenance and *building* owner education documents shall be in accordance with Sections 904.3 and 904.4 and submitted to the owner prior to the issuance of the Certificate of Occupancy. Record documents shall be in accordance with Section 904.2. The *building* owner shall file a letter with the *code official* certifying the receipt of record documents and *building* owner education, operations and maintenance documents. At least one copy of these materials shall be in the possession of the owner and at least one additional copy shall remain with the *building* throughout the life of the *structure*.

**904.1.1 Owner responsibility.** *Buildings* built under this code shall be maintained and operated at the level of performance required by the *approved* documents.

**904.1.1.1 Periodic reporting.** Where required by Table 302.1, a report confirming that the *building* is maintained and operated at the level of performance required by the *approved* documents shall be submitted to the *code official* at approved intervals.

**904.2 Record documents.** The cover sheet of the record documents for the project shall clearly indicate that at least one copy of the materials shall be in the possession of the owner and at least one additional copy shall remain with the *building* throughout the life of the *structure*. Record documents shall include all of the following:

1. Copies of the *approved construction documents*, including plans and specifications.
2. As-built plans and specifications indicating the actual locations of piping, ductwork, valves, controls, equipment, access panels, lighting and other similar components where they are concealed or are installed in locations other than those indicated on the *approved construction documents*.
3. A copy of the Certificate of Occupancy.

**904.3 Building operations and maintenance documents.** The *building* operations and maintenance documents shall consist of manufacturer's specifications and recommendations, programming procedures and data points, narratives, and other means of illustrating to the owner how the *building*, site and systems are intended to be maintained and operated. The following information shall be included in the materials, as applicable to the specific project:

1. Directions to the owner or occupant on the manual cover sheet indicating that at least one copy of the materials shall be in the possession of the owner or occupant and at least one additional copy shall remain with the *building*.
2. Operations and maintenance manuals for equipment, products and systems installed under or related to the provisions of Chapter 4 including, but not limited to, the following, as applicable:
  - 1.1 Natural resource protections and setbacks.
  - 2.2 Water conserving landscape and irrigation systems.
    - a. Stormwater management systems
    - b. Permanent erosion control measures.
    - c. **Landscape or tree management plans.**

[Portions Omitted]

4. Operations and maintenance documents for equipment, products and systems installed under or related to the provisions of this code for energy conservation in accordance with Chapter 6 including, but not limited to, the following:

[Portions Omitted]

- 4.2 Domestic hot water systems including performance criteria and controls.
5. Operations and maintenance documents for equipment, products and systems installed under or related to the provisions of this code for water conservation in accordance *with* Chapter 7, including, but not limited to the following:
  - 5.1 Domestic fixtures.
  - 5.2 Water regulating devices including faucets and valves.
  - 5.3 Irrigation and *rainwater* and *graywater* catchment.

**904.4 Building owner education manual.** The owner shall cause to be assembled an informational document on the *building*, site or *structure* and systems and sustainable features that are covered by this code and included in the *building*. Such information shall be educational in nature and sufficient for future tenants, owners and operators of

the *building*, *building site*, *structure* and systems to understand the basic purpose and basis for these systems and features and how they are to be maintained for continued performance. The education documents shall consist of a statement of performance goals or requirements and a narrative illustrating the reasoning behind the *building's* site, features, and systems design. One copy of the owner education manual shall be in the possession of the owner and one additional copy shall remain with the *building* throughout the life of the *structure*.

## CHAPTER 10

# EXISTING BUILDINGS

### SECTION 1001 GENERAL

**1001.1 Scope.** The provisions of this chapter shall control the *alteration, repair, addition, maintenance and operation and change of occupancy* of existing *buildings and structures*. Existing *building sites* shall comply with Chapter 11.

**1001.2 Building operation and maintenance.** Existing *buildings* and parts thereof, shall be operated and maintained in conformance with the code edition and zoning or other adopted site development regulations applicable at the time of construction, and as required by Section 102.6. The owner or the owner's designated agent shall be responsible for the operation and maintenance of existing *buildings*. The requirements of this chapter shall not provide the basis for removal or abrogation of fire protection and safety systems and devices in *existing structures*.

**1001.3 Compliance.** *Alterations, repairs, additions* and changes of occupancy to *existing structures* shall comply with the provisions of this chapter.

**1001.4 Building materials, assemblies and systems.** *Building materials* shall comply with the requirements of this section.

**1001.4.1 Existing materials, assemblies, configurations and systems.** Materials, assemblies, configurations and systems already in use in a *building* in conformance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the *code official* to be dangerous to life, health or safety. Where such conditions are determined to be dangerous to the environment, life, health or safety, they shall be mitigated or made safe.

**1001.4.2 New and replacement materials, assemblies, configurations and systems.** Except as otherwise required or permitted by this code, materials, assemblies, configurations and systems permitted by the applicable code for new construction shall be used. Like materials shall be permitted for *repairs* and *alterations* provided that a hazard to life, health or property is not created. Hazardous materials shall not be used where the code for new construction would not *permit* their use in *buildings* of similar occupancy, purpose and location.

### SECTION 1002 ADDITIONS

**1002.1 General.** *Additions* to any *building or structure* shall comply with the requirements of this code for new construction. Unaltered portions of the *building or structure* shall be in accordance with the provisions of the code in force at the time of their construction and shall comply with Section 1003.2.

*Additions* to existing portions or components of the *building structure* shall be in accordance with the provisions of this code for those portions or components being altered.

1. *Additions* to an existing *building or structure* shall be made such that the existing *building or structure* together with the *addition* are not less conforming with the provisions of this code than the existing *building* and or *structure* was prior to the *addition*.
2. *Additions* shall not be permitted to *buildings and structures* that are located in *flood hazard areas*.

**Exception:** Where an existing *building* or *structure* is located such that all habitable space is located not less than 1 foot above the flood elevation, *additions* complying with Section 402.2.1(1) shall be permitted.

## **SECTION 1003 ALTERATIONS TO EXISTING BUILDINGS**

**1003.1 General.** *Alterations* to existing *buildings* and *building* systems shall be in accordance with the provisions of this code for those areas, assemblies, systems and components being altered. Unaltered portions and components, areas and systems of the *building* or *structure* shall be in accordance with the provisions of the code in force at the time of their construction and shall comply with Section 1003.2. *Alterations* shall be such that the existing *building* or *structure* is not less conforming to the provisions of this code upon the completion of work than the existing *building* or *structure* was prior to the *alteration*. Energy compliance for this purpose shall be evaluated in accordance with Section 602.4. Areas, assemblies, systems and components that are altered shall be in accordance with this section and Sections 1003.2 and 1003.3.

**Exception:** Where, in the opinion of the *code official*, there is no significant compromise of the intent of this code, the *code official* shall have the authority to approve materials and assemblies that perform in a manner that is at least the equivalent of those being replaced.

**1003.2 Minimum water requirements.** Compliance with Sections 1003.2.1 through 1003.2.3 shall be required.

### **Exceptions:**

1. Materials, assemblies and components regulated by Sections 1003.2.1, 1003.2.2 or 1003.2.3 that are dependent upon properties of other concealed materials, assemblies or system components to function properly and where the properties of the concealed materials, assemblies or components are unknown or insufficient and will not be revealed during construction.
2. Where the application of the requirements of Sections 1003.2.1, 1003.2.2 or 1003.2.3 are determined by the *code official* to be technically infeasible based upon the existing configuration of spaces, unless the intent of the *permit* applicant is to reconfigure those spaces or portions thereof.
3. Where a tenant in a multi-tenant *building* does not have control within that tenant space of a complete system or item, compliance for that complete system or item shall not be required.

**1003.2.1 Heating, ventilation and air conditioning.** Heating, *ventilation* and air conditioning systems and equipment shall be in accordance with the following:

1. Hot water and steam leaks, defective steam traps and radiator control, relief, and vent valves shall not be permitted in any accessible piping.
2. Leaking accessible chilled water lines and equipment shall be repaired or replaced.

**1003.2.2 Service water systems.** Defective hot and cold water piping and equipment within service water systems shall be repaired or replaced.

**1003.3 Additional requirements.** *Alterations* of portions and components of *buildings* shall comply with Sections 1003.3.1 through 1003.3.9.

### **Exceptions:**

1. The total cost of improvements required by Sections 1003.3.1 through 1003.3.9 shall not be required to exceed 10 percent of the costs of the *alterations* exclusive of land and *building site* improvements. The costs of *alterations* shall include costs related to Section 1003.2, but shall not limit its application.

2. This section shall not require compliance that exceeds that required for systems regulated by Chapters 6 through 7 of this code.
3. Materials, assemblies and components regulated by Sections 1003.3.1 through 1003.3.9 that are dependent upon properties of other concealed materials, assemblies or system components to function properly and where the properties of the concealed materials, assemblies or components are unknown or insufficient and will not be revealed during construction.
4. Where the application of the requirements of Sections 1003.3.1 through 1003.3.9 are determined by the *code official* to be technically infeasible based upon the existing configuration of spaces, unless the intent of the *permit* applicant is to reconfigure those spaces or portions thereof.
5. Where a tenant in a multi-tenant *building* does not have control within that tenant space of a complete system or item, compliance for that complete system or item shall not be required.

[Portions Omitted]

**1003.3.2 Metering devices.** Dedicated individual utility or private *metering* devices to facilitate the measurement and verification of energy and water use within the *building* or space shall be provided for at least one of the following:

1. Water consumption for individual tenant spaces
2. Water consumption for landscape irrigation

[Portions Omitted]

**1003.3.4 Service water systems.** Service water systems and equipment shall be in accordance with the following:

1. Water heater and hot water *storage tanks* shall have a combined minimum total of external and internal insulation value of R-16.
2. Accessible hot and cold water supply and *distribution pipes* shall be insulated to *R-values* as specified in this code.
3. In Seismic Design Categories D, E and F, as established in accordance with the *International Building Code*, water heater and water *storage tanks* with a tank capacity of thirty gallons or greater shall be strapped or otherwise secured to a wall, floor, ceiling, or other object that itself is adequately secured to a wall, floor, or ceiling. Water, gas and overflow pipes connected to water tanks shall be similarly secured. Gas water heaters shall have a flexible gas line entering the appliance.
4. Circulating pump systems for hot water supply purposes other than comfort heating shall be controlled as specified in Section 608.8.
5. Showerhead, toilet, urinal and faucet flow rates shall be in accordance with this code.

[Portions omitted]

**1003.3.8 Swimming pools and spas.** Swimming pools and spas and their equipment shall be in accordance with the following:

1. Heated swimming pools and spas shall be equipped with a cover for unoccupied hours.

**Exception:** A cover shall not be required for indoor pools or spas in which water temperature is less than eighty degrees Fahrenheit during time of non-use.

2. Pool and spa recirculation pumps shall be under timeclock control.
3. Heaters shall be cleaned and tuned for efficiency within one year prior to the *change of occupancy*.

## **SECTION 1004 CHANGE OF OCCUPANCY**

**1004.1 Change of occupancy.** Where a change in occupancy of a *building* or tenant space places it in a different division of the same group of occupancy or in a different group of occupancies, as determined in accordance with the provisions of the *International Building Code*, compliance with Section 1003.2 shall be required. Altered portions of, and *additions* to, existing *buildings* that are not a result of *change of occupancy* requirements, shall comply with other sections of this chapter, as applicable.

**Exception:** *Historic buildings* in accordance with Section 1005 shall not be required to comply with Section 1004.

## **SECTION 1005 HISTORIC BUILDINGS**

**1005.1 Historic buildings.** The provisions of this code relating to the construction, *repair*, *alteration*, *addition*, restoration and movement of *structures*, and *change of occupancy*, where each individual provision is evaluated separately on its own merit, shall not be mandatory for *historic buildings* for any of the following conditions:

1. Where implementation of that provision would change the visible configuration of *building* components in a manner that is not in keeping with the *buildings* historic nature, as determined by the *code official*, or
2. Where compliance with that provision would produce a conflict with a *building* function that is fundamental to the historic nature of the *building*.



## CHAPTER 12

# 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 102.4.

**APHA** American Public Health Association  
800 I Street NW  
Washington, DC 20001

Standard reference number	Title	Referenced in code section number
2005	Standard Methods for Examination of Water and Waste Water-21 <sup>st</sup> Edition . . . . .	702.16.1.1

**ASME** American Society of Mechanical Engineers  
Three Park Avenue  
New York, NY 10016-5990

Standard reference number	Title	Referenced in code section number
A112.18.1/ CSA B125.1—2010	Plumbing Supply Fittings. .... Table 702.1, Table 702.1.1(2), 702.2	

**ASSE** American Society of Mechanical Engineers  
Three Park Avenue  
New York, NY 10016-5990

Standard reference number	Title	Referenced in code section number
1016—2010	Performance Requirements for Automatic Compensating, Valves for Individual Showers and Tub/Shower Combinations ..... Table 702.1, Table 702.1.1(2)	

**ASTM** ASTM International  
100 Barr Harbor  
West Conshohocken, PA 19428-2959

Standard reference number	Title	Referenced in code section number
F1639-05	Standard Test Method for Performance of Combination Ovens.....	702.21

# EPA

Environmental Protection Agency  
 Ariel Rios Building  
 1200 Pennsylvania Avenue, NW  
 Washington, DC 20460

Standard reference number	Title	Referenced in code section number
ENERGY STAR	Energy Star.....	404.3.1, Table 702.1, Table 702.1.1(2), 702.6.1, 702.6.2, 702.6.4
Water Sense Feb-2007	High Efficiency Toilet Specification.....	Table 702.1, Table 702.1.1(3)
Water Sense October-2007	Lavatory Faucet Specification.....	Table 702.1
Water Sense October-2009	Flushing Urinal Specification.....	Table 702.1
Water Sense March 2010	Showerhead Specification.....	Table 702.1

# ICC

International Code Council, Inc.  
 500 New Jersey Avenue, NW  
 6<sup>th</sup> Floor  
 Washington, DC 20001

Standard reference number	Title	Referenced in code section number
IBC-12	International Building Code® .....	101.2., 102.4.1; 102.4.12.1, 102.6, 109.2, 201.3, 202, 406.3.1, 703.7.1, 707.12.7.3, 708.12.6.4, 710.6.1; 710.7, 1002.1, 1003.3.4, 1004.1
IFGC-12	International Fuel Gas Code® .....	102.4.2, 201.3
IMC-12	International Mechanical Code® .....	102.4.3, 201.3, 202, 703.7
IPC-12	International Plumbing Code® .....	102.3.4, 201.3, 608; Table 702.2.2(1), Table 702.1.1(2), 704.1.3, 704.2, 707.5, 707.6, 707.11, 705.2, 707.3, 707.12.3.2, 707.12.4.1, 707.12.4.2, 707.12.4.3, 707.12.7.2, 707.12.7.4, 707.12.7.5, 707.12.7.6, 707.12.10, 707.12.7.11, 707.12.11; 707.12.11.3; 707.12.12.1; 707.12.12.2, 707.12.12.3; 707.13.1; 707.13.2, 707.13.3, 707.13.4, 708.3, 708.5; 708.10, 708.12.1.1, 708.12.2, 708.12.3.1, 708.12.3.2, 708.12.3.3, 708.12.6.5, 708.12.6.6, 708.12.6.8, 708.12.6.11, 708.12.8, 708.12.9, 708.12.9.3, 708.12.10.1, 708.12.10.2, 708.12.10.3, 708.13.1, 708.13.2, 708.13.3, 708.13.4, 709.3, 709.4, 709.7, 709.8, 707.9.1.1; 709.9.1.2, 709.9.1.3, 709.10.1, 709.10.2
IPMC-12	International Property Maintenance Code® .....	102.4.6, 102.6
IFC-12	International Fire Code® .....	102.4.6, 102.6, 201.3
IECC-12	International Energy Conservation Code® .....	102.4.8, 201.3, 202, 608.3, 608.4, Table 903.1, 1003.3.5
IWUIC-12	International Wildland-Urban Interface® .....	102.4.9
ICC-PC-12	International Performance Code® .....	102.4.10
IEBC-12	International Existing Building Code® .....	102.4.11, 102.6
IRC-12	International Residential Code® .....	202
IZC-12	International Zoning Code® .....	102.4.12

# ISEA

International Safety Equipment Association  
 1901 N. Moore Street, Suite 808  
 Arlington, VA 22209

Standard reference number	Title	Referenced in code section number
Z358.1	Emergency Eyewash and Shower Equipment.....	702.1.3

# NFPA

National Fire Protection Association  
1 Batterymarch Park  
Quincy, MA 02269

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Standard reference number	Title	Referenced in code section number
NFPA 72-2010	National Alarm and Signaling Code.....	710.6.2

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# NSF

NSF International  
789 Dixboro Road  
Ann Arbor, MI 48105

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Standard reference number	Title	Referenced in code section number
NSF/ANSI 44-09	Residential Cation Exchange Water.....	704.1.2, 704.1.4
NSF/ANSI 50-09	Equipment for Swimming Pools, Spas, Hot Tubs, and other Recreational Water Facilities.....	708.12.7.1
NSF/ANSI 58-09	Reverse Osmosis Drinking Water Treatment Systems.....	704.2
NSF/ANSI 61-09	Drinking Water Systems Components – Health Effects.....	707.16
NSF/P151-95	Health Effects from Rain Water Catchment Systems Components.....	707.12.1.1

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SAFE & SUSTAINABLE BY THE BOOK



THE INTERNATIONAL CODE COUNCIL (ICC), along with its Cooperating Sponsors, is pleased to introduce the *International Green Construction Code (IGCC)*. The Cooperating Sponsors are: the American Institute of Architects (AIA), the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), the U.S. Green Building Council (USGBC), and the Illuminating Engineering Society (IES). The IGCC includes ANSI/ASHRAE/USGBC/IES Standard 189.1 as a *Jurisdictional Requirement Option*. This resource document can be used to immediately incorporate “green” components into existing or developing building codes. Application of the IGCC components will ensure integration with other International Code provisions and provide criteria that have been reviewed by experts in sustainable building science, safety, and building performance.



## IGCC: A NEW APPROACH FOR SAFE & SUSTAINABLE CONSTRUCTION



**What does the IGCC do?** The IGCC provides model code language to establish baseline regulations for new and existing buildings related to energy conservation, water efficiency, building owner responsibilities, site impacts, building waste, and materials and other considerations.

**How does the IGCC become law?** The model code language becomes law when it is adopted by the appropriate state or local authority charged with governing construction. The adopting jurisdiction is charged with determining the final content of the code, and has the ability to calibrate the application of the code on a project-by-project basis.

**How does this complement existing rating systems or other guidelines?** Rating systems such as LEED are voluntary guidelines for cutting-edge applications of green building design. The IGCC establishes minimum requirements for all buildings, providing a natural complement for voluntary rating systems which extend beyond the IGCC’s baseline. The U.S. Green Building Council, creators of LEED, has participated in the development of the IGCC and endorses its usage as a viable option for communities that wish to regulate minimum green building provisions.

**What if my state or local jurisdiction seeks a different approach than others considering the adoption of the IGCC?** The IGCC establishes several levels of compliance, starting with the basic provisions of the code, and then offering “jurisdictional requirement” options. Further, the jurisdiction can add more guidance on a project-by-project basis through establishing the specific number of available IGCC “project electives.”

**How extensive is the IGCC and how difficult will it be to enforce?** The IGCC has 11 chapters, plus two appendices. Many provisions in the IGCC are modeled after familiar tables and application tools that are found in other International Codes that have been adopted in every state in the United States. The IGCC acts as an overlay on other existing codes, including using the provisions of the *International Energy Conservation Code (IECC)* as a baseline. To make sure the IGCC is enforceable, it was reviewed by the same experts that develop the building codes that officials enforce daily.

**Will there be professional development for those helping implement the IGCC?** Training, certification exams, and contractor testing on the key elements of the IGCC currently are being offered by the International Code Council, with additional professional development and technical support materials under development. Representatives from IGCC sponsoring organizations also are available to speak about the code at local, state, and national events.

**How was the code developed?** The initial public version of IGCC was developed over an eight month period by a broad-based, 29-member Sustainable Building Technology Committee, with input from more than 100 Work Group members composed of experts in government, business and academia, code development and enforcement, architecture, materials science, engineering, and environmental advocacy. Subsequently, the code was updated and refined based on over 1,500 public comments and a public hearing conducted in mid-2010. The IGCC will be integrated fully into the existing I-Code family in early 2012 after hearings in 2011.



## KEY COMPONENTS OF IGCC PUBLIC VERSION 2.0

IGCC Public Version 2.0 is now available as a resource for jurisdictions that are ready to adopt a useable and enforceable framework that links together issues of green design, building performance, and building safety.

### Key changes in Public Version 2.0 include:

- A Zero Energy Performance Index (zEPI), requiring buildings to use no more than 51 percent of the energy allowable in the 2000 *International Energy Conservation Code*;
- The jurisdictional project electives formula now requires jurisdictions to enforce at least one and up to 14 electives;
- The addition of appliance information, radon mitigation, and documentation requirements to the commissioning provisions to ensure the health and safety of building occupants;
- A 20 percent water savings beyond U.S. federal standards for water closets in residential settings;
- New requirements for identification and removal of materials containing asbestos;
- Land use regulations including new provisions addressing flood risk, development limitations related to "greenfields," use of turf grass, and minimum landfill diversion requirements;
- Movement of many responsibilities from the registered design professional to the owner to prevent potential conflicts with state and local requirements; and
- Consistency with industry standards for air handling systems.

Visit [www.iccsafe.org/igcc](http://www.iccsafe.org/igcc) for updates and to download IGCC Public Version 2.0 today.

## THE IGCC IS:

**COMPREHENSIVE:** The IGCC applies to the construction of traditional and high-performance buildings, structures, and systems, including alterations, and additions.

**INTEGRATED:** The IGCC has been designed to coordinate and integrate with the health and safety features of existing I-Codes and existing rating systems such as LEED.

**CONSENSUS BASED:** ICC's open, governmental consensus code development process ensures that key stakeholder voices have been heard throughout the process.

**ADAPTABLE:** The IGCC is a "model" code, requiring adoption by a governing jurisdiction before it becomes law. In this way, the model language can, if necessary, be adapted to address local conditions.

**ENFORCEABLE:** The IGCC creates a regulatory framework for new and existing buildings, advancing and complementing the momentum in "green" building created by popular rating systems.

### International Code Council

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[www.iccsafe.org/igcc](http://www.iccsafe.org/igcc)



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SAFE & SUSTAINABLE BY THE BOOK

*This document consists of provisions extracted directly from the IGCC PV 2.0 and is designed for ease of access to its water-related provisions. The document will not be revised separately from the IGCC. Rather, any changes made to the water provisions in the IGCC itself will automatically convey to future versions of this document.*