



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Introduction

DGS recommendations are the product of an in-depth group effort involving subject matter experts representing all major disciplines within DBDC, supplemented by input from several consultants. These considerations are made with the goal of enabling development and economic growth in Montgomery County.

## Review Criteria

- 1 IgCC Recommendations:
  - a Maintain all criteria that are readily achievable based on current technology, product availability, and practice as base code
  - b Transfer to Appendix A as a project elective criteria which are:
    - difficult or costly to implement;
    - ahead of their respective industry for product and reliable software development; and
    - where language or concept is confusing or requires extended effort
  - c Eliminate criteria that are regulated by other governing authorities
- 2 ASHRAE Recommendations:
  - a Recognizing it is a 'standard' developed by ASHRAE rather than a code subject to amendment and adoption, the goal is to adopt as-is
  - b Modifications:
    - include items for safety and security such as lighting; and
    - where regulated by others

## Overview of Recommended Amendments

### IgCC

#### Chapter 1 – Scope and Administration

Retained in its entirety

#### Chapter 2 – Definitions

Retained in its entirety

#### Chapter 3 – Jurisdictional Requirements and Life Cycle Assessment

Retained with the exception of transfer life cycle assessment (LCA) requirements to Appendix A; modified Jurisdictional Requirements listed in Table 302.1 as noted in individual chapters below.

#### Chapter 4 – Site Development and Land Use

Retained requirements that are not regulated by other authorities and transfer requirements that are not practical for all site conditions to Appendix A

#### Chapter 5 – Material Resource Conservation and Efficiency

Retained requirements that are not regulated by other authorities

#### Chapter 6 – Energy Conservation, Efficiency and CO<sub>2</sub>e Emission Reduction

Substantially retained; moved items difficult to achieve or financially unreasonable to Appendix A; and deleted items covered by IECC or regulated by EPA.

#### Chapter 7 – Water Resource Conservation, Quality and Efficiency

Retained 50%; moved items that were difficult to achieve or financially unreasonable to Appendix A; and deleted large part covered by IMC and IFGC or regulated by MDE, HHS and WSSC

#### Chapter 8 – Indoor Environmental Quality and Comfort

Retained 50%; moved substantial amount to Appendix A due to the difficulty to execute; and deleted several items covered by IMC, regulated by EPA, or unfeasible due to lack of technological infrastructure.

Chapter 9 – Commissioning, Operation and Maintenance

Retained in its entirety with a minor rewrite to avoid confusion

Chapter 10 – Existing Buildings

Substantially retained; moved a minor amount of items which are impractical to implement to Appendix A; and deleted one covered by MC Code for Historic Buildings and Historic Resources Preservation

Chapter 11 – Existing Building Site Development

Retained in its entirety

Appendix A – Project Electives

Substantially retained; modified one item; added a significant number of electives from chapters listed above plus 2 additional requirements found in LEED 2009 and ASHRAE 189.1; and deleted three that are regulated by FEMA, MDE and DPS

**ASHRAE 189.1**

Section 1 – Purpose

Retained in its entirety

Section 2 – Scope

Retained in its entirety

Section 3 – Definitions, Abbreviations and Acronyms

Retained in its entirety

Section 4 – Administration and Enforcement

Retained in its entirety

Section 5 – Site Sustainability

Substantially retained; modified one item to align with County requirements and one to establish consistency; and deleted three that are regulated by M-NCPPC and DPS

Section 6 – Water Use Efficiency

Substantially retained; modified one item to establish consistency; and deleted one that is regulated by WSSC

Section 7 – Energy Efficiency

Substantially retained; one to clarify

Section 8 – Indoor Environmental Quality (IEQ)

Substantially retained; modified several items to provide greater flexibility and eliminate confusion; and deleted one item regulated by a County ordinance

Section 9 – The Building's Impact on the Atmosphere, Materials and Resources

Retained in its entirety

Section 10 – Construction and Plans for Operation

Substantially retained; recommended modification of two items to eliminate confusion

## General Recommendations

- 1 DGS recommends that DPS phase in implementation of the IgCC to allow the design and construction community as well as supporting industries to ramp up to meet its requirements. DGS proposes the following schedule and minimum gross building area thresholds for phase-in:
  - a 1<sup>st</sup> year - 30,000 sf
  - b 2<sup>nd</sup> year - 20,000 sf
  - c 3<sup>rd</sup> year - 10,000 sf
- 2 DGS recognizes that owners and project teams accustomed to working on large projects will be best equipped to comply with the new code, however all projects above the minimum thresholds should aspire to higher sustainability goals. In accordance with 105.6 Approved Programs, DGS recommends that LEED 2009 be deemed an acceptable compliance path for projects at the current 10,000 sf threshold, however at the higher Silver level rating rather than at the Certified level which is currently required. Ultimately the required compliance levels would be:
  - a Projects at 0-10,000 sf: no compliance with IgCC required
  - b Projects at 10,001-20,000 sf - acceptable compliance paths:
    - LEED 2009 at Silver level

- IgCC
  - ASHRAE 189.1
- c Projects at 20,001 sf and greater - acceptable compliance paths:
- IgCC
  - ASHRAE 189.1
- 3 Upon adoption of the IgCC as a code in force, DGS recommends that DPS eliminate the requirement for all buildings in Montgomery County to conform with the County Green Building Law which requires achievement of LEED (or similar) at specified levels.
  - 4 Prior to adoption of the IgCC, DGS recommends that DPS provides an online database for project submissions which includes templates for all criteria to be submitted.
  - 5 DGS recommends that DPS recognize the cost of implementation of the IgCC: this not only pertains significantly to owners in terms of additional consultant fees, construction costs, and project duration, but also to maintenance costs as well as DPS administration and enforcement. (Note that design, construction and maintenance costs refer to complex systems that require a higher level of attention during all phases including maintenance. Some such systems include: pervious concrete, roof washer, skylights, vegetative roofs and PV panels.)
  - 6 DGS recommends that DPS consider ramifications of this code on development in Montgomery County and carefully amend it to encourage economic growth and development in order to maintain a steady pace without creating undue hardship.
  - 7 As with previous sustainable rating systems, the IgCC and ASHRAE 189.1 contain requirements which are reasonable in their intent solely within their discipline; however when intertwined with requirements of multiple disciplines they end up creating conflict which may be unintended. One such example is the prescriptive requirements for controlling solar heat gain with shading devices while also trying to provide for maximum day lighting. This establishes a scenario that is overly restrictive, conflicting, and will lead project teams to rely heavily on unproven modeling and highly technical (as in highly automated) solutions in order to resolve these conflicting requirements. The unintended consequence is that facilities will require a much higher level and volume of maintenance (which is unlikely to take place) and the systems will not function as designed (and modeled). Perhaps a better option is that the code eliminate the prescriptive options; be written to require the performance options at certain levels (overall energy usage for instance); and allow project teams more flexibility in meeting those requirements.
- In summary, DGS is concerned with unintended consequences as a result of conflicting requirements, specifically with the significant emphasis on permanent projections for shading fenestration in both the IgCC and ASHRAE 189.1. While permanent projections provide potential (not yet determined by true data) level of energy conservation by limiting solar heat gain, they will complicate and compromise the weather tightness and thermal resistance of the vertical envelope components.

## Editing Conventions

- a Black = Base code
- b Green = Electives (items recommended to be moved to Appendix A and those already in Appendix A)
- c Grey Shade = Recommended for deletion (primarily items that are regulated by other agencies)
- d Strikethrough = Text recommended to be deleted
- e Underline = Text recommended to be included



# 2012 IgCC RECOMMENDATION

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## Appendix A – Project Electives

### SECTION A101 GENERAL

**A101.1 Scope.** The provisions of this appendix are designed to offer conservation practices that achieve greater benefit than the minimum requirements of the International Green Construction Code™ (IgCC™).

**A101.2 Intent.** This appendix shall provide a basis by which a jurisdiction can implement measures to increase natural resource conservation, material resource conservation, energy conservation, water conservation and environmental comfort and mitigate impacts of building site development.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action required

**2011 ASHRAE 189.1 CORRELATION:** None

### SECTION A102 APPLICABILITY AND CONFORMANCE

**A102.1 General.** Project electives shall be applicable to building, structures and building sites constructed under the provisions of this code.

**A102.2 Required number of and selection of project electives.** The jurisdiction shall indicate the number of project electives required in the blank provided in the row that references Section A102.2 in Tables A104, A105, A106, A107 and A108. Each project constructed in the jurisdiction shall be required to comply with this number of project electives. A total of not less than this number of project electives shall be selected by the owner from each table. Selected project electives shall be applied as mandatory requirements for the project. Selected project electives shall be communicated to the code official by means of checking the appropriate boxes in the tables and providing a copy of the tables, or by inclusion of a list of selected project electives, with the construction documents.

**PROPOSED ACTION:** DGS recommends that DPS require 20% of the total number of electives be attained for Tables A104, A105 and A106; 0% for Table A107; and 30% for Table A108.

**RATIONALE / IMPACT:** None of the electives listed in Table A107 are readily achievable given the current state of water resource technology. In addition, several electives are regulated by other AHJ's, therefore identifying a minimum number of electives in this category is premature.

**2011 ASHRAE 189.1 CORRELATION:** None

### SECTION A103 DEFINITIONS

**A103.1 Definitions.** The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of this code for general definitions.

**DESIGN LIFE.** The intended service life or the period of time that a building or its component parts are expected to meet or exceed the performance requirements.

**GEOTHERMAL ENERGY.** Renewable energy generated from the interior of the Earth and used to produce energy for heating buildings or serving building commercial or industrial processes.

**PROJECT ELECTIVE.** The minimum total number of project electives that must be selected and complied with as indicated in Section A102.2 and Tables A104, A105, A106, A107 and A108.

**SERVICE LIFE.** The period of time after installation during which a building or its component parts meets or exceeds the performance requirements.

**VOCs, TOTAL (TVOCs).** Sum of the concentrations of all identified and unidentified volatile organic compounds between and including n-hexane through n-hexadecane (i.e., C 6 C 16 as measured by gas chromatography/mass spectrometry total ion-current chromatogram method and are quantified by converting the total area of the chromatogram in that analytical window to toluene equivalents.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action required

**2011 ASHRAE 189.1 CORRELATION:** None

**SECTION A104 SITE PROJECT ELECTIVES**

**A104.1 Flood hazard area project elective.** Where Section 402.2.1 is not listed in Table 302.1 as a mandatory requirement, and in specific flood hazard areas if Section 402.2.2 is not a mandatory requirement, projects seeking flood hazard area project electives in accordance with Section A102.2 shall comply with one of the project electives identified in Sections A104.1.1 through A104.1.3.

**A104.1.1 Flood hazard area preservation.** Where less than 25 percent of a building site is located within a flood hazard area, buildings and building site improvements shall be located on portions of the building site that are located outside of the flood hazard area. The building site shall not be filled or regraded to raise the elevation of the site to remove areas from the flood hazard area.

**A104.1.2 Flood hazard area minimization.** Where 25 percent or more of a building site is located within a flood hazard area, the lowest floors of buildings that are located within the flood hazard area shall be not less than 1 foot (305 mm) above the design flood elevation as established by the International Building Code, or not less than the height, as established by the jurisdiction, above the design flood elevation, whichever is higher. The placement of fill on a building site shall not be used to achieve the required height above the design flood elevation.

**A104.1.3 Flood hazard area, existing building.** Where additions, alterations, or repairs are made to an existing building located in a flood hazard area, and the cost of the work equals or exceeds 40 percent of the market value of the structure before the improvement or repair is started, the entire building shall be brought into compliance with the flood-resistant construction requirements in the International Building Code for new buildings and structures.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by FEMA, MDE and DPS

**2011 ASHRAE 189.1 CORRELATION:** 5.3.1.2

**A104.2 Wildlife corridor project elective.** Site development that restores a wildlife corridor, connecting wildlife corridors on adjacent lots, shall be recognized as a project elective.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 5.3.1.2

**A104.3 Infill site project elective.** The development of a building site that is an infill site with a new building and associated site improvements shall be recognized as a project elective.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**A104.4 Brownfield site project elective.** The development of a building site that is a brownfield site with a new building with associated site improvements shall be recognized as a project elective. The development shall be in accordance with the following:

Phase I and II Environmental Assessment and, as necessary, the documentation of the site remediation plan and completion of the plan, as approved by the jurisdictional agency in charge of environmental regulations.

2. Where contamination levels are above risk-based standards for intended reuse and remediation is required, building and site development shall provide effective remediation approved by the local, state or federal government agency which classified the site as a brownfield, by one of the following:

2.1. The effective remediation is completed in the manner described in the remediation plan approved by the agency which classified the site as a brownfield.

2.2. A remediation commensurate with the initial approved plan which the agency approves upon completion by issuing a letter stating that no further remediation action is required.

3. The brownfield site project elective fully accomplishes the applicable state and local brownfields program cleanup goals, with all supporting documentation as required by the state, tribal or other responsible authority.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** Chapter 5

**A104.5 Site restoration project elective.** Previously developed sites that restore 25 percent or more of the nonbuilding footprint building site area with native or adaptive vegetation shall be recognized as a project elective.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*A104.6 Mixed-use development project elective. Development of a mixed-use building shall be recognized as a project elective. The building shall be in accordance with all of the following:*

- 1. It shall have not less than two stories.*
- 2. Eight or more dwelling units of Group R-1 or R-2 occupancy shall be located above the first story.*
- 3. The first story shall contain one or more of the following occupancies: A-1, A-2, A-3, B, M, Group E daycare, or Group R-2 live/work units.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*A104.7 Changing and shower facilities project elective. Where a new building is less than 10,000 square feet (929 m<sup>2</sup> in total building floor area, providing changing and shower facilities in accordance with Section 407.2 shall be recognized as a project elective. A104.8 Long-term bicycle parking and storage project*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*A104.8 Long-term bicycle parking and storage project elective. The development of a new building and associated site improvements where additional long-term bicycle parking is provided in accordance with all of the following shall be recognized as a single project elective:*

- 1. Provide long-term bicycle parking that is twice the number of parking spaces required by Table 407.3;*
- 2. Provide spaces in accordance with Section 407.3.2; and*
- 3. Locate not less than 90 percent of long-term bicycle parking within a building or provide the parking with a permanent cover including, but not limited to, roof overhangs, awnings, or bicycle storage lockers.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.4.1

*A104.9 Heat island. Project electives related to heat island impact shall comply with Sections A104.9.1 through A104.9.4. Compliance with multiple electives shall be recognized.*

*A104.9.1 Site hardscape project elective 1. In climate zones 1 through 6, as established in the International Energy Conservation Code, the development of a new building and associated site improvements where a minimum of 75 percent of the site hardscape is in accordance with one or any combination of options in Sections 408.2.1 through 408.2.4, shall be recognized as a project elective.*

*A104.9.2 Site hardscape project elective 2. In climate zones 1 through 6, as established in the International Energy Conservation Code, the development of a new building and associated site improvements where a minimum of 100 percent of the site hardscape is in accordance with one or any combination of options in Sections 408.2.1 through 408.2.4, shall be recognized as a project elective.*

*A104.9.3 Site hardscape project elective 3. In climate zones 7 and 8, as established in the International Energy Conservation Code, the development of a new building and associated site improvements where a minimum of 50 percent of the site hardscape is in accordance with one or any combination of options in Sections 408.2.1 through 408.2.4, shall be recognized as a project elective.*

*A104.9.4 Roof covering project elective. In climate zones 4 through 8, as established in the International Energy Conservation Code, the development of a new building with roof coverings in accordance with Section 408.3.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 5.3.2

**SECTION A105 MATERIAL RESOURCE CONSERVATION AND EFFICIENCY**

**A105.1 Waste management project elective.** Projects seeking a waste management project elective shall comply with Section 503.1, except that the nonhazardous construction waste materials required to be diverted from landfills shall be increased by 20 percent. Where another percentage is indicated by the jurisdiction in Table 302.1, projects seeking this credit shall increase diversion by 20 percent above the percentage indicated in Table 302.1.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 9.3.1

**A105.2 Construction waste landfill maximum project elective.** Projects seeking a construction waste landfill maximum project elective in accordance with Table A105 and Section A102.2 shall comply with Section 503.1 except that not more than 4 pounds (1.814 kg) of construction waste, excluding hardscape, per square foot (0.0929 m<sup>2</sup> of building area shall be disposed of in a landfill. Building construction waste and hardscape waste shall be measured separately.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 9.3.1.1

**A105.3 Material selection project electives.** Each of the following shall be considered a separate material selection project elective. The project electives are cumulative and compliance with each item shall be recognized individually. Compliance with this project elective shall require compliance with Section 505.2, except that buildings and structures shall contain used, recycled content, recyclable, bio-based and indigenous materials that comply with Sections 505.1 through 505.2.5 such that the aggregate total materials compliant with those sections constitute at least 70 percent of the total building products and materials used, based on mass, volume or cost, used singularly or in combination. Compliance with Item 1 except that such materials shall be used for at least 85 percent of the total mass, volume or cost of materials in the project.

**PROPOSED ACTION:** Adopt with the following modification: Compliance with this project elective shall require compliance with Section 505.2, except that buildings and structures shall contain used, recycled content, recyclable, bio-based and/or indigenous materials that comply with Sections 505.1 through 505.2.5 such that the aggregate total materials compliant with those sections constitute at least 70 percent of the total building products and materials used, based on mass, volume or cost, used singularly or in combination.

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 9.4.1

**A105.4 Building service life plan project electives.** Projects seeking a building service life plan project elective shall comply with this section. The building service life plan (BSLP) in accordance with Section A105.4.1 shall be included in the construction documents. A105.4.1 Plan and components. The building service life plan (BSLP) shall indicate the intended length in years of the design service life for the building as determined by the building owner or registered design professional, and shall include a maintenance, repair, and replacement schedule for each of the following components. The maintenance, repair and replacement schedule shall be based on manufacturer's reference service life data or other approved sources for the building components. The manufacturer's reference service life data or data from other approved sources shall be included in the documentation. Structural elements and concealed materials and assemblies. Materials and assemblies where replacement is cost prohibitive or impractical. Major materials and assemblies that are replaceable. Roof coverings. Mechanical, electrical and plumbing equipment and systems. Site hardscape.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.3

**A105.5 Design for deconstruction and building reuse project elective.** Projects seeking a design for deconstruction and building reuse project elective shall be designed for deconstruction of not less than 90 percent of the total components, assemblies, or modules to allow essentially the entire building to be reused. Design for deconstruction shall be documented on the building's plans and construction documents.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*A105.6 Existing building reuse project elective. The development of a building site on which an existing building is already located and in which not less than 75 percent of the existing core and shell of the structure will be reused shall be recognized as a project elective.*

**PROPOSED ACTION:** Modify to incorporate a sliding scale based on size of structure to be retained. Renumber to "A1010.x" to correspond with Chapter 10 Existing Buildings.

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*A105.7 Historic building reuse project elective. The development of a building site on which an existing building is already located and in which not less than 75 percent of the existing core and shell of a locally or nationally designated historic structure will be reused shall be recognized as a project elective.*

**PROPOSED ACTION:** Modify to incorporate a sliding scale based on size of structure to be retained. Renumber to "A1011.x" to correspond with Chapter 11 Historic Buildings.

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**SECTION A106 ENERGY CONSERVATION, EFFICIENCY AND EARTH ATMOSPHERIC QUALITY**

*A106.1 zEPI reduction project electives. Project electives for buildings pursuing performance-based compliance in accordance with Section 601.3.1 shall be in accordance with the portions of Table A106 that reference Section A106.1. Equation 6-1 and the calculation procedures specified in Section 602.1.2.1.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4 and 7.5.3

*A106.2 Mechanical systems project elective. Buildings seeking a mechanical systems project elective in accordance with Sections A102.2 and A106 shall comply with Sections A106.2.1 through A106.2.5. A106.2.1 Prescriptive path. The building shall be designed prescriptively in accordance with Section 601.3.2.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3

*A106.2.2 Mechanical equipment. Mechanical equipment shall comply with Sections A106.2.2.1 through A106.2.2.4 to achieve the mechanical systems project elective.*

*A106.2.2.1 Heating equipment. For heating equipment, the part-load efficiency of the equipment shall be not less than 10 percent greater than the part-load efficiencies shown in the applicable tables of the International Energy Conservation Code, or ASHRAE 90.1, or the equipment shall be ENERGY STAR qualified, as applicable.*

*A106.2.2.2 Cooling equipment. For cooling equipment, the part-load efficiency of the equipment shall be not less than 10 percent greater than the part-load efficiencies shown in the applicable tables of the International Energy Conservation Code, or ASHRAE 90.1, or the equipment shall be ENERGY STAR qualified.*

*A106.2.2.3 Ground source heat pumps. Ground source heat pumps shall meet the provisions of Table A106.2.2.3 based on the applicable referenced test procedure. A106.2.2.4 Multi-stage ground source heat pumps. The efficiency of multi-stage ground source heat pumps shall meet the provisions of Table A106.2.2.3 based on the applicable referenced test procedure. TABLE A106.2.2.3*

**TABLE A106.2.2.3  
ENERGY-EFFICIENCY CRITERIA FOR  
GROUND SOURCE HEAT PUMPS**

PRODUCT TYPE	MINIMUM EER	MINIMUM COP
Water-to-Air Closed loop TEST PROCEDURE - ISO 13256-1	14.1	3.3
Water-to-Air Open loop TEST PROCEDURE - ISO 13256-1	16.2	3.6
Water-to-Water Closed loop TEST PROCEDURE - ISO 13256-2	15.1	3.0
Water-to-Water Open loop TEST PROCEDURE - ISO 13256-2	19.1	3.4
Direct Expansion (DX) or Direct GeoExchange (DGN) TEST PROCEDURE - AHRI 870	15.0	3.5

EER = energy-efficiency ratio; COP = coefficient of performance

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.7.3

*A106.2.3 Duct insulation. Ducts shall be insulated to R-8 or greater where located in unconditioned spaces and R- 11 minimum where located outside of the building structure. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by R-8 insulation or greater.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3.8

*A106.2.4 Duct system testing. Duct systems shall be leak-tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual and shall have a rate of air leakage (CL) less than or equal to 4 as determined in accordance with Equation 4-5 of the International Energy Conservation Code.*

*A106.2.4.1 Documentation. Documentation shall be furnished by the designer demonstrating that representative sections totaling not less than 50 percent of the duct area have been tested and that all tested sections meet the requirements of Section A106.2.4.*

**PROPOSED ACTION:** Modify to incorporate a sliding scale to acknowledge additional percentage for duct tested.

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*A106.2.5 Service water heating equipment. The efficiency of the service water heating equipment shall be not less than 10 percent greater than the efficiencies shown in the International Energy Conservation Code and ASHRAE 90.1 or the service water heating equipment shall be ENERGY STAR qualified.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.4

*A106.3 Service water heating project elective. Buildings seeking a service water heating project elective in accordance with Sections A102.2 and A106.3 shall comply with Sections A106.3.1 through A106.3.3.*

*A106.3.1 Prescriptive path. The building shall be designed prescriptively in accordance with Section 601.3.2.*

*A106.3.2 Occupancy. The building shall be designed to serve one of the following occupancies:*

*Group A-2, restaurants and banquet halls;*

*Group F, laundries;*

*Group R-1, boarding houses (transient), hotels (transient), motels (transient);*

*Group R-2 buildings;*

*Group A-3, health clubs and spas; and*

Group I-2, hospitals, mental hospitals and nursing homes.

**A106.3.3 Service water heating efficiency.** The efficiency of the service water heating equipment shall be at least 10 percent greater than the efficiencies shown in the International Energy Conservation Code and ASHRAE 90.1 or the service water heating equipment shall be ENERGY STAR qualified.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.4

**A106.4 Lighting system efficiency project elective.** Buildings seeking a lighting system efficiency project elective in accordance with Sections A102.2 and A106.4 shall comply with Sections A106.4.1 through A106.4.3.

**A106.4.1 Prescriptive path.** The building shall be designed prescriptively in accordance with Section 602.3.1.

**A106.4.2 Interior lighting system efficiency.** The interior connected lighting power shall be 10 percent less than the allowance determined in accordance with Section C405.5 of the International Energy Conservation Code.

**A106.4.3 Exterior lighting system efficiency.** The exterior connected lighting power shall be 10 percent less than the allowance determined in accordance with Section C405.6 of the International Energy Conservation Code.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.6

**A106.5 Passive design project elective.** Buildings seeking a passive design project elective in accordance with Sections A102.2 and A106.5 shall comply with Sections A106.5.1 and A106.5.2.

**A106.5.1 Performance path.** The building shall be designed using the performance path in accordance with Section 601.3.1.

**A106.5.2 Passive design provisions.** The simulation of energy use performed pursuant to Section 602 shall document that not less than 40 percent of the annual energy use reduction realized by the proposed design has been achieved through passive heating, cooling, and ventilation design, as compared to the standard reference design. Passive heating and cooling shall use strategies including, but not limited to, building orientation, fenestration provisions, material selection, insulation choices, overhangs, shading means, microclimate vegetation and water use, passive cooling towers, natural heat storage, natural ventilation, and thermal mass.

**PROPOSED ACTION:** Modify to incorporate a sliding scale starting at a lower threshold.

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**A106.6 Renewable energy system project electives.** Buildings seeking a renewable energy system project elective or electives shall be equipped with one or more renewable energy systems in accordance with Section 610.1 that have the capacity to provide the percent of annual energy used within the building as selected in Table A106. Capacity shall be demonstrated in accordance with Section 610.1.1 or 610.1.2.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.1

#### **SECTION A107 WATER RESOURCE CONSERVATION AND EFFICIENCY**

**A107.1 Indoor water use.** This section contains project electives related to indoor water use.

**A107.2 Onsite waste water treatment project elective.** Where projects are intended to qualify for an onsite waste water treatment project elective in accordance with Section A107.2, all waste water from the building shall be treated to meet the quality requirements appropriate for its intended use and as required by law.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 6.4

**A107.3 Alternate onsite nonpotable water for outdoor hose connections project elective.** Where projects are intended to qualify for an alternate onsite nonpotable for out- door hose connections project elective in accordance with Section A107.3, 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.

**A107.3.1 Signage.** Each outlet shall be provided with signage in accordance with Section 706.2. **A107.4 Alternate onsite nonpotable water for plumbing**

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** Chapter 6

**A107.4 Alternate onsite nonpotable water for plumbing fixture flushing water project elective.** Where projects are intended to qualify for an alternate onsite nonpotable water for plumbing fixture flushing project elective in accordance with Section A107.4, nonpotable water shall be used for flushing water closets and urinals.

**A107.4.1 Water quality.** Nonpotable 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 nonpotable water shall contain not more than 4 mg/L of chloramines or free chlorine. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use.

**A107.4.2 Filtration required.** Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100 micron or finer filter.

**A107.4.3 Signage.** The entries to rooms having water closets or urinals that are supplied with nonpotable water shall be provided with signage in accordance with Section 706.2.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** Chapter 6

**A107.5 Automatic fire sprinkler system project elective.** Where projects are intended to qualify for an automatic fire sprinklers system project elective in accordance with Section A107.5, automatic fire sprinkler systems shall be supplied with nonpotable water from an onsite rainwater collection system. Such rainwater collection system shall comply with Section 707. The requirements of Sections A107.5.1 and A107.5.3 shall apply to the fire sprinkler system and the onsite rainwater collection system.

**A107.5.1 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 onsite rainwater collection system.

**A107.5.2 Source volume indication.** The fire command center for the building shall be equipped with a device that indicates the volume of nonpotable water contained in the collection reservoir. The indicator shall be approved and shall be in compliance with NFPA 72.

**A107.5.3 Quality of water used for fire suppression.** The required quality and treatment of the nonpotable water stored and used for fire suppression shall be determined by authority(s) having jurisdiction. **A107.6 Alternate onsite nonpotable water to fire pumps.**

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**A107.6 Alternate onsite nonpotable water to fire pumps project elective.** Where projects are intended to qualify for an alternate onsite nonpotable water to fire pumps project elective in accordance with Sections A107.6, one or more fire pumps shall be located within 200 feet (60 960 mm) of a non- potable water collection system of sufficient quality, pressure, and capacity for fire pump applications and the fire pumps shall be connected to such source of nonpotable water. The connections shall be in accordance with Section 403.3.2 of the International Building Code.

**A107.6.1 Quality of water used for fire suppression.** The required quality and treatment of the nonpotable water stored and used for fire suppression shall be determined by the authority having jurisdiction.

**A107.6.2 Signage.** Fire pumps connected to a nonpotable water supply shall have signage in accordance with Section 706.2 provided at the building's fire command center and at each fire pump. **A107.7 Alternate onsite nonpotable water for industrial**

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**A107.7 Alternate onsite nonpotable water for industrial process makeup water project elective.** Where projects are intended to qualify for an alternate onsite nonpotable water for industrial process makeup water project elective in accordance with Section A107.7, industrial processes requiring makeup water shall utilize nonpotable water except where the process requires potable water for proper functioning.  
**A107.7.1 Signage.** Rooms containing process equipment supplied with nonpotable water shall be provided with signage in accordance with Section 706.2.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**A107.8 Alternate onsite nonpotable water for cooling tower makeup water project elective.** Where projects are intended to qualify for an alternate onsite nonpotable water for cooling tower makeup water project elective in accordance with Section A107.7, nonpotable water shall be utilized for cooling tower makeup water in accordance with the requirements of Section 706.3.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**A107.9 Gray water collection project elective.** Where projects are intended to qualify for a gray water collection project elective in accordance with Section A107.8, waste water from lavatories, showers, bathtubs, clothes washers, and laundry trays shall be collected for reuse onsite in accordance with Section 708.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

#### **SECTION A108 INDOOR ENVIRONMENTAL QUALITY AND COMFORT**

**A108.1 VOC emissions project electives.** Sections A108.2 through A108.5 shall be considered to be separate project electives. The electives shall be cumulative and compliance with each project elective shall be recognized individually. **A108.2 Flooring material project elective.** Where projects are intended to qualify for a "flooring material" project elective, all flooring installed within the interior of the building shall comply with Section 806.4 or shall be one or more of the following flooring materials that are deemed to comply with VOC emission limits:

1. Ceramic and concrete tile
2. Clay pavers
3. Concrete
4. Concrete pavers
5. Metal
6. Organic-free, mineral-based

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 8.4.2.3

**A108.3 Ceiling materials project elective.** Where projects are intended to qualify for a "ceiling materials" project elective, all ceiling systems shall comply with Section 806.5 or shall be one or more of the following ceiling systems that are deemed to comply with VOC emission limits:

1. Ceramic tile
2. Clay masonry
3. Concrete
4. Concrete masonry
5. Metal
6. Organic-free, mineral-based

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION: 8.4.2.6**

**A108.4 Wall materials project elective.** Where projects are intended to qualify for a "wall materials" project elective, all wall systems shall comply with Section 806.5 or shall be one or more of the following wall systems that are deemed to comply with VOC emission limits:

1. Ceramic tile
2. Clay masonry
3. Concrete
4. Concrete masonry
5. Metal
6. Organic-free, mineral-based

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION: 8.4.2.6**

**A108.5 Total VOC limit project elective.** Where projects are intended to qualify for a "total VOC limit" project elective in accordance with a minimum of 50 percent of all adhesives and sealants, architectural paints and coatings, flooring, acoustical ceiling tiles and wall systems and Insulation shall have a Total Volatile Organic Compounds (TVOCs) emission limit of  $\leq 500 \text{ ug/m}^3$ . The test methodology used to determine compliance shall be from CDPH/EHLB/Standard Method V.1.1. The emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION: 8.4.2.1.2**

**A108.6 Views to building exterior project elective.** Where projects are intended to qualify for a "views to building exterior" project elective in accordance with Section A108.6, not less than 50 percent of the net floor area shall have a direct line of sight to the exterior through clear vision glazing. A total of not less than 45 square feet (4.18 m<sup>2</sup>) of clear vision glazing in the exterior wall or roof shall be visible. The direct line of sight shall originate at a height of 42 inches (1067 mm) above the finished floor of the space, shall terminate at the clear vision glazing in the exterior wall or roof, and shall be less than 40 feet (12 192 mm) in length. Exception: Where the direct line of sight is less than 25 feet (7620 mm) in length, a total of not less than 18 square feet (1.67 m<sup>2</sup>) of clear vision glazing in the exterior wall or roof shall be visible.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION: None**

**PROPOSED ELECTIVES**

**Indoor Environmental Air Quality – Proposed Elective**

**PROPOSED ACTION:** Adopt the following project elective

**RATIONALE / IMPACT:** Good practice; language taken directly from ASHRAE 189.1

**2011 ASHRAE 189.1 CORRELATION: 8.3.1.5**

**Building Entrances.** All building entrances shall employ an entry mat system that shall have a scraper surface, an absorption surface, and a finishing surface. Each surface shall be a minimum of the width of the entry opening, and the minimum length is measured in the primary direction of travel.

**Exceptions:** 1. Entrances to individual dwelling units. 2. Length of entry mat surfaces is allowed to be reduced due to a barrier, such as a counter, partition, or wall, or local regulations prohibiting the use of scraper surfaces outside the entry. In this case entry mat surfaces shall have a minimum length of 3 ft (1 m) of indoor surface, with a minimum combined length of 6 ft (2 m).

**Scraper Surface.** The scraper surface shall comply with the following: a. Shall be the first surface stepped on when

entering the building. b. Shall be either immediately outside or inside the entry. c. Shall be a minimum of 3 ft (1 m) long. d. Shall be either permanently mounted grates or removable mats with knobby or squeegee-like projections.  
**Absorption Surface.** The absorption surface shall comply with the following: a. Shall be the second surface stepped on when entering the building. b. Shall be a minimum of 3 ft (1 m) long, and made from materials that can perform both a scraping action and a moisture wicking action.  
**Finishing Surface.** The finishing surface shall comply with the following: a. Shall be the third surface stepped on when entering the building. b. Shall be a minimum of 4 ft (1.2 m) long, and made from material that will both capture and hold any remaining particles or moisture.

**Innovation in Design – Proposed Elective**

**PROPOSED ACTION:** Adopt the following project elective

**RATIONALE / IMPACT:** Promote sustainable strategies and resource conservation techniques not addressed elsewhere in the Code but worthy of consideration; language taken from LEED 2009 with minor modifications for this Code.

**2011 ASHRAE 189.1 CORRELATION:** None

**Innovative Strategies:** Innovative strategies are those that are not addressed by any other requirement of this Code. Only those strategies that demonstrate a comprehensive approach and have significant, measurable environmental benefits are applicable. Credit may be granted for strategies that demonstrate innovation in design or exemplary performance.



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 1 – Scope and Application

*[A] 101.1 Title. These regulations shall be known as the Green Construction Code of [NAME OF JURISDICTION] herein-after referred to as "this code."*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*101.2 General. This code is an overlay document to be used in conjunction with the other codes and standards adopted by the jurisdiction. This code is not intended to be used as a standalone construction regulation document and permits are not to be issued under this code. This code is not intended to abridge or supersede safety, health or environmental requirements under other applicable codes or ordinances.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action required

**2011 ASHRAE 189.1 CORRELATION:** None

*101.3 Scope. The provisions of this code shall apply to the design, construction, addition, alteration, change of occupancy, relocation, replacement, repair, equipment, building site, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures and to the site on which the building is located. Occupancy classifications shall be determined in accordance with the International Building Code (IBC) Exceptions: 1. The code shall not apply to items 1.1, 1.2 and 1.3 except where the jurisdiction adopts the jurisdictional requirements of Section 302.1, Item 1, for residential buildings. 1.1. Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height above grade plane with a separate means of egress, their accessory structures, and the site or lot upon which these buildings are located. 1.2. Group R-3 residential buildings, their accessory structures, and the site or lot upon which these buildings are located. 1.3. Group R-2 and R-4 residential buildings four stories or less in height above grade plane, their accessory structures, and the site or lot upon which these buildings are located. 2. The code shall not apply to equipment or systems that are used primarily for industrial or manufacturing. 3. The code shall not apply to temporary structures approved under Section 3103 of the International Building Code. 4. Where 2011 ASHRAE 189.1 is selected in accordance with Section 301.1.1, 2011 ASHRAE 189.1 shall not apply to buildings identified in Exceptions 1 through 3.*

*101.3.1 Residential construction. In lieu of the requirements of this code the following shall be deemed-to-comply with this code: 1. Group R-2 and R-4 residential buildings five stories or more in height above grade plane, their accessory structures, and the site or lot upon which these buildings are located that comply with ICC 700, with a minimum energy efficiency category requirements of the Silver performance level or equivalent. 2. Group R-2 and R-4 portions of mixed use buildings that comply with ICC 700, with a minimum energy efficiency category requirements of the Silver performance level or equivalent. The remainder of the building and the site upon which the building is located shall comply with the provisions of this code.*

**PROPOSED ACTION:** Adopt with following modification to 101.3: Add 5. All buildings less than 10,000 sq.ft gross floor area

**RATIONALE / IMPACT:** The language is consistent with other ICC codes and proposed modification is consistent with current Montgomery County Green Buildings Law (Chapter 8, Article 7 of Montgomery County Code)

**2011 ASHRAE 189.1 CORRELATION:** Chapter 2

*101.4 Appendices. Provisions in the appendices shall not apply unless specifically adopted.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** 4.1

*101.5 Intent. This code is intended to safeguard the environment, public health, safety and general welfare through the establishment of requirements to reduce the negative impacts and increase the positive impacts of the built environment on the natural environment and building occupants. This code is not intended to abridge or supersede safety, health or environmental requirements under other applicable codes or ordinances.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** Chapter 1; 2.3

*102.1 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 requirement to meet the intent of the code shall govern.*

*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 102.4, 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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Provides flexibility for practical interpretation by project team in consultation with DPS

**2011 ASHRAE 189.1 CORRELATION:** None

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

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** 2.3

*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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*102.4 Referenced codes and standards. The following codes shall be considered part of the requirements of this code: the International Building Code, the International Code Council Performance Code (ICCPC) the International Energy Conservation Code (IECC) the International Existing Building Code (IEBC) the International Fire Code (IFC) the International Fuel Gas Code (IFGC) the International Mechanical Code (IMC) the International Plumbing Code (IPC) International Property Maintenance Code (IPMC) and the International Residential Code (IRC)*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**102.4.1 Conflicting provisions.** Where the extent of the reference to a referenced code or standard includes a thing that is within the scope of this code or the International Codes listed in Section 102.4, 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.

**PROPOSED ACTION:** Recommend that DPS revise for clearer intent

**RATIONALE / IMPACT:** Poorly written and difficult to understand

**2011 ASHRAE 189.1 CORRELATION:** None

**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.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**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.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** 2.1

**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.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**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 Section 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 on unusual technical issues that arise, subject to the approval of the appointing authority.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**104.1 Information on construction documents.** *The content and format of construction documents shall comply with the International Building Code.*

**PROPOSED ACTION:** Adopt with the following addition: The content and format of construction documents shall comply with the International Building Code as amended by County Executive Regulations.

**RATIONALE / IMPACT:** Comply with local amendments

**2011 ASHRAE 189.1 CORRELATION:** None

**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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**105.4 Innovative approaches and alternative materials, design, 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*

**PROPOSED ACTION:** Adopt as written: See also proposed innovation credit(s) in Appendix A

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*105.6 Approved programs. The code official or other authority having jurisdiction shall be permitted to deem a national, state or local program to meet or exceed this code. Buildings approved in writing by such a program shall be considered to be in compliance with this code.  
105.6.1 Specific approval. The code official or authority having jurisdiction shall be permitted to approve programs or compliance tools for a specified application, limited scope or specific locale. For example, a specific approval shall be permitted to apply to a specific section or chapter of this code.*

**PROPOSED ACTION:** Adopt with following modification: Add 105.6.2 USGBC's LEED 2009 is an accepted compliance path if achieved at the Silver level

**RATIONALE / IMPACT:** Allows time for DPS and project teams to transition to IGCC and ASHRAE 189.1 compliance paths while maintaining intent of the County's Green Building Law.

**2011 ASHRAE 189.1 CORRELATION:** None

*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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language supports other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*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*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

*109.1 Violations. 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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## 2012 IgCC - Chapter 2 – Scope and Application

**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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** None

**201.3 Terms defined in other codes.** *Where terms are not defined in this code and are defined in the International Building Code (IBC) International Energy Conservation Code (IECC) International Fire Code (IFC) International Fuel Gas Code (IFGC) International Mechanical Code (IMC) International Plumbing Code (IPC) or International Residential Code (IRC) such terms shall have the meanings ascribed to them as in those codes.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** The language is consistent with other ICC codes

**2011 ASHRAE 189.1 CORRELATION:** 3.1

**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.*

**PROPOSED ACTION:** Delete and replace with: Other terms that are not defined shall have their ordinarily accepted meanings within the context in which they are used. Ordinarily accepted meanings shall be based upon American standard English language usage, as documented in an unabridged dictionary accepted by the authority having jurisdiction.

**RATIONALE / IMPACT:** Language revisions to eliminate multiple interpretations and provide specific direction for consistency.

**2011 ASHRAE 189.1 CORRELATION:** 3.1

## 202 DEFINITIONS

**95th-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.

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

**AIR CURTAIN.** A device that generates and discharges a laminar air stream installed at the building entrance intended to prevent the infiltration of external, unconditioned air into the conditioned spaces, or the loss of interior, conditioned air to the outside.

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

**ALTERNATE ON-SITE NONPOTABLE WATER.** Non-potable water from other than public utilities, onsite surface sources and subsurface natural freshwater sources. Examples of such water are gray water, onsite reclaimed water, collected rainwater, captured condensate, and rejected water from reverse osmosis systems.

**APPROVED.** Acceptable to the code official or authority having jurisdiction.

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

**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.

**AREA, TOTAL BUILDING FLOOR.** The total of the total floor areas on all stories of the building.

**AREA, TOTAL FLOOR.** The total area of a story as measured from the interior side of the exterior walls.

**ASBESTOS-CONTAINING PRODUCTS.** Building materials containing one or more of the following mineral fibers in any detectable amount that have been intentionally added or are present as a contaminant: chrysotile, amosite, crocidolite, tremolite, actinolite, anthophyllite and any fibrous amphibole.

**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").

**AUTOMATIC TIME SWITCH CONTROL.** A device or system that automatically controls lighting or other loads, including switching ON or OFF, based on time schedules.

**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.

**BICYCLE PARKING, LONG TERM.** Bicycle racks or storage lockers provided for bicycle riders including, but not limited to, employees and students, anticipated to be at a building site for four or more hours.

**BICYCLE PARKING, SHORT TERM.** Bicycle racks or storage lockers provided for bicycle riders including, but not limited to, customers, visitors, and event audiences, anticipated to be at a building site for less than four hours.

**BIO-BASED MATERIAL.** A commercial or industrial material or product, other than food or feed, that is composed of, or derived from, in whole or in significant part, biological products or renewable domestic agricultural materials, including plant, animal, and marine materials, or forestry materials.

**BRANCH CIRCUIT.** All circuit conductors between the final branch-circuit overcurrent device and the load.

**BROWNFIELD.** A site in which the expansion, redevelopment or reuse of would be required to address the presence or potential presence of a hazardous substance, pollutant or contaminant. Brownfield sites include: 1. EPA-recognized brownfield sites as defined in Public Law 107-118 (H.R. 2869) "Small Business Liability Relief and Brownfields Revitalization Act," 40 CFR, Part 300; and 2. Sites determined to be contaminated according to local or state regulation. **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).

**BUFFER.** The number of feet of setback from a wetland or water body determined by a jurisdiction to be necessary to protect a specific wetland or water body. The width of the buffer varies based on characteristics of the wetland and surrounding areas including, but not limited to, the type and function of the wetland, soils, slopes, land uses, habitats, and needs for wildlife or water quality protection. **BUILDING.** Any structure used or intended for supporting or sheltering any use or occupancy, including the energy using systems and site subsystems powered through the building's electrical service.

**BUILDING COMMISSIONING (See "Commissioning").**

**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.

**BUILDING THERMAL ENVELOPE.** The basement walls, exterior walls, floor, roof, and any other building elements that enclose conditioned space. This boundary also includes the boundary between conditioned space and any exempt or unconditioned space.

**CAPTIVE KEY CONTROL.** An automatic control device or system that energizes circuits when the key that unlocks the sleeping unit is inserted into the device and that de-energizes those circuits when the key is removed.

**CARBON DIOXIDE EQUIVALENT (CO<sub>2</sub>e) EMISSIONS.** A measure used to compare the emissions from various greenhouse gases based upon their 100-year time horizon global warming potential (GWP). CO<sub>2</sub>e emissions from carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) are included. The carbon dioxide equivalent for a gas is derived by multiplying the weight of the gas by the associated GWP.

**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 PIPING.** Unpressurized piping used within the collection system that drains rainwater or gray water to the storage tank by gravity.

**COMBINATION OVEN/STEAMER.** A chamber designed for heating, roasting, or baking food by a combination of conduction, convection, radiation, electromagnetic energy or steam.

**COMMISSIONING.** A process that verifies and documents that the selected building and site systems have been designed, installed, and function in accordance with the owner's project requirements and construction documents, and minimum code requirements

**COMPOSITE WOOD PRODUCTS.** Hardwood plywood, particleboard, and medium-density fiberboard. Composite wood products do not include the following: 1. Hardboard and structural plywood as specified in DOC PS-1; 2. Structural panels as specified in DOC PS-2; 3. Structural composite lumber as specified in ASTM D 5456; 4. Oriented strand board and glued laminated timber as specified in ANSI A190.1; 5.

Prefabricated wood I-joists as specified in ASTM D 5055; and 6. Finger-jointed lumber.

**CONSERVATION AREA.** Land designated by the jurisdiction or by state or federal government, as appropriate for conservation from development because of the land possessing natural values important to the community including, but not limited to, wildlife habitat, forest or other significant vegetation, steep slopes, ground water recharge area, riparian corridor or wetland.

**CONSTRUCTION-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.

**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. CO 2 e. Weight of each gas emitted when consuming a specific energy type in the building per unit of the specific energy type provided to the building at the utility meter multiplied by the global warming potential (GWP) of the specific gas, and then summed over all three gases emitted. where: GWP (CO 2 1 GWP (CH 4 25 GWP (N 2 O) 298.

**COURT.** An open, uncovered space, unobstructed to the sky, bounded on three or more sides by exterior building walls or other enclosing devices.

**DAYLIGHT CONTROL.** A device or system that provides automatic control of electric light levels based on the amount of daylight in a space.

**DAYLIGHT SATURATION.** The percentage of daylight hours throughout the year when not less than 28 foot candles (300 lux) of natural light is provided at a height of 30 inches (760 mm) above the floor.

**DAYLIT AREA.** That portion of a building's interior floor area that is regularly illuminated by natural light.

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

**DECONSTRUCTION.** The process of systematically disassembling a building, structure, or portion thereof, so that the materials, products, components, assemblies and modules can be salvaged for repurpose, reuse or recycling.

**DEMAND LIMIT.** The shedding of loads when pre-determined peak demand limits are about to be exceeded.

**DEMAND RESPONSE (DR).** The ability of a building system to reduce the energy consumption for a specified time period after receipt of demand response signal typically from the power company or demand response provider. Signals requesting demand response are activated at times of peak usage or when power reliability is at risk.

**DEMAND RESPONSE, AUTOMATED (AUTO-DR).** Fully automated demand response initiated by a signal from a utility or other appropriate entity, providing fully automated connectivity to customer energy end-use control strategies.

**DEMAND RESPONSE AUTOMATION INTERNET SOFTWARE.** Software that resides in a building energy management control system that can receive a demand response signal and automatically reduce heating, ventilation, air-conditioning (HVAC) and lighting system loads.

**DEMOLITION.** The process of razing, relocation, or removal of an existing building or structure, or a portion thereof.

**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 down-stream stormwater systems.

**DISHWASHER.**

**Dishwasher, door type.** A machine designed to clean and sanitize plates, glasses, cups, bowls, utensils, and trays by applying sprays of detergent solution and a sanitizing final rinse, that is designed to accept a standard 20-inch by 20-inch (508 mm by 508 mm) dish rack which requires the raising of a door to place the rack into the wash/rinse chamber.

**Dishwasher, multiple tank conveyor.** A machine designed to clean and sanitize plates, glasses, cups, bowls, utensils, and trays by applying sprays of detergent solution and a sanitizing final rinse, using a conveyor or similar mechanism to carry dishes through a series of wash and rinse sprays utilizing one or more tanks within the machine. This type of machine may include a prewashing section before the washing section and an auxiliary rinse section between the power rinse and final rinse section.

**Dishwasher, pot pan and utensil.** A machine designed to clean and sanitize pots, pans, and kitchen utensils by applying sprays of detergent solutions and a sanitizing final rinse.

**Dishwasher, rackless conveyor.** A machine designed to clean and sanitize plates, glasses, cups, bowls, utensils, and trays by applying sprays of detergent solution and a sanitizing final rinse, using a conveyor or similar mechanism to carry dishes through a series of wash and rinse sprays within the machine. Rackless conveyor machines utilize permanently installed, vertical pegs to carry dishware through the wash and rinse cycles.

**Dishwasher, single tank conveyor.** A machine designed to clean and sanitize plates, glasses, cups, bowls, utensils, and trays by applying sprays of detergent solution and a sanitizing final rinse, using a conveyor or similar mechanism to carry dishes through a series of wash and rinse sprays within the machine. This type of machine does not have a pumped rinse tank but may include a prewashing section ahead of the washing section.

**Dishwasher, under counter.** A machine designed to clean and sanitize plates, glasses, cups, bowls, utensils, and trays by applying sprays of detergent solution and a sanitizing final rinse, that has an overall height 38 inches (965 mm) or less, designed to be installed under food preparation workspaces.

**DISTRIBUTION PIPE.** Pressurized or nonpressure piping used within the plumbing system.

**DIVERSE USE CATEGORIES.** Categories of occupancies and land uses which are designated as either community, retail or service facilities:

**Community facilities.** The community facilities category includes: child care; civic or community center; a building containing a place of worship; police or fire station; post office, public library, public park, school, senior care facility, homeless shelter, and similar social services facilities. Retail uses. The retail use category includes: convenience store, florist, hardware store, pharmacy, grocery or supermarket and similar retail uses.

**Service uses.** The service use category includes: bank, coffee shop or restaurant; hair care; health club or fitness center; laundry or dry cleaner, medical or dental office and similar service uses.

**DWELLING UNIT.** A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

**ENERGY MANAGEMENT AND CONTROL SYSTEM, BUILDING (EMCS).** A computerized, intelligent network of electronic devices, designed to automatically monitor and control the energy using systems in a building.

**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.

**ENERGY STAR QUALIFIED.** Appliances or equipment that have been found to comply with ENERGY STAR requirements by a third-party organization recognized by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE).

**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.

**EVAPORATIVE COOLING SYSTEM.** A system for cooling the air in a building or space by removing heat from the outdoor air by means of the evaporation of water. The system forces air through wet porous pads, causing the latent heat of evaporation to cool the air. Water is continuously

circulated over the pads to replenish the evaporated water. Where the cooled air is sent directly into the building, the system is referred to as "direct evaporative cooling." Where the cooled air is sent through heat exchangers recirculating indoor air, the system is referred to as "indirect evaporative cooling."

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

**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.

**EXTERIOR WALL, OBSTRUCTED.** That portion of an exterior wall with limited access to natural light due to shading from buildings, structures, or geological formations.

**FACILITY OPERATIONS.** A facility is operational during the time when the primary activity that facility is designed for is taking place. For Group A and Group M occupancies, this is the time during which the facility is open to the public.

**FAN EFFICIENCY GRADE (FEG).** A numerical rating identifier that specifies the fan's aerodynamic ability to convert shaft power, or impeller power in the case of a direct driven fan, to air power. FEGs are based on fan peak (optimum) energy efficiency that indicates the quality of the fan energy usage and the potential for minimizing the fan energy usage.

**FARMLAND.**

**Farmlands of statewide significance.** Land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage and oil seed crops. Criteria for delineating this land is determined by the appropriate state agency.

**Prime farmland.** Land that has the best combination of physical and chemical characteristics for producing food, fiber, feed, forage, and oil seed crops and that is also available for these uses, including cropland, pastureland, forest land, range land and similar lands which are not water areas or urban or built-up land areas.

**Unique farmland.** Land other than prime farmland that is used for the production of specific high-value food or fiber crops. The land has the special combination of soil quality, location, growing season and moisture supply needed to economically produce sustained high-quality crops or high yields of a specific crop where the lands are treated and managed according to acceptable farming methods.

**FEEDER CONDUCTORS.** The circuit conductors between the service equipment, the source of a separately derived system, or other power supply source and the final branch-circuit overcurrent device.

**FENESTRATION.** Skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block, and combination opaque/glazed doors. Fenestration includes products with glass and nonglass glazing materials.

**FIBER PROCUREMENT SYSTEM.** A system that ensures that fiber procured for the manufacture of wood and wood-based products comes from responsible or certified sources in accordance with ASTM D 7612.

**FIREPLACE.** An assembly consisting of a hearth and fire chamber of noncombustible material and provided with a chimney for use with solid fuels. **Factory-built fireplace.** A listed and labeled fireplace and chimney system composed of factory-made components, and assembled in the field in accordance with the manufacturer's instructions and the conditions of the listing. **Masonry fireplace.** A field-constructed fireplace composed of solid masonry units, bricks, stones or concrete.

**FLOOD HAZARD AREA.** The greater of the following two areas: 1. The area within a floodplain subject to a 1-percent or greater chance of flooding in any given year; 2. The area designated as a flood hazard area on a community's flood hazard map, or otherwise legally designated.

**FLOOD OR FLOODING.** A general and temporary condition of partial or complete inundation of normally dry land from: 1. The overflow of inland or tidal waters; 2. The unusual and rapid accumulation of runoff of surface waters from any source.

**FLOODPLAIN.** An area of land at risk of being inundated with water during high flows. Floodplains are associated with both water courses, such as rivers and streams, and bodies of water, such as oceans and lakes.

**FLOOR AREA, NET.** The actual occupied area not including unoccupied accessory areas such as corridors, stairways, toilet rooms, mechanical rooms and closets.

**FREEZER.** Equipment designed to enclose a space of mechanically cooled and temperature-controlled air used to maintain prescribed frozen food holding temperatures.

**FRYER, DEEP FAT.** A unit with a width between 12 and 18 inches (305 and 457 mm) that cooks food by immersion in a tank of oil or fat more than 25 pounds (11 kg) and less than 50 pounds (23 kg).

**FRYER, LARGE VAT.** A unit with a width greater than 18 inches (457 mm) that cooks food by immersion in a tank of oil or fat more than 50 pounds (23 kg).

**GLOBAL WARMING POTENTIAL (GWP).** The cumulative radiative forcing effects of a gas over a 100-year time horizon resulting from the emission of a unit mass of gas relative to a reference gas. The GWP-weighted emissions of direct greenhouse gases in the U.S. inventory are presented in terms of equivalent emissions of carbon dioxide (CO<sub>2</sub> using units of teragrams of carbon dioxide equivalents (TgCO<sub>2</sub> Eq.). conversion: Tg=10<sup>9</sup> kg 10<sup>6</sup> metric tons 1 million metric tons.

**GRAY WATER.** Untreated waste water that has not come into contact with waste water from water closets, urinals, kitchen sinks, or dishwashers. Gray water includes, but is not limited to, waste water from bathtubs, showers, lavatories, clothes washers, and laundry trays.

**GREENFIELD.** Land that has not been previously developed or has a history of only agricultural use.

**GREENHOUSE GAS.** A gas in the atmosphere that absorbs and emits radiation within the thermal infrared range.

**GRIDDLE, DOUBLE-SIDED.** Equipment used to cook food between flat, smooth, or grooved horizontal plates heated from above and underneath.

**GRIDDLE, SINGLE-SIDED.** Equipment used to cook food directly on a flat, smooth, or grooved horizontal plate heated from underneath.

**GROUND SOURCE OR GEOEXCHANGE.** Where the earth is used as a heat sink in air conditioning or heat pump island systems. This also applies to systems utilizing subsurface water. Ground source heating and cooling uses the relatively constant temperature of the earth below the frost line. This steady temperature profile allows the earth to be used as a heat source in the winter and as a heat sink in the summer.

**HARDSCAPE.** Areas of a building site covered by man-made materials.

**HIGH-OCCUPANCY VEHICLE.** A vehicle which is occupied by two or more people, including carpools, van-pools, and buses.

**HISTORIC BUILDINGS.** Buildings that are listed in or eligible for listing in the National Register of Historic Places, or designated as historic under an appropriate state or local law.

**ICE MACHINE.**

**Ice machine, ice-making head.** A factory-made assembly consisting of a condensing unit and ice-making section operating as an integrated unit, with means for making and harvesting ice, that combines the ice-making mechanism and the condensing unit in a single package, but requires a separate ice storage bin.

**Ice machine, remote-condensing unit.** A factory-made assembly consisting of a condensing unit and ice-making section operating as an integrated unit, with means for making and harvesting ice, where the ice-making mechanism and condenser or condensing unit are in separate

sections.

**Ice machine, self-contained unit.** A factory-made assembly consisting of a condensing unit and ice-making section operating as an integrated unit, with means for making and harvesting ice and where the ice-making mechanism and storage compartment are combined into an integral cabinet.

**IMPERVIOUS SURFACE.** Paved concrete or asphalt and other similar surfaces that readily accommodate the flow of water with relatively little absorption, as typically used at exterior horizontal areas including, but not limited to, parking lots, bikeways, walkways, plazas and fire lanes.

**INDEPENDENT SYSTEM OPERATOR (ISO).** The electric system's operator.

**INFEASIBLE.** An alteration of a building, site feature, or system that has little likelihood of being accomplished because existing physical or site constraints prohibit modification or addition of elements, spaces or features which are in full and strict compliance with the minimum requirements for new construction.

**INFILL SITE.** Infill sites are one of the following: 1. A vacant lot, or collection of adjoining lots, located in an established, developed area that is already served by existing infrastructure; 2. A previously developed lot or a collection of previously developed adjoining lots, that is being redeveloped or is designated for redevelopment.

**INFRASTRUCTURE.** Facilities within a jurisdiction that provide community services and networks for travel and communication including: transportation services such as, but not limited to roads, bikeways and pedestrian ways and transit services; utility systems such as, but not limited to, water, sanitary sewage, stormwater management, telecommunications, power distribution and waste management; and community services such as, but not limited to, public safety, parks, schools and libraries.

**INFRASTRUCTURE, ADEQUATE.** The capacity of infrastructure systems, as determined by the jurisdiction, to serve the demands imposed by a new development on building sites without negatively impacting services to existing users of the infrastructure and without negatively impacting the overall functionality of the infrastructure. Adequacy can be determined based on existing infrastructure or on the infrastructure as augmented by a development project.

**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, defined by using the best scientific knowledge of that region. Consideration for inclusion as an invasive species shall include, but shall not be limited to, those species identified on: 1. Approved city, county or regional lists. 2. State noxious weeds laws, 3. Federal noxious weeds laws.

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

**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.

**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.

**LIFE CYCLE ASSESSMENT (LCA).** A technique to evaluate the relevant energy and material consumed and environmental emissions associated with the entire life of a building, product, process, material, component, assembly, activity or service.

**LIGHTING BOUNDARY.** Where the lot line abuts a public walkway, bikeway, plaza, or parking lot, the lighting boundary shall be a line 5 feet (1524 mm) from the lot line and located on the public property. Where the lot line abuts a public roadway or public transit corridor, the lighting boundary shall be the centerline of the public roadway or public transit corridor. In all other circumstances, the lighting boundary shall be at the lot line.

**LISTED.** Equipment, materials, products or services included in a list published by an organization acceptable to the code official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose.

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

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

**LOW EMISSION, HYBRID AND ELECTRIC VEHICLE.** Vehicles that achieve EPA Tier 2, California LEV-II, or a minimum of EPA LEV standards, whether by means of hybrid, alternative fuel, or electric power.

**LOW VOLTAGE DRY-TYPE DISTRIBUTION TRANSFORMER.** A NEMA 'Class 1' transformer that is air-cooled, does not use oil as a coolant, has an input voltage  $\leq 600$  volts, and is rated for operation at a frequency of 60 hertz.

**MANUAL.** Capable of being operated by personal intervention (see "Automatic").

**MINIMUM EFFICIENCY REPORTING VALUE (MERV).** Minimum efficiency-rated value for the effectiveness of air filters.

**METER.** A measuring device used to collect data and indicate usage.

**MODIFIED ENERGY FACTOR (MEF).** The capacity in cubic feet of the clothes container of a clothes washing machine, C, divided by the clothes washing total energy consumption in kWh per cycle. Total energy consumption per cycle is the sum of the machine electrical energy consumption per cycle, M; the hot water energy consumption per cycle, E; and the energy required for removal of the remaining moisture in the wash load per cycle, D. The equation is:  $MEF = C / (M + E + D)$

**MUNICIPAL RECLAIMED WATER.** Reclaimed water treated by a municipality.

**NATIVE PLANT SPECIES.** Species that are native to the ecosystem under consideration, defined by using the best scientific knowledge of that region. Consideration for inclusion as a native species shall include, but is not limited to, those species identified in any of the following: 1. Approved city, county and regional lists. 2. State laws. 3. Federal laws.

**NONPOTABLE WATER.** Water not safe for drinking, personal or culinary utilization.

**OCCUPANT LOAD.** The occupant load as calculated in accordance with the requirements of Chapter 10 of the International Building Code.

**OCCUPANT SENSOR CONTROL.** A device or system that detects the presence or absence of people within an area and causes lighting, equipment, or appliances to be regulated accordingly.

**ONCE-THROUGH COOLING.** The use of water as a cooling medium where the water is passed through a heat exchanger one time and then discharged to the drainage system. This also includes the use of water to reduce the temperature of condensate or process water before discharging it to the drainage system.

**ORGANIC MATTER.** Carbon-containing material composed of both living organisms and formerly living, decomposing plant and animal matter. Soil organic matter content is either naturally occurring or is a result of supplementation with compost or other partially decomposed plant and animal material.

**OUTDOOR ORNAMENTAL FOUNTAIN.** An outdoor fixture whose dominant use is aesthetic consisting of a catch basin, reservoir or chamber

from which one or more jets or streams of water is emitted.

**OVEN, CONVECTION.** A chamber designed for heating, roasting, or baking food by conduction, convection, radiation, and/or electromagnetic energy.

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

**PERVIOUS CONCRETE.** Hydraulic cement concrete with distributed, interconnected macroscopic voids that allows water to pass through the material with little resistance.

**POST-CONSUMER RECYCLED CONTENT.** The proportion of recycled material in a product generated by house-holds or by commercial, industrial, and institutional facilities in their role as end users of the product that can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

**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.

**POWER CONVERSION SYSTEM.** The equipment used to convert incoming electrical power, to the force causing vertical motion of the elevator. In a traction system, this would include the electrical drive, motor, and transmission.

**PRECONSUMER (POST-INDUSTRIAL) RECYCLED CONTENT.** The proportion of recycled material in a product diverted from the waste stream during the manufacturing process. Preconsumer recycled content does not include reutilization of material such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

**PRIMARY ENERGY USE.** The total fuel-cycle energy embedded within building materials and all forms of energy required for building operation. Units of energy are reported in total Btu's for building materials and total Btu's per unit of energy (e.g., kWh, therms and gallons) consumed in the operation of building mechanical systems (HVAC and lighting). Total fuel-cycle energy includes energy required from the point of initial extraction, through processing and delivery to the final point of consumption into building materials or building operation.

**PROCESS LOADS.** Building energy loads that are not related to building space conditioning, lighting, service water heating or ventilation for human comfort.

**PROJECTION FACTOR.** A ratio that describes the geometry of a horizontal projection, as determined in accordance with Equation 4-2 of Section C402.3.3 of the International Energy Conservation Code.

**PROPOSED DESIGN.** A description of the proposed building used to estimate annual energy use for determining compliance based on total building performance including improvements in design such as the use of passive solar energy design concepts and technologies, improved building thermal envelope strategies, increased equipment and systems efficiency, increased use of daylighting, improved control strategies and improved lighting sources that will result in a decrease in annual energy.

**R-VALUE (THERMAL RESISTANCE).** The inverse of the time rate of heat flow through a body from one of its bounding surfaces to the other surface for a unit temperature difference between the two surfaces, under steady state conditions, per unit area ( $h\ ft^2\ ^\circ F/Btu$ ) [ $(m^2\ K)/W$ ].

**RAINWATER.** Water from natural precipitation.

**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.

**REBOUND AVOIDANCE, EXTENDED AUTO-DR CONTROL.** The rebound avoidance, extended Auto-DR control strategy is essentially an extension of the rebound avoidance, slow recovery strategy. Although a slow recovery strategy is critical to maximize the benefit of an Auto-DR strategy, the building energy management and control system (EMCS) programming for just such a strategy can be very complex or might not be possible for many conventional EMCS's. A rebound avoidance, extended Auto-DR control strategy also includes logic and controls for avoiding a rebound peak when the control signal is stopped.

**REBOUND AVOIDANCE, SEQUENTIAL EQUIPMENT RECOVERY.** Sequential equipment recovery that disperses short duration equipment start up spikes gradually, thereby avoiding a larger whole building demand spike.

**REBOUND AVOIDANCE, SLOW RECOVERY.** Slow recovery strategies slowly recover the target parameter that was controlled in the demand response strategy. Where this strategy is applied, the zone setpoints are gradually restored to the normal setpoints. Where air moving systems are targeted, a limit strategy is applied to the adjustable speed drives; fan adjustable speed drive limits are gradually shifted up.

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

**RECLAIMED WATER.** Nonpotable water that has been derived from the treatment of waste water 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." **RECYCLABILITY.** Ability of a material or product to be captured and separated from a waste stream for conversion, reprocessing or reuse.

**REFRIGERATOR.** Equipment designed to enclose a space of mechanically cooled and temperature-controlled air used to maintain prescribed cold food holding temperatures.

**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.

**RELOCATABLE (RELOCATED) MODULAR BUILDING.** A partially or completely assembled building using a modular construction process and designed to be reused or repurposed multiple times and transported to different building sites.

**RENEWABLE ENERGY CREDIT (REC).** An REC represents the property rights to the environmental, social, and other nonpower qualities of renewable electricity generation. An REC, and its associated attributes and benefits, is sold separately from the underlying physical electricity associated with an onsite renewable energy source. REC's allow organizations to support renewable energy development and protect the environment where renewable power products are not locally available. There are two approaches to verifying REC ownership and the right to make environmental claims: (1) REC contracts from a list of approved providers, including an audit of the chain of custody; and (2) REC tracking systems.

**RENEWABLE ENERGY SOURCE, ONSITE.** Energy derived from solar radiation, wind, waves, tides, biogas, bio-mass, or geothermal energy. The energy system providing onsite renewable energy is located on or adjacent to the building site, and generate energy for use on the building site or to send back to the energy supply system.

**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.

**REUSE.** To divert a material, product, component, module, or a building from the waste stream in order to use it again.

**ROOF COVERING.** The covering applied to the roof deck for weather resistance, fire classification or appearance.

**ROOF REPLACEMENT.** The process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering.

**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.

**SEQUENCE OF OPERATIONS (HVAC).** A fully descriptive detailed account of the intended operation of HVAC systems covering the operation of systems in narrative terms, accounting for all of the equipment that makes up the systems, how the systems are designed to operate, and how they are to be controlled.

**SITE DISTURBANCE.** Site preparation or construction which negatively affects the native soils, native vegetation, or native animal life of the site

**SKYLIGHTS AND SLOPED GLAZING.** Glass or other transparent or translucent glazing material installed at a slope of less than 60 degrees (1.05 rad) from horizontal. Glazing material in skylights, including unit skylights, tubular daylighting devices, solariums, sunrooms, roofs and sloped walls, are included in this definition.

**SKYLIGHT, UNIT.** A factory-assembled, glazed fenestration unit, containing one panel of glazing material that allows for natural lighting through an opening in the roof assembly while preserving the weather-resistant barrier of the roof.

**SLEEPING UNIT.** A room or space in which people sleep, that can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

**SOLAR HEAT GAIN COEFFICIENT (SHGC).** The ratio of the solar heat gain entering the space through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then reradiated, conducted or convected into the space.

**SOLAR PHOTOVOLTAIC SYSTEM.** Devices such as photovoltaic (PV) modules and inverters that are used to transform solar radiation into energy.

**SOLAR REFLECTANCE.** A measure of the ability of a surface material to reflect sunlight. It is the fraction of incident sunlight reflected by a surface, expressed on a scale of 0 to 1. Solar reflectance is also referred to as "albedo."

**SOLAR REFLECTANCE INDEX (SRI).** A value that incorporates both solar reflectance and thermal emittance in a single measure to represent a surface's relative temperature in the sun. SRI compares a surface's temperature to those of standard black and standard white surfaces. It typically ranges from 0 for standard black to 100 for standard white, but can be less than 0 or greater than 100.

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

**STANDARD REFERENCE DESIGN.** A building design that meets the minimum requirements of the International Energy Conservation Code and the additional requirements of Section 602.2.

**STANDBY MODE (ELEVATOR).** An operating mode during periods of inactivity in which electrical loads are reduced to conserve energy. For elevators, standby mode begins up to 5 minutes after an elevator is unoccupied and has parked and completed its last run and ends when the doors are re-opened. For escalators and moving walkways, standby mode begins after traffic has been absent for up to 5 minutes and ends when the next passenger arrives.

**STEAM COOKER.** Equipment in which potable steam is used for heating, cooking, and reconstituting food.

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

**STORY.** That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above. It is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

**STRUCTURE.** That which is built or constructed.

**SUBSTANTIAL IMPROVEMENT.** Any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not include either of the following: 1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the code official and that are the minimum necessary to assure safe living conditions. 2. Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.

**THERMAL EMITTANCE.** The ratio of radiative power emitted by a sample to that emitted by a black body radiator at the same temperature.

**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.

**TRACTION ELEVATOR.** An elevator system in which the cars are suspended by ropes wrapped around a sheave that is driven by an electric motor.

**TRANSIT SERVICE.** A service that a public transit agency serving the area has committed to provide including, but not limited to, bus, streetcar, light or heavy rail, passenger ferry or tram service.

**TUBULAR DAYLIGHTING DEVICE (TDD).** A non-operable fenestration unit primarily designed to transmit daylight from a roof surface to an interior space via a tubular conduit. The basic unit consists of an exterior glazed weathering surface, a light-transmitting tube with a reflective interior surface, and an interior-sealing device such as a translucent panel. The unit is either factory assembled, or field assembled from a manufacturing kit.

**U-FACTOR (THERMAL TRANSMITTANCE).** The coefficient of heat transmission (air to air) through a building component or assembly, equal to the lime rate of heat flow per unit area and unit temperature difference between the warm side and cold side air films (Btu/h ft<sup>2</sup> °F) [W/(m<sup>2</sup> K)].

**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.

**VENTILATION.** The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

**VISIBLE TRANSMITTANCE (VT).** The ratio of visible light entering the space through the fenestration product assembly to the incident visible light. VT includes the effects of glazing material and frame and is expressed as a number between 0 and 1.

**VOLATILE ORGANIC COMPOUND (VOC).** A volatile chemical compound based on carbon chains or rings that typically contain hydrogen and sometimes contain oxygen, nitrogen and other elements, and that has a vapor pressure of greater than 0.1 mm of mercury at room temperature.

**VOLTAGE DROP.** A decrease in voltage caused by losses in the circuit conductors connecting the power source to the load.

**WATER FACTOR (WF).** The quantity of water, in gallons per cycle (Q), divided by a clothes washing machine clothes container capacity in cubic feet (C). The equation is: WF Q/C

**WATER FEATURE.** An outdoor open water installation or natural open water way within a built landscape to retain water supplied from source other than rainwater naturally flowing into the feature.

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

**WETLAND.** Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

**ZERO ENERGY PERFORMANCE INDEX (zEPI).** A scalar representing the ratio of energy performance of the proposed design compared to the average energy performance of buildings relative to a benchmark year.

#### **PROPOSED ACTION:**

1. Delete: **FENESTRATION.** Skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block, and combination opaque/glazed doors. Fenestration includes products with glass and nonglass glazing materials.  
Add: **FENESTRATION.** All areas (including the frames) in the building envelope that let in light, including windows, plastic panels, clerestories, skylights, doors that are more than one-half glass, and glass block walls. (See building envelope and door.)
2. **FIREPLACE.** An assembly consisting of a hearth and fire chamber of noncombustible material and provided with a chimney or direct vent for use with solid fuels. Factory-built fireplace. A listed and labeled fireplace and chimney system composed of factory-made components, and assembled in the field in accordance with the manufacturer's instructions and the conditions of the listing. Masonry fireplace. A field-constructed fireplace composed of solid masonry units, bricks, stones or concrete
3. **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 that provides storm water quantity and quality benefits.

#### **RATIONALE / IMPACT:**

1. Language revision to eliminate primarily opaque surfaces as fenestration; language adopted from ASHRAE 90.1
2. Language revision to include all types of vents and fuels
3. Language revision to broaden the definition

**2011 ASHRAE 189.1 CORRELATION:** Section 3.2



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 3 – Jurisdictional Requirements and Life Cycle Assessment

**301.1 Scope.** This chapter contains requirements that are specific to and selected by the jurisdiction and provisions for whole building life cycle assessment.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action required

**2011 ASHRAE 189.1 CORRELATION:** 9.5.1 Life Cycle Assessment

**301.1.1 Application.** The requirements contained in this code are applicable to buildings, or portions of buildings. As indicated in Section 101.3, these buildings shall meet either the requirements of 2011 ASHRAE 189.1 or the requirements contained in this code.

**PROPOSED ACTION:** Adopt with the following modification: Add - **301.1.1 Application.** The requirements contained in this code are applicable to buildings, or portions of buildings. As indicated in Section 101.3, these buildings shall meet either the requirements of 2011 ASHRAE 189.1, USGBC's LEED 2009 achieving the Silver level, or the requirements contained in this code.

**RATIONALE / IMPACT:** Accommodates urban and rural projects; allows concerned parties to become familiar with the Code; allows project teams to select the compliance path that makes most sense for their project; coincides with ICC's decision to leave both paths open to the project team rather than being mandated by the AHJ; and allowing LEED as an additional compliance path provides the County time to implement Code requirements.

**2011 ASHRAE 189.1 CORRELATION:** 2011 ASHRAE 189.1

**301.2 Jurisdictional requirements.** 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. All other provisions of this code shall be mandatory as applicable.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** None

**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 whether requirements for residential buildings, as indicated in Exception 1 to Section 101.3, are applicable by selecting "Yes" or "No" in Table 302.1. Where "Yes" is selected, the provisions of ICC 700 shall apply and the remainder of this code shall not apply. 2. Where the jurisdiction requires enhanced energy performance for buildings designed on a performance basis, the jurisdiction shall indicate a zEPI of 46 or less in Table 302.1 for each occupancy required to have enhanced energy performance. 3. Where "Yes" or "No" boxes are provided, the jurisdiction shall check the box to indicate "Yes" where that section is to be enforced as a mandatory requirement in the jurisdiction, or "No" where that section is not to be enforced as a mandatory requirement in the jurisdiction.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written (302.1 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Good practice may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** None

**302.1.1 zEPI of 46 or less.** Where a zEPI of 46 or less is indicated by the jurisdiction in Table 302.1, buildings shall comply on a performance-basis in accordance with Section 601.3.1. **Exception:** Buildings less than 25,000 square feet (2323 m<sup>2</sup> in total building floor area pursuing compliance on a prescriptive basis shall be deemed to have a zEPI of 51 and shall not be required to comply with the zEPI of Jurisdictional Choice indicated by the jurisdiction in Table 302.1.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written (302.1.1 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Good practice may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** None

**303.1 Whole building life cycle assessment.** Where a whole building life cycle assessment is performed in accordance with Section 303.1, compliance with Section 505 shall not be required. The requirements for the execution of a whole building life cycle assessment shall be performed in accordance with the following: 1. The assessment shall demonstrate that the building project achieves not less than a 20-percent improvement in environmental performance for global warming potential and at least two of the following impact measures, as compared to a reference design of similar usable floor area, function and configuration that meets the minimum energy requirements of this code and the structural requirements of the International Building Code. For relocatable buildings, the reference design shall be comprised of the number of reference buildings equal to the estimated number of uses of the relocatable building. 1.1. Primary energy use. 1.2. Acidification potential. 1.3. Eutrophication potential. 1.4. Ozone depletion potential. 1.5. Smog potential. 2. The reference and project buildings shall utilize the same life cycle assessment tool. 3. The life cycle assessment tool shall be approved by the code official. 4. Building operational energy shall be included. For relocatable buildings, an average building operational energy shall be estimated to reflect potential changes in location, siting, and configuration by adding or subtracting modules, or function. 5. Building process loads shall be permitted to be included. 6. Maintenance and replacement schedules and actions for components shall be included in the assessment. For relocatable buildings, average transportation energy, material and waste generation associated with reuse of relocatable buildings shall be included in the assessment. 7. The full life cycle, from resource extraction to demolition and disposal, including but not limited to, onsite construction, maintenance and replacement, relocation and reconfiguration, and material and product embodied acquisition, process and transportation energy, shall be assessed. **Exception:** Electrical and mechanical equipment and controls, plumbing products, fire detection and alarm systems, elevators and conveying systems shall not be included in the assessment. 8. The complete building envelope, structural elements, inclusive of footings and foundations, and interior walls, floors and ceilings, including interior and exterior finishes, shall be assessed to the extent that data are available for the materials being analyzed in the selected life cycle assessment tool. 9. The life cycle assessment shall conform to the requirements of ISO 14044.

**PROPOSED ACTION:** Move to Appendix A - Adopt as written

**RATIONALE / IMPACT:** Good practice may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 9.5.1

**TABLE 302.1  
REQUIREMENTS DETERMINED BY THE JURISDICTION**

Section	Section Title or Description and Directives	Jurisdictional Requirements	
<b>CHAPTER 1. SCOPE</b>			
101.3 Exception 1.1	Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height above grade plane with a separate means of egress, their accessory structures, and the site or lot upon which these buildings are located, shall comply with ICC 700.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
101.3 Exception 1.2	Group R-3 residential buildings, their accessory structures, and the site or lot upon which these buildings are located, shall comply with ICC 700.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
101.3 Exception 1.3	Group R-2 and R-4 residential buildings four stories or less in height above grade plane, their accessory structures, and the site or lot upon which these buildings are located, shall comply with ICC 700.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<b>CHAPTER 4. SITE DEVELOPMENT AND LAND USE</b>			
402.2.1	Flood hazard area preservation, general	<input type="checkbox"/> Yes	<input type="checkbox"/> No
402.2.2	Flood hazard area preservation, specific	<input type="checkbox"/> Yes	<input type="checkbox"/> No
402.3	Surface water protection	<input type="checkbox"/> Yes	<input type="checkbox"/> No
402.5	Conservation area	<input type="checkbox"/> Yes	<input type="checkbox"/> No
402.7	Agricultural land	<input type="checkbox"/> Yes	<input type="checkbox"/> No
402.8	Greenfield sites	<input type="checkbox"/> Yes	<input type="checkbox"/> No
407.4.1	High-occupancy vehicle parking	<input type="checkbox"/> Yes	<input type="checkbox"/> No
407.4.2	Low-emission, hybrid and electric vehicle parking	<input type="checkbox"/> Yes	<input type="checkbox"/> No
409.1	Light pollution control	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<b>CHAPTER 5. MATERIAL RESOURCE CONSERVATION AND EFFICIENCY</b>			
503.1	Minimum percentage of waste material diverted from landfills	<input type="checkbox"/> 50% <input type="checkbox"/> 65% <input type="checkbox"/> 75%	
<b>CHAPTER 6. ENERGY CONSERVATION, EFFICIENCY AND CO<sub>2</sub>e EMISSION REDUCTION</b>			
302.1, 302.1.1, 602.1	zEPI of Jurisdictional Choice - The jurisdiction shall indicate a zEPI of 46 or less in each occupancy for which it intends to require enhanced energy performance.	Occupancy: _____ zEPI: _____	
604.1	Automated demand response infrastructure	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<b>CHAPTER 7. WATER RESOURCE CONSERVATION, QUALITY AND EFFICIENCY</b>			
702.7	Municipal reclaimed water	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<b>CHAPTER 8. INDOOR ENVIRONMENTAL QUALITY AND COMFORT</b>			
804.2	Post-Construction Pre-Occupancy Baseline IAQ Testing	<input type="checkbox"/> Yes	<input type="checkbox"/> No
807.1	Sound transmission and sound levels	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<b>CHAPTER 10. EXISTING BUILDINGS</b>			
1007.2	Evaluation of existing buildings	<input type="checkbox"/> Yes	<input type="checkbox"/> No
1007.3	Post Certificate of Occupancy zEPI, energy demand, and CO <sub>2</sub> e emissions reporting	<input type="checkbox"/> Yes	<input type="checkbox"/> No

**PROPOSED ACTION:** Delete 402.2.1, 402.2.2, 402.3, 402.5, 402.7 and 402.8; and move all but 409.1 and 503.1 to Appendix A. See individual recommendations.



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 4 – Site Development and Land Use

**401.1 Scope and intent.** This chapter provides requirements for the development and maintenance of building and building sites to minimize negative environmental impacts and to protect, restore and enhance the natural features and environmental quality of the site.

**PROPOSED ACTION:** Adopt with the following modifications:

**RATIONALE / IMPACT:** See Sections 401.2 through 409.3

**2011 ASHRAE 189.1 CORRELATION:** See Chapters 5, 6 and 10 of 2011 ASHRAE 189.1

**401.2 Pre-design site inventory and assessment.** An inventory and assessment of the natural resources and baseline conditions of the building site shall be submitted with the construction documents. The inventory and assessment shall: 1. Determine the location of any protection areas identified in Section 402.1 that are located on, or adjacent to, the building site; 2. Determine whether, and to the degree to which, the native soils and hydrological conditions of the building site have been disturbed and altered by previous use or development; 3. Identify invasive plant species on the site for removal; and 4. Identify native plant species on the site.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by M-NCPPC and DPS (Articles 19 & 22A of County Code – Forest Conservation)

**2011 ASHRAE 189.1 CORRELATION:** None

**402.1 Protection by area.** Where flood hazard areas, surface water bodies or wetlands, conservation areas, parklands, agricultural lands or greenfields are located on, or adjacent to, a lot, the development of the lot as a building site shall comply with the provisions of Sections 402.2 through 402.8.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by FEMA, MDE, M-NCPPC and DPS (Articles 19 & 22A of County Code – Forest Conservation)

**2011 ASHRAE 189.1 CORRELATION:** 5.3.1.2

**402.2. Flood hazard areas.** For locations within flood hazard areas, unless compliance with Section 402.2.1 or Section 402.2.2 is required by Table 302.1, new buildings and structures and substantial improvements shall comply with Section 402.2.3.  
**402.2.1 Flood hazard area preservation, general.** Where this section is indicated to be applicable in Table 302.1, new buildings and structures, site disturbance, and development of land shall be prohibited within flood hazard areas.  
**402.2.2 Flood hazard area preservation, specific.** Where this section is indicated to be applicable in Table 302.1, new buildings and structures, site disturbance, and development of land shall be prohibited within the specific flood hazard areas established pursuant to local land use authority.  
**402.2.3 Development in flood hazard areas.** New buildings, structures and substantial improvements constructed in flood hazard areas shall be in compliance with Section 1612 of the International Building Code provided the lowest floors are elevated or dry floodproofed to not less than 1 foot (25 mm) above the elevation required by Section 1612 of the International Building Code, or the elevation established by the jurisdiction, whichever is higher.

**PROPOSED ACTION:** Delete (402.2.1 and 402.2.2 are Jurisdictional Electives)

**RATIONALE / IMPACT:** Regulated by FEMA, MDE, and DPS (Article 19 of County Code – Sediment Control)

**2011 ASHRAE 189.1 CORRELATION:** 5.3.1.2

**402.3 Surface water protection.** Where this section is indicated to be applicable in Table 302.1, buildings and building site improvements shall not be located over, or located within a buffer as established by the jurisdiction, around or adjacent to oceans, lakes, rivers, streams and other bodies of water that support or could support fish, recreation or industrial use. The buffer shall be measured from the ordinary high-water mark of the body of water. **Exceptions:** 1. Buildings and associated site improvements specifically related to the use of the water including, but not limited to, piers, docks, fish hatcheries, and habitat restoration facilities, shall be permitted where the impacts of the construction and location adjacent to or over the water on the habitat is mitigated. 2. Buildings and associated site improvements shall be permitted where a wetlands permit has been issued under a national wetlands permitting program or otherwise issued by the authority having jurisdiction.

**PROPOSED ACTION:** Delete (402.3 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Regulated by FEMA, MDE, and DPS (Article 19 of County Code – Sediment Control)

**2011 ASHRAE 189.1 CORRELATION:** 5.3.1.2

**402.4 Wetland protection.** Buildings and building site improvements shall not be located within a wetland or within a buffer as established by the jurisdiction around a wetland. **Exception:** Buildings and associated site improvements specifically related to the use of the wetland including, but not limited to, piers, docks, fish hatcheries, and habitat restoration facilities, shall be permitted where the impacts of the construction and location adjacent to or over the wetland on the habitat are mitigated.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by EPA, MDE, and DPS (Article 19 of County Code – Sediment Control)

**2011 ASHRAE 189.1 CORRELATION:** 5.3.1.2

**402.5 Conservation area.** Where this section is indicated to be applicable in Table 302.1, site disturbance or development of land in or within 50 feet (15 240 mm) of any designated conservation area shall not be permitted. **Exception:** Buildings and associated site improvements located in or within 50 feet (15 240 mm) of a conservation area shall be permitted where the building and associated site improvements serve a purpose related to the conservation area as determined by the authority that designated the conservation area.

**PROPOSED ACTION:** Delete (402.5 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Regulated by MDE, M-NCPPC and DPS (Article 19 of County Code – Sediment Control)

**2011 ASHRAE 189.1 CORRELATION:** 5.3.1.2

**402.6 Park land.** Site disturbance or development of land located within a public park shall not be permitted. **Exceptions:** 1. Buildings and site improvements shall be permitted to be located within a park where the building and site improvements serve a park-related purpose. 2. Park lands owned and managed by the Federal government shall be exempt from this prohibition. 3. Privately held property located within the established boundary of a park shall be exempt from this prohibition.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by M-NCPPC

**2011 ASHRAE 189.1 CORRELATION:** None

**402.7 Agricultural land.** Where this section is indicated to be applicable in Table 302.1, buildings and associated site improvements shall not be located on land zoned for agricultural purposes. **Exception:** Buildings and associated site improvements shall be permitted to be located on agriculturally zoned land where the building serves an agriculturally related purpose, including, but not limited to, primary residence, farmhouse, migrant workers housing, farm produce storage, processing and shipping.

**PROPOSED ACTION:** Delete (402.7 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Regulated by M-NCPPC and DPS (Article 59 of County Code – Zoning)

**2011 ASHRAE 189.1 CORRELATION:** None

**402.8 Greenfield sites.** Where this section is indicated to be applicable in Table 302.1, site disturbance or development shall not be permitted on greenfield sites. **Exception:** The development of new buildings and associated site improvements shall be permitted on greenfield sites where the jurisdiction determines that adequate infrastructure exists, or will be provided, and where the sites comply with not less than one of the following: 1. The greenfield site is located within 1/4 mile (0.4 km) of developed residential land with an average density of not less than 8 dwelling units per acre (19.8 dwelling units per hectare). 2. The greenfield site is located within 1/4 mile (0.4 km) distance, measured over roads or designated walking surfaces, of not less than 5 diverse uses and within 1/2 mile (0.8 km) walking distance of not less than 7 diverse uses. The diverse uses shall include not less than one use from each of the following categories of diverse uses: retail, service, or community facility. 3. The greenfield site has access to transit service. The building on the building site shall be located in compliance with one of the following: 3.1. Within 1/4 mile (0.4 km) distance, measured over designated walking surfaces, of existing or planned bus or streetcar stops. 3.2. Within 1/2 mile (0.8 km) distance, measured over designated walking surfaces, of existing or planned rapid transit stops, light or heavy passenger rail stations, ferry terminals, or tram terminals. 4. The greenfield site is located adjacent to areas of existing development that have connectivity of not less than 90 intersections per square mile (35 intersections per square kilometer). Not less than 25 percent of the perimeter of the building site shall adjoin, or be directly across a street, public bikeway or pedestrian pathway from the qualifying area of existing development. 4.1. Intersections included for determination of connectivity shall include the following: 4.1.1. Intersections of public streets with other public streets; 4.1.2. Intersections of public streets with bikeways and pedestrian pathways that are not part of a public street for motor vehicles; and 4.1.3. Intersections of bikeways and pedestrian pathways that are not part of a public street for motor vehicles. 4.2. The following areas need not be included in the determination of connectivity: 4.2.1. Water bodies, including, but not limited to lakes and wetlands. 4.2.2. Parks larger than 1/2 acre (2023 m<sup>2</sup> designated conservation areas and areas preserved from development by the jurisdiction or by the state or federal government. 4.2.3. Large facilities including, but not limited to airports, railroad yards, college and university campuses.

**402.8.1 Site disturbance limits on greenfield sites.** For greenfield sites that are permitted to be developed, site disturbances shall be limited to the following areas: 1. Within 40 feet (18 288 mm) of the perimeter of the building; 2. Within 15 feet (4572 mm) of proposed surface walkways, roads, paved areas and utilities; 3. Within 25 feet (7620 mm) of constructed areas with permeable surfaces that require additional staging areas to limit compaction in the constructed areas.

**PROPOSED ACTION:** Delete (402.8 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Regulated by M-NCPPC and DPS (Article 59 of County Code – Zoning)

**2011 ASHRAE 189.1 CORRELATION:** 5.3.1.1

**403.1 Stormwater management.** Stormwater management systems, including, but not limited to, infiltration, evapotranspiration, rainwater harvest and runoff reuse; shall be provided and retained on the building site.

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

**403.1.2 Adjoining lots and property.** 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.

**403.1.3 Brownfields.** Stormwater management systems on areas of brownfields where contamination is left in place shall not use infiltration. Stormwater management systems shall not penetrate, damage, or otherwise compromise remediation actions at the building site.

**403.2 Coal tar sealants.** Coal tar sealants shall not be used in any application exposed to stormwater, wash waters, condensates, snowmelt, icemelt or any source of water that could convey coal tar sealants into soils, surface waters or ground-waters.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by EPA, MDE and DPS (Article 19 of County Code – Sediment Control)

**2011 ASHRAE 189.1 CORRELATION:** None

**404.1 Landscape irrigation systems.** Irrigation of exterior landscaping shall comply with Sections 404.1.1 and 404.1.2.

**404.1.1 Water for outdoor landscape irrigation.** Outdoor landscape irrigation systems shall be designed and installed to reduce potable water use by 50 percent from a calculated mid-summer baseline in accordance with Section 404.1.2 or, where permitted by State regulation or local ordinances, the system shall be supplied by municipal reclaimed water or with alternate onsite nonpotable water complying with Chapter 7. **Exceptions:** Potable water is permitted to be used as follows: 1. During the establishment phase of newly planted landscaping. 2. To irrigate food production. 3. To supplement nonpotable water irrigation of shade trees provided in accordance with Section 408.2.3. 4. Potable water is permitted for landscape irrigation where approved by local ordinance or regulation.

**404.1.2 Irrigation system design and installation.** Where in-ground irrigation systems are provided, the systems shall comply with all of the following: 1. The design and installation of outdoor irrigation systems shall be under the supervision of an irrigation professional accredited or certified by an appropriate local or national body. 2. Landscape irrigation systems shall not direct water onto building exterior surfaces, foundations or exterior paved surfaces. Systems shall not generate runoff. 3. Where an irrigation control system is used, the system shall be one that regulates irrigation based on weather, climatological or soil moisture status data. The controller shall have integrated or separate sensors to suspend irrigation events during rainfall. 4. Irrigation zones shall be based on plant water needs with plants of similar need grouped together. Turfgrass shall not be grouped with other plantings on the same zone. 5. Microirrigation zones shall be equipped with pressure regulators that ensure zone pressure is not greater than 40 psi (275.8 kPa), filters, and flush end assemblies. 6. Sprinklers shall: 6.1. Have nozzles with matched precipitation rates. 6.2. Be prohibited on landscape areas less than 4 feet (1230 mm) in any dimension. 6.3. Be prohibited on slopes greater than 1 unit vertical to 4 units horizontal (25-percent slope). **Exception:** Where the application rate of the sprinklers is less than or equal to 0.5 inches (12.7 mm) per hour. 6.4. Be permitted for use on turfgrass and crop areas only excepting microsprays of a flow less than 45 gallons (170 liters) per hour. 6.5. If of the pop-up configuration, pop-up to a height of not less than 4 inches (101 mm). 6.6. Only be installed in zones composed exclusively of sprinklers and shall be designed to achieve a lower quarter distribution uniformity of not less than 0.65.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 6.3.1.2

**404.2 Outdoor ornamental fountains and water features.** Where available and approved for use by the authority having jurisdiction, alternate nonpotable onsite water sources complying with Chapter 7 shall be used for outdoor ornamental fountains and other water features constructed or installed on a building site. Where the fountain or water feature is the primary user of the building site's nonpotable water source, a potable makeup water connection is prohibited. **Exception:** Outdoor ornamental fountains and water features are allowed to use potable water provided water is recirculated and there is not an automatic refill valve connection to a source of potable water, and provided that either: 1. The catch basin or reservoir is no greater than 100 gallons (379 L); or 2. Less than 20 square feet (1.86 m<sup>2</sup>) of water surface area is exposed.

**404.2.1 Treatment.** The treatment required to RETAIN appropriate water quality shall comply with the authority having jurisdiction.

**404.2.2 Recirculation.** Outdoor ornamental fountains and water features shall be equipped to recirculate and reuse the supplied water.

**404.2.3 Signage.** Signage in accordance with Chapter 7 shall be posted at each outdoor ornamental fountain and water feature where nonpotable water is used.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 6.4.3

**405.1 Soil and water quality protection.** Soil and water quality shall be protected in accordance with Sections 405.1.1 through 405.1.6.

**PROPOSED ACTION:** Adopt with the following modifications (see 405.1.1 through 405.1.6)

**RATIONALE / IMPACT:** Good practice, some sections covered by other County ordinances

**2011 ASHRAE 189.1 CORRELATION:** See below

**405.1.1 Soil and water quality protection plan.** A soil and water quality protection plan shall be submitted by the owner and approved prior to construction. The protection plan shall address the following: 1. A soils map, site plan, or grading plan that indicates designated soil management areas for all site soils, including, but not limited to: 1.1. Soils that will be retained in place and designated as vegetation and soil protection areas (VSPAs). 1.2. Topsoils that will be stockpiled for future reuse and the locations for the stockpiles. 1.3. Soils that will be disturbed during construction and plans to restore disturbed soils and underlying subsoils to soil reference conditions. 1.4. Soils that will be restored and revegetated. 1.5. Soils disturbed by previous development that will be restored in place and revegetated. 1.6. Locations for all laydown and storage areas, parking areas, haul roads and construction vehicle access, temporary utilities and construction trailer locations. 1.7. Treatment details for each zone of soil that will be restored, including the type, source and expected volume of materials, including compost amendments, mulch and topsoil. 1.8. A narrative of the measures to be taken to ensure that areas not to be disturbed and areas of restored soils are protected from compaction by vehicle traffic or storage, erosion, and contamination until project completion. 2. A written erosion, sedimentation and pollutant control program for construction activities associated with the project. The program shall describe the best management practices (BMPs) to be employed including how the BMPs accomplish the following objectives: 2.1. Prevent loss of soil during construction due to stormwater runoff or wind erosion, including the protection of topsoil by stockpiling for reuse. 2.2. Prevent sedimentation of stormwater conveyances or receiving waters or other public infrastructure. 2.3. Prevent polluting the air with dust and particulate matter. 2.4. Prevent runoff and infiltration of other pollutants from construction site, including, but not limited to thermal pollution, concrete wash, fuels, solvents, hazardous chemical runoff, pH and pavement sealants. Ensure proper disposal of pollutants. 2.5. Protect from construction activities the designated vegetation and soil protection areas, flood hazard areas and other areas of vegetation that will remain on site. 3. A written periodic maintenance protocol for landscaping and stormwater management systems, including, but not limited to: 3.1. A schedule for periodic watering of new plantings that reflects different water needs during the establishment phase of new plantings as well as after establishment. Where development of the building site changed the amount of water reaching the preserved natural resource areas, include appropriate measures for maintaining the natural areas. 3.2. A schedule for the use of fertilizers appropriate to the plants species, local climate and the preestablishment and post-establishment needs of the installed landscaping. Nonorganic fertilizers shall be discontinued following plant establishment. 3.3. A requirement for a visual inspection of the site after major precipitation events to evaluate systems performance and site impacts. 3.4. A schedule of maintenance activities of the stormwater management system including, but not limited to, cleaning of gutters, downspouts, inlets and outlets, removal of sediments from pretreatment sedimentation pits and wet detention ponds, vacuum sweeping followed by high-pressure hosing at porous pavement and removal of litter and debris. 3.5. A schedule of maintenance activities for landscaped areas including, but not limited to, the removal of dead or unhealthy vegetation; reseeded of turf areas; mowing of grass to a height which optimizes lawn health and retention of precipitation.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MDE and DPS (Article 19 of County Code – Sediment Control)

**2011 ASHRAE 189.1 CORRELATION:** None

**405.1.2 Topsoil protection.** Topsoil that could potentially be damaged by construction activities or equipment shall be removed from areas to be disturbed and stockpiled on the building site for future reuse on the building site or other approved location. Topsoil stockpiles shall be secured and protected throughout the project with temporary or permanent soil stabilization measures to prevent erosion or compaction.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MDE and DPS (Article 19 of County Code – Sediment Control)

**2011 ASHRAE 189.1 CORRELATION:** None

**405.1.3 Imported soils.** Topsoils or soil blends imported to a building site to serve as topsoil shall not be mined from the following locations: 1. Sites that are prime farmland, unique farmland, or farmland of statewide importance. 2. Greenfield sites where development is prohibited by Section 402.8. **Exception:** Soils shall be permitted to be imported from the locations in Items 1 and 2 where those soils are a byproduct of a building and building site development process provided that imported soils are reused for functions comparable to their original function.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MDE and DPS (Article 19 of County Code – Sediment Control)

**2011 ASHRAE 189.1 CORRELATION:** None

**405.1.4 Soil reuse and restoration.** Soils that are being placed or replaced on a building site shall be prepared, amended and placed in a manner that establishes or restores the ability of the soil to support the vegetation that has been protected and that will be planted. Soil reuse and restoration shall be in accordance with Sections 405.1.4.1 and 405.1.4.2.

**405.1.4.1 Preparation.** Before placing stockpiled or imported topsoils, compliance with all of the following shall occur: 1. Areas shall be cleared of debris including, but not limited to, building materials, plaster, paints, road base type materials, petroleum based chemicals, and other harmful materials; 2. Areas of construction-compacted subsoil shall be scarified; and 3. The first lift of replaced soil shall be mixed into this scarification zone to improve the transition between the subsoil and overlying soil horizons. **Exception:** Scarification is prohibited in all of the following locations: 1. Where scarification would damage existing tree roots. 2. On inaccessible slopes. 3. On or adjacent to trenching and drainage installations. 4. On areas intended by the design to be compacted such as abutments, footings, inslopes. 5. Brownfields. 6. Other locations where scarification would damage existing structures, utilities and vegetation being preserved.

**405.1.4.2 Restoration.** Soils disturbed during construction shall be restored in areas that will not be covered by buildings, structures or hardscapes. Soil restoration shall comply with the following: 1. Organic matter. To provide appropriate organic matter for plant growth and for water storage and infiltration, soils shall be amended with a mature, stable compost material so that not less than the top 12 inches (305 mm) of soil contains not less than 3 percent organic matter. Sphagnum peat or organic amendments that contain sphagnum peat shall not be used. Soil organic matter shall be determined in accordance with ASTM D 2974. Organic materials selected for onsite amendment or for blending of imported soils shall be renewable within a 50-year cycle. **Exception:** Where the reference soil for a building site has an organic level depth other than 12 inches (305 mm), soils shall be amended to organic matter levels and organic matter depth that are comparable to the site's reference soil. 2. Additional soil restoration criteria. In addition to compliance with Item 1, soil restoration shall comply with not less than three of the following criteria: 2.1. Compaction. Bulk densities within the root zone shall not exceed the densities specified in Table 405.1.2 and shall be measured using a soil cone penetrometer in accordance with ASAE S313.3. The root zone shall be not less than 12 inches (305 mm) nor less than the site's reference soil, whichever results in the greater depth of measurement. Data derived from a soil cone penetrometer shall be reported in accordance with ASAE EP542. 2.2. Infiltration rates. Infiltration rates or saturated hydraulic conductivity of the restored soils shall be comparable to the site's reference soil. Infiltration rates shall be determined in accordance with ASTM D 3385 or ASTM D 5093. For sloped areas where the methods provided in the referenced standards cannot be used successfully, alternate methods approved by the code official shall be permitted provided that the same method is used to test both reference soil and onsite soil. 2.3. Soil biological function. Where remediated soils are used, the biological function of the soils' mineralizable nitrogen shall be permitted as a proxy assessment of biological activity. 2.4. Soil chemical characteristics. Soil chemical characteristics appropriate for plant growth shall be restored. The pH, cation exchange capacity and nutrient profiles of the original undisturbed soil or the site's reference soil shall be matched in restored soils. Salinity suitable for regionally appropriate vegetation shall be established. Soil amendments and fertilizers shall be selected from those which minimize nutrient loading to waterways or groundwater.

**405.1.5 Engineered growing media.** Where engineered growing media are used onsite, including, but not limited to vegetative roofs, trees located within hardscape areas, and special soils specified for wetlands and environmental restoration sites, such media shall comply with the best

**405.1.6 Documentation.** The following shall be provided to document compliance with Sections 405.1.3 through 405.1.5: 1. Documentation, such as receipts from a soil, compost and amendments supplier, to demonstrate that techniques to restore soil occurred; and 2. Soil test results to demonstrate that the selected techniques achieved the criteria of Section 405.1.4.2. Not less than two soil tests shall be conducted on the building site. For building sites where more than 8,000 square feet (744 m<sup>2</sup>) of soil is to be disturbed during construction, there shall be not less than one report for every 4,000 square feet (372 m<sup>2</sup>) disturbed or report frequency as determined by the registered design professional, available science and practice standards for that engineered growing media and use.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**TABLE 405.1.2  
MAXIMUM CONE PENETROMETER READINGS**

SURFACE RESISTANCE (PSI)		SUBSURFACE RESISTANCE (PSI)	
All Textures Sand	Sand (includes loamy sand, sandy loam, sandy clay loam, and sandy clay)	Silt (includes loam, silt loam, clay loam, and silty clay)	Clay (includes silty clay loam)
110	260	260	225

**405.2 Vegetation and soil protection.** *Vegetation and soils shall be protected in accordance with Sections 405.2.1 and 405.2.2.*

**405.2.1 Vegetation and soil protection plan.** *Where existing soils and vegetation are to be protected, a vegetation and soil protection plan establishing designated vegetation and soil protection areas (VSPAs) shall be submitted with the construction documents and other submittal documents. The protection plan shall address the following: 1. Identification of existing vegetation located on a building site that is to be preserved and protected. 2. Identification of portions of the building site to be designated as vegetation and soil protection areas (VSPAs) that are to be protected during the construction process from being affected by construction activities. 3. Specification of methods to be used such as temporary fencing or other physical barriers to maintain the protection of the designated vegetation and soil protection areas (VSPAs). 4. Specification of protected perimeters around trees and shrubs that are to be included in the designated vegetation and soil protection areas (VSPAs). Perimeters around trees shall be identified as a circle with a radius of not less than 1 foot (305 mm) for every inch (25 mm) of tree diameter with a radius of not less than 5 feet (1524 mm). The perimeters around shrubs shall be not less than twice the radius of the shrub. Exception: Approved alternative perimeters appropriate to the location and the species of the trees and shrubs shall be permitted. 5. Specification of methods to protect the viability of the designated vegetation and soil protection areas (VSPAs) to support the remaining vegetation at the conclusion of the construction process including minimizing impacts on the existing stormwater drainage patterns associated with the VSPAs. 6. Identification of plans, methods and practices used to designate essential areas of soil and subsoil disturbance.*

**405.2.1.1 Tree protection zones (TPZ).** *Where tree protection zones are specified, the specifications and documentation shall be in accordance with Part 5 of TCIA/ANSI A300.*

**405.2.2 Invasive plant species.** *Invasive plant species shall not be planted on a building site. A management plan for the containment, removal and replacement of any invasive plant species currently on the site shall be generated based on either published PROPOSED ACTION for the referenced invasive plant or guidance prepared by a qualified professional. Existing vegetation that is to be retained on a building site shall be protected as required by Section 405.2.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by M-NCPPC (Article 22A of County Code – Forest Conservation)

**2011 ASHRAE 189.1 CORRELATION:** None

**405.3 Native plant landscaping.** *Where new landscaping is installed as part of a site plan or within the building site, not less than 75 percent of the newly landscaped area shall be planted with native plant species.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by M-NCPPC (Article 22A of County Code – Forest Conservation)

**2011 ASHRAE 189.1 CORRELATION:** None

**406.1 Building site waste management plan.** *A building site waste management plan shall be developed and implemented to divert not less than 75 percent of the land-clearing debris and excavated soils. Land-clearing debris includes rock, trees, stumps and associated vegetation. The plan shall include provisions that address all of the following: 1. Materials to be diverted from disposal by efficient usage, recycling or reuse on the building site shall be specified. 2. Diverted materials shall not be sent to sites that are agricultural land, flood hazard areas or greenfield sites where development is prohibited by Section 402.1 except where approved by the code official. 3. The effective destruction and disposal of invasive plant species. 4. Where contaminated soils are removed, the methods of removal and location where the soils are to be treated and disposed. 5. The amount of materials to be diverted shall be specified and shall be calculated by weight or volume, but not both. 6. Where the site is located in a federal or state designated quarantine zone for invasive insect species, building site vegetation management shall comply with the quarantine rules. 7. Receipts or other documentation related to diversion shall be maintained through the course of construction. When requested by the code official, evidence of diversion shall be provided.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**406.2 Construction waste.** *Construction materials and waste and hardscape materials removed during site preparation shall be managed in accordance with Section 503.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**407.1 Walkways and bicycle paths.** Not less than one independent, paved walkway or bicycle path suitable for bicycles, strollers, pedestrians, and other forms of nonmotorized locomotion connecting a street or other path to a building entrance shall be provided. Walkways and bicycle paths shall connect to existing paths or sidewalks, and shall be designed to connect to any planned future paths. Paved walkways and bicycle paths shall be designed to minimize stormwater runoff. Pervious and permeable pavement shall be designed in accordance with Section 408.2.4.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.4.1

**407.2 Changing and shower facilities.** Buildings with a total building floor area greater than 10,000 square feet (929 m<sup>2</sup>) and that are required to be provided with long-term bicycle parking and storage in accordance with Section 407.3 shall be provided with onsite changing room and shower facilities. Not less than one shower shall be provided for each 20 long-term bicycle parking spaces, or fraction thereof. Where more than one changing room and shower facility is required, separate facilities shall be provided for each sex.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** None

**407.3 Bicycle parking and storage.** Long-term and short-term bicycle parking shall be designated on the site plan by a registered design professional and as specified in Table 407.3. The required number of spaces shall be determined based on the net floor area of each primary use or occupancy of a building except where Table 407.3 specifies otherwise. Accessory occupancy areas shall be included in the calculation of primary occupancy area. **Exceptions:** 1. Long-term bicycle parking shall not be required where the total building floor area is less than 2,500 square feet (232 m<sup>2</sup>) 2. Subject to the approval of the code official, the number of bicycle parking spaces shall be permitted to be reduced because of building site characteristics including, but not limited to, isolation from other development.

**407.3.1 Short-term bicycle parking.** Short-term bicycle parking shall comply with all of the following: 1. It shall be provided with illumination of not less than 1 footcandle (11 lux) at the parking surface; 2. It shall be located at the same grade as the sidewalk or at a location reachable by ramp or accessible route; 3. It shall have an area of not less than 18 inches (457 mm) by 60 inches (1524 mm) for each bicycle; 4. It shall be provided with a rack or other facility for locking or securing each bicycle; and 5. It shall be located within 100 feet (30 480 mm) of, and visible from, the main entrance. **Exception:** Where directional signage is provided at the main building entrances, short-term bicycle parking shall be permitted to be provided at locations not visible from the main entrance.

**407.3.2 Long-term bicycle parking.** Long-term bicycle parking shall comply with all of the following: 1. It shall be located on the same site and within the building or within 300 feet (91 440 mm) of the main entrances; 2. It shall be provided with illumination of not less than 1 footcandle (11 lux) at the parking surface; 3. It shall have an area of not less than 18 inches (457 mm) by 60 inches (1524 mm) for each bicycle; and 4. It shall be provided with a rack or other facility for locking or securing each bicycle. Not less than 50 percent of long-term bicycle parking shall be within a building or provided with a permanent cover including, but not limited to, roof overhangs, awnings, or bicycle storage lockers. Vehicle parking spaces, other than those required by Section 407.4, local zoning requirements and accessible parking required by the International Building Code, shall be permitted to be used for the installation of long term bicycle parking spaces.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects. Regulated by Chapter 59 Montgomery County Code – Zoning Ordinance.

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.4.1

**TABLE 407.3  
BICYCLE PARKING\***

OCCUPANCY	SPECIFIC USE	SHORT-TERM SPACES	LONG-TERM SPACES*
A-1	Movie theaters	1 per 50 seats; not less than 2 spaces	2 spaces
	Concert halls, theaters other than for movies	1 per 500 seats	
A-2	Restaurants	1 per 50 seats; not less than 2 spaces	
A-3	Places of worship	1 per 500 seats	
A-3	Assembly spaces other than places of worship	1 per 25,000 square feet; not less than 2 spaces	1 per 50,000 square feet; not less than 2 spaces
A-4 - A-5	All	1 per 500 seats	2 spaces
B	All	1 per 50,000 square feet; not less than 2 spaces	1 per 25,000 square feet; not less than 2 spaces
E	Schools	None	1 per 250 square feet of classroom area
E, I-4	Day care	None	2 spaces
F, II	All	None	1 per 25,000 square feet; not less than 2 spaces
I-1	All	None	2 spaces
I-2	All	1 per 25,000 square feet; not less than 2 spaces	1 per 50,000 square feet; not less than 2 spaces
M	All	1 per 25,000 square feet; not less than 2 spaces	1 per 50,000 square feet; not less than 2 spaces
R-1	Hotels, motels, boarding houses	None	1 per 25,000 square feet; not less than 2 spaces
R-2, R-3, R-4	All	None	None
S	Transit park and ride lots	None	1 per 20 vehicle parking spaces
	Commercial parking facilities	1 per 20 vehicle parking spaces	None
	All other	None	2 spaces
Other	Outdoor recreation, parks	1 per 20 vehicle parking spaces; not less than 2 spaces	None

For SI: 1 square foot = 0.0929 m<sup>2</sup>.

a. Requirements based on square feet shall be the net floor area of the occupancy or use.

b. When a calculation results in a fraction of space, the requirements shall be rounded to the next higher whole number.

**407.4 Preferred vehicle parking.** Where either Section 407.4.1 or 407.4.2 is indicated to be applicable in Table 302.1, parking provided at a building site shall comply with this section. Preferred parking spaces required by this section shall be those in the parking facility that are located on the shortest route of travel from the parking facility to a building entrance, but shall not take precedence over parking spaces that are required to be accessible in accordance with the International Building Code. Where buildings have multiple entrances with adjacent parking, parking spaces required by this section shall be dispersed and located near the entrances. Such parking spaces shall be provided with approved signage that specifies the permitted usage.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.4.1

**407.4.1 High-occupancy vehicle parking.** Where employee parking is provided for a building that has a total building floor area greater than 10,000 square feet (929 m<sup>2</sup>) a building occupant load greater than 100 and not less than 20 employees, at least 5 percent, but not less than two, of the employee parking spaces provided shall be designated as preferred parking for high occupancy vehicles.

**PROPOSED ACTION:** Move to Appendix A- adopt as written (407.4.1 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.4.1

**407.4.2 Low-emission, hybrid, and electric vehicle parking.** Where parking is provided for a building that has a total building floor area greater than 10,000 square feet (929 m<sup>2</sup>) and that has an building occupant load greater than 100, at least 5 percent, but not less than two, of the parking spaces provided shall be designated as preferred parking for low emission, hybrid, and electric vehicles.

**PROPOSED ACTION:** Move to Appendix A- adopt as written (407.4.2 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.4.1

**408.1 General.** The heat island effect of building and building site development shall be mitigated in accordance with Sections 408.2 and 404.3.

**PROPOSED ACTION:** Adopt with following modification - Replace 404.3 with 408.3.

**RATIONALE / IMPACT:** Typographical error

**2011 ASHRAE 189.1 CORRELATION:** None

**408.2 Site hardscape.** In climate zones 1 through 6, as established in the International Energy Conservation Code, not less than 50 percent of the site hardscape shall be provided with one or any combination of options described in Sections 408.2.1 through 408.2.4. For the purposes of this section, site hardscape shall not include areas of the site covered by solar photovoltaic arrays or solar thermal collectors.

**408.2.1 Site hardscape materials.** Hardscape materials shall have an initial solar reflectance value of not less than 0.30 in accordance with ASTM E 1918 or ASTM C 1549. **Exception:** The following materials shall be deemed to comply with this section and need not be tested: 1. Pervious and permeable concrete pavements. 2. Concrete paving without added color or stain.

**408.2.2 Shading by structures.** Where shading is provided by a building or structure or a building element or component, such building, structure, component or element shall comply with all of the following: 1. Where open trellis-type, free-standing structures such as, but not limited to, covered walkways, and trellises or pergolas, are covered with native plantings, the plantings shall be designed to achieve mature coverage within five years; 2. Where roofed structures are used to shade parking, those roofs shall comply with Section 408.3 in climate zones 1 through 6; and 3. Shade provided onto the hardscape by an adjacent building or structure located on the same lot shall be calculated and credited toward compliance with this section based on the projected peak sun angle on the summer solstice.

**408.2.3 Shading by trees.** Where shading is provided by trees, such trees shall be selected and placed in accordance with all of the following: 1. Trees selected shall be those that are native or adaptive to, the region and climate zone in which the project site is located. Invasive plant species shall not be selected. Plantings shall be selected and sited to produce a hardy and drought resistant vegetated area; 2. Construction documents shall be submitted that show the planting location and anticipated ten year canopy growth of trees and that show the contributions of existing tree canopies; and 3. Shading calculations shall be shown on the construction documents demonstrating compliance with this section and shall include only those hardscape areas directly beneath the trees based on a ten year growth canopy. Duplicate shading credit shall not be granted for those areas where multiple trees shade the same hardscape.

**408.2.4 Pervious and permeable pavement.** Pervious and permeable pavements including open grid paving systems and open-graded aggregate systems shall have a percolation rate not less than 2 gallons per minute per square foot (100 L/min m<sup>2</sup>). Pervious and permeable pavement shall be permitted where the use of these types of hardscapes does not interfere with fire and emergency apparatus or vehicle or personnel access and egress, utilities, or telecommunications lines. Aggregate used shall be of uniform size.

**PROPOSED ACTION:** Move to Appendix A – adopt as written

**RATIONALE / IMPACT:** Good practice: may represent significant cost impact for some projects

**2011 ASHRAE 189.1 CORRELATION:** 5.3.2.1

**408.3 Roof surfaces.** Not less than 75 percent of the roof surfaces of buildings and covered parking located in climate zones 1 through 3, as established in the International Energy Conservation Code, shall be a roof complying with Section 408.3.1; shall be covered with a vegetative roof complying with Section 408.3.2; or a combination of these requirements. The provisions of this section shall apply to roofs of structures providing shade to parking in accordance with Section 408.2.2 where located in climate zones 1 through 6. **Exception:** Portions of roof surfaces occupied by the following shall be permitted to be deducted from the roof surface area required to comply with this section: 1. Solar thermal collectors. 2. Solar photovoltaic systems. 3. Roof penetrations and associated equipment. 4. Portions of the roof used to capture heat for building energy technologies. 5. Rooftop decks and rooftop walkways.

**408.3.1 Roof coverings—solar reflectance and thermal emittance.** Where roof coverings are used for compliance with Section 408.3, roof coverings shall comply with Section 408.3.1.1 or 408.3.1.2. The values for solar reflectance and thermal emittance shall be determined by an independent laboratory accredited by a nationally recognized accreditation program. Roof products shall be listed and labeled and certified by the manufacturer demonstrating compliance.

**408.3.1.1 Roof products testing.** Roof products shall be tested for a minimum three-year aged solar reflectance in accordance with ASTM E 1918, ASTM C 1549 or the CRRC-1 Standard and thermal emittance in accordance with ASTM C 1371, ASTM E 408 or the CRRC-1 Standard, and shall comply with the minimum values in Table 408.3.1.

**408.3.1.2 Solar reflectance index.** Roof products shall be permitted to use a solar reflectance index (SRI) where the calculated value is in compliance with Table 408.3.1 values for minimum aged SRI. The SRI value shall be determined using ASTM E 1980 with a convection coefficient of 2.1 Btu/h-ft<sup>2</sup> (12 W/m<sup>2</sup> K) based on three-year aged roof samples tested in accordance with the test methods in Section 408.3.1.1.

**PROPOSED ACTION:** Move to Appendix A – adopt as written

**RATIONALE / IMPACT:** Good practice: may represent significant cost impact for some projects

**2011 ASHRAE 189.1 CORRELATION:** 5.3.2.1

**TABLE 408.3.1  
REFLECTANCE AND EMITTANCE**

ROOF SLOPE	MINIMUM AGED SOLAR REFLECTANCE	MINIMUM AGED THERMAL EMITTANCE	MINIMUM AGED SRI
2:12 or less	0.55	0.75	60
Greater than 2:12	0.30	0.75	25

**408.3.2 Vegetative roofs.** Vegetative roofs, where provided in accordance with Section 408.3, shall comply with the following: 1. All plantings shall be selected based on their hardiness zone classifications in accordance with USDA MP1475 and shall be capable of withstanding the climate conditions of the jurisdiction and the micro climate conditions of the building site including, but not limited to, wind, precipitation and temperature. Planting density shall provide foliage coverage, in the warm months, of not less than 80 percent within two years of the date of installation unless a different time period is established in the approved design. Plants shall be distributed to meet the coverage requirements. Invasive plant species shall not be planted. 2. The engineered soil medium shall be designed for the physical conditions and local climate to support the plants and shall consist of nonsynthetic materials. The planting design shall include measures to protect the engineered soil medium until the plants are established. Protection measures include, but are not limited to, installation of pregrown vegetated mats or modules, tackifying agents, fiber blankets and reinforcing mesh. The maximum wet weight and water holding capacity of an engineered soil medium shall be determined in accordance with ASTM E 2399. 3. Where access to the building facades is provided from locations on the perimeter of the roof, nonvegetated buffers adequate to support associated equipment and to protect the roof shall be provided. 4. Nonvegetated clearances as required for fire classification of vegetative roof systems shall be provided in accordance with the International Fire Code. 5. Plantings shall be capable of being managed to RETAIN the function of the vegetative roof as provided in the documents required by Section 904.3.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MDE (Stormwater Management Regulations)

**2011 ASHRAE 189.1 CORRELATION:** 5.3.2.3

**409.1 Light pollution control.** Where this section is indicated to be applicable in Table 302.1, uplight, light trespass, and glare shall be limited for all exterior lighting equipment as described in Sections 409.2 and 409.3. **Exception:** Lighting used for the following exterior applications is exempt where equipped with a control device independent of the control of the nonexempt lighting: 1. Specialized signal, directional, and marker lighting associated with transportation. 2. Advertising signage or directional signage. 3. Lighting integral to equipment or instrumentation and installed by its manufacturer. 4. Theatrical purposes, including performance, stage, film production, and video production. 5. Athletic playing areas where lighting is equipped with hoods or louvers for glare control. 6. Temporary lighting. 7. Lighting for industrial production, material handling, transportation sites, and associated storage areas where lighting is equipped with hoods or louvers for glare control. 8. Theme elements in theme and amusement parks. 9. Roadway lighting required by governmental authorities. 10. Lighting used to highlight features of public monuments and registered landmark structures. 11. Lighting classified for and used in hazardous areas. 12. Lighting for swimming pools and water features. **409.1.1 Exterior lighting zones.** The lighting zone for the building site shall be determined from Table 409.1.1 unless otherwise specified by the jurisdiction.

**PROPOSED ACTION:** (409.1 is a Jurisdictional Elective) Adopt with the following modification - Add the following exceptions:

- 13. Means of egress and emergency lighting
- 14. Lighting for public safety
- 15. Lighting for security

**RATIONALE / IMPACT:** To minimize vandalism and provide safe environments

**2011 ASHRAE 189.1 CORRELATION:** 5.3.3.1 and 5.3.3.3

**(E) TABLE 409.1.1  
EXTERIOR LIGHTING ZONES**

LIGHTING ZONE	DESCRIPTION
1	Developed areas of national parks, state parks, forest land and rural areas
2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed use areas
3	All other areas
4	High-activity commercial districts in major metropolitan areas as designated by the local jurisdiction

**409.2 Uplight.** Exterior lighting shall comply with the requirements of Table 409.2 for the exterior lighting zones (LZ) appropriate to the building site. **Exception:** Lighting used for the following exterior applications shall be exempt from the requirements of Table 409.2. 1. Lighting for building facades, landscape features, and public monuments in exterior lighting zones 3 and 4. 2. Lighting for building facades in exterior lighting zone 2.

**TABLE 409.2  
UPLIGHT RATINGS<sup>a, b</sup>**

	LIGHTING ZONE (LZ)			
	1	2	3	4
Maximum Luminaire Uplight Rating	U1	U2	U3	U4

- a. Uplight ratings (U) are defined by IESNA TM-15-07 Addendum A.
- b. The rating shall be determined by the actual photometric geometry in the specified mounting orientation.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 5.3.3.3

**409.3 Light trespass and glare.** Where luminaires are mounted on buildings with their backlight oriented towards the building, such luminaires shall not exceed the applicable glare ratings specified in Table 409.3(1). Other exterior luminaires shall not exceed the applicable backlight and glare ratings specified in Table 409.3(2).

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 5.3.3.2

**Table 409.3(1)**  
**MAXIMUM GLARE RATINGS FOR BUILDING MOUNTED LUMINAIRES WITH THE BACKLIGHT ORIENTED TOWARDS THE BUILDING<sup>a, b</sup>**

HORIZONTAL DISTANCE TO LIGHTING BOUNDARY ( $H_{LB}$ )	LIGHTING ZONE (LZ)			
	1	2	3	4
$H_{LB} > 2h_m$	G1	G2	G3	G4
$h_m < H_{LB} \leq 2h_m$	G0	G1	G1	G2
$0.5h_m \leq H_{LB} \leq h_m$	G0	G0	G1	G1
$H_{LB} < 0.5h_m$	G0	G0	G0	G1

$h_m$  = Mounting height: The distance above finished grade at which a luminaire is mounted, measured to the midpoint of the luminaire.

- a. Glare (G) ratings are defined by IESNA TM-15-07 Addendum A.
- b. The rating shall be determined by the actual photometric geometry in the specified mounting orientation.

**Table 409.3(2)**  
**MAXIMUM ALLOWABLE BACKLIGHT AND GLARE RATINGS<sup>a, b, c</sup>**

HORIZONTAL DISTANCE TO LIGHTING BOUNDARY ( $H_{LB}$ )	LIGHTING ZONE (LZ)			
	1	2	3	4
$H_{LB} > 2h_m$	B3	B4	B5	B5
	G1	G2	G3	G4
$h_m < H_{LB} \leq 2h_m$	B2	B3	B4	B4
	G1	G2	G3	G4
$0.5h_m \leq H_{LB} \leq h_m$	B1	B2	B3	B3
	G1	G2	G3	G4
$H_{LB} < 0.5h_m$	B0	B0	B1	B2
	G1	G2	G3	G4

$h_m$  = Mounting height: The distance above finished grade at which a luminaire is mounted, measured to the midpoint of the luminaire.

- a. Backlight (B) and glare (G) ratings are defined by IESNA TM-15-07 Addendum A.
- b. Luminaires located two mounting heights or less from the *lighting boundary* shall be installed with backlight towards the nearest *lighting boundary*, unless lighting a roadway, bikeway or walkway that intersects a public roadway.
- c. The rating shall be determined by the actual photometric geometry in the specified mounting orientation.



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 5 – Material Resources Conservation and Efficiency

**501.1 Scope.** *The provisions of this chapter shall govern matters related to building material conservation, resource efficiency and environmental performance.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action required

**2011 ASHRAE 189.1 CORRELATION:**

**502.1 Construction material management.** *Construction material management shall comply with Sections 502.1.1 and 502.1.2.*  
**502.1.1 Storage and handling of materials.** *Materials stored and handled onsite during construction phases shall comply with the applicable manufacturer's printed instructions. Where manufacturer's printed instructions are not available, approved standards or guidelines shall be followed*  
**502.1.2 Construction phase moisture control.** *Porous or fibrous materials and other materials subject to moisture damage shall be protected from moisture during the construction phase. Material damaged by moisture or that are visibly colonized by fungi either prior to delivery or during the construction phase shall be cleaned and dried or, where damage cannot be corrected by such means, shall be removed and replaced.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**503.1 Construction material and waste management plan.** *Not less than 50 percent of nonhazardous construction waste shall be diverted from disposal, except where other percentages are indicated in Table 302.1. A Construction Material and Waste Management Plan shall be developed and implemented to recycle or salvage construction materials and waste. The Construction Material and Waste Management Plan shall comply with all of the following: 1. The location for collection, separation and storage of recyclable construction waste shall be indicated. 2. Materials to be diverted from disposal by efficient usage, recycling, reuse, manufacturer's reclamation, or salvage for future use, donation or sale shall be specified. 3. The percentage of materials to be diverted shall be specified and shall be calculated by weight or volume, but not both. 4. Receipts or other documentation related to diversion shall be maintained through the course of construction. Where requested by the code official, evidence of diversion shall be provided. For the purposes of this section, construction materials and waste shall include all materials delivered to the site and intended for installation prior to the issuance of the certificate of occupancy, including related packaging. Construction and waste materials shall not include land-clearing debris, excavated soils and fill and base materials such as, but not limited to, topsoil, sand and gravel. Land-clearing debris shall include trees, stumps, rocks, and vegetation. Excavated soil, fill material and land-clearing debris shall be managed in accordance with Section 406.1.*

**PROPOSED ACTION:** (503.1 is a Jurisdictional Elective) Adopt with following modification: Add Calculations are allowed to be done by either weight or volume, but shall be consistent throughout. Further recommendation: maintain 50% waste management as base requirement in Table 302.1; delete 65% waste management requirement altogether; and move to Appendix A for 75% waste management.

**RATIONALE / IMPACT:** Consistent with Montgomery County Recycle Program and to provide specific direction for consistency

**2011 ASHRAE 189.1 CORRELATION:** 9.3.1.1

**504.1 Recycling areas for waste generated post certificate of occupancy.** *Waste recycling areas for use by building occupants shall be provided in accordance with one of the following: 1. Waste recycling areas shall be designed and constructed in accordance with the jurisdiction's laws or regulations; 2. Where laws or regulations do not exist or where limited recycling services are available, waste recycling areas shall be designed and constructed to accommodate recyclable materials based on the availability of recycling services; or 3. Where recycling services are not available, waste recycling areas shall be designed and constructed to accommodate the future recycling of materials in accordance with an approved design. The approved design shall meet one of the following: 3.1. The approved waste recycling area design shall be based on analysis*

of other regional recycling services, laws or regulations. 3.2. The approved waste recycling area shall be designed to meet the needs of the occupancy, facilitate efficient pick-up, and shall be available to occupants and haulers.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 9.3.4.1

~~504.2 Storage of lamps, batteries and electronics. Storage space shall be provided for fluorescent lamps, high-intensity discharge (HID) lamps, batteries, electronics, and other discarded items requiring special disposal by the jurisdiction.~~

**PROPOSED ACTION:** Replace with the following: An area shall be provided that serves the entire building and is designed for the collection and storage of fluorescent and HID lamps and ballasts and facilitates proper disposal and/or recycling according to state and local hazardous waste requirements.

**RATIONALE / IMPACT:** Language revision for clearer intent

**2011 ASHRAE 189.1 CORRELATION:** 9.3.4.3

~~505.1 Material selection and properties. Building materials shall conform to Section 505.2. Exceptions: 1. Electrical, mechanical, plumbing, security and fire detection, and alarm equipment and controls, automatic fire sprinkler systems, elevators and conveying systems shall not be required to comply with Section 505.2. 2. Where a whole building life cycle assessment is performed in accordance with Section 303.1, compliance with Section 505.2 shall not be required.~~

**PROPOSED ACTION:** Add - Exception: 3. Projects that are less than 50,000 sq.ft.

**RATIONALE / IMPACT:** Considerations include: cost impact; administrative complexity; limited availability of quality products to meet current energy efficiency, product durability and envelope system requirements; availability of materials from manufacturing facilities that are consolidated beyond defined limits; and environmental impact of material transport via various means from distances beyond and within defined limits.

**2011 ASHRAE 189.1 CORRELATION:** 9.4.1

~~505.2 Material selection. Not less than 55 percent of the total building materials used in the project, based on mass, volume or cost, shall comply with Section 505.2.1, 505.2.2, 505.2.3, 505.2.4 or 505.2.5. Where a material complies with more than one section, the material value shall be multiplied by the number of sections that it complies with. The value of total building material mass, volume or cost shall remain constant regardless of whether materials are tabulated in more than one section.~~

~~505.2.1 Used materials and components. Used materials and components shall comply with the provisions for such materials in accordance with the applicable code referenced in Section 102.4 and the applicable requirements of this code.~~

~~505.2.2 Recycled content building materials. Recycled content building materials shall comply with one of the following: 1. Contain not less than 25 percent combined post-consumer and preconsumer recovered material, and shall comply with Section 505.2.3. 2. Contain not less than 50 percent combined post-consumer and preconsumer recovered material.~~

~~505.2.4 Bio-based materials. Bio-based materials shall be those materials that comply with one or more of the following: 1. The bio-based content is not less than 75 percent as determined by testing in accordance with ASTM D 6866. 2. Wood and wood products used to comply with this section, other than salvaged or reused wood products, shall be labeled in accordance with the SFI Standard, FSC STD-40-004 V2-1 EN, PEFC Council Technical Document or equivalent fiber procurement system. As an alternative to an on-product label, a Certificate of Compliance indicating compliance with the fiber procurement system shall be permitted. Manufacturer's fiber procurement systems shall be audited by an accredited third-party. 3. The requirements of USDA 7CFR Part 2902.~~

~~505.2.5 Indigenous materials. Indigenous materials or components shall be composed of resources that are recovered, harvested, extracted and manufactured within a 500 mile (800 km) radius of the building site. Where only a portion of a material or product is recovered, harvested, extracted and manufactured within 500 miles (800 km), only that portion shall be included. Where resources are transported by water or rail, the distance to the building site shall be determined by multiplying the distance that the resources are transported by water or rail by 0.25, and adding that number to the distance transported by means other than water or rail.~~

**PROPOSED ACTION:** Revise 505.2 as follows: **505.2 Material selection.** Not less than 40 percent...

**RATIONALE / IMPACT:** Consistent with current practice

**2011 ASHRAE 189.1 CORRELATION:** 9.4.1, 9.4.1.1, 9.4.1.1 and 9.4.1.3

~~506.1 Low mercury lamps. The mercury content in lamps shall comply with Section 506.2 or 506.3. Exception: Appliance, black light, bug, colored, germicidal, plant, shatter-resistant/shatterproof/shatter-protected, showcase, UV, T-8 and T-12 lamps with a color rendering index of 87 or~~

higher, lamps with RDC bases, and lamps used for special-needs lighting for individuals with exceptional needs.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by federal government

**2011 ASHRAE 189.1 CORRELATION:** None

*506.2 Straight fluorescent lamps. Straight, double-ended fluorescent lamps less than 6 feet (1829 mm) in nominal length and with bi-pin bases shall contain not more than 5 milligrams of mercury per lamp. Exception: Lamps with a rated lifetime greater than 22,000 hours at 3 hours per start operated on an ANSI reference ballast shall not exceed 8 milligrams of mercury per lamp.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by federal government

**2011 ASHRAE 189.1 CORRELATION:** None

*506.3 Compact fluorescent lamps. Single-ended pin-base and screw-base compact fluorescent lamps shall contain not more than 5 milligrams of mercury per lamp, and shall be listed and labeled in accordance with UL 1993. Exception: Lamps rated at 25 watts or greater shall contain not more than 6 milligrams of mercury per lamp.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by federal government

**2011 ASHRAE 189.1 CORRELATION:** None

*507.1 Moisture control preventative measures. Moisture preventative measures shall be inspected in accordance with Sections 902 and 903 for the categories listed in Items 1 through 7. Inspections shall be executed in a method and at a frequency as listed in Table 903.1. 1. Foundation subsoil drainage system. 2. Foundation waterproofing. 3. Foundation dampproofing. 4. Under slab water vapor protection. 5. Flashings: Windows, exterior doors, skylights, wall flashing and drainage systems. 6. Exterior wall coverings. 7. Roof coverings, roof drainage, and flashings.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Consistent with current practice

**2011 ASHRAE 189.1 CORRELATION:** None



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 6 – Energy Conservation, Efficiency and CO<sub>2</sub>e Emission Reduction

**601.1 Scope.** *The provisions of this chapter regulate the design, construction, commissioning, and operation of buildings and their associated building sites for the effective use of energy.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.1

**601.2 Intent.** *This chapter is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve the effective use of energy.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**601.3 Application.** *Buildings and their associated building sites shall comply with Section 601.3.1 or Section 601.3.2.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.2; 7.4; 7.5

**601.3.1 Performance-based compliance.** *Buildings designed on a performance basis shall comply with Sections 602, 608.6, 609, 610 and 611.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.2; 7.5

**601.3.2 Prescriptive-based compliance.** *Buildings designed on a prescriptive basis shall comply with the requirements of Sections 605, 606, 607, 608, 609, 610 and 611.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.2.; 7.4

**601.4 Minimum requirements.** *Buildings shall be provided with metering complying with Section 603, and commissioning complying with Section 611. Where required in accordance with Section 604.1, building shall be provided with automated-demand response complying with Section 604.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:**

**601.5 Multiple buildings on a site and mixed use buildings.** Where there is more than one building on a site and where a building has more than one use in the building, each building or each portion of a building associated with a particular use shall comply with Sections 601.5.1 or 601.5.2 or a combination of both.

**601.5.1 Multiple buildings on a site.** For building sites with multiple buildings, the energy use associated with the building site shall be assigned on a proportional basis to each building based on total gross floor area of each building in relation to the total gross floor area of all buildings on the building site. Where energy is derived from either renewable or waste energy, or both sources located on the building site, within individual buildings, or on individual buildings and delivered to multiple buildings, the energy so derived shall be assigned on a proportional basis to the buildings served based on building gross floor area. Energy delivered from renewable and waste energy sources located on or within a building shall be assigned to that building. **Exception:** Where it can be shown that energy to be used at the building site is associated with a specific building, that energy use shall be assigned to that specific building.

**601.5.2 Mixed use buildings.** Where buildings have more than one use, the energy use requirements shall be based on each individual occupancy

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.3.2; 7.4.1.1

**602.1 Performance-based compliance.** Compliance for buildings and their sites to be designed on a performance basis shall be determined by predictive modeling. Predictive modeling shall use source energy kBtu/sf-y unit measure based on compliance with Section 602.1.1 and CO<sub>2</sub>e emissions in Section 602.3. Where a building has mixed uses, all uses shall be included in the performance-based compliance.

**602.1.1 zEPI.** Performance-based designs shall demonstrate a zEPI of not more than 51 as determined in accordance with Equation 6-1 for energy use reduction and shall demonstrate a CO<sub>2</sub>e emissions reduction in accordance with Section 602.2 and Equation 6-2 for CO<sub>2</sub>e. zEPI 57 (EUIp/EUI) (Equation 6-1) where: EUIp the proposed energy use index in source kBtu/sf-y for the proposed design of the building and its site calculated in accordance with Section 602.1.2. EUI the base annual energy use index in source kBtu/sf-y for a baseline building and its site calculated in accordance with Section 602.1.2.

**602.1.2 Base annual energy use index.** The proposed energy use index (EUIp) of the building and building site shall be calculated in accordance with Equation 6-1 and Appendix G to 2011 ASHRAE 90.1, as modified by Sections 602.1.2.1 through 602.1.2.3. The annual energy use shall include all energy used for building functions and its anticipated occupancy.

**602.1.2.1 Modifications to Appendix G of 2011 ASHRAE 90.1.** The performance rating in Section G1.2 of 2011 ASHRAE 90.1 shall be based on energy use converted to consistent units in accordance with Sections 602.1.2.2 and 602.1.2.3, instead of energy cost.

**602.1.2.2 Electric power.** In calculating the annual energy use index, electric energy used shall be consistent units by converting the electric power use at the utility meter or measured point of delivery to Btus and multiplying by the conversion factor in Table 602.1.2.1 based on the geographical location of the building.

**602.1.2.3 Nonrenewable energy.** In calculating the annual energy use index for fuel other than electrical power, energy use shall be converted to consistent units by multiplying the nonrenewable energy fossil fuel use at the utility meter or measured point of delivery to Btu's and multiplying by the conversion factor in Table 602.1.2.2. The conversion factor for energy sources not included in Table 602.1.2.2 shall be 1.1. Conversion factors for purchased district heating shall be 1.35 for hot water and 1.45 for steam. The conversion factor for district cooling shall be 0.33 times the value in Table 602.1.2.1 based on the EPA eGRID Sub-region in which the building is located

**PROPOSED ACTION:** DGS recommends DPS adopt the two following approaches which will provide opportunities for all project types:

1. Require zEPI calculations be based on the Commercial Buildings Energy Consumption Survey (CBECS) 2003 year data as baseline
2. Adopt ASHRAE 90.1 methodology where the proposed building uses the same model with improved factors for envelope, mechanical and lighting.

**RATIONALE / IMPACT:** zEPI methodology is fine; however no baseline data is available for entire building energy usage for any building type. Total energy building use was never recorded in 2000 which renders zEPI impractical to implement at this time based on that reference year. Until an accurate baseline can be established for zEPI to reference, zEPI will not be practical.

**2011 ASHRAE 189.1 CORRELATION:** 7.4; 7.5.3

**TABLE 602.1.2.1  
ELECTRICITY GENERATION ENERGY CONVERSION FACTORS  
BY EPA eGRID SUB-REGION<sup>a</sup>**

eGRID 2007 SUB-REGION ACRONYM	eGRID 2007 SUB-REGION NAME	ENERGY CONVERSION FACTOR
AKGD	ASCC Alaska Grid	2.97
AKMS	ASCC Miscellaneous	1.76
ERCF	ERCOT All	2.93
FRCC	FRCC All	2.97
HMIS	HMCC Miscellaneous	3.82
HIOA	HMCC Ohio	3.14
MORE	MRO East	3.40
MROW	MRO West	3.41
NYLI	NPCC Long Island	3.20
NEWE	NPCC New England	3.01
NYCW	NPCC NYC/Westchester	3.32
NYUP	NPCC Upstate NY	2.51
RFCE	RFC East	3.15
RFCM	RFC Michigan	3.05
RFCW	RFC West	3.14
SRMW	SERC Midwest	3.24
SRMV	SERC Mississippi Valley	3.03
SRSO	SERC South	3.08
SRTV	SERC Tennessee Valley	3.11
SRVC	SERC Virginia/Carolina	3.13
SPNO	SPP North	3.53
SPSO	SPP South	3.05
CAMX	WECC California	2.61
NWPP	WECC Northwest	2.26
RMPA	WECC Rockies	3.18
AZNM	WECC Southwest	2.95

<sup>a</sup> Sources: EPA eGrid2007 version 1.1, 2005 data; EPA eGrid regional gross grid loss factors, EPA Table 8.4a (Sum tables 8.4b and 8.4c) and Table 8.2c (breakout of Table 8.2b), 2005 data

**TABLE 602.1.2.2  
U.S. AVERAGE BUILDING FUELS ENERGY CONVERSION  
FACTORS BY FUEL TYPE<sup>a</sup>**

FUEL TYPE	ENERGY CONVERSION FACTOR
Natural Gas	1.09
Fuel Oil	1.13
LPG	1.12

<sup>a</sup> Source: Gas Technology Institute Source Energy and Emissions Analysis Tool

**602.1.3 Registered design professional in responsible charge of building energy simulation.** For purposes of this section, and where it is required that documents be prepared by a registered design professional, the code official is authorized to require the owner to engage and designate on the building permit application a registered design professional who shall act as the registered design professional in responsible charge of building energy simulation. Modelers engaged by the registered design professional in responsible charge of building energy simulation shall be certified by an approved accrediting entity. Where the circumstances require, the owner shall designate a substitute registered design professional in responsible charge of building energy simulation who shall perform the duties required of the original registered design professional in responsible charge of building energy simulation. The code official shall be notified in writing by the owner whenever the registered design professional in responsible charge of building energy simulation is changed or is unable to continue to perform the duties.

**PROPOSED ACTION:** Adopt, however clarify the following statement: "Modelers engaged by the registered design professional in responsible charge of building energy simulation shall be certified by an approved accrediting entity."

**RATIONALE / IMPACT:** Poorly written; clarification to eliminate ambiguity regarding qualifications of a Modeler.

**2011 ASHRAE 189.1 CORRELATION:** Forward

**602.2 Annual direct and indirect CO<sub>2</sub>e emissions.** The CO<sub>2</sub>e emissions calculations for the building and building site shall be determined in accordance with Sections 602.2.1 and 602.2.2. The emissions associated with the proposed design shall be less than or equal to the CO<sub>2</sub>e

emissions associated with the standard reference design in accordance with Equation 6-2.  $CO_2\ e\ pd \geq (zEPI\ CO_2\ e\ srbd)/57$  (Equation 6-2) where: zEPI the minimum score in accordance with Section 602.1.1.  $CO_2\ e\ pd$  emissions associated with the proposed design.  $CO_2\ e\ srbd$  emissions associated with the standard reference budget design in accordance with Section 602.1.2.

**602.2.1 Onsite electricity.** Emissions associated with use of electric power shall be based on electric power excluding any renewable or recovered waste energy covered under Section 602.2.1. Emissions shall be calculated by converting the electric power used by the building at the electric utility meter or measured point of delivery, to MWhs, and multiplying by the  $CO_2\ e$  conversion factor in Table 602.2.1 based on the EPA eGRID Sub-region in which the building is located.

**602.2.2 Onsite nonrenewable energy.** Emissions associated with the use of nonrenewable energy sources other than electrical power such as natural gas, fuel oil, and propane shall be calculated by multiplying the fossil fuel energy used by the building and its site at the utility meter by the national emission factors in Table 602.2.2 and the conversions required by this section. Emissions associated with fossil fuels not specified in Table 602.2.2 shall be calculated by multiplying the fossil fuel used by the building at the utility meter by 250. Emissions associated with purchased district energy shall be calculated by multiplying the energy used by the building at the utility meter by 150 for hot water and steam, and for district cooling, the factors from Table 602.2.2 based on the EPA eGRID Sub-region in which the building is located.

**602.2.3 Annual direct and indirect  $CO_2\ e$  emissions associated with onsite use of fossil fuels and purchased district energy.** Emissions associated with the use of natural gas, fuel oil and, propane shall be calculated by multiplying the natural gas, fuel oil, and propane delivered to the building at the utility meter by the corresponding emission factors in Table 602.2.2. Emissions associated with fossil fuels not listed shall be calculated by multiplying the fossil fuel delivered to the building at the utility meter by 250. Emissions associated with purchased district heating shall be calculated by multiplying the heating energy delivered to the building at the utility meter by 150 for hot water and steam, and for district cooling, the factors from Table 602.2.1 based on the EPA eGRID Sub-region in which the building is located.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice using alternative methodologies for zEPI recommended in 602.1

**2011 ASHRAE 189.1 CORRELATION:** 7.5.3

**TABLE 602.2.1  
ELECTRICITY EMISSION RATE BY EPA eGRID SUB-REGION\***

eGRID 2007 SUB-REGION ACRONYM	eGRID 2007 SUB-REGION NAME	2005 $CO_2\ e$ RATE (lb <sub>e</sub> /MWh)
AKGD	ASCC Alaska Grid	1270
AKMS	ASCC Miscellaneous	515
ERCT	ERCOT All	1417
FRCC	FRCC All	1416
HMMS	HICC Miscellaneous	1595
HIOA	HICC Oahu	18591
MORE	MRO East	1971
MROW	MRO West	1957
NYLI	NPCC Long Island	1651
NEWE	NPCC New England	999
NYCW	NPCC NYC/Westchester	874
NYUP	NPCC Upstate NY	774
RFC E	RFC East	1224
RFCM	RFC Michigan	1680
RFCW	RFC West	1652
SRMW	SERC Midwest	1966
SRMV	SERC Mississippi Valley	1094
SRSO	SERC South	1691
SRTV	SERC Tennessee Valley	1623
SRVC	SERC Virginia/Carolina	1220
SPNO	SPP North	2106
SPSO	SPP South	1780
CAMX	WECC California	768
NWPP	WECC Northwest	958
RMPA	WECC Rockies	1999
AZNM	WECC Southwest	1391

\* Source: EPA eGRID2007 Version 1.1, 2005 data; EPA eGrid regional gross grid loss factor.

**TABLE 603.2.2  
FOSSIL FUEL EMISSION FACTORS**

EMISSION RATE (lb/MMBtu HHV)	NATURAL GAS AS STATIONARY FUEL	FUEL OIL AS STATIONARY FUEL	PROPANE AS STATIONARY FUEL
CO <sub>2</sub> e	137.35	200.63	162.85

For SI: MMBtu = 1,000,000 Btu = 10<sup>6</sup> Btu; HHV = High-heating value.

**603.1 Purpose.** Buildings that consume energy shall comply with Section 603. The purpose of this section is to provide requirements that will ensure that buildings are constructed or altered in a way that will provide the capability for their energy use, production and reclamation to be measured, monitored and reported. This includes the design of energy distribution systems so as to isolate load types, the installation of or ability to install in the future meters, devices and a data acquisition system, and the installation of, or the ability to provide, public displays and other appropriate reporting mechanisms in the future. All forms of energy delivered to the building and building site, produced on the building site or in the building and reclaimed at the building site or in the building shall be metered and all energy load types measured in accordance with this section.

**603.1.1 Buildings with tenants.** In buildings with tenants, the metering required by Section 603.3 shall be collected for the entire building and for each tenant individually. Tenants shall have access to all data collected for their space.

**603.2 Energy distribution design requirements and load type isolation in buildings.** Energy distribution systems within, on or adjacent to and serving a building shall be designed such that each primary circuit, panel, feeder, piping system or supply mechanism supplies only one energy use type as defined in Sections 603.2.1 through 603.2.5. The energy use type served by each distribution system shall be clearly designated on the energy distribution system with the use served, and adequate space shall be provided for installation of metering equipment or other data collection devices, temporary or permanent, to measure their energy use. The energy distribution system shall be designed to facilitate the collection of data for each of the building energy use categories in Section 603.4 and for each of the end use categories listed in Sections 603.2.1 through 603.2.5. Where there are multiple buildings on a building site, each building shall comply separately with the provisions of Section 603.

**Exception:** Buildings designed and constructed such that the total usage of each of the load types described in Sections 603.2.1 through 603.2.5 shall be permitted to be measured through the use of installed sub-meters or other equivalent methods as approved.

**603.2.1 HVAC system total energy use.** The HVAC system total energy use category shall include all energy used to heat, cool, and provide ventilation to the building including, but not limited to, fans, pumps, boiler energy, chiller energy and hot water.

**603.2.2 Lighting system total energy use.** The lighting system total energy use category shall include all interior and exterior lighting used in occupant spaces and common areas.

**603.2.3 Plug loads.** The plug loads energy use category shall include all energy use by devices, appliances and equipment connected to convenience receptacle outlets.

**603.2.4 Process loads.** The process loads energy use category shall include the energy used by any single load associated with activities within the building, such as, but not limited to, data centers, manufacturing equipment and commercial kitchens, that exceeds 5 percent of the peak connected load of the whole building.

**603.2.5 Energy used for building operations loads and other miscellaneous loads.** The category of energy used for building operations loads and other miscellaneous loads shall include all vertical transportation systems, automatic doors, motorized shading systems, ornamental fountains and fireplaces, swimming pools, in-ground spas, snow-melt systems, exterior lighting that is mounted on the building or used to illuminate building facades and the use of any miscellaneous loads in the building not specified in Sections 603.2.1 through 603.2.4.

**603.3 Energy-type metering.** Buildings shall be provided with the capability to determine energy use and peak demand as provided in this section for each of the energy types specified in Sections 603.3.1 through 603.3.7. Utility energy meters or supplemental sub-meters are permitted to be used to collect whole building data, and shall be equipped with a local data port connected to a data acquisition system in accordance with Section 603.5.

**603.3.1 Gaseous fuels.** Gaseous fuels including, but not limited to, natural gas, LP gas, coal gas, hydrogen, landfill gas, digester gas and biogas shall be capable of being metered at the building site to determine the gross consumption and peak demand of each different gaseous fuel by each building on a building site. The installation of gas meters and related piping shall be in accordance with the International Fuel Gas Code.

**603.3.2 Liquid fuels.** Liquid fuels including, but not limited to, fuel oil, petroleum-based diesel, kerosene, gasoline, bio diesel, methanol, ethanol and butane shall be capable of being metered at the building site to allow a determination of the gross consumption and peak demand of each liquid fuel use by each building on a building site. The installation of meters and related piping shall be in accordance with the International Mechanical Code.

**603.3.3 Solid fuels.** Solid fuels including, but not limited to, coal, charcoal, peat, wood products, grains, and municipal waste shall be capable of having their use determined at the building site to allow a determination of the gross consumption and peak demand of each solid fuel use by each building on a building site.

**603.3.4 Electric power.** Electric power shall be capable of being metered at the building site to allow a determination of the gross consumption and peak demand by each building on a building site. The installation of electric meters and related wiring shall be in accordance with NFPA 70.

**603.3.5 District heating and cooling.** Hot water, steam, chilled water, and brine shall be capable of being metered at the building site, or where produced on the building site, to allow a determination of the gross consumption of heating and cooling energy by each building on a building site. Energy use associated with the production of hot water, steam, chilled water or brine shall be determined based on the fuel used.

**603.3.6 Combined heat and power.** Equipment and systems with a connected load greater than 125,000 Btu/hr (36.63 kW) providing combined heat and power (CHP) shall be capable of being metered to allow a determination of the gross consumption of each form of delivered energy to the equipment. The output of CHP shall be metered in accordance with the applicable portions of Section 603 based on the forms of output from the CHP.

**603.3.7 Renewable and waste energy.** Equipment and systems providing energy from renewable or waste energy sources which is included in the determination of the building zEPI, shall be capable of being metered to allow a determination of the output of equipment and systems in accordance with Sections 603.3.7.1 through 603.3.7.5.

**603.3.7.1 Solar electric.** Equipment and systems providing electric power through conversion of solar energy directly to electric power shall be capable of being metered so that the peak electric power (kW) provided to the building and its systems or to off-site entities can be determined at 15-minute intervals and the amount of electric power (kWh) provided to the building and its systems can be determined at intervals of 1 hour or

less.

**603.3.7.2 Solar thermal.** Equipment and systems providing heat to fluids or gases through the capture of solar energy shall be capable of being metered so that the peak thermal energy (Btu/h) provided to the building and its systems or to off-site entities can be determined at 15-minute intervals and the amount of heat captured (Btu) for delivery to the building and its systems can be determined intervals of 1 hour or less.

**Exception:** Systems with a rated output of less than 100 kBtu/hr shall not be required to have the capacity to be metered.

**603.3.7.3 Waste heat.** Equipment and systems providing energy through the capture of waste heat shall be capable of being metered so that the amount of heat captured and delivered to the building and its systems can be determined at intervals of 1 hour or less. **Exception:** Systems with a rated output of less than 100 kBtu/hr shall not be required to have the capacity to be metered.

**603.3.7.4 Wind power systems.** Equipment and systems providing electric power through conversion of wind energy directly to electric power shall be capable of being metered so that the peak electric power (kW) provided to the building and its systems or to off-site entities can be determined at 15-minute intervals and the amount of electric power (kWh) provided to the building and its systems can be determined at intervals of 1 hour or less.

**603.3.7.5 Other renewable energy electric production systems.** Equipment and systems providing electric power through conversion of other forms of renewable energy directly to electric power shall be capable of being metered so that the peak electric power (kW) provided to the building and its systems or to off-site entities can be determined at 15-minute intervals and the amount of electric power (kWh) provided to the building and its systems can be determined at intervals of 1 hour or less.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** Chapter 6 and 7

**603.4 Energy load type sub-metering.** For buildings that are not less than 25,000 square feet (2323 m<sup>2</sup> in total building floor area) the energy use of the categories specified in Section 603.2 shall be metered through the use of sub-meters or other approved, equivalent methods meeting the capability requirements of Section 603.3.

**PROPOSED ACTION:** Adopt with following modification. Replace ~~For buildings that are not less than 25,000 square feet with the following:~~ For buildings that are not less than 25,000 square feet and equipped with building automation system

**RATIONALE / IMPACT:** Language revision for clearer intent

**2011 ASHRAE 189.1 CORRELATION:**

**603.4.1 Buildings less than 25,000 square feet.** For buildings that are less than 25,000 square feet (2323 m<sup>2</sup> in total building floor area), the energy distribution system shall be designed and constructed to accommodate the future installation of sub-meters and other approved devices in accordance with Section 603.4. This includes, but is not limited to, providing access to distribution lines and ensuring adequate space for the installation of sub-meters and other approved devices.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Financially unreasonable

**2011 ASHRAE 189.1 CORRELATION:** 7.3.3

**603.5 Minimum energy measurement and verification.** Meters, sub-meters, and other approved devices installed in compliance with Sections 603.3 and 603.4 shall be connected to a data acquisition and management system capable of storing not less than 36-months worth of data collected by all meters and other approved devices and transferring the data in real time to a display as required in Section 603.6.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice; represents cost impact

**2011 ASHRAE 189.1 CORRELATION:**

**603.5.1 Annual emissions.** The data acquisition and management system shall be capable of providing the data necessary to calculate the annual CO<sub>2</sub>e emissions associated with the operation of the building and its systems using the results of annual energy use measured in accordance with Section 603.5. The calculation shall be based on energy measured for each form of energy delivered to the site on an annual basis. Where reporting of emissions is required, the determination of emissions shall be in accordance with Section 602.2.3.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Corresponds with 602:2 which is recommended for deletion.

**2011 ASHRAE 189.1 CORRELATION:**

**603.6 Energy display.** A permanent, readily accessible and visible display shall be provided adjacent to the main building entrance or on a publicly available Internet web site. The display shall be capable of providing all of the following: 1. The current energy demand for the whole building level measurements, updated for each fuel type at the intervals specified in Section 603.3. 2. The average and peak demands for the previous day and the same day the previous year. 3. The total energy usage for the previous 18 months.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Short term positive impact; and information is available through energy management systems

**2011 ASHRAE 189.1 CORRELATION:** None

**604.1 Establishing an open and interoperable automated demand-response (Auto-DR) infrastructure.** Where this section is indicated to be applicable in Table 302.1, buildings that contain heating, ventilating, air-conditioning (HVAC) or lighting systems shall comply with Sections 604.1 through 604.4. A building energy management and control system (EMCS) shall be provided and integrated with building HVAC systems controls and lighting systems controls to receive an open and interoperable automated demand-response (Auto-DR) relay or Internet signal. Building HVAC and lighting systems and specific building energy-using components shall incorporate preprogrammed demand response strategies that are automated with a demand response automation Internet software client. **Exception:** Auto-DR infrastructure is not required for the following: 1. Buildings located where the electric utility or regional Independent System Operator (ISO) or Regional Transmission Operator (RTO) does not offer a demand response program to buildings regulated by this code. 2. Buildings with a peak electric demand not greater than 0.75 times that of the standard reference design. 3. Buildings that have incorporated onsite renewable energy generation to provide 20 percent or more of the building's energy demand.

**PROPOSED ACTION:** Move to Appendix A (604.1 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Good practice, maybe difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 7.4.5.1

**604.2 Software clients.** Demand response automation software clients shall be capable of communicating with a demand response automation server via the Internet or other communication relay.

**604.3 Heating, ventilating and air-conditioning (HVAC) systems.** The Auto-DR strategy for HVAC systems shall be capable of reducing the building peak cooling or heating HVAC demand by not less than 10 percent when signaled from the electric utility, regional independent system operator (ISO) or regional transmission operator (RTO), through any combination of the strategies and systemic adjustments, including, but not limited to the following: 1. Space temperature set-point reset. 2. Increasing chilled water supply temperatures or decreasing hot water supply temperatures. 3. Increasing or decreasing supply air temperatures for variable air volume (VAV) systems. 4. Limiting capacity of HVAC equipment that has variable or multiple-stage capacity control. 5. Cycling of HVAC equipment or turning off noncritical equipment. 6. Disabling HVAC in unoccupied areas. 7. Limiting the capacity of chilled water, hot water, and refrigerant control valves. 8. Limiting the capacity of supply and exhaust fans, without reducing the outdoor air supply below the minimum required by Chapter 4 of the International Mechanical Code, or the minimum required by 2011 ASHRAE 62.1. 9. Limiting the capacity of chilled water or hot water supply pumps. 10. Anticipatory control strategies to pre-cool or preheat in anticipation of a peak event. **Exception:** The Auto-DR strategy is not required to include the following buildings and systems: 1. Hospitals and critical emergency response facilities. 2. Life safety ventilation for hazardous materials storage. 3. Building smoke exhaust systems. 4. Manufacturing process systems.

**604.3.1 Rebound avoidance.** The Auto-DR strategy shall include logic to prevent a rebound peak. When the signal for Auto-DR is ended, a gradual return to normal heating, ventilation and air-conditioning (HVAC) equipment operations shall be part of the Auto-DR strategy, through any combination of the strategies and systemic adjustments, including, but not limited to the following: 1. Where close to the unoccupied period, the Auto-DR period shall be extended using a rebound avoidance, extended Auto-DR control strategy until the initiation of the unoccupied period. 2. Rebound avoidance, slow recovery control strategies, gradually increasing or decreasing space temperature set-points or a variance in the timing by cooling or heating zone. 3. Rebound avoidance, slow recovery control strategies, gradually increasing or decreasing zone supply air temperatures. 4. Rebound avoidance, slow recovery control strategies, gradually increasing or decreasing chilled water temperatures or decreasing hot water temperatures. 5. Rebound avoidance, sequential equipment recovery strategies, gradually restoring demand limited equipment capacity. 6. Rebound avoidance, sequential equipment recovery strategies, gradually restoring equipment that was turned off during the Auto-DR period. 7. Rebound avoidance, slow recovery control strategies, gradually increasing capacity for air moving and pumping systems. 8. Rebound avoidance, sequential equipment recovery or rebound avoidance, slow recovery control where chilled water or hot water and other capacity control valves are sequentially or gradually allowed to return to normal operation, respectively.

**604.4 Lighting.** In Group B office spaces, the Auto-DR system shall be capable of reducing total connected power of lighting as determined in accordance with Section C405.5 of the International Energy Conservation Code by not less than 15 percent. **Exception:** The following buildings and lighting systems need not be addressed by the Auto-DR system: 1. Buildings or portions associated with lifeline services. 2. Luminaires on emergency circuits. 3. Luminaires located in emergency and life safety areas of a building. 4. Lighting in buildings that are less than 5,000 square feet (465 m<sup>2</sup> in total area). 5. Luminaires located within a daylight zone that are dimmable and connected to automatic daylight controls complying with Section C405.2.2.3.2 of the International Energy Conservation Code. 6. Signage used for emergency, life safety or traffic control purposes.

**PROPOSED ACTION:** Move to Appendix A (604.1 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Good practice, maybe difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 7.4.5.1

**605.1 Prescriptive compliance.** Where buildings are designed using the prescriptive-based compliance path in accordance with Section 601.3.2, building thermal envelope systems shall comply with the provisions of Section C402 of the International Energy Conservation Code and the provisions of this section.

**605.1.1 Insulation and fenestration criteria.** The building thermal envelope shall exceed the requirements of Tables C402.1.2 and C402.3 of the International Energy Conservation Code by not less than 10 percent. Specifically, for purposes of compliance with this code, each U-factor, C-factor, F-factor and SHGC in the specified tables shall be reduced by 10 percent to determine the prescriptive criteria for this code. In Sky Type "C" locations specified in Section 808.4, the skylights shall not exceed 5 percent of the building roof area.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC (C502.2). More stringent requirements are financially unreasonable.

**2011 ASHRAE 189.1 CORRELATION:** 7.4.2

**605.1.1.1 Permanent shading devices for fenestration.** Vertical fenestration within 45 degrees (785 rad) of the nearest west, south, and east cardinal ordinate shall be shaded by permanent horizontal exterior projections with a projection factor greater than or equal to 0.25. Where different windows or glass doors have different projection factor values, each shall be evaluated separately, or an area-weighted projection factor value shall be calculated and used for all windows and glass doors. Horizontal projections shall extend laterally beyond the edge of the glazing not less than one-half of the height of the glazing, except at building corners. **Exception:** Shading devices are not required for the following buildings and fenestrations: 1. Buildings located in hurricane-prone regions in accordance with Section 1609.2 of the International Building Code or on any other building with a mean roof height exceeding the height limits specified in Table 1504.8 of the International Building Code based on the exposure category and basic wind speed at the building site. 2. Where fenestration is located in a building wall that is within 18 inches (457 mm) of the lot line. 3. Where equivalent shading of the fenestration is provided by buildings, structures, geological formations, or permanent exterior projections that are not horizontal, as determined by sun angle studies at the peak solar altitude on the spring equinox, and three hours before and after the peak solar altitude on the spring equinox. 4. Where fenestration contains dynamic glazing that has a lower labeled solar heat gain coefficient (SHGC) equal to or less than 0.12, and the ratio of the higher and lower labeled visible transmittance (VT) is greater than or equal to 5. Dynamic glazing shall be automatically controlled to modulate, in multiple steps, the amount of solar gain and light transmitted into the space in response to daylight levels or solar intensity. Functional testing of controls shall be conducted in accordance with Section C408.3.1 of the International Energy Conservation Code.

**PROPOSED ACTION:** Adopt with the following modification. Add exceptions: 5. Where shade trees provided for site shading under Section 408.2.3 they may be evaluated as an offset for the need to provide permanent building mounted shading projections. 6. Where interior shading devices are provided, they may be evaluated as an offset for the need to provide permanent building mounted shading projections.

**RATIONALE / IMPACT:** Good practice, however trees and interior shading devices are well-established, very effective and cost effective methods of shading and energy conservation that do not have unintended negative consequences on the building envelope system, and should be included as exceptions.

**2011 ASHRAE 189.1 CORRELATION:** 7.4.2.5

**605.1.2 Air leakage.** The building thermal envelope shall be durably sealed to limit air leakage in accordance with Section C402.4 of the International Energy Conservation Code and the provisions of this section.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Consistent with current practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.2.9

**605.1.2.1 Air barriers.** A continuous air barrier shall be provided for buildings in climate zones 1 through 8 in accordance with Section C402.4.1 of the International Energy Conservation Code. **The exception in Section C402.4.1 of the International Energy Conservation Code shall not apply.**

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Consistent with current practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.2.9

*605.1.2.2 Testing requirement. The building thermal envelope air tightness shall be considered to be acceptable where the tested air leakage of the total area of the building thermal envelope is less than 0.25 cfm/ft<sup>2</sup> under a pressure differential of 0.3 in water column (1.57 lb/ft<sup>2</sup> (1.25 L/s.m<sup>2</sup> under a pressure differential of 75 Pa). Testing shall occur after rough-in and after installation of penetrations of the building envelope, including penetrations for utilities, heating, ventilating and air-conditioning (HVAC) systems, plumbing, and electrical equipment and appliances. Testing shall be done in accordance with ASTM E 779.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Impractical, financially unreasonable for some projects

**2011 ASHRAE 189.1 CORRELATION:** 7.4.2.9

*605.1.2.3 Air curtains. Where a building entrance is required to be protected with a vestibule in accordance with the International Energy Conservation Code, an air curtain tested in accordance with ANSI/AMCA 220 is permitted to be used as an alternative to separate conditioned space from the exterior.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Consistent with current practice

**2011 ASHRAE 189.1 CORRELATION:** None

*605.2. Roof replacement. Above-deck insulation for roof replacement on an existing building with insulation entirely above the deck and where the roof slope is less than two units vertical in 12 units horizontal (17-percent slope) shall be in accordance with Section 1003.2.7.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Consistent with current practice

**2011 ASHRAE 189.1 CORRELATION:**

*606.1 Prescriptive compliance. Where buildings are designed using the prescriptive-based compliance path in accordance with Section 601.3.2, building mechanical systems shall comply with the provisions of the International Energy Conservation Code and the provisions of this section.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action taken

**2011 ASHRAE 189.1 CORRELATION:** 7.4

*606.2 HVAC equipment performance requirements. Heating, ventilation and air-conditioning (HVAC) equipment shall comply with Sections 606.2.1 and 606.2.2.*

*606.2.1 Equipment covered by federal standards. Equipment covered by federal minimum efficiency standards shall comply with the minimum efficiency requirements of the International Energy Conservation Code.*

*606.2.2 Equipment not covered by federal standards. Equipment not covered by federal minimum efficiency standards shall comply with the minimum efficiency requirements of this section.*

*606.2.2.1 Ground source heat pumps. The efficiency of ground source heat pumps shall comply with the provisions of Table 606.2.2.1 based on the applicable referenced test procedure.*

*606.2.2.2 Multi-stage ground source heat pumps. The efficiency of multi-stage ground source heat pumps shall comply with the provisions of Table 606.2.2.1 based on the applicable referenced test procedure.*

*606.2.2.3 Minimum fan efficiency. Stand-alone supply, return and exhaust fans designed for operating with motors over 750 watts (1 hp) shall have an energy efficiency classification of not less than FEG71 as defined in AMCA 205. The total efficiency of the fan at the design point of operation shall be within 10 percentage points of either the maximum total efficiency of the fan or the static efficiency of the fan.*

**PROPOSED ACTION:** Move to Appendix A, Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:**

**TABLE 606.2.2.1  
ENERGY-EFFICIENCY CRITERIA FOR  
GROUND SOURCE HEAT PUMPS**

PRODUCT TYPE	MINIMUM EER	MINIMUM COP	TEST PROCEDURE
Water-to-Air Closed loop	14.1	3.3	ISO 13256-1
Water-to-Air Open loop	16.2	3.6	ISO 13256-1
Water-to-Water Closed loop	15.1	3.0	ISO 13256-2
Water-to-Water Open loop	19.1	3.4	ISO 13256-2
Direct Expansion (DX) or Direct GeoExchange (DGN)	15.0	3.5	AHRI 87D

EER = Energy efficiency ratio, COP = Coefficient of performance.

**606.3 Duct and plenum insulation, sealing and testing.** Supply and return air ducts and plenums, air handlers and filter boxes shall be insulated and sealed in accordance with Section C403.2.7.1.1 of the International Energy Conservation Code. The exception in Section C403.2.7.1.1 shall not apply.

**PROPOSED ACTION:** Adopt with modification: Delete "The exception in Section C403.2.7.1.1 shall not apply."

**RATIONALE / IMPACT:** Improving overall good practice by eliminating potential problematic situation

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3.8

**606.3.1 Duct air leakage testing.** Ductwork that is designed to operate at static pressures greater than 3 inches water column (747 Pa) and all ductwork located outdoors shall be leak-tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual. Representative sections totaling not less than 25 percent of the total installed duct area for the designated pressure class shall be tested. Positive pressure testing is acceptable for negative pressure ductwork. Duct systems with pressure ratings in excess of 3 inches water column (747 Pa) shall be identified on the construction documents. Duct leakage shall not exceed the rate determined in accordance with Equation 6-3, FCLP 0.65 (Equation 6-3) where: F maximum leakage in cfm/100 ft<sup>2</sup> duct surface area; CL 4, duct leakage class, cfm/100 ft<sup>2</sup> at 1 inch water column. P test pressure, which shall be equal to the design duct pressure class rating inches of water column.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Incomplete and not to industry standards

**2011 ASHRAE 189.1 CORRELATION:** None

**606.4 Heating, ventilating and air-conditioning (HVAC) piping insulation.** Piping with a nominal diameter greater than 1 4 inch (6.4 mm), including associated valves, fittings and piping system components, in heating, ventilating and air-conditioning (HVAC) systems shall be thermally insulated in accordance with Table 606.4. For insulation outside of the conductivity ranges specified in Table 606.4, the minimum thickness of the insulation shall be determined in accordance with Equation 6-4,  $T r / [(1/t) K/k + 1]$  (Equation 6-4) where: T minimum insulation thickness (inches), r actual outside radius of pipe (inches), t insulation thickness specified in Table 606.4 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 specified in Table 606.4 for the applicable fluid temperature. 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. **Exception:** Piping insulation is not required for the following: 1. Factory-installed piping within HVAC equipment tested and rated in accordance with Section 606.2. 2. Piping conveying fluids having a design operating temperature range between 60°F (15.6°C) and 105°F (40.6°C). 3. Piping conveying fluids not heated or cooled such as roof and condensate drains, cold water supply, and natural gas piping. 4. Where heat gain or heat loss will not increase energy usage such as liquid refrigerant piping. 5. Piping having an outside diameter of 1 inch (25 mm) or less, associated with strainers, control valves, and balancing valves.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3

**TABLE 606.4  
MINIMUM PIPE INSULATION THICKNESS**

FLUID	CONDUCTIVITY Btu-in/h-ft <sup>2</sup> × (ft <sup>2</sup> × F)	RATIO OF WALL THICKNESS OF PIPE INSULATION TO NOMINAL PIPE DIAMETER <sup>a,b</sup>
Steam	0.27 – 0.34	≥ 2:1
Hot Water	0.22 – 0.29	≥ 1:1
Chilled Water	0.22 – 0.28	≥ 1:1

For SI: 1 inch = 25.4 mm, 1 Btu-in = W/m × K.

- a. The proportions apply to all nominal pipe diameters greater than 1/2 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.
- b. These thicknesses are based on energy-efficiency considerations only.

**606.5 Economizers.** Economizers shall comply with the requirements of the International Energy Conservation Code, except as noted herein.

**606.5.1 Economizer systems.** Each cooling system that has a fan shall include either an air economizer complying with Section 606.5.1.1 or a water economizer complying with Section 606.5.1.2. **Exception:** Economizers are not required for the following. 1. Individual fan-cooling units with a supply capacity less than the minimum listed in Table 606.5.1(1). 2. In Group I-2 occupancies, hospitals, and Group B occupancies, ambulatory care facilities, where more than 75 percent of the air designed to be supplied by the system is to spaces that are required to be humidified above a 35°F (1.7°C) dew-point temperature to comply with applicable codes or accreditation standards. In other occupancies, where more than 25 percent of the air designed to be supplied by the system is to spaces that are designed to be humidified above a 35°F (1.7°C) dew-point temperature to satisfy process needs. 3. Systems that include a condenser heat recovery system that is designed to utilize 60 percent of the peak heat rejection load at design conditions and there is a documented need for that rejected heat for either service hot water or space heating during peak heat rejection design conditions. 4. Systems that serve spaces estimated as having a sensible cooling load at design conditions, excluding transmission and infiltration loads, of less than or equal to transmission and infiltration losses at the temperature and relative humidity design conditions in accordance with Section 6.1 of 2011 ASHRAE 55. 5. Where the use of outdoor air for cooling will affect supermarket open refrigerated casework systems. 6. Where the cooling efficiency is equal to, or greater than, the efficiency improvement requirements in Table 606.5.1(2).

**606.5.1.1 Air economizers.** Air economizers shall be designed in accordance with Sections 606.5.1.1.1 through 606.5.1.1.4.

**606.5.1.1.1 Design capacity.** Air economizer systems shall be capable of modulating outdoor air and return air dampers to provide up to 100 percent of the design supply air quantity as outdoor air for cooling.

**606.5.1.1.2 Control signal.** Economizer dampers shall be capable of being sequenced with the mechanical cooling equipment and shall not be controlled by only mixed air temperature. **Exception:** The use of mixed air temperature limit control shall be permitted for systems controlled from space temperature, such as single-zone systems.

**606.5.1.1.3 High-limit shutoff.** Air economizers shall be capable of automatically reducing outdoor air intake to the design minimum outdoor air quantity when the outdoor air intake will not reduce cooling energy usage. High-limit shutoff control types for specific climates shall be chosen from Table 606.5.1.1.3(1). High-limit shutoff control settings for the Table 606.5.1.1.3(1) control types shall be as specified in Table 606.5.1.1.3(2).

**606.5.1.1.4 Relief of excess outdoor air.** Systems shall provide a means to relieve excess outdoor air during air economizer operation to prevent over-pressurizing of the building. The relief air outlets shall be located to avoid recirculation of the relief of air into the building.

**606.5.1.2 Water economizer systems for HVAC equipment.** Economizer systems for heating, ventilating and air-conditioning (HVAC) equipment shall be designed in accordance with Sections 606.5.1.2.1 through 606.5.1.2.4.

**606.5.1.2.1 Design capacity.** Water economizer systems shall be capable of cooling supply air by indirect evaporation and providing up to 100 percent of the expected system cooling load at outdoor air temperatures of 50°F (10°C) dry bulb/45°F (7.2°C) wet bulb and below. **Exception:** Systems in which a water economizer is used and where dehumidification requirements cannot be met using outdoor air temperatures of 50°F (10°C) dry bulb/45°F (7.2°C) wet bulb, shall satisfy 100 percent of the expected system cooling load at 45°F (7.2°C) dry bulb/40°F (4.4°C) wet bulb.

**606.5.1.2.2 Maximum pressure drop.** Pre-cooling coils and water-to-water heat exchangers used as part of a water economizer system shall have a water-side pressure drop of less than 15 feet of water column (44 835 Pa) including the control valve or a secondary loop shall be created so that the coil or heat exchanger pressure drop is not seen by the circulating pumps when the system is in the normal cooling non-economizer mode.

**606.5.1.2.3 Integrated economizer control.** Economizer systems shall be integrated with the mechanical cooling system and shall be capable of providing partial cooling whether or not additional mechanical cooling is required to meet the remainder of the cooling load.

**606.5.1.2.4 Economizer heating system impact.** Heating, ventilating and air-conditioning (HVAC) system design and economizer controls shall be so that economizer operation does not increase the building heating energy use during normal operation. **Exception:** Economizers on variable air volume (VAV) systems that cause zone level heating to increase because of reduction in supply air temperature.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC (C403.3.1)

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3.3

**TABLE 606.5.1(1)  
ECONOMIZER REQUIREMENTS**

CLIMATE ZONES	ECONOMIZER REQUIREMENT
1A, 1B	No requirement
2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, 8	Economizers on all cooling systems having a capacity $\geq 33,000$ Btuh <sup>a</sup>

For SI: 1 British thermal unit per hour = 0.293 W.

a. The total capacity of all systems without economizers shall not exceed 480,000 Btuh per building or 20 percent of the building's air economizer capacity, whichever is greater.

**TABLE 606.5.1(2)  
EQUIPMENT EFFICIENCY PERFORMANCE  
EXCEPTION FOR ECONOMIZERS**

CLIMATE ZONES	COOLING EQUIPMENT EFFICIENCY IMPROVEMENT (%) <sup>a</sup>
2A	17
2B	21
3A	27
3B	32
4A	42
4B	49

IPLV = Integrated part load value, IEER = Integrated energy-efficiency ratio, SEER = Seasonal energy-efficiency rating, EER = Energy-efficiency ratio, COP = Coefficient of performance

a. Where a unit is rated with an IPLV, IEER or SEER, the minimum values for these metrics shall be increased by the percentage listed in the table in order to eliminate the required air or water economizer. Where a unit is rated only with a full load metric such as EER or COP cooling, these metrics shall be increased by the percentage shown.

**TABLE 606.5.1.3(1)  
HIGH-LIMIT SHUTOFF CONTROL OPTIONS  
FOR AIR ECONOMIZERS**

CLIMATE ZONES	ALLOWED CONTROL TYPES	PROHIBITED CONTROL TYPES
1B, 2B, 3B, 3C, 4B, 4C, 5B, 5C, 6B, 7, 8	Fixed dry bulb Differential dry bulb Electronic enthalpy <sup>a</sup> Differential enthalpy Dew-point and dry-bulb temperatures	Fixed enthalpy
1A, 2A, 3A, 4A	Fixed enthalpy Electronic enthalpy <sup>a</sup> Differential enthalpy Dew-point and dry-bulb temperatures	Fixed dry bulb Differential dry bulb
All other climates zones	Fixed dry bulb Differential dry bulb Fixed enthalpy Electronic enthalpy <sup>a</sup> Differential enthalpy Dew-point and dry-bulb temperatures	—

a. Electronic enthalpy controllers are devices that use a combination of humidity and dry-bulb temperature in their switching algorithm.

**TABLE 606.5.1.1.3(2)  
HIGH-LIMIT SHUTOFF CONTROL SETTING FOR AIR ECONOMIZERS**

DEVICE TYPE	CLIMATE ZONE	REQUIRED HIGH LIMIT (Economizer off when)	
		Equation	Description of equation
Fixed dry bulb	1B, 2B, 3B, 3C, 4B, 4C, 5B, 5C, 6B, 7, 8	$T_{out} > 75^{\circ}\text{F}$	Outdoor air temperature ( $T_{out}$ ) is greater than 75°F
	5A, 6A, 7A	$T_{out} > 70^{\circ}\text{F}$	Outdoor air temperature ( $T_{out}$ ) is greater than 70°F
	All other zones	$T_{out} > 65^{\circ}\text{F}$	Outdoor air temperature ( $T_{out}$ ) is greater than 65°F
Differential dry bulb	1B, 2B, 3B, 3C, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, 8	$T_{out} > T_{ret}$	Outdoor air temperature ( $T_{out}$ ) is greater than return air temperature ( $T_{ret}$ )
Fixed enthalpy	All	$h_{out} > 28 \text{ Btu/lb}^a$	Outdoor air enthalpy ( $h_{out}$ ) is greater than 28 Btu/lb of dry air <sup>a</sup>
Electronic enthalpy	All	$(T_{out}/RH_{out}) > A$	Outdoor air temperature ( $T_{out}$ ) divided by RH <sub>out</sub> is greater than the "A" setpoint curve <sup>b</sup>
Differential enthalpy	All	$h_{out} > h_{ret}$	Outdoor air enthalpy ( $h_{out}$ ) is greater than return air enthalpy ( $h_{ret}$ )
Dew-point and dry bulb temperatures	All	$DP_{out} > 55^{\circ}\text{F}$	Outside dew point ( $DP_{out}$ ) is greater than 55°F
		$T_{out} > 75^{\circ}\text{F}$	Outdoor air dry bulb ( $T_{out}$ ) is greater than 75°F

For 5B, 5C =  $(1^{\circ}\text{F}) \cdot 22/1.8$ , 1 foot = 304.8 mm, 1 British thermal unit per pound = 2326 Btu/kg.

- At altitudes substantially different than sea level, the fixed enthalpy limit shall be set to the enthalpy value at 75°F and 50-percent relative humidity. As an example, at approximately 6000 feet elevation the fixed enthalpy limit is approximately 30.7 Btu/lb.
- Setpoint "A" corresponds to a curve on the psychrometric chart that goes through a point at approximately 75°F and 40-percent relative humidity and is nearly parallel to dry-bulb lines at low humidity levels and nearly parallel to enthalpy lines at high humidity levels.

**606.6 Variable air volume (VAV) fan control.** Individual fans with motors equal to or greater than 1.0 horsepower (0.746 kW) shall be one of the following: 1. Driven by a mechanical or electrical variable speed drive. 2. Driven by a vane-axial fan with variable-pitch blades. 3. Provided with controls or devices that will result in fan motor demand of not more than 30 percent of its design wattage at 50 percent of design airflow when static pressure set point equals one-third of the total design static pressure, based on manufacturer's certified fan data. Static pressure sensors used to control VAV fans shall be placed in a position so that the controller set point is not greater than one-third of the total design fan static pressure, except for systems with direct digital control. Where this results in the sensor being located downstream of major duct branching, multiple sensors shall be installed in each major branch to ensure that the static pressure can be maintained in each branch. For systems with direct digital control of individual zone boxes reporting to the central control panel, the static pressure set point shall be reset based on the zone requiring the most pressure. The set point shall be reset lower until one zone damper is wide open. **Exception:** Systems without zone dampers are exempt from the static pressure reset requirements.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**606.7 Kitchen exhaust systems.** Kitchen ventilation and exhaust systems shall be in accordance with the International Mechanical Code and this section. Kitchen ventilation systems that deliver conditioned supply air to any space containing a kitchen hood shall not be capable of exceeding the greater of the following: 1. The ventilation rate required to supply the space conditioning load; or 2. The hood exhaust flow minus the available transfer air from adjacent spaces. For the purposes of this section, available transfer air is considered to be that portion of outdoor ventilation air not required to satisfy other exhaust needs, such as restrooms, and not required to RETAIN pressurization of adjacent spaces. Where the total hood exhaust airflow rate of kitchen hoods in the space is greater than 5,000 cfm (2360 L/s) each hood shall have an exhaust rate in not greater than 110 percent of the minimum exhaust rate required by the International Mechanical Code and the ventilation system shall comply with one of the following: 1. Not less than 50 percent of replacement air is transfer air that would otherwise be exhausted. 2. Demand ventilation systems that are capable of reducing exhaust and replacement air system airflow rates by not less than 50 percent for not less than 75 percent of the exhaust air. The demand ventilation system shall include controls necessary to modulate airflow in response to appliance operation and to RETAIN full capture and containment of smoke, effluent and combustion products during cooking and when idle. 3. Listed energy recovery devices with a sensible heat recovery effectiveness of not less than 40 percent shall provided for not less than 50 percent of the total exhaust air. Where a single hood, or hood section, is installed over appliances with different duty ratings, the maximum allowable flow rate for the hood or hood section shall be based on the requirements for the appliance with the highest duty rating located under the hood or hood section. **Exception:** Where not less than 75 percent of the replacement air provided by the kitchen ventilation and exhaust system is transfer air that would otherwise be exhausted, the provisions of this section shall not apply.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3.7

**606.8 Laboratory exhaust systems.** Laboratory exhaust systems shall comply with the provisions of the International Energy Conservation Code except as specified in Section 606.8.1.

**606.8.1 Laboratory exhaust systems.** Buildings with laboratory exhaust systems having a total exhaust rate greater than 5,000 cfm (2360 L/s)

shall be provided with one or more of the following: 1. A variable air volume (VAV) laboratory exhaust and room supply system capable of reducing exhaust and makeup air flow rates to the minimum required in the International Mechanical Code. 2. A heat recovery system to precondition makeup air from laboratory exhaust so that the percentage that the exhaust and makeup air flow rates can be reduced from design conditions plus the sensible recovery effectiveness percentage totals not less than 50 percent. 3. Direct makeup auxiliary air supply equal to not less than 75 percent of the exhaust air flow rate capable of being heated and cooled to the design temperatures specified in Section C302.1 of the International Energy Conservation Code.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**606.9 Control of HVAC in Group R-1 sleeping rooms.** In Group R-1 occupancies, each sleeping room shall be provided with a dedicated system to control automatically the heating, ventilating and air-conditioning (HVAC) systems to control the energy consumption during unoccupied periods. The controls shall be designed to raise cooling and lower heating temperature set points by at least 4°F (-15.6°C) during periods when the sleeping room is unoccupied. **Exception:** Automatic controls are not required in Group R-1 occupancies with fewer than 20 sleeping rooms.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3.9

**607.1 Prescriptive compliance.** Where buildings are designed using the prescriptive-based compliance path in accordance with Section 601.3.2, service water heating systems shall comply with the provisions of the International Energy Conservation Code and the provisions of this section.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action required

**2011 ASHRAE 189.1 CORRELATION:** 7.4.4

**607.2 Service water heating (SWH) equipment performance requirements.** Service water heating equipment shall comply with Sections 607.2.1 and 607.2.2.

**607.2.1 Equipment covered by federal standards.** Equipment covered by federal minimum efficiency standards shall comply with the minimum efficiency requirements of the International Energy Conservation Code.

**607.2.2 Water heater controls for dwelling units.** Water heaters installed in dwelling units in buildings shall be equipped with external water temperature thermostat controls. The controls shall allow the occupant to set the water temperature at a setting that is below 100°F (38°C) and greater than or equal to 50°F (10°C).

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC

**2011 ASHRAE 189.1 CORRELATION:** 7.4.4

**607.3 Pools, hot tubs and spas.** Pools, hot tubs and spas shall comply with the efficiency requirements of the International Energy Conservation Code.

**607.3.1 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 by one or both of the following: 1. An onsite renewable energy system. 2. A heat recovery system.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**607.4 Snowmelt systems.** Snow melt systems shall comply with the requirements of the International Energy Conservation Code. Hydronic systems shall supplement not less than 25 percent of the design snow melting total annual consumption measured in Btu/ft<sup>2</sup> (J/m<sup>2</sup> energy per

unit area. Electric systems shall supplement not less than 50 percent of the design snow melt peak load demand. These requirements shall be supplied by one or both of the following: 1. An onsite renewable energy system. 2. A heat recovery system. Exception: Emergency service ingress and egress are exempt from the requirements of Section 607.4.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**607.5 Waste water heat recovery system.** The following building types shall be provided with a waste water heat recovery system that will preheat the incoming water used for 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; 5. Group A-3, health clubs and spas; and 6. Group I-2, hospitals, psychiatric hospitals and nursing homes. Exception: Waste water heat recovery systems are not required for single-story slab-on-grade and single-story on crawl-space buildings.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Financially unreasonable

**2011 ASHRAE 189.1 CORRELATION:** None

**607.6 Service water heating piping insulation.** Service water heating piping shall be thermally insulated in accordance with Table 606.4. Where hot water distribution piping is installed within attics and crawlspaces, the insulation shall continue to cover the pipe for a distance not less than 6 inches (152 mm) beyond the building thermal envelope. Where hot water distribution piping is installed within walls, the insulation shall completely surround the pipe with not less than 1 inch (25 mm) of insulation. Where hot water piping is installed in a wall cavity of insufficient size to accommodate the pipe and insulation levels of Table 606.4, the insulation thickness shall be permitted to have the maximum thickness that the wall cavity can accommodate, but not less than 1/2-inch (12 mm) thick. Exception: Insulation is not required for the following: 1. Factory-installed piping within service water heating equipment tested and rated in accordance with Section 606.4. 2. Piping conveying fluids that is neither heated nor cooled, including 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.

**607.6.1 Buried piping.** Service hot water piping installed within a slab or below grade shall be insulated in accordance with Section 607.6 and shall be placed within a physically protective, waterproof channel or sleeve having internal dimensions large enough so that the piping and insulation can be removed and replaced, and RETAIN its dimensional integrity during and after construction. Exception: For piping other than that located under building slabs, insulation is not required where the insulation manufacturer stipulates that the pipe insulation will RETAIN its insulating value in underground applications in damp soil where installed in accordance with the manufacturer's instructions.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC (C404.5)

**2011 ASHRAE 189.1 CORRELATION:** 7.4.4.2

**607.7 Circulating hot water systems.** Controls that allow continuous, timer, or water temperature-initiated (aquastat) operation of a circulating pump are prohibited. Gravity or thermosiphon 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 at temperatures greater than 105°F (41°C) 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.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Impractical and poorly written

**2011 ASHRAE 189.1 CORRELATION:** None

**608.1 General.** Where buildings are designed using the prescriptive-based compliance path in accordance with Section 601.3.2, building electrical power and lighting systems shall comply with the provisions of the International Energy Conservation Code and the provisions of Section 608.

**608.1.1 Occupant sensor controls.** Occupant sensor controls shall comply with Section C405.2 of the International Energy Conservation Code.

**608.1.2 Time switch controls.** Time switch controls shall comply with Section C405.2 of the International Energy Conservation Code.

**608.1.3 Automatic daylight controls.** Automatic daylight controls shall comply with Section C405.2 of the International Energy Conservation Code.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC (C408.3)

**2011 ASHRAE 189.1 CORRELATION:** 7.4.6.2, 7.4.6.4

**608.2 Sleeping unit controls.** Sleeping units in Group R-1 and R-2 occupancies shall have an automatic control system or device that shuts off permanently wired luminaires and switched receptacles, except those in bathrooms, within 30 minutes of the unit being vacated. **Exception:** Sleeping unit controls are not required in sleeping units where permanently wired luminaires and switched receptacles, except those in bathrooms, are connected to a captive key control.

**608.2.1 Sleeping unit bathroom controls.** Permanently wired luminaires located in bathrooms within sleeping units in Group R-1 and R-2 occupancies shall be equipped with occupant sensors that require manual intervention to energize circuits. **Exception:** Not more than 5 watts of lighting in each bathroom shall be permitted to be connected to the captive key control at the main room entry instead of being connected to the occupant sensor control.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3.9, 7.4.6.2, 7.4.6.3, 7.4.6.4

**608.3 Interior light reduction controls.** Occupant sensor controls shall be provided to automatically reduce connected lighting power by not less than 45 percent during periods when occupants are not present in the following locations: 1. Corridors and enclosed stairwells; 2. Storage and stack areas not open to the public; and 3. Parking garages. **Exception:** Automatic power reduction is not required for the following: 1. Where occupant sensor controls are overridden by time switch controls that keep lights on continuously during peak occupancy periods. 2. Means of egress lighting required by the International Building Code or the International Fire Code.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC (C405)

**2011 ASHRAE 189.1 CORRELATION:** 7.4.3.9, 7.4.6.1, 7.4.6.2, 7.4.6.3, 7.4.6.4

**608.4 Exterior lighting controls.** Exterior lighting shall comply with the requirements of Sections 608.4.1 and 608.4.2.

**608.4.1 Exterior light reduction.** Exterior lighting shall be controlled by a time switch and configured so that the total exterior lighting power is automatically reduced by not less than 30 percent within 2 hours after facility operations conclude. **Exception:** Exterior lighting need not be controlled for the following occupancies and conditions: 1. Group H occupancies. 2. Group I-3 occupancies 3. Lighting that is connected to occupant sensor controls. 4. Means of egress lighting required by the International Building Code or the International Fire Code. 5. Solar powered luminaires that are not connected to a centralized power source.

**608.4.2 Exterior lighting and signage shutoff.** The lighting of building facades, signage, and landscape features shall be controlled by a time switch control configured so that the lighting automatically shuts off from within 1 hour after facility operations conclude until within 1 hour before facility operations begin or as established by the jurisdiction. Where facility operations are continuous, decorative lighting of building facades and landscape features shall automatically shut off from midnight until 6:00 a.m.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC (C405.6, C405.2.4)

**2011 ASHRAE 189.1 CORRELATION:** 5.3.3, 7.4.6.5, 7.4.6.5.1, 7.4.6.5.2

**608.5 Automatic daylight controls.** Automatic daylight controls shall be provided in daylight areas complying with Section 808.3.1 or Section 808.3.2 to control the lights serving those areas. General lighting in a sidelighting daylight area that is within one window head height shall be separately controlled by automatic daylight controls. **Exception:** Automatic daylight controls are not required for the following spaces and equipment: 1. Toplighting daylight areas where the skylight is located in a portion of the roof that is shaded during the peak sun angle on the summer solstice by permanent features of the building or by permanent features of adjacent buildings. 2. Sidelighting daylight areas where the fenestration is located in an obstructed exterior wall that does not face a public way or a yard or court complying with Section 1206 of the International Building Code or where the distance to any buildings, structures, or geological formations in front of the wall is less than two times the height of the buildings, structures, or geological formations. 3. Daylit areas served by less than 90 watts of lighting. 4. Spaces where medical care is directly provided. 5. Spaces within dwelling units or sleeping units. 6. Lighting required to comply with Section C405.2.3 of the International Energy Conservation Code.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by 2012 IECC (C405.2.2.3.2)

**2011 ASHRAE 189.1 CORRELATION:** 8.3.4, 8.4.1, and 8.5.1

**608.6 Plug load controls.** Receptacles and electrical outlets in the following spaces shall be controlled by an occupant sensor or time switch as follows: 1. In Group B office spaces without furniture systems incorporating wired receptacles, not less than one controlled receptacle shall be provided for each 50 square feet (4.65 m<sup>2</sup>). 2. In Group B office spaces with furniture systems incorporating wired receptacles, not less than one controlled circuit shall be provided at each electrical outlet used for powering furniture systems. 3. In classrooms in Group B and Group E occupancies, not less than four controlled receptacles shall be provided in each classroom. 4. In copy rooms, print shops, and computer labs, not less than one controlled receptacle shall be provided for each data jack. 5. In spaces with an overhead cabinet above a counter or work surface, not less than one controlled receptacle shall be provided for each work surface.

**608.6.1 Distribution and marking.** Controlled receptacles and electrical outlets shall be distributed in a reasonably uniform pattern throughout each space. Controlled receptacles shall be marked to differentiate them from uncontrolled receptacles.

**608.6.2 Furniture systems.** Furniture systems incorporating wired receptacles shall include not less than two receptacles at each workstation that are connected to a controlled circuit.

**608.6.3 Computer office equipment.** Computer monitors, plug in space heaters, air purifiers, radios, computer speakers, coffee makers, fans, and task lights located in spaces with controlled receptacles shall be plugged into controlled receptacles.

**608.6.4 Audio and visual systems.** Displays, projectors, and audio amplifiers in Group B and Group E classrooms, conference and meeting rooms, and multipurpose rooms shall be controlled by an occupant sensor.

**608.6.5 Water dispensers.** Water dispensers that utilize energy to cool or heat drinking water shall be controlled by time switch controls.

**608.6.6 Refrigerator and freezer cases.** Lighting integral to vending machines and refrigerator and freezer cases shall be controlled by an occupant sensor or a time switch.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Impractical and poorly written

**2011 ASHRAE 189.1 CORRELATION:** None

**608.7 Fuel gas lighting systems.** Fixtures that generate illumination by combustion of fuel gas shall be included in lighting power calculations required under Sections C405.5 and C405.6 of the International Energy Conservation Code by converting the maximum rated Btu/h of the luminaire into watts using Equation 6-5. Wattage Equivalent Maximum btu/h rating of the fuel gas lighting system/3.413. Equation 6-5 **Exception:** Fuel gas lighting at historic buildings in accordance with Section C101.4.2 of the International Energy Conservation Code is not included in the calculation.

**608.7.1 Continuously burning pilot lights.** Fixtures that generate illumination by combustion of fuel gas shall not contain continuously burning pilot lights.

**PROPOSED ACTION:** No Action

**RATIONALE / IMPACT:** If applies, may fall under International Fuel Gas Code

**2011 ASHRAE 189.1 CORRELATION:**

**608.8 Electrical system efficiency.** Electrical systems shall comply with Section 608.8.1.

**608.8.1 Prescriptive compliance.** Prescriptive compliance for electrical systems shall be in accordance with Sections 608.8.1.1 through 608.8.1.3.

**608.8.1.1 Transformer efficiency.** Distribution transformers installed on the load side of the service disconnecting means shall comply with the provisions of Tables 608.8.1.1(1), 608.8.1.1(2) and 608.8.1.1(3), and the Energy Policy Act of 2005 as applicable. **Exception:** The following transformers are exempt from the efficiency standards of Section 608.8.1.1: 1. Transformers not covered by the Energy Policy Act of 2005. 2. Transformers for special purpose applications, and not used in general purpose applications. 3. Transformers with multiple voltage taps where the highest tap is not less than 20 percent more than the lowest tap. 4. Drive transformers, rectifier transformers, auto-transformers, uninterruptible power supply transformers, impedance transformers, regulating transformers, sealed and non-ventilating transformers, machine tool transformers, welding transformers, grounding transformers, and testing transformers.

**608.8.1.2 Voltage drop in feeders.** The voltage drop in feeder conductors shall not exceed 1.5 percent at design load.

**608.8.1.3 Voltage drop in branch circuits.** The voltage drop in branch circuit conductors shall not exceed 1.5 percent at design load.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Consistent with current practice

**2011 ASHRAE 189.1 CORRELATION:** None

**TABLE 608.8.1.1(1)**  
**LOW-VOLTAGE DRY-TYPE DISTRIBUTION TRANSFORMERS**  
**(Maximum 600 Volt Primary)\***

SINGLE PHASE		THREE PHASE	
kVA Rating	Minimum Efficiency (%)	kVA Rating	Minimum Efficiency (%)
15	97.7	15	97.0
25	98.0	30	97.5
37.5	98.2	45	97.7
50	98.3	75	98.0
75	98.5	112.5	98.2
100	98.6	150	98.3
167	98.7	225	98.5
250	98.8	300	98.6
333	98.9	500	98.7
—	—	750	98.8
—	—	1000	98.9

a. All efficiency values for low-voltage transformers are at 35 percent of nameplate-rated load, determined in accordance with the DOE test procedure, 10 CFR Part 431, Sub-part K, Appendix A.

**TABLE 608.8.1.1(2)**  
**MEDIUM-VOLTAGE DRY-TYPE DISTRIBUTION TRANSFORMERS**  
**(Maximum 34,500 Volt Primary, Maximum 600 Volt Secondary)\***

SINGLE PHASE				THREE PHASE			
kVA Rating	20-45 kV BIL Minimum Efficiency (%)	48-95 kV BIL Minimum Efficiency (%)	>96 kV BIL Minimum Efficiency (%)	kVA Rating	20-45 kV BIL Minimum Efficiency (%)	48-95 kV BIL Minimum Efficiency (%)	>96 kV BIL Minimum Efficiency (%)
15	98.10	97.86	—	15	97.50	97.18	—
25	98.33	98.12	—	30	97.90	97.63	—
37.5	98.49	98.30	—	45	98.10	97.86	—
50	98.60	98.42	—	75	98.33	98.12	—
75	98.73	98.57	98.53	112.5	98.49	98.30	—
100	98.82	98.67	98.63	150	98.60	98.42	—
167	98.96	98.83	98.80	225	98.73	98.57	98.53
250	99.07	98.95	98.91	300	98.82	98.67	98.63
333	99.14	99.03	98.99	500	98.96	98.83	98.80
500	99.22	99.12	99.09	750	99.07	98.95	98.91
667	99.27	99.18	99.15	1000	99.14	99.03	98.99
833	99.31	99.23	99.20	1500	99.22	99.12	99.09
—	—	—	—	2000	99.27	99.18	99.15
—	—	—	—	2500	99.31	99.23	99.20

BIL = Basic impulse insulation level.

a. All efficiency values for medium-voltage transformers are at 50 percent of nameplate-rated load, determined in accordance with the DOE test procedure, 10 CFR Part 431, Sub-part K, Appendix A.

**TABLE 608.8.1.1(3)**  
**MEDIUM-VOLTAGE LIQUID-IMMERSED**  
**DISTRIBUTION TRANSFORMERS**  
 (Maximum 34,500 Volt Primary, Maximum 600 Volt Secondary)\*

SINGLE PHASE		THREE PHASE	
kVA Rating	Minimum Efficiency (%)	kVA Rating	Minimum Efficiency (%)
10	98.62	15	98.36
15	98.76	30	98.62
25	98.91	45	98.76
37.5	99.01	75	98.91
50	99.08	112.5	99.01
75	99.17	150	99.08
100	99.23	225	99.17
167	99.25	300	99.23
250	99.32	500	99.25
333	99.36	750	99.32
500	99.42	1000	99.36
667	99.46	1500	99.42
883	99.49	2000	99.46
—	—	2500	99.49

a. All efficiency values for medium-voltage transformers are at 50 percent of nameplate-rated load, determined in accordance with the DOE test procedure, 10 CFR Part 431, Sub-part K, Appendix A.

**608.9 Exterior lighting.** Exterior lighting shall comply with Sections C405.6.1 and C405.6.2 of the International Energy Conservation Code regardless of how the power for that lighting is supplied. **Exception:** Lighting for the following purposes is exempt: 1. Where approved because of historical, safety, signage, or emergency lighting considerations. 2. Roadway lighting required by governmental authorities.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Consistent with current practice

**2011 ASHRAE 189.1 CORRELATION:** 7.4.6.3

**608.10 Verification of lamps and ballasts.** Prior to issuance of a certificate of occupancy, the field inspector shall confirm the installation of luminaires, type and quantity; lamps, type, wattage and quantity, and ballasts, type and performance for not less than one representative luminaire of each type, for consistency with the approved construction documents. Where a discrepancy is found, energy calculations shall be revised and resubmitted.

**PROPOSED ACTION:** Move to Appendix A - Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** None

**608.11 Verification of lighting controls.** Prior to issuance of a certificate of occupancy, the field inspector shall confirm the installation of lighting controls shown on the approved construction documents. Where a discrepancy is found, the installation shall be reviewed for conformance to the International Energy Conservation Code and Sections 608.2, 608.3, 608.4, 608.5, and 608.6.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: covered by IECC 408.3

**2011 ASHRAE 189.1 CORRELATION:** 7.4.6.2, 7.4.6.4, 7.4.6.5

**608.12 Main electrical panel rating.** The main electrical service entrance panel for the building shall be listed and labeled as a suitable

connection to an onsite renewable energy source.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Current technology is cost prohibitive

**2011 ASHRAE 189.1 CORRELATION:** 7.4.1.1

**609.1 General.** This section provides requirements for appliances and equipment installed in the building or on the building site. Permanent appliances and equipment shall comply with the provisions of Section 609.2, and portable appliances and equipment shall comply with the provisions of Section 609.3. **Exception:** Section 609 does not apply to appliances and equipment in compliance with Sections 605 through 608 and those specified in Table 609.1.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good Practice

**2011 ASHRAE 189.1 CORRELATION:**

**TABLE 609.1  
APPLIANCES AND EQUIPMENT COVERED BY FEDERAL  
EFFICIENCY STANDARDS**

RESIDENTIAL PRODUCTS	COMMERCIAL PRODUCTS
Battery chargers <sup>a</sup>	Automatic ice makers
Ceiling fans and ceiling fanlight kits	Commercial clothes washers
Clothes dryers	Distribution transformers
Clothes washers	Electric motors <sup>a</sup>
Dehumidifiers	HD lamps <sup>a</sup>
Dishwashers	Metal halide lamp fixtures
Fluorescent and incandescent lamps	Refrigerated beverage vending machines <sup>a</sup>
Fluorescent lamp ballasts <sup>a</sup>	Walk-in coolers and walk-in freezers
Microwave ovens <sup>a</sup>	
Ranges and ovens	
Refrigerators, refrigerator-freezers, and freezers	
Room air conditioners	
Torchieres	

a. These products currently have no federal standards. NOTE: U.S. Department of Energy rulemakings are underway or scheduled.

**609.2 Permanent appliances and equipment.** Appliances and equipment that are permanently connected to the building energy supply systems shall comply with the provisions of Sections 609.2.1 through 609.2.4 as applicable. Such appliances and equipment shall be listed and labeled and installed in accordance with the manufacturer's installation instructions and the provisions and terms of their listing, the International Energy Conservation Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code and International Building Code, and shall be provided with controls and energy monitoring systems as required by this code.

**609.2.1 Elevators.** Elevator systems shall comply with Sections 609.2.1.1 through 609.2.1.2.3.

**609.2.1.1 Lighting.** The total lighting in each elevator cab shall be not less than 35 lumens per watt, based on the total lumens from lamps divided by the total wattage of the luminaires in the cab, but not including luminaires of signals and displays.

**609.2.1.2 Power conversion system.** Power conversion systems for traction elevators shall comply with Sections 609.2.1.2.1 through 609.2.1.2.3.

**609.2.1.2.1 Motor.** Induction motors with a Class IE2 efficiency rating, as defined by IEC EN 60034-30, or alternative technologies, such as permanent magnet synchronous motors that have equal or better efficiency, shall be used.

**609.2.1.2.2 Transmission.** Transmissions shall not reduce the efficiency of the combined motor/transmission below that shown for the Class IE2 motor. Gearless machines shall be assumed to have a 100-percent transmission efficiency.

**609.2.1.2.3 Drive.** Potential energy released during motion shall be recovered.

**609.2.1.3 Ventilation.** Cab ventilation fans shall have an efficacy greater than or equal to 3.0 cfm per watt (0.085 m<sup>3</sup>/min./watt).

**609.2.1.4 Standby mode.** When the elevator is stopped, not occupied, and with doors closed, lighting, ventilation, and cab displays shall be capable of being de-energized within 5 minutes of stopping, and re-energized prior to opening the doors. Power shall cease to be applied to the door motor after the elevator is stopped, lighting is de-energized, and no one is in the cab, and re-energized upon the next passenger arrival. In

*buildings with multiple elevators serving the same floors, not less than half of the elevators shall be capable of switching to sleep, low-power mode, during periods of low traffic.*  
*609.2.1.5 Guides. Elevator car guides shall be of the roller type, in order to reduce frictional energy losses. Counterweights with sliding guides shall be balanced in order to minimize frictional losses associated with the counterweight guides.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MD DLLR

**2011 ASHRAE 189.1 CORRELATION:**

*609.2.2 Escalators and moving walkways. Escalators and moving walkways shall comply with Sections 609.2.2.1 through 609.2.2.5.*  
*609.2.2.1 Lighting. Light sources, including, but not limited to, balustrade lighting, comb-plate lighting and step demarcation lighting, shall have an efficacy of not less than 35 lm/W, based on the total lumens from lamps divided by the total wattage of the luminaires provided on the escalator or moving walk.*  
*609.2.2.2 Drive system. Induction motors with a class IE3 efficiency rating, as defined by IEC EN 60034-30, or permanent magnet synchronous motors shall be used*  
*609.2.2.3 Energy recovery. Down-running escalators equipped with direct variable frequency drives shall use regenerative drives and return recovered energy to the building electrical power system*  
*609.2.2.5 Standby mode. During standby mode, escalators and moving walkways shall be capable of being automatically slowed to not greater than 50 percent of nominal speed. Escalators and moving walkways shall be capable of being automatically turned off when the building is unoccupied or outside of facility operations. In locations where multiple escalators serve the same passenger load, not less than 50 percent of the escalators shall have the capability of being turned off in response to reduced occupant traffic.*  
*609.2.2.4 Handrails. Handrails shall use friction-reducing measures, such as, but not limited to, rollers in newels.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MD DLLR

**2011 ASHRAE 189.1 CORRELATION:**

*609.2.3 Commercial food service equipment. Not less than 50 percent of the commercial food service equipment installed shall comply with energy efficiency and water use as identified on Table 609.2.3, based on aggregate energy input rating.*

**PROPOSED ACTION:** Adopt but replace language to be consistent with ASHRAE 189.1 Section 7.4.7.3

**RATIONALE / IMPACT:** Ambiguous

**2011 ASHRAE 189.1 CORRELATION:** 7.4.7.3

**TABLE 609.2.3  
COMMERCIAL FOOD SERVICE EQUIPMENT—ENERGY-EFFICIENCY AND WATER USE REQUIREMENTS**

APPLIANCE TYPE	ENERGY-EFFICIENCY REQUIREMENTS	MAXIMUM WATER USE
<b>Combination Oven/Steamer</b>		
Electric <sup>a</sup>	N/A	3.5 gal/hr/pan
Gas <sup>a</sup>	N/A	3.5 gal/hr/pan
<b>Dishwashers</b>		
Door type, high temp <sup>a</sup>	idle rate ≤ 0.7 kW	0.95 gal/rack
Door type, low temp <sup>b</sup>	idle rate ≤ 0.6 kW	1.18 gal/rack
Multiple tank conveyor, high temp <sup>a</sup>	idle rate ≤ 2.0 kW	0.54 gal/rack
Multiple tank conveyor, low temp <sup>a</sup>	idle rate ≤ 2.0 kW	0.54 gal/rack
Pot pan and utensil <sup>a</sup>	N/A	2.2 gal/rack
Rackless conveyor <sup>a</sup>	N/A	2.2 gallons/minute
Single tank conveyor, high temp <sup>a</sup>	idle rate ≤ 1.5 kW	0.7 gal/rack
Single tank conveyor, low temp <sup>a</sup>	idle rate ≤ 1.5 kW	0.79 gal/rack
Under counter, high temp <sup>a</sup>	idle rate ≤ 0.5 kW	1.0 gal/rack
Under counter, low temp <sup>a</sup>	idle rate ≤ 0.5 kW	1.7 gal/rack
<b>Freezers</b>		
Chest <sup>a</sup>	daily energy ≤ 0.270V + 0.130 kWh/day	N/A
Reach-in, solid door, 0 ≤ V < 15 ft <sup>3</sup> <sup>a</sup>	daily energy ≤ 0.250V + 1.250 kWh/day	N/A
Reach-in, solid door, 15 ≤ V < 30 ft <sup>3</sup> <sup>a</sup>	daily energy ≤ 0.4V + 1.000 kWh/day	N/A
Reach-in, solid door, 30 ≤ V < 50 ft <sup>3</sup> <sup>a</sup>	daily energy ≤ 0.163V + 6.125 kWh/day	N/A
Reach-in, solid door, 50 ≤ V ft <sup>3</sup> <sup>a</sup>	daily energy ≤ 0.158V + 6.333 kWh/day	N/A
Reach-in, transparent door, 0 ≤ V < 15 ft <sup>3</sup> <sup>a</sup>	daily energy ≤ 0.607V + 0.893 kWh/day	N/A
Reach-in, transparent door, 15 ≤ V < 30 ft <sup>3</sup> <sup>a</sup>	daily energy ≤ 0.733V + 1.000 kWh/day	N/A
Reach-in, transparent door, 30 ≤ V < 50 ft <sup>3</sup> <sup>a</sup>	daily energy ≤ 0.250V + 13.50 kWh/day	N/A
Reach-in, transparent door, 50 ≤ V ft <sup>3</sup> <sup>a</sup>	daily energy ≤ 0.450V + 3.50 kWh/day	N/A
<b>Fryers</b>		
Deep fat, electric <sup>a</sup>	efficiency ≥ 50% and idle rate ≤ 9000 Btu/h	N/A
Deep fat, gas <sup>a</sup>	efficiency ≥ 80% and idle rate ≤ 1.0 kW	N/A
Large vat, electric <sup>a</sup>	efficiency ≥ 80% and idle rate ≤ 1.1 kW	N/A
Large vat, gas <sup>a</sup>	efficiency ≥ 50% and idle rate ≤ 12000 Btu/h	N/A
<b>Griddles</b>		
Double-sided, electric <sup>a</sup>	efficiency ≥ 70% and idle rate ≤ 355 W/sq. ft.	N/A
Double-sided, gas <sup>a</sup>	efficiency ≥ 38% and idle rate ≤ 2650 Btu/h/sq. ft.	N/A
Single-sided, electric <sup>a</sup>	efficiency ≥ 70% and idle rate ≤ 355 W/sq. ft.	N/A
Single-sided, gas <sup>a</sup>	efficiency ≥ 38% and idle rate ≤ 2650 Btu/h/sq. ft.	N/A
<b>Hot Food Holding Cabinets</b>		
13 ≤ V ≤ 28 ft <sup>3</sup> <sup>a</sup>	Idle Rate ≤ 2V + 25.4 Watts	N/A
V < 13 ft <sup>3</sup> <sup>a</sup>	Idle Rate ≤ 21.5V Watts	N/A
V > 28 ft <sup>3</sup> <sup>a</sup>	Idle Rate ≤ 3.8V + 203.5 Watts	N/A

*(continued)*

**TABLE 609.2.3—continued  
COMMERCIAL FOOD SERVICE EQUIPMENT—ENERGY-EFFICIENCY AND WATER USE REQUIREMENTS**

APPLIANCE TYPE	ENERGY-EFFICIENCY REQUIREMENTS	MAXIMUM WATER USE
<b>Ice Machines</b>		
Ice making head, $11 > 450$ lb/day <sup>1</sup>	energy $\leq 6.20 + 0.001011$ kWh/100 lb ice	25 gal/100 lb ice
Ice making head, $11 < 450$ lb/day <sup>1</sup>	energy $\leq 9.23 + 0.007711$ kWh/100 lb ice	25 gal/100 lb ice
Remote condensing unit w/o remote compressor, $11 < 1000$ lb/day <sup>2</sup>	energy $\leq 8.05 + 0.003511$ kWh/100 lb ice	25 gal/100 lb ice
Remote condensing unit w/o remote compressor, $11 > 1000$ lb/day <sup>2</sup>	energy $\leq 4.64$ kWh/100 lb ice	25 gal/100 lb ice
Remote condensing unit with remote compressor, $11 < 934$ lb/day <sup>3</sup>	energy $\leq 8.05 + 0.003511$ kWh/100 lb ice	25 gal/100 lb ice
Remote condensing unit with remote compressor, $11 > 934$ lb/day <sup>3</sup>	energy $\leq 4.82$ kWh/100 lb ice	25 gal/100 lb ice
Self-contained unit, $11 < 175$ lb/day <sup>4</sup>	energy $\leq 16.7 + 0.043611$ kWh/100 lb ice	35 gal/100 lb ice
Self-contained unit, $11 > 175$ lb/day <sup>4</sup>	energy $\leq 9.11$ kWh/100 lb ice	35 gal/100 lb ice
<b>Convection Ovens</b>		
Full-size electric <sup>5</sup>	efficiency $\geq 70\%$ and idle rate $\leq 1.6$ kW	0.25 gal/hr
Full-size gas <sup>6</sup>	efficiency $\geq 44\%$ and idle rate $\leq 1,000$ Btu/h	0.25 gal/hr
Half-size electric <sup>7</sup>	efficiency $\geq 70\%$ and idle rate $\leq 1.0$ kW	0.25 gal/hr
<b>Refrigerators</b>		
Chest <sup>8</sup>	daily energy $\leq 0.125V + 0.475$ kWh/day	N/A
Reach-in, solid door, $0 \leq V < 15$ ft <sup>3</sup> <sup>9</sup>	daily energy $\leq 0.089V + 1.411$ kWh/day	N/A
Reach-in, solid door, $15 \leq V < 30$ ft <sup>3</sup> <sup>9</sup>	daily energy $\leq 0.037V + 2.200$ kWh/day	N/A
Reach-in, solid door, $30 \leq V < 50$ ft <sup>3</sup> <sup>9</sup>	daily energy $\leq 0.056V + 1.635$ kWh/day	N/A
Reach-in, solid door, $50 \leq V$ ft <sup>3</sup> <sup>9</sup>	daily energy $\leq 0.06V + 1.416$ kWh/day	N/A
Reach-in, transparent door, $0 \leq V < 15$ ft <sup>3</sup> <sup>9</sup>	daily energy $\leq 0.118V + 1.382$ kWh/day	N/A
Reach-in, transparent door, $15 \leq V < 30$ ft <sup>3</sup> <sup>9</sup>	daily energy $\leq 0.140V + 1.050$ kWh/day	N/A
Reach-in, transparent door, $30 \leq V < 50$ ft <sup>3</sup> <sup>9</sup>	daily energy $\leq 0.088V + 2.625$ kWh/day	N/A
Reach-in, transparent door, $50 \leq V$ ft <sup>3</sup> <sup>9</sup>	daily energy $\leq 0.110V + 1.500$ kWh/day	N/A
<b>Steam Cookers</b>		
With drain connection, electric <sup>10</sup>	N/A	5 gal/hour/pan
With drain connection, gas <sup>11</sup>	N/A	5 gal/hour/pan
No drain connection, electric <sup>12</sup>	efficiency $\geq 50\%$ and idle rate $\leq 135$ W/pan	2 gal/hour/pan
No drain connection, gas <sup>13</sup>	efficiency $\geq 38\%$ and idle rate $\leq 2100$ Btu/h/pan	2 gal/hour/pan
Water-cooled refrigeration equipment	Not allowed unless on a closed-loop system or cooling tower	

1 Ice SH<sub>2</sub> (3" x 1/2" x 3/16") @ 0.28 W  
 2 Maximum water use as determined by ASTM F 2061  
 3 Idle rate as determined by ASTM F 1606 and water use as determined by ANSI/ASHRAE 90.1  
 4 Idle rate as determined by ASTM F 1920 and water use as determined by ANSI/ASHRAE 90.1  
 5 Water use as determined by ANSI/ASHRAE 90.1  
 6 Daily energy use as determined by ANSI/ASHRAE Standard 72 with temperature set points of 48°F for medium temp refrigerators, 0°F for low temp freezers, and -12°F for ice cream freezers  
 7 Heavy-load cooking energy efficiency and idle rate as determined by ASTM F 1306  
 8 Heavy-load (reach-in) cooking energy efficiency and idle rate as determined by ASTM F 2144  
 9 Heavy-load cooking energy efficiency and idle rate as determined by ASTM F 1606  
 10 Heavy-load cooking energy efficiency and idle rate as determined by ASTM F 1275  
 11 Idle rate as determined by ASTM F 2140  
 12 Energy and water use as determined by ARI 800  
 13 Heavy-load (pan) cooking energy efficiency and idle rate as determined by ASTM F 1406  
 14 Heavy-load (pizza) cooking energy efficiency and idle rate as determined by ASTM F 1404

**609.2.4 Conveyors.** Motors associated with conveyors shall be sized to meet the expected load and designed to run within 90 percent of capacity at all times the conveyor is expected to operate. Conveyor motors shall be provided with sleep mode controls. Two-speed motors and adjustable-speed drives shall be provided where load weights are expected to vary. Readily accessible controls shall be provided to allow for manual shut off of the conveyor when the conveyor is not needed. Conveyor systems shall be designed to use gravity feed where conditions allow and arranged so that long straight runs are provided with as few drives as possible.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**610.1 Renewable energy systems requirements.** Buildings that consume energy shall comply with this section. Each building or surrounding lot or building site where there are multiple buildings on the building site shall be equipped with one or more renewable energy systems in accordance

with this section. Renewable energy systems shall comply with the requirements of Section 610.2 for solar photovoltaic systems, Section 610.3 for wind systems, or Section 610.4 for solar water heating systems, and Section 610.5 for performance monitoring and metering of these systems as approved by the code official. These systems shall be commissioned in accordance with the requirements of Section 611. **Exception:** Renewable energy systems are not required for the following: 1. Buildings or building sites where there are multiple buildings on the building site providing not less than 2 percent of the total estimated annual energy use of the building, or collective buildings on the site, with onsite renewable energy using a combination of renewable energy generation systems complying with the requirements of Section 610.2, 610.3, or 610.4. 2. Where not less than 4 percent of the total annual building energy consumption from renewable generation takes the form of a 10-year commitment to renewable energy credit ownership, confirmed by the code official. 3. Where the combined application of onsite generated renewable energy and a commitment to renewable energy credit ownership as confirmed by the code official, totals not less than 4 percent of the total annual building energy consumption from renewable generation.

**610.1.1 Building performance-based compliance.** Buildings and surrounding property or building sites where there are multiple buildings on the building site, that are designed and constructed in accordance with Section 601.3.1, performance-based compliance, shall be equipped with one or more renewable energy systems that have the capacity to provide not less than 2 percent of the total calculated annual energy use of the building, or collective buildings on the site.

**610.1.2 Building prescriptive compliance.** Buildings and surrounding property or building sites where there are multiple buildings on the building site, that are designed and constructed in accordance with Section 601.3.2, prescriptive compliance, shall be equipped with one or more renewable energy systems that have the capacity to provide not less than 2 percent of the total estimated annual energy use of the building, or collective buildings on the building site, with onsite renewable energy by calculation demonstrating that onsite renewable energy production has a rating of not less than 1.75 Btu/h (0.5 W) or not less than 0.50 watts per square foot of conditioned floor area, and using any single or combination of renewable energy generation systems meeting the requirements of Sections 610.2, 610.3, or 610.4.

**610.2 Solar photovoltaic systems.** Solar photovoltaic systems shall be sized to provide not less than 2 percent of the total estimated annual electric energy consumption of the building, or collective buildings on the building site in accordance with Section 610.1.1 or 610.1.2.

**610.2.1 Limitation.** Solar photovoltaic systems shall not be used to comply with Section 610.1 where building sites have total global insolation levels lower than 2.00 kWh/m<sup>2</sup>/day as determined in accordance with NREL SERI TR-642-761.

**610.2.2 Requirements.** The installation, inspection, maintenance, repair and replacement of solar photovoltaic systems and system components shall comply with the manufacturer's instructions, Section 610.2.2.1, the International Fire Code, the International Building Code and NFPA 70.

**610.2.2.1 Performance verification.** Solar photovoltaic systems shall be tested on installation to verify that the installed performance meets the design specifications. A report of the tested performance shall be provided to the building owner.

**610.3 Wind energy systems.** Wind energy systems shall be designed, constructed and sized to provide not less than 2 percent of the total estimated annual electric energy consumption of the building, or collective buildings on the building site in accordance with NFPA 70 and Section 610.1.1 or 610.1.2.

**610.3.1 Installation, location and structural requirements.** Wind energy systems shall be located on the building, adjacent to the building, or on the building site.

**610.4 Solar water heating equipment.** Not less than 10 percent of the building's annual estimated hot water energy usage shall be supplied by onsite solar water heating equipment.

**610.5 Renewable energy system performance monitoring and metering.** Renewable energy systems shall be metered and monitored in accordance with Sections 610.5.1 and 610.5.2.

**610.5.1 Metering.** Renewable energy systems shall be metered separately from the building's electrical and fossil fuel meters. Renewable energy systems shall be metered to measure the amount of renewable electric or thermal energy generated on the building site in accordance with Section 603.

**610.5.2 Monitoring.** Renewable energy systems shall be monitored to measure the peak electric or thermal energy generated by the renewable energy systems during the building's anticipated peak electric or fossil fuel consumption period in accordance with Section 603.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Discretionary

**2011 ASHRAE 189.1 CORRELATION:** 7.3.2

**611.1 Mechanical systems commissioning and completion requirements.** Within 60 days from approval conducting the final mechanical inspection, the registered design professional shall provide evidence of mechanical systems commissioning and completion of the mechanical system installation to the code official, in accordance with the International Energy Conservation Code. Drawing notes shall clearly indicate provisions for commissioning and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner and made available to the code official upon request.

**611.1.1 Commissioning plan.** A commissioning plan shall be developed by a registered design professional or approved agency and shall include as a minimum all of the following items: 1. A narrative describing the activities that will be accomplished during each phase of commissioning, including guidance on who accomplishes the activities and how they are completed. 2. Equipment and systems to be tested including, but not limited to, the specific equipment, appliances or systems to be tested and the number and extent of tests. 3. Functions to be tested including, but not limited to, calibrations and economizer controls. 4. Conditions under which the test shall be performed including, but not limited to, affirmation of winter and summer design conditions and full outside air. 5. Measurable criteria for performance.

**611.1.2 Systems adjusting and balancing.** HVAC systems shall be balanced in accordance with generally accepted engineering standards. Air and water flow rates shall be measured and adjusted to deliver final flow rates within the tolerances provided in the product specifications. Test and balance activities shall include, at a minimum, the provisions of Sections 611.1.2.1 and 611.1.2.2.

**611.1.2.1 Air systems balancing.** Each supply air outlet and zone terminal device shall be equipped with a means for air balancing in accordance with the International Mechanical Code. Discharge dampers are prohibited on constant volume fans and variable volume fans with motors of 10 hp (7.35 kW) and larger. Air systems shall be balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp (735 W), fan speed shall be adjusted to meet design flow conditions. **Exception:** Fans with fan motor horsepower of 1 hp (735 W) or less.

**611.1.2.2 Hydronic systems balancing.** Individual hydronic heating and cooling coils shall be equipped with means for balancing and measuring

flow. Hydronic systems shall be proportionately balanced in a manner to first minimize throttling losses, then the pump impeller shall be trimmed or pump speed shall be adjusted to meet design flow conditions. Each hydronic system shall have either the capability to measure pressure across the pump, or shall have test ports at each side of each pump. **Exceptions:** 1. Pumps with pump motors of 5 hp (3677 W) or less. 2. Where throttling results in not greater than 5 percent of the nameplate horsepower draw above that required if the impeller were trimmed.

**611.1.3 Functional performance testing.** Functional performance testing shall be in accordance with the requirements of Sections 611.1.3.1, 611.1.3.2 and 611.1.3.3.

**611.1.3.1 Equipment.** Equipment functional performance testing shall demonstrate the installation and operation of components, systems, and system-to-system interfacing relationships in accordance with approved plans and specifications so that operation, function, and maintenance serviceability for each of the commissioned systems is confirmed. Testing shall include all specified modes of control and sequence of operation, including under full-load, part-load and all of the following emergency conditions: 1. Each mode as described in the sequence of operation. 2. Redundant or automatic backup mode. 3. Performance of alarms. 4. Mode of operation upon a loss of power and restoration of power

**611.1.3.2 Controls.** HVAC control systems shall be tested to document that control devices, components, equipment, and systems are calibrated, adjusted and operated in accordance with the approved plans and specifications. Sequences of operation shall be functionally tested to document that they operate in accordance with the approved plans and specifications.

**611.1.3.3 Economizers.** Air economizers shall undergo a functional test to determine that they operate in accordance with the manufacturer's specifications.

**611.1.4 Preliminary commissioning report.** A preliminary report of commissioning test procedures and results shall be completed and certified by the registered design professional or approved agency and provided to the building owner. The report shall be identified as "Preliminary Commissioning Report" and shall identify all of the following: 1. Itemization of deficiencies found during testing required by this section that have not been corrected at the time of report preparation. 2. Deferred tests that cannot be performed at the time of report preparation because of climatic conditions. 3. Climatic conditions required for performance of the deferred tests.

**611.1.4.1 Acceptance.** Buildings, or portions thereof, shall not pass the final mechanical inspection until such time as the code official has received a letter of transmittal from the building owner acknowledging that the building owner has received the Preliminary Commissioning Report.

**611.1.4.2 Copy.** At the request of the code official, a copy of the Preliminary Commissioning Report shall be made available for review.

**611.1.4.3 Certification.** A certification, signed and sealed by the registered design professional, documenting that the mechanical and service water heating systems comply with Sections C403 and C404 of the International Energy Conservation Code, shall be provided to the code official.

**611.1.5 Completion requirements.** The construction documents shall specify that the requirements described in this section be provided to the building owner within 90 days of the date of receipt of the certificate of occupancy.

**611.1.5.1 Drawings.** Construction documents shall include the location of and performance data pertaining to each piece of equipment.

**611.1.5.2 Manuals.** An operating and maintenance manual in accordance with industry-accepted standards shall be provided and shall include all of the following: 1. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance. 2. Manufacturer's operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the building project. Required routine maintenance shall be clearly identified. 3. Names and addresses of not less than one service agency. A systems manual shall be provided and shall include all of the following: 1. HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined set-points shall be permanently recorded on control drawings at control devices or, for digital control systems, in programming comments. 2. A complete narrative of how each system is intended to operate, including recommended set-points, seasonal changeover information and emergency shutdown operation. 3. Control sequence descriptions for lighting, domestic hot water heating and all renewable energy systems complete with a description of how these systems connect to, and are controlled in conjunction with, the overall building system.

**611.1.5.3 System balancing report.** A written report describing the activities and measurements completed in accordance with Section 611.1.2 shall be provided.

**611.1.5.4 Final commissioning report.** A complete report of test procedures and results identified as "Final Commissioning Report" shall be completed and provided to the building owner. The report shall include all of the following: 1. Results of all functional performance tests. 2. Disposition of all deficiencies found during testing, including details of corrective measures used or proposed. 3. All functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability. **Exception:** Deferred tests that were not performed at the time of report preparation because of climatic conditions.

**611.1.5.5 Post-occupancy recommissioning.** The commissioning activities specified in Sections 611.1.2 through 611.1.5 shall be repeated 18 to 24 months after certificate of occupancy. Systems and control devices that are not functioning properly shall be repaired or replaced. Adjustments to calibration settings shall be documented. This documentation shall be provided to the building owner.

**611.2 Sequence of operation.** A sequence of operation shall be developed and finalized upon commissioning, when the operational details are initialized and validated. A sequence of operation shall be the final record of system operation, and shall be included on the control diagram "as-built," or as part of the education and operation and maintenance document that is provided to the owner.

**611.3 Lighting and electrical systems commissioning and completion requirements.** Prior to issuance of a certificate of occupancy, the registered design professional shall provide evidence of lighting and electrical systems commissioning and completion in accordance with the International Energy Conservation Code and the provisions of this section. Drawing notes shall specify the provisions for commissioning and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner and made available to the code official upon request in accordance with Sections 611.2.4 and 611.2.5

**611.3.1 Preconstruction documentation, lighting.** Construction and owner education documents shall include floor plans, diagrams and notations of sufficient clarity describing the types of, location and operational requirements of all lighting controls including a sequence of operation and preliminary intended set-points for all dimming systems and automatic daylight controls, demonstrating conformance to the provisions of this code, relevant laws, ordinances, rules and regulations, as approved by the code official.

**611.3.2 Verification.** The approved agency conducting commissioning shall verify that controls have been installed in accordance with the approved construction documents. Any discrepancies shall be reviewed for compliance with Section 608 and the requirements of Section C405.2 of the International Energy Conservation Code.

**611.3.3 Commissioning.** Lighting controls shall be commissioned in accordance with this section.

**611.3.3.1 Occupant sensors.** It shall be verified that the functional testing in accordance with Section C405.2 of the International Energy Conservation Code has been performed.

**611.3.3.2 Automatic daylight controls.** Automatic daylight controls shall be commissioned in accordance with all of the following: 1. It shall be verified that the placement and orientation of each sensor is consistent with the manufacturer's instructions. If not, the sensor shall be relocated or

replaced. 2. Control systems shall be initially calibrated to meet settings and design intent established in the construction documents. 3. Prior to calibration of systems controlling dimmable luminaires, all lamps shall be seasoned in accordance with the recommendations of the lamp manufacturer. 4. Where located inside buildings, calibration of open-loop daylight controls, which receive illumination from natural light only, shall not occur until fenestration shading devices such as blinds or shades have been installed and commissioned. 5. Calibration of closed-loop daylight controls, that receive illumination from both natural and artificial light, shall not occur until furniture systems and interior finishes have been installed, and any fenestration shading devices such as blinds or shades have been installed and commissioned. 6. Calibration procedures shall be in accordance with the manufacturer's instructions.

**611.3.3.3 Time switch and programmable schedule controls.** Lighting controls installed in accordance with Section 608 shall be programmed. Scheduling shall incorporate weekday, weekend and holiday operating times, including leap year and daylight savings time corrections. It shall be verified that system overrides work and are located in compliance with Section C405.2 of the International Energy Conservation Code.

**611.3.3.4 Dimming systems with preset scenes.** For programmable dimming systems, it shall be verified that automatic shutoff and manual overrides are working and that programming is complete. Prior to programming, all lamps shall be seasoned in accordance with NEMA LSD 23.

**611.3.4 Post-commissioning documentation.** The following documentation shall be provided to the building owner in accordance with Section 903. 1. Settings determined during commissioning activities outlined in Section 611.3.3. 2. A narrative describing the intent and functionality of all controls including any capability for users to override a schedule or master command. 3. Specification sheets for all lighting equipment and controls. 4. Operation manuals for each lighting control device. Required maintenance and maintenance schedules shall be clearly identified. Documentation and instructions necessary for building maintenance personnel to RETAIN and recalibrate lighting systems and controls. 5. An annual inspection schedule for lighting controls. 6. Troubleshooting information for fluorescent dimming systems and the remediation of switching issues such as false-ons and false-offs.

**611.3.5 Post-occupancy recommissioning.** The commissioning activities in Section 611.3.3 shall be repeated 18 to 24 months after issuance of the certificate of occupancy. Control devices that are not functioning properly shall be repaired or replaced. Adjustments to calibration settings shall be documented. This documentation shall be provided to the building owner.

**611.4 Building envelope systems commissioning and completion requirements.** Prior to issuance of a certificate of occupancy, the registered design professional shall provide evidence of building thermal envelope systems commissioning and completion to the building owner in accordance with the International Energy Conservation Code and the provisions of this section. Construction documents shall specify the provisions for commissioning and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the building owner and made available to the code official upon request in accordance with Sections 611.4.1 and 611.4.2.

**611.4.1 Preconstruction documentation, building thermal envelope.** Construction and owner education documents shall indicate the location, nature and extent of the work proposed and show the functional requirements and operation of all building thermal envelope systems demonstrating conformance to the provisions of this code, relevant laws, ordinances, rules and regulations, as approved by the code official

**611.4.2 Verification.** The approved agency conducting commissioning shall verify that building thermal envelope systems have been installed in accordance with the approved construction documents. Any discrepancies shall be reviewed for compliance with requirements of the International Energy Conservation Code and this code.

**PROPOSED ACTION:** Move to Chapter 9 - Adopt as written

**RATIONALE / IMPACT:** Consistent with current practice - All commissioning activities should be in one chapter for better coordination to eliminate confusion and redundancy.

**2011 ASHRAE 189.1 CORRELATION:** Chapter 10



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 7 – Water Resource Conservation, Quality and Efficiency

**701.1 Scope.** The provisions of this chapter shall establish the means of conserving water, protecting water quality and providing for safe water consumption.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action required

**2011 ASHRAE 189.1 CORRELATION:** 6.1

**702.1 Fitting and fixture consumption.** Fixtures shall comply with Table 702.1 and the following: 1. For dwelling unit and guestroom shower compartments with a floor area of not greater than 2600 in 2 (1.7 m 2 the combined flow rate from shower water outlets that are capable of operating simultaneously including rain systems, waterfalls, body sprays and jets shall not exceed 2.0 gallons per minute (gpm) (7.6 L/min). Where the floor area of such shower compartments is greater than 2600 in 2 (1.7 m 2 the combined flow rate from simultaneously operating shower water outlets shall not exceed 2.0 gpm (7.6 L/min) for each additional 2600 in 2 (1.7 m 2 of floor area or portion thereof. 2. In gang shower rooms, the combined flow rate from shower water outlets that are capable of operating simultaneously including rain systems, waterfalls, body sprays and jets shall not exceed 2.0 gpm (7.6 L/min) for every 1600 in 2 (1.01 m 2 or portion thereof of room floor area. 3. In shower compartments required to comply with the requirements of Chapter 11 of the International Building Code, the combined flow rate from shower water outlets that are capable of operating simultaneously including rain systems, waterfalls, body sprays and jets shall not exceed 4.0 gpm (15.1 L/min) for every 2600 in 2 (1.7 m 2 or portion thereof of room floor area.

**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 not exceed 0.1 gpm, measured in accordance with the requirements of ASME A112.18.1/CSA B125.1.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC, Plumbing and Fuel Gas code

**2011 ASHRAE 189.1 CORRELATION:** 6.3.2.1

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

FIXTURE OR FIXTURE FITTING TYPE	MAXIMUM FLOW RATE
Showerhead <sup>a</sup>	2.0 gpm and WaterSense labeled
Lavatory faucet and bar sink—private	1.5 gpm
Lavatory faucet—public (metered)	0.25 gpc <sup>b</sup>
Lavatory faucet—public (nonmetered)	0.8 gpm
Kitchen faucet—private	2.2 gpm
Kitchen and bar sink faucets in other than dwelling units and guestrooms	2.2 gpm
Urinal	0.5 gpf and WaterSense labeled or nonwater urinal
Water closet—public and remote <sup>c</sup>	1.6 gpf
Water closet—public and nonremote	1.28 gpf average <sup>d,e</sup>
Water closet—tank type, private	1.28 gpf and WaterSense labeled <sup>f</sup>
Water closet—flushometer type, private	1.28 gpf <sup>g</sup>
Prerinse spray valves	1.3 gpm
Drinking fountains (manual)	0.7 gpm
Drinking fountains (metered)	0.25 gpc <sup>h</sup>

For SI: 1 to 0 = 201.8 mm, 1 gallon per cycle (gpc) = 3.8 Lpc, 1 gallon per flush (gpf) = 3.8 Lpf, 1 gallon per minute (gpm) = 3.8 Lpm.

- a. Includes hand showers, body sprays, rainfall panels and jets. Showerheads shall be supplied by automatic compensating valves that comply with ASSE 1016 or ASME A112.18.1/ENSA B125.1 and that are specifically designed to function at the flow rate of the showerheads being used.
- b. Gallons per cycle of water volume discharged from each activation of a metered faucet.
- c. A remote water closet is a water closet located not less than 30 feet upstream of other drain line connections or fixtures and is located where less than 1.5 drainage fixture units are upstream of the drain line connection.
- d. The effective flush volume for a dual flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.
- e. In public settings, the maximum water use of a dual flush water closet is based solely on its full flush operation, not an average of full and reduced volume flushes.

**702.3 Food establishment prerinse spray valves.** Food establishment prerinse spray valves shall have a maximum flow rate in accordance with Table 702.1 and shall shut off automatically when released.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by HHS (Verify)

**2011 ASHRAE 189.1 CORRELATION:** 6.4.2.2

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

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

**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.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

**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 of the type in the ENERGY STAR program as defined in "ENERGY STAR Program Requirements,

Product Specification for Clothes Washers, Eligibility Criteria," shall have a water factor (WF) not exceeding 6.0 and a modified energy factor (MEF) of not less than 2.0

**702.6.2 Ice makers.** Ice makers shall not be water cooled. Ice makers producing cubed-type ice shall be ENERGY STAR qualified as commercial ice machines. Ice makers of a type not currently ENERGY STAR qualified, such as flake, nugget or continuous-type ice makers, shall not exceed the total water use of 25 gallons per 100 pounds (208-L per 100 kg) of ice produced.

**702.6.3 Steam cookers.** Steam cookers shall consume not more than the amounts indicated in Table 610.2.3.

**702.6.4 Dishwashers.** Dishwashers shall be ENERGY STAR qualified where an ENERGY STAR category exists for the specific dishwasher type. Where an ENERGY STAR category does not exist, the dishwasher shall be in accordance with Table 702.6.4.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant: Covered by Chapter 6 section 609

**2011 ASHRAE 189.1 CORRELATION:** 6.3.2.2; 6.4.2.2

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

DISHWASHER TYPE	MAXIMUM WATER CONSUMPTION
Rackless conveyor	2.2 gallons per minute
Utensil washer	2.2 gallons per rack

For SI: 1 gallon per minute = 3.785 L/min.

**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. A municipal reclaimed water supply shall be deemed accessible where the supply is not greater than 150 percent of the distance that the potable water supply is from the lot boundary or the supply is within 100 feet (30.5 m) of a potable water supply that serves the lot.

**PROPOSED ACTION:** Delete (702.7 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** 6.3.3; 6.4.3

**702.8 Efficient hot and tempered water distribution.** Hot and tempered water distribution shall comply with either the maximum pipe length or maximum pipe volume limits in this section. Hot and tempered water shall be delivered to the outlets of individual showers, combination tub-showers, sinks, lavatories, dishwashers, washing machines and hot water hose bibbs in accordance with Section 702.8.1 or Section 702.8.2. For purposes of this section, references to pipe shall include tubing. For purposes of this section, the source of hot or tempered water shall be considered to be a water heater, boiler, circulation loop piping or electrically heat-traced piping.

**702.8.1 Maximum allowable pipe length method.** The maximum allowable pipe length from the source of hot or tempered water to the termination of the fixture supply pipe shall be in accordance with the maximum pipe length columns in Table 702.8.2. Where the length contains more than one size of pipe, the largest size shall be used for determining the maximum allowable length of the pipe in Table 702.8.2.

**702.8.2 Maximum allowable pipe volume method.** The water volume in the piping shall be calculated in accordance with Section 702.8.2.1. The maximum volume of hot or tempered water in the piping to public lavatory faucets, metering or non-metering, shall be 2 ounces (0.06 L). For fixtures other than public lavatory faucets, the maximum volume shall be 64 ounces (1.89 L) for hot or tempered water from a water heater or boiler; and 24 ounces (0.7 L) for hot or tempered water from a circulation loop pipe or an electrically heat-traced pipe.

**702.8.2.1 Water volume determination.** The volume shall be the sum of the internal volumes of pipe, fittings, valves, meters and manifolds between the source of hot water and the termination of the fixture supply pipe. The volume shall be determined from the liquid ounces per foot column of Table 702.8.2. The volume contained within fixture shutoff valves, flexible water supply connectors to a fixture fitting, or within a fixture fitting shall not be included in the water volume determination. Where hot or tempered water is supplied by a circulation loop pipe or an electrically heat-traced pipe, the volume shall include the portion of the fitting on the source pipe that supplies water to the fixture.

**702.9 Trap priming water.** Potable water shall not be used for trap priming purposes where an alternate nonpotable onsite water distribution system, a reclaimed water distribution system or a gray water distribution system is available.

**702.9.1 Continuous operation prohibited.** Trap primers that allow continuous water flow shall be prohibited.

**702.9.2 Volume limitation.** Trap primers shall be of the type that use not more than 30 gallons (114 L) per year per trap.

**702.9.3 Water criteria.** Where nonpotable water is available and is already being used to supply plumbing fixtures, such water shall be used to supply trap primers.

**702.10 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 10 feet (3048 mm). Where water-powered pumps are used, they shall have a water-efficiency factor of pumping not less than 2 gallons (7.6 L) of water to a height of 8 feet (2438 mm) for every 1 gallon (3.8 L) of water used to operate the pump, measured at a water pressure of 60 psi (413.7 kPa). Pumps shall be clearly marked as to the gallons (liters) of water pumped per gallon (liters) of potable water consumed.

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

**702.12 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).

**702.13 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 cutoffs. Except for water recirculated within the facility, potable and nonpotable water use for automobile washing shall not exceed 40 gallons (151 L) per vehicle for in-bay automatic washing and 35 gallons (132.5 L) per vehicle for conveyor and express-type car washing. **Exception:** Bus and large commercial vehicle washing facilities.

**702.14 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.

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

**702.16 Food waste 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 (3.78 Lpm) under no-load operating conditions and 8 gpm (30.2 Lpm) under full-load operating conditions.

**702.17 Combination ovens.** Combination ovens shall consume not more than 3.5 gallons (13.25 L) per hour per steamer pan in any operational mode. Water consumption shall be tested in accordance with the requirements of ASTM F 1639

**702.18 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.

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

**702.19 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.

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

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

**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.

**PROPOSED ACTION:** DPS to provide language revision to clarify what water source may be used.

**RATIONALE / IMPACT:** Ambiguous

**2011 ASHRAE 189.1 CORRELATION:** None

**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.

**PROPOSED ACTION:** Adopt with following modification: Except where greater humidity is required for medical, agricultural, archival, or scientific research purposes, or other user-defined purposes, humidification systems shall be disabled and locked-out when the relative humidity in the space served is greater than 55 percent.

**RATIONALE / IMPACT:** Language revision for broader latitude

**2011 ASHRAE 189.1 CORRELATION:** None

**703.3 Condensate coolers and tempering.** Potable water shall not be used as tempering water for sanitary discharge where the tempering water volume requirement for the application exceeds 200 gallons per day (757 liters per day). Where the tempering water volume required for the application is 200 gallons per day (757 liters per day) or less and potable water is used for tempering, water flow control devices shall be installed. Such control devices shall limit the flow rate of tempering water to that which is necessary to limit the temperature of the waste discharge to a maximum of 140°F (60°C). Such devices shall have a maximum flow rate of 200 gallons per day (757 liters per day).

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

*703.4 Condensate drainage recovery. Condensate shall be collected and reused onsite for applications such as, but not limited to, water features, fountains, gray water collection systems and rainwater collection systems. Where onsite applications for condensate reuse are not available and the community sanitary sewer authority provides return credit for sanitary sewage or recycles sewage into a nonpotable water supply, condensate shall be discharged to the sanitary sewer system except where prohibited by the authority having jurisdiction.*

**PROPOSED ACTION:** Move to Appendix A

**RATIONALE / IMPACT:** Good practice (May be difficult to implement to all projects)

**2011 ASHRAE 189.1 CORRELATION:** None

*703.5 Heat exchangers. Once-through cooling shall be prohibited. Heat exchangers shall be connected to a recirculating water system such as a chilled water loop, cooling tower loop or similar recirculating system.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*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.*

**PROPOSED ACTION:** Move to Appendix A

**RATIONALE / IMPACT:** Good practice (May be difficult to implement to all projects)

**2011 ASHRAE 189.1 CORRELATION:** None

*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.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Redundant, Currently covered by 2012 IMC with amendments

**2011 ASHRAE 189.1 CORRELATION:** None

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

**PROPOSED ACTION:** Adopt as written; renumber to stand alone

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

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

**PROPOSED ACTION:** Adopt as written. Revise 705.2 to correct reference, perhaps "Section 705".

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.1.2.2

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

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*703.7.6 Water quality. Where nonpotable 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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

*703.7.7 Discharge. The discharge water from cooling towers used for air-conditioning systems shall be in compliance with 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 ppm (1,500 mg/L), or silica in excess of 120 ppm (120 mg/L) measured as silicon dioxide shall not be required to meet the minimum parameters specified in Table 703.7.7.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 6.4.2.1

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

<b>MAKEUP WATER TOTAL HARDNESS (mg/L)<sup>a</sup></b>	<b>MAXIMUM CYCLES OF CONCENTRATION</b>
< 200	5
≥ 200	3.5

a. 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 705.1.*

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

*703.8.2 Water sources. Where suitable alternate onsite nonpotable water or municipal reclaimed water is available, makeup water supplies to the recirculation system of wet-hood exhaust scrubbers shall utilize alternate onsite nonpotable water or municipal reclaimed water of a water quality appropriate for the application*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 8.3.1.3

**703.9 Evaporative cooling.** *Evaporative cooling systems shall use less than 4 gallons of water per ton-hour (4.2 L per kWh) of cooling capacity when system controls are set to the maximum water use. The amount of water use shall be expressed in maximum water use per ton-hour (kWh) of cooling capacity and shall be marked on the equipment, included in product user manuals, included in product information literature and included in manufacturer's instructions. Water use information shall be readily available at the time of code compliance inspection.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Does not apply to this climate zone

**2011 ASHRAE 189.1 CORRELATION:** 6.3.2.3

**703.9.1 Overflow alarm.** *Cooling systems shall be equipped with an overflow alarm to alert building owners, tenants or maintenance personnel when the water refill valve continues to allow water to flow into the reservoir when the reservoir is full. The alarm shall have a minimum sound pressure level rating of 85 dB measured at a distance of 10 feet (3048 mm).*

**PROPOSED ACTION:** Adopt with following modification: Cooling systems shall be equipped with an overflow alarm to alert building owners, tenants or maintenance personnel when the water refill valve continues to allow water to flow into the reservoir when the reservoir is full. ~~The alarm shall have a minimum sound pressure level rating of 85 dB measured at a distance of 10 feet (3048 mm)~~ The alarm itself shall comply with County noise ordinance and be tied to the building automation system.

**RATIONALE / IMPACT:** Language revision for clear intent

**2011 ASHRAE 189.1 CORRELATION:** None

**703.9.2 Automatic pump shutoff.** *Cooling systems shall automatically cease pumping water to the evaporation pads when sensible heat reduction is not needed.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**703.9.3 Cooler reservoir discharge.** *A water quality management system such as a timer or water quality sensor shall be required. Where timers are used, the time interval between the discharge events of the water reservoir shall be set to 6 hours or greater of cooler operation. Continuous discharge or continuous bleed systems shall be prohibited.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**703.9.4 Discharge water reuse.** *Discharge water shall be reused where appropriate applications exist on site. Where a nonpotable water source system exists on site, evaporative cooler discharge water shall be collected and discharged to such collection system. Exception: Where the reservoir water will adversely affect the quality of the nonpotable water supply making the nonpotable water unusable for its intended purposes.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**703.9.5 Discharge water to drain.** *Where discharge water is not required to be recovered for reuse, the sump overflow pipe shall not directly connect to a drain. Where the discharge water is discharged into a sanitary drain, an air gap of not less than 6 inches (150 mm) shall be required between the termination of the discharge pipe and the drain opening. The discharge pipe shall terminate in a location that is readily visible to the building owners, tenants or maintenance personnel.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

*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 gallons (18.9 L) per 1000 grains (17.1 g/L) 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 1/4 inches (31.8 mm) 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 and labeled in accordance with NSF 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*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Projects of size recommended for implementation of IgCC likely to be on public utilities

**2011 ASHRAE 189.1 CORRELATION:** 6.4.2.3

*704.2 Reverse osmosis water treatment systems. Point-of-use reverse osmosis treatment systems shall be listed and labeled in accordance 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.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

*704.3 Onsite reclaimed water treatment systems. Onsite reclaimed water treatment systems, including gray water reuse treatment systems and waste water treatment systems, used to produce nonpotable water for use in water closet and urinal flushing, surface irrigation and similar applications shall listed and labeled to NSF 350.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

*705.1 Metering. Water consumed from any source associated with the building or building site shall be metered. Each potable and reclaimed source of water, and each onsite non-potable water source, shall be metered separately. Meters shall be installed in accordance with the requirements of the International Plumbing Code. For the purposes of Section 705.1.1, Each meter identified in Table 705.1.1 shall be capable of communicating water consumption data remotely and at a minimum, be capable of providing daily data with electronic data storage and reporting capability that can produce reports that show daily, monthly, and annual water consumption.*

*705.1.1 Metering. All potable and nonpotable water supplied to the applications listed in Table 705.1.1 shall be individually metered in accordance with the requirements indicated in Table 705.1.1. Similar appliances and equipment shall be permitted to be grouped and supplied from piping connected to a single meter.*

**PROPOSED ACTION:** Move to Appendix A

**RATIONALE / IMPACT:** Good practice but financially unreasonable

**2011 ASHRAE 189.1 CORRELATION:** None

**TABLE 705.1.1  
METERING REQUIREMENTS**

APPLICATION	REQUIREMENTS
Irrigation	Irrigation systems that are automatically controlled shall be metered.
Tenant spaces	Tenant spaces that are estimated to consume over 1000 gallons of water per day shall be metered individually.
Onsite water collection systems	The makeup water lines supplying onsite water collection systems shall be metered.
Ornamental water features	Ornamental water features with a permanently installed water supply shall be required to utilize a meter on makeup water supply lines.
Pools and in-ground spas	Indoor and outdoor pools and in-ground spas shall be required to utilize a meter on makeup water supply lines.
Cooling towers	Cooling towers of 100 tons capacity or greater or groups of towers shall be required to utilize a meter on makeup water and blow-down water supply lines.
Steam boilers	The makeup water supply line to steam boilers anticipated to draw more than 100,000 gallons annually or having a rating of 500,000 Btu/h or greater shall be metered.
Industrial processes	Industrial processes consuming more than 1,000 gallons per day on average shall be metered 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 metered.
Makeup water for closed loop systems such as chilled water and hydronic systems	Makeup water supplying systems of 50 tons of cooling capacity or 500,000 Btu/h of heating capacity shall be metered.
Roof spray systems	Roof spray systems for irrigating vegetated roofs or thermal conditioning shall be metered.

For SI: 1 gallon = 3.8 L, 1 gallon per minute = 3.8 Lpm, 1 ton = 12,000 Btu, 1 British thermal unit per hour = 0.00029 kWh.

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

**706.2 Signage required.** Where nonpotable water is used for a water use application, signage shall be provided that reads as follows: "Nonpotable water is utilized for [APPLICATION NAME]. Caution: nonpotable 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 (13 mm) 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 nonpotable water.

**706.3 Water quality.** Nonpotable 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.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

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

**707.2 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.

**707.3 Nonpotable water connections.** Where nonpotable 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.

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

**707.5 Rainwater collected for landscape irrigation.** 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 comply with the provisions of Section 707 with the exception of Sections 707.11.1, 707.11.1.1 and 707.11.7.3.

**707.6 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.

**707.7 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 (1.6 mm) and shall be close fitting. Screen materials shall be compatible with contacting system components and shall not accelerate corrosion of system components

**707.8 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.

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

from freezing.

**707.10 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 nonpotable, 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 nonpotable water service pipe crosses a sewer pipe provided the water service pipe is sleeved to not less than 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.

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

**707.11.1 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.

**707.11.1.1 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 are 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.

**707.11.2 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.

**707.11.3.1 Slope.** Roof gutters, leaders, and rainwater collection piping shall slope continuously toward collection inlets. Gutters and downspouts shall have a slope of not less than 1 unit in 96 units 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.

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

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

**707.11.4 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.

**707.11.3 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 water tight. Where the collected rainwater is to be used for potable applications, gutters, downspouts, flashing and joints shall be constructed of materials approved for drinking water applications.

**707.11.4.1 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.

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

**707.11.4.3 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.

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

**707.11.6 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. Where chlorine is used for disinfection or treatment, water shall be tested for residual chlorine in accordance with ASTM D 1253. The levels of residual chlorine shall not exceed the levels allowed for the intended use in accordance with the requirements of the jurisdiction.

**707.11.7 Storage tank.** The design of the storage tank shall be in accordance with Sections 707.11.7.1 through 707.11.7.10.

**707.11.7.1.** Rainwater storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table 707.11.7.1.

**707.11.7.1 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, fiberglass, 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

**707.11.7.2 Materials.** Where water is collected onsite, it shall be collected in an approved tank constructed of durable, nonabsorbent and corrosion-resistant materials. Storage vessels shall be compatible with the material being stored. Where collected water is to be treated to potable water standards, tanks shall be constructed of materials in accordance with NSF 61. 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.

**707.11.7.2.1 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 in accordance with NSF standards. Where unlined tanks are used, the species of wood shall be decay resistant and untreated.

**707.11.7.3 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 in accordance with the International Plumbing Code.

**707.11.7.4 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 protected from insects or vermin and the discharge from such pipe shall be disposed of in a manner

consistent with storm water runoff requirements of the jurisdiction. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. 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.

**707.11.7.5 Access.** A minimum of one access opening shall be provided to allow inspection and cleaning of the tank interior. 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 (102 mm) above ground or shall be designed so as to prevent water infiltration. Finish grade shall be sloped away from the manhole to divert surface water from the manhole. Each manhole cover shall be secured to prevent unauthorized access. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access.

**Exception:** Storage tanks having a volume of less than 800 gallons (3028 L) 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.

**707.11.7.6 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.

**707.11.7.7 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.

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

**707.11.7.9 Draining of tanks.** Where tanks require draining for service or cleaning, tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The discharge from draining the tank shall be disposed of 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.

**707.11.7.10 Marking and signage.** Each storage tank shall be marked with its rated capacity. Storage tanks shall bear signage that reads as follows: "CAUTION: NONPOTABLE 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 (13 mm) in height and shall be of a color that contrasts with the background on which they are applied.

**707.11.8 Valves.** Valves shall be supplied in accordance with Section 707.11.8.1.

**707.11.8.1 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.

**707.11.9 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.

**707.11.10 Vent piping.** Storage tanks shall be provided with a vent in accordance with the requirements of Section 707.11.7.6. 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 inches (102 mm) 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 707.7.

**707.11.11 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, labeled 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.

**707.11.11.1 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.

**707.11.12 Distribution pipe.** Distribution piping shall comply with Sections 707.11.12.1 through 707.11.12.4.

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

**707.11.12.2 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.

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

**707.11.12.4 Marking.** Nonpotable 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 not less than 3 inches (76 mm) 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 nonpotable rainwater distribution pipes, fastened not greater than every 10 feet (3048 mm) 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.

**707.12 Tests and inspections.** Tests and inspection shall be performed in accordance with Sections 707.12.1 through 707.12.10.

**707.12.1 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.

**707.12.2 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.

**707.12.3 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.

**707.12.4 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.

**707.12.5 Inspection vermin and insect protection.** 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

**707.12.6 Roof gutter inspection and test.** Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section 707.11.3. Gutters shall be tested by pouring not less than 1 gallon (3.8 L) 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.

**707.12.7 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 707.11.9 shall be verified.

**707.12.8 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. 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. The makeup water system shall be observed for proper operation and successful automatic shutoff of the system at the refill threshold shall be verified.

**707.12.9 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 707.11.11.

**707.12.10 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. Except where site conditions as specified in ASTM E 2727 affect the rainwater, collected rainwater shall be considered to have the parameters indicated in Table 707.12.10.

**707.13 Operations and maintenance manuals.** Operations and maintenance materials shall be supplied in accordance with 707.13.1 through 707.13.4.

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

**707.13.2 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.

**707.13.3 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.

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

**707.14 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. 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

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

**707.15.1 Water quality testing.** Collected rainwater 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 707.15.1.1 and 707.15.1.2

**707.15.1.1 Test methods.** Water quality testing shall be performed in accordance with the latest edition of APHA—Standard Methods for the Examination of Water and Wastewater and in accordance with Sections 707.15.1.1.1 and 707.15.1.1.2.

**707.15.1.1.1 Annual tests required.** Accumulated rainwater shall be tested prior to initial use and annually thereafter for *Escherichia coli*, total coliform, heterotrophic bacteria and cryptosporidium.

**707.15.1.1.2 Quarterly tests required.** Accumulated rainwater shall be tested prior to initial use and quarterly thereafter for pH, filterable solids, residual chlorine if disinfection is used; and turbidity. The pH shall be tested in accordance with ASTM D 5464; filterable solids shall be tested in accordance with ASTM D 5907; residual chlorine shall be tested in accordance with ASTM D 1253 and turbidity shall be tested in accordance with ASTM D 6698.

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

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MDE and WSSC

**2011 ASHRAE 189.1 CORRELATION:**

**TABLE 707.11.7.1  
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

For SI: 1 foot = 304.8 mm.

**TABLE 707.12.10  
RAINWATER QUALITY**

PARAMETER	VALUE
pH	6.0 – 7.0
Biological oxygen demand	Not greater than 10 mg/L
Nephelometric turbidity unit	Not greater than 2
Fecal coliform	No detectable fecal coli in 100 mL
Sodium	No detectable sodium in 100 mL
Chlorine	No detectable chlorine in 100 mL
Enteroviruses	No detectable enteroviruses in 100 mL

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

**708.2 Permits.** Permits shall be required for the construction, installation, alteration, and repair of gray water systems. Construction documents, engineering calculations, diagrams, and other such data pertaining to the gray water 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 gray water system, the potable water supply shall be protected against backflow in accordance with Section 608 of the International Plumbing Code.

**708.4 Nonpotable water connections.** Where nonpotable 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 the manufacturer's instructions, as applicable.

**708.5.1 Gray water systems for landscape irrigation.** Gray water systems used for landscape irrigation purposes shall be limited to subsurface and surface irrigation applications. Gray water shall not be retained longer than 24 hours before being used for surface irrigation. Gray water to be used in gray water irrigation shall comply with the provisions of Section 708 with the exception of Sections 708.6 and 708.12.6.5. Subsurface gray water systems shall be in accordance with Section 708.14. Gray water shall be filtered by a 0.004-inch (100 micron) or finer filter. The control panel for the gray water irrigation system shall be provided with signage in accordance with Section 706.2.

**708.6 Applications.** Untreated gray water shall be utilized in accordance with Section 702 and local codes. Treated gray water 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 gray water 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 (1.6 mm) 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 gray water, shall be separated from the building sewer by 5 feet (1524 mm) of undisturbed or compacted earth. Gray water piping shall be separated from potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water service pipes shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried gray 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 gray water service pipe within 5 feet (1524 mm) of the sewer is not less than 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 gray water pipe is not less than 12 inches (305 mm) above the top of the highest point of the gray water 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 nonpotable water service pipe crosses a sewer pipe provided that the water service pipe is sleeved to not less than 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 gray water pipe provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the gray water 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 gray water is used for outdoor applications.

**708.11 System abandonment.** If the owner of a gray water 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. 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 Gray water systems.** The design of the gray water system shall conform to accepted engineering practice.

**708.12.1 Gray water sources.** Gray water reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers, and laundry trays. Water from other approved nonpotable sources including swimming pool backwash operations, air conditioner condensate, rainwater, cooling tower blowdown 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 gray water systems, as approved by the code official and as appropriate for the intended application.

**708.12.1.1 Prohibited gray water sources.** Waste water containing urine or fecal matter shall not be diverted to gray water 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 waste water, dishwasher waste water, and waste water discharged from wet-hood scrubbers shall not be collected for reuse within a gray water system.

**708.12.2 Traps.** Traps serving fixtures and devices discharging waste water to gray water 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.** Gray water reuse systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey untreated gray water. Vent piping approved for use within plumbing venting systems shall be utilized for vents within the gray water system. Drains to the sanitary sewer shall use approved waste piping.

**708.12.3.1 Joints.** Collection piping conveying untreated gray water 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 Marking.** Additional marking of untreated gray water 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 gray water 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 gray water requires disinfection or other treatment or both, collected gray water shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Where chlorine is used for disinfection or treatment, water shall be tested for residual chlorine in accordance with ASTM D 1253. The levels of residual chlorine shall not exceed the levels allowed for the intended use in accordance with the requirements of the jurisdiction. Untreated gray water 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 708.12.6.10 of 24 hours..

**708.12.6.1 Sizing.** The holding capacity of the storage tank shall be sized in accordance with the anticipated demand. Where gray water 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 gray water to a maximum

**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, fiberglass, 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. Gray water 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 gray water shall be located a minimum horizontal distance of 5 feet (1524 mm) from buildings, in addition to the requirements in Table 708.12.6.2

**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 Makeup water.** Where an uninterrupted supply of makeup water 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, 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 level from dropping below a predetermined point. Where makeup water is provided, the water level shall not be permitted to drop below the gray water inlet or the intake of any attached pump.

**708.12.6.5 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 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.

**708.12.6.6 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 (102 mm) above ground. Finished grade shall be sloped away from the manhole to divert surface water from the manhole. Each manhole cover shall have a locking device. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall have a locking cover or a brass cleanout plug. **Exception:** Storage tanks under 800 gallons (3024 L) 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.

**708.12.6.7 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 vent system.

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

**708.12.6.9 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. Not less than one cleanout shall be provided on each drain pipe in accordance with Section 708 of the International Plumbing Code.

**708.12.6.10 Signage.** Each storage tank shall be marked 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 (13 mm) 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 listed and labeled to NSF 50 or other approved device shall be installed on gray water collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated gray water 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 marked 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.** Overflow and tank drain piping shall be protected against backwater conditions by the installation of one or more backwater valves. 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 not less than 4 inches (102 mm) 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.** Makeup 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 gray water 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 gray 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

**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 gray water shall conform to standards and requirements specified by the International Plumbing Code.

**708.12.10.2 Joints.** Distribution piping conveying gray water 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 gray water shall be sized in accordance with the International Plumbing Code for the intended application or applications.

**708.12.10.4 Marking.** All gray water 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 not less than 3 inches (76 mm) 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 gray water distribution pipes, fastened not greater than every 10 feet (3048 mm) 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 gray water is used for outdoor applications.

**708.13 Tests and inspections.** Tests and inspections shall be performed in accordance with Sections 708.13.1 through 708.13.8.

**708.13.1 Drainage and vent test.** A pressure test shall be applied to the gray water collection piping, overflow piping, storage tank drainage piping and tank vent piping in accordance with Section 312 of the International Plumbing Code. and rainwater distribution piping shall be conducted in accordance with Section 312.5 of the International Plumbing Code.

**708.13.2 Drainage and vent final test.** A final test shall be applied to the gray water collection piping, overflow piping, 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

**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 that is 2 inches (51 mm) 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 707.12.9.

**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 Subsurface gray water irrigation systems.** Gravity subsurface gray water irrigation systems, where provided in accordance with Section 404.1.1, shall be designed and installed in accordance with Sections 708.14.1 through 708.14.6. Gray water collection and storage systems shall comply with this section and the provisions of Section 708 except for Sections 708.6 and 708.12.6.5.

**708.14.1 Estimating gray water 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 gray water system. The discharge shall be calculated by the following equation:  $C = (Ax B) - D$  (Equation 7-1) where: A = Number of occupants: Residential—For dwelling units regulated by this code in accordance with Section 101.3, 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 (L) of gray water discharge based on the total number of occupants. D= Estimated gallons (L) of gray water to be used within the interior of the building.

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

**708.14.2.1 Percolation tests and procedures.** Not less than 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. Additional percolation tests shall be made where necessary, depending on system design.

**708.14.2.1.1 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.

**708.14.2.1.2 Test procedure, sandy soils.** The hole shall be filled with clearwater to a depth of not less than 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 708.14.2.1.3.

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

**708.14.2.1.3 Test procedure, other soils.** The hole shall be filled with clear water, and a water depth of not less than 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. 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). Not less than 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.

**708.14.3 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 708.14.2.1 for evaluating the soil.

**708.14.4 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 708.14.4 and as provided in Section 708.12.6.2. Surface water shall be diverted away from any soil absorption site on the same or adjoining lots.

**TABLE 708.12.6.2  
LOCATION OF GRAY WATER 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, lakes, wetlands and other bodies of water	50
Water service	5
Public water main	10

For SI: 1 foot = 304.8 mm.

**TABLE 708.14.4  
LOCATION OF GRAY WATER SYSTEM**

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

For SI: 1 foot = 304.8 mm.

**TABLE 708.14.5.1  
DESIGN LOADING RATE**

PERCOLATION RATE (minutes per inch)	DESIGN LOAD 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>.

**708.14.5 Installation.** Absorption systems shall be installed in accordance with Sections 708.14.5.1 through 708.14.5.5 to provide landscape irrigation without surfacing of gray water. Excavations shall not encroach upon the critical root zone (CRZ) of protected trees.

**708.14.5.1 Absorption area.** The total absorption area required shall be computed from the estimated daily gray water discharge and the design-loading rate based on the percolation rate for the site. The required absorption area equals the estimated gray water discharge divided by the design-loading rate from Table 708.14.5.1.

**708.14.5.2 Seepage trench excavations.** Seepage trench excavations shall be not less than 1 foot (304 mm) and not greater than 5 feet (1524 mm) wide. Trench excavations shall be spaced not less than 2 feet (610 mm) apart. The soil absorption area of a seepage trench shall be computed by using the bottom width of the trench multiplied by the length of pipe. Individual seepage trenches shall not exceed 100 feet (30 480 mm) in developed length.

**708.14.5.3 Seepage bed excavations.** Seepage bed excavations shall be not less than 5 feet (1524 mm) wide and shall 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 not greater than 5 feet (1524 mm) and not less than 3 feet (914 mm) apart, and not greater than 3 feet (914 mm) and not less than 1 foot (305 mm) from the sidewall or headwall.

**708.14.5.4 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.

**708.14.5.5 Aggregate and backfill.** Not less than a 6-inch-thick (152 mm) layer 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 in a layer not less than 2 inches (51 mm) thick 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. Not less than 9 inches (229 mm) of soil backfill shall be placed on top of the synthetic material or marsh hay or straw.

**708.14.6 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 not less than .2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).

**708.15 Operation and maintenance manuals.** Operations and maintenance materials shall be supplied with gray water systems in accordance with Sections 708.15.1 through 708.15.4.

**708.15.1 Manual.** A detailed operations and maintenance manual shall be supplied in hardcopy form with all gray water systems.

**708.15.2 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.

**708.15.3 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.

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

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MDE and WSSC

**2011 ASHRAE 189.1 CORRELATION:** None

**709.1 Scope.** The provisions of this section shall govern the construction, installation, alteration, and repair of systems supplying nonpotable 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 the manufacturer's instructions, as applicable.

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

**709.5.1 Reclaimed water for landscape irrigation.** 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 0.004-inch (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, reclaimed water shall be permitted in sprinkler irrigation applications.

**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 mm) of undisturbed or compacted earth. Reclaimed water piping shall be separated from potable water piping underground by 5 feet (1524 mm) 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 not less than 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 not less than 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 nonpotable water service pipe crosses a sewer pipe provided the water service pipe is sleeved to not less than 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 not less than 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 ASTM E 2635 and 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 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 not less than 3 inches (76 mm) 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 not greater than every 10 feet (3048 mm) 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.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by MDE and WSSC

**2011 ASHRAE 189.1 CORRELATION:** Chapter 6

**710.1 Alternate nonpotable sources of water.** *Other onsite sources of nonpotable water including, but not limited to, stormwater, reverse osmosis reject water, foundation drain water and swimming pool backwash water, shall be permitted to be used for nonpotable uses provided that they have been treated to the quality level necessary for their intended use and in accordance with requirements of the jurisdiction having authority.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 6.3.3



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 8 – Indoor Environmental Quality and Comfort

**801.1 Scope and intent.** *The provisions of this chapter are intended to provide an interior environment that is conducive to the health of building occupants.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No Impact

**2011 ASHRAE 189.1 CORRELATION:** 8.1

**801.2 Indoor air quality management plan required.** *An indoor air quality management plan shall be developed. Such plan shall address the methods and procedures to be used during design and construction to obtain compliance with Sections 802 through 805.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 8.3.1.2, 8.3.1.3

**802.1 Scope.** *To facilitate the operation and maintenance of the completed building, the building and its systems shall comply with the requirements of Sections 802.2 and 802.3.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**802.2 Air-handling system access.** *The arrangement and location of air-handling system components including, but not limited to, ducts, air handler units, fans, coils and condensate pans, shall allow access for cleaning and repair of the air-handling surfaces of such components. Access ports shall be installed in the air-handling system to permit such cleaning and repairs. Piping, conduits, and other building components shall not be located so as to obstruct the required access ports.*

**802.3 Air-handling system filters.** *Filter racks shall be designed to prevent airflow from bypassing filters. Access doors and panels provided for filter replacement shall be fitted with flexible seals to provide an effective seal between the doors and panels and the mating filter rack surfaces. Special tools shall not be required for opening access doors and panels. Filter access panels and doors shall not be obstructed.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Covered by 2012 IMC with local amendments

**2011 ASHRAE 189.1 CORRELATION:** 8.3.1

**803.1 Construction phase requirements.** *The ventilation of buildings during the construction phase shall be in accordance with Sections 803.1.1 through 803.1.3.*

**803.1.1 Duct openings.** *Duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal or shall be closed by an approved method to reduce the amount of dust and debris that collects in the system from the time of rough-in installation and until startup of the heating and cooling equipment. Dust and debris shall be cleaned from duct openings prior to system flush out and building occupancy.*

**803.1.2 Indoor air quality during construction.** *Temporary ventilation during construction shall be provided in accordance with Sections 803.1.2.1 through 803.1.2.3.*

**803.1.2.1 Ventilation.** *Ventilation during construction shall be achieved through openings in the building envelope using one or more of the following methods: 1. Natural ventilation in accordance with the provisions of the International Building Code or the International Mechanical Code.*

2. Fans that produce a minimum of three air changes per hour. 3. Exhaust in the work area at a rate of not less than 0.05 cfm/ft<sup>2</sup> (0.24 L/s/ft<sup>2</sup>) and not less than 10 percent greater than the supply air rate so as to maintain negative pressurization of the space.

**803.1.2.2 Protection of HVAC system openings.** HVAC supply and return duct and equipment openings shall be protected during dust-producing operations.

**803.1.3 Construction phase ductless system or filter.** Where spaces are conditioned during the construction phase, space conditioning systems shall be of the ductless variety, or filters for ducted systems shall be rated at MERV 8 or higher in accordance with ASHRAE 52.2, and system equipment shall be designed to be compatible. Duct system design shall account for pressure drop across the filter

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**803.2 Thermal environmental conditions for human occupancy.** Buildings shall be designed in compliance with ASHRAE 55, Sections 6.1, "Design," and 6.2, "Documentation." **Exception:** Spaces with special requirements for processes, activities, or contents that require a thermal environment outside of that which humans find thermally acceptable, such as food storage, natatoriums, shower rooms, saunas and drying rooms.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 8.3.2

**803.3 Environmental tobacco smoke control.** Smoking shall not be allowed inside of buildings. Any exterior designated smoking areas shall be located not less than 25 ft (7.5 m) away from building entrances, outdoor air intakes, and operable windows.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 8.3.1.4

**803.4 Isolation of pollutant sources.** The isolation of pollutant sources related to print, copy and janitorial rooms, garages and hangars shall be in accordance with Section 803.4.1.

**803.4.1 Printer, copier and janitorial rooms.** Enclosed rooms or spaces that are over 100 square feet (9.3 m<sup>2</sup>) in area and that are used primarily as a print or copy facility containing five or more printers, copy machines, scanners, facsimile machines or similar machines in any combination, and rooms used primarily as janitorial rooms or closets where the use or storage of chemicals occurs, shall comply with all of the following: 1. The enclosing walls shall extend from the floor surface to the underside of the floor, roof deck or solid ceiling above and shall be constructed to resist the passage of airborne chemical pollutants and shall be constructed and sealed as required for 1-hour fire-resistance-rated construction assemblies. Alternatively, for janitorial rooms and closets, all chemicals shall be stored in approved chemical safety storage cabinets. 2. Doors in the enclosing walls shall be automatic or self-closing. 3. An HVAC system shall be provided that: provides separate exhaust airflow to the outdoors at a rate of not less than 0.50 cfm per square foot (2.4 L/s/m<sup>2</sup>) that maintains a negative pressure of not less than 7 Pa within the room; and that prohibits the recirculation of air from the room to other portions of the building.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Does not account for advances in office equipment technology or potential change of use for spaces based on changing technologies; and requirement for fire rated partitions does not accurately respond to level of hazard given standard office equipment and increasing use of green cleaning supplies.

**2011 ASHRAE 189.1 CORRELATION:** 8.3.1

**803.5 Filters.** Filters for air-conditioning systems that serve occupied spaces shall be rated at MERV 11 or higher, in accordance with ASHRAE Standard 52.2, and system equipment shall be designed to be compatible. The air-handling system design shall account for pressure drop across the filter. The pressure drop across clean MERV 11 filters shall be not greater than 0.45 in. w.c. at 500 FPM (412 Pa at 2.54 m/s) filter face velocity. Filter performance shall be shown on the filter manufacturer's data sheet.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 8.3.1.3

**804.1 Fireplaces and appliances.** Where located within buildings, fireplaces, solid fuel-burning appliances, vented decorative gas appliances, vented gas fireplace heaters and decorative gas appliances for installation in fireplaces shall comply with Sections 804.1.1 through 804.1.3. Unvented room heaters and unvented decorative appliances, including alcohol burning, shall be prohibited.

**804.1.1 Venting and combustion air.** Fireplaces and fuel-burning appliances shall be vented to the outdoors and shall be provided with combustion air provided from the outdoors in accordance with the International Mechanical Code and the International Fuel Gas Code. Solid-fuel-burning fireplaces shall be provided with a means to tightly close-off the chimney flue and combustion air openings when the fireplace is not in use.

**804.1.2 Wood-fired appliances.** Wood stoves and wood-burning fireplace inserts shall be listed and, additionally, shall be labeled in accordance with the requirements of the EPA Standards of Performance for New Residential Wood Heaters, 40 CFR Part 60, subpart AAA.

**804.1.3 Biomass appliances.** Biomass fireplaces, stoves and inserts shall be listed and labeled in accordance with ASTM E 1509 or UL 1482. Biomass furnaces shall be listed and labeled in accordance with CSA B366.1 or UL 391. Biomass boilers shall be listed and labeled in accordance with CSA B366.1 or UL 2523.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Covered by 2012 IMC with County amendments

**2011 ASHRAE 189.1 CORRELATION:** None

**804.2 Post-construction, pre-occupancy baseline IAQ testing.** Where this section is indicated to be applicable in Table 302.1, and after all interior finishes are installed, the building shall be tested for indoor air quality and the testing results shall indicate that the levels of VOCs meet the levels detailed in Table 804.2 using testing protocols in accordance with ASTM D 6196, ASTM D 5466, ASTM D 5197, ASTM D 6345, and ISO 7708. Test samples shall be taken in not less than one location in each 25,000 square feet (1860 m<sup>2</sup> of floor area or in each contiguous floor area. **Exceptions:** 1. Group F, H, S and U occupancies shall not be required to comply with this section. 2. A building shall not be required to be tested where a similarly designed and constructed building as determined by the code official, for the same owner or tenant, has been tested for indoor air quality and the testing results indicate that the level of VOCs meet the levels detailed in Table 804.2. 3. Where the building indoor environment does not meet the concentration limits in Table 804.2 and the tenant does not address the air quality issue by mitigation and retesting, the building shall be flushed-out by supplying continuous ventilation with all air-handling units at their maximum outdoor air rate for at least 14 days while maintaining an internal temperature of at least 60°F (15.6°C), and relative humidity not higher than 60 percent. Occupancy shall be permitted to start 7 days after start of the flush-out, provided that the flush-out continues for the full 14 days.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written (804.2 is a Jurisdictional Elective)

**RATIONALE / IMPACT:** Good practice. May be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** None

**TABLE 804.2  
MAXIMUM CONCENTRATION OF AIR POLLUTANTS**

MAXIMUM CONCENTRATION OF AIR POLLUTANTS RELEVANT TO IAQ	MAXIMUM CONCENTRATION, ug/m <sup>3</sup> (unless otherwise noted)
1-Methyl-2-pyrrolidione*	100
1,1,1-Trichloroethane	1000
1,3-Butadiene	20
1,4-Dichlorobenzene	500
1,4-Dioxane	3000
2-Ethylhexanoic acid*	25
2-Propanol	7000
4-Phenylcyclohexene (4-PCHE)	2.5
Acetaldehyde	140
Acrylonitrile	5
Benzene	60
n-Butyl methyl ether	8000
Caprolactam*	100
Carbon disulfide	800
Carbon monoxide	<sup>1)</sup> ppm and no greater than 2 ppm above outdoor levels
Carbon tetrachloride	40
Chlorobenzene	1000
Chloroform	300
Dichloroethane	400
Ethylbenzene	2000
Ethylene glycol	400
Formaldehyde	27
n-Hexane	7000
Naphthalene	9
Nonanal*	13
Octanal*	7.2
Particulates (PM 2.5)	35 (24-hr)
Particulates (PM 10)	150 (24-hr)
Phenol	200
Styrene	900
Tetrachloroethene	35
Toluene	300
Total volatile organic compounds (TVOC)	500
Trichloroethene	600
Xylene isomers	700

\* This chemical has a limit only where carpets and fabrics with styrene-butadiene rubber (SBR) latex backing material are installed as part of the base building systems.

**805.1 Scope.** The use of the following materials shall be prohibited: 1. Asbestos-containing materials. 2. Urea-formaldehyde foam insulation.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by EPA

**2011 ASHRAE 189.1 CORRELATION:** None

**806.1 Emissions from composite wood products.** Composite wood products used interior to the approved weather covering of the building shall comply with the emission limits or be manufactured in accordance with the standards cited in Table 806.1. Compliance with emission limits shall be demonstrated following the requirements of Section 93120 of Title 17, California Code of Regulations, Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products. **Exceptions:** 1. Composite wood products that are made using adhesives that do not contain urea-formaldehyde (UF) resins. 2. Composite wood products that are sealed with an impermeable material on all sides and edges. 3. Composite wood products that are used to make elements considered to be furniture, fixtures and equipment (FF&E) that are not permanently installed.

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by EPA

**2011 ASHRAE 189.1 CORRELATION:** 8.4.2.4

**TABLE 806.1  
COMPOSITE PRODUCTS EMISSIONS**

PRODUCT	FORMALDEHYDE LIMIT <sup>a</sup> (ppm)	STANDARD
Hardwood plywood	0.05	—
Particle board	0.09	—
Medium-density fiberboard	0.11	—
Thin medium-density fiberboard <sup>b</sup>	0.13	—

- a. Maximum thickness of  $\frac{3}{16}$  inch (8 mm).
- b. Phase 2 Formaldehyde Emissions Standards, Table 1, Section 93120, Title 17, California Code of Regulations; compliance shall be demonstrated in accordance with ASTM E 1333 or ASTM D 6007.

**806.2 Adhesives and sealants.** A minimum of 85 percent by weight or volume, of specific categories of site-applied adhesives and sealants used on the interior side of the building envelope shall comply with the VOC content limits in Table 806.2(1) or alternative VOC emission limits in Table 806.2(2). The VOC content shall be determined in accordance with the appropriate standard being either U.S. EPA Method 24 or SCAQMD Method 304, 316A or 316B. The exempt compound content shall be determined by either SCAQMD Methods 302 and 303 or ASTM D 3960. Table 806.2(1) adhesives and sealants regulatory category and VOC content compliance determination shall conform to the SCAQMD Rule 1168 Adhesive and Sealant Applications as amended on 1/7/05. The provisions of this section shall not apply to adhesives and sealants subject to state or federal consumer product VOC regulations. HVAC duct sealants shall be classified as "Other" category within the SCAQMD Rule 1168 sealants table. Exception: HVAC air duct sealants are not required to meet the emissions or the VOC content requirements when the air temperature in which they are applied is less than 40°F (4.5°C). Table 806.2(2) adhesive alternative emissions standards compliance shall be determined utilizing test methodology incorporated by reference in the CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The alternative emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice; allows latitude for areas with special requirements

**2011 ASHRAE 189.1 CORRELATION:** 8.4.2.1, 8.4.2.1.1, 8.4.2.1.2

**TABLE 806.2(1)  
SITE-APPLIED ADHESIVE AND SEALANT VOC LIMITS**

ADHESIVE	VOC LIMIT <sup>a</sup>
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesive	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Dry wall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single ply roof membrane adhesives	250
Architectural sealants	250
Architectural sealant primer	
Nonporous	250
Porous	775
Modified bituminous sealant primer	500
Other sealant primers	750
CPVC solvent cement	400
PVC solvent cement	510
ABS solvent cement	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact adhesive	50
Special purpose contact adhesive	250
Structural wood member adhesive	140

- a. VOC limit less water and less exempt compounds in granules.
- b. For liquid adhesives and sealants, the VOC limit is expressed in grams per liter of material as specified in Rule 1168. For all other adhesives and sealants, the VOC limits are expressed as grams of VOC per liter of adhesive or sealant less water and less exempt compounds as specified in Rule 1168.

**TABLE 806.3(2)  
VOC EMISSION LIMITS**

VOC	LIMIT
Individual VOCs	≤ 1/2 CA chronic REL <sup>a</sup>
Formaldehyde	≤ 16.5 µg/m <sup>3</sup> or ≤ 13.5 ppb <sup>b,c</sup>

a. CDPH/EHLB/Standard Method V.1.1 Chronic Reference Exposure Level (CREL)

b. Effective January 1, 2012, limit became less than or equal to the CDPH/EHLB/Standard Method V.1.1 CREL (≤ 9 µg/m<sup>3</sup> or ≤ 3 ppb)

c. Formaldehyde emission levels need not be reported for materials where formaldehyde is not added by the manufacturer of the material

**806.3 Architectural paints and coatings.** A minimum of 85 percent by weight or volume, of site-applied interior architectural coatings shall comply with VOC content limits in Table 806.3(1) or the alternate emissions limits in Table 806.3(2). The exempt compound content shall be determined by ASTM D 3960. Table 806.3(2) architectural coating alternate emissions standards compliance shall be determined utilizing test methodology incorporated by reference in the CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The alternative emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation.

**TABLE 806.3(1)—continued c, d, e VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS** b. Limit is expressed as VOC actual. c. The specified limits remain in effect unless revised limits are listed in subsequent columns in the table. d. Values in this table are derived from those specified by the California Air Resources Board Suggested Control Measure for Architectural Coatings, dated February 1, 2008. e. Table 806.3(1) architectural coating regulatory category and VOC content compliance determination shall conform to the California Air Resources Board Suggested Control Measure for Architectural Coatings, dated February 1, 2008.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice: allows latitude for areas with special requirements

**2011 ASHRAE 189.1 CORRELATION:** 8.4.2.1, 8.4.2.1.1, 8.4.2.1.2

**806.4 Flooring.** A minimum of 85 percent of the total area of flooring installed within the interior of the building shall comply with the requirements of Table 806.4(2). Where flooring with more than one distinct product layer is installed, the emissions from each layer shall comply with these requirements. The test methodology used to determine compliance shall be from CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation. Where post-manufacture coatings or surface applications have not been applied, the flooring listed in Table 806.4(1) shall be deemed to comply with the requirements of Table 806.4(2).

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice: allows latitude for areas with special requirements

**2011 ASHRAE 189.1 CORRELATION:** 8.4.2.3

**806.5 Acoustical ceiling tiles and wall systems.** A minimum of 85 percent of acoustical ceiling tiles and wall systems, by square feet, shall comply with the requirements of Table 806.5(2). Where ceiling and wall systems with more than one distinct product layer are installed, the emissions from each layer shall comply with these requirements. The test methodology used to determine compliance shall be from CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation. Where post-manufacture coatings or surface applications have not been applied, the ceiling or wall systems listed in Table 806.5(1) shall be deemed to comply with the requirements of Table 806.5(2).

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 8.4.2.6

**806.6 Insulation.** A minimum of 85 percent of insulation shall comply with the requirements of Table 806.6(1) or Table 808.6(2). The test methodology used to determine compliance shall be from CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION: 8.4.2.6**

**TABLE 806.3(2)  
ARCHITECTURAL COATINGS VOC EMISSION LIMITS**

VOC	LIMIT
Individual	≤ 1/2 CA chronic REL <sup>a</sup>
Formaldehyde	≤ 16.5 µg/m <sup>3</sup> or ≤ 1.15 ppb <sup>b</sup>

- a. CA Chronic Reference Exposure Level (CREL).  
 b. Formaldehyde emission levels need not be reported for materials where formaldehyde is not added by the manufacturer of the material.

**TABLE 806.3(1)  
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS<sup>a, b</sup>**

CATEGORY	Effective: January 1, 2010	Effective: January 1, 2012
	LIMIT <sup>c</sup> g/l	LIMIT <sup>c</sup> g/l
Flat coatings	50	
Nonflat coatings	100	
Nonflat - High-gloss coatings	150	
Specialty coatings:		
Aluminum roof coatings	400	
Basement specialty coatings	400	
Bituminous roof coatings	50	
Bituminous roof primers	350	
Bond breakers	350	
Concrete curing compounds	350	
Concrete/masonry sealers	100	
Driveway sealers	50	
Dry fog coatings	150	
Faux finishing coatings	350	
Fire-retardive coatings	350	
Floor coatings	100	
Form-release compounds	250	
Graphic arts coatings (Sign paints)	500	
High-temperature coatings	420	
Industrial maintenance coatings	250	
Low solids coatings	120 <sup>d</sup>	
Magnesite cement coatings	450	
Mastic texture coatings	100	
Metallic pigmented coatings	500	
Multi-color coatings	250	
Pretreatment wash primers	420	
Primers, sealers, and undercoaters	100	
Reactive penetrating sealers	350	
Recycled coatings	250	
Roof coatings	50	
Rust-preventative coatings	400	250
Shellacs, clear	730	
Shellacs, opaque	550	
Specialty primers, sealers, and undercoaters	350	100
Stains	250	
Stone consolidants	450	
Swimming pool coatings	340	
Traffic marking coatings	100	
Tub and tile refinish coatings	420	
Waterproofing membranes	250	
Wood coatings	275	
Wood preservatives	350	
Zinc-rich primers	340	

- a. Limits are expressed as VOC<sup>c</sup> Regulatory (except as noted, limited to the manufacturer's maximum thinning recommendation, excluding any solvent added to tint bases).

**TABLE 806.4(1)  
FLOORING DEEMED TO COMPLY WITH VOC EMISSION LIMITS**

Ceramic and concrete tile
Organic-free, mineral-based
Clay pavers
Concrete pavers
Concrete
Metal

**TABLE 806.4(2)  
FLOORING VOC EMISSION LIMITS**

VOC	LIMIT
Individual	≤ 1/2 CA chronic REL <sup>a</sup>
Formaldehyde	≤ 16.5 µg/m <sup>3</sup> or ≤ 13.5 ppb

a. CA Chronic Reference Exposure Level (CREL).

**TABLE 806.5(1)  
CEILING AND WALL SYSTEMS DEEMED TO  
COMPLY WITH VOC EMISSION LIMITS**

Ceramic and concrete tile
Organic-free, mineral-based
Gypsum plaster
Clay masonry
Concrete masonry
Concrete
Metal

**TABLE 806.5(2)  
ACOUSTICAL CEILING TILES AND WALL  
SYSTEMS VOC EMISSION LIMITS**

VOC	LIMIT
Individual	≤ 1/2 CA chronic REL <sup>a</sup>
Formaldehyde	≤ 16.5 µg/m <sup>3</sup> or ≤ 13.5 ppb

a. CA Chronic Reference Exposure Level (CREL).

**TABLE 806.6(1)  
INSULATION VOC EMISSION LIMITS**

VOC	LIMIT
Individual	≤ 1/2 CA chronic REL <sup>a</sup>
Formaldehyde	≤ 16.5 µg/m <sup>3</sup> or ≤ 13.5 ppb

a. CA Chronic Reference Exposure Level (CREL).

**TABLE 806.6(2)  
INSULATION MANUFACTURED WITHOUT FORMALDEHYDE  
VOC EMISSION LIMITS**

VOC	LIMIT
Individual	≤ 1/2 CA chronic REL <sup>a</sup>

a. CA Chronic Reference Exposure Level (CREL).

**SECTION 807 - ACOUSTICS**

**807.1 Sound transmission and sound levels.** Where required by Table 302.1, buildings and tenant spaces shall comply with the minimum sound transmission class and maximum sound level requirements of Sections 807.2 through 807.5.2. **Exception:** The following buildings and spaces need not comply with this section: 1. Building or structures that have the interior environment open to the exterior environment. 2. Parking structures. 3. Concession stands and toilet facilities in Group A-4 and A-5 occupancies.

**807.2 Sound transmission.** Sound transmission classes established by laboratory measurements shall be determined in accordance with ASTM E 413 based on measurements in accordance with ASTM E 90. Sound transmission classes for concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined in accordance with ASTM E 413 based on measurements in accordance with ASTM E 90. Field measurements of completed construction, if conducted, shall be in accordance with ASTM E 336 where conditions regarding room size and absorption required in ASTM E 336 are met.

**807.2.1 Interior sound transmission.** Wall and floor-ceiling assemblies that separate Group A and F occupancies from one another or from Group B, I, M or R occupancies shall have a sound transmission class (STC) of not less than 60 or an apparent sound transmission class (ASTC) of not less than 55 if the completed construction is field tested. Wall and floor-ceiling assemblies that separate Group B, I, M or R occupancies from one another shall have a sound transmission class (STC) of not less than 50 or an apparent sound transmission class (ASTC) of not less than 45 if the completed construction is field tested. Wall and floor-ceiling assemblies that separate Group R condominium occupancies from one another or from other Group B, I, M or R occupancies shall have a sound transmission class (STC) of not less than 55 or an apparent sound transmission class (ASTC) of not less than 50 if the completed construction is field tested. **Exception:** This section shall not apply to wall and floor-

ceiling assemblies enclosing: 1. Public entrances to tenants of covered and open mall buildings. 2. Concession stands and lavatories in Group A-4 and A-5 occupancies. 3. Spaces and occupancies that are accessory to the main occupancy.

**807.2.2 Mechanical and emergency generator equipment and systems.** Wall and floor-ceiling assemblies that separate a mechanical equipment room or space from the remainder of the building shall have a sound transmission class (STC) of not less than 50 or an apparent sound transmission class (ASTC) of not less than 45 if the completed construction is field tested. Wall and floor-ceiling assemblies that separate a generator equipment room or space from the remainder of the building shall have a sound transmission class (STC) of not less than 60 or an apparent sound transmission class (ASTC) of not less than 55 if the completed construction is field tested.

**807.3 Sound levels.** The design and construction of mechanical and electrical generator systems and of walls and floor-ceilings separating such equipment from the outdoors or other building space shall achieve sound levels not greater than specified in Sections 807.3.1 and 807.3.2 during the normal operation of mechanical equipment and generators. Electrical generators used only for emergencies are exempt from the limits on sound levels within the building and need only meet daytime limits for sound-reaching boundaries. Where necessary, walls and floor-ceiling assemblies with sound transmission class (STC) ratings greater than specified in Section 807.2.2 shall be used to meet this requirement.

**807.3.1 Sound of mechanical and electrical generator equipment outside of buildings.** Where mechanical equipment or electrical generators are located outside of the building envelope or their sound is exposed to the exterior environment, the sound reaching adjacent properties shall comply with all applicable ordinances and zoning performance standards. In the absence of an ordinance or zoning performance standard specifying sound limits at the boundary, or a law specifying different limits if limits are imposed, an adjacent property at the boundary shall not be subjected to a sound level greater than indicated in Table 807.3.1 because of the sound of the equipment. Where a generator is used only for providing emergency power and all periodic operational testing is done during the daytime period of Table 807.3.1, the sound of a generator during the night-time hours shall meet the daytime limits.

**807.3.2 Sound of HVAC and mechanical systems within buildings.** Sound levels within rooms generated by HVAC and mechanical systems within the building, including electrical generators used regularly but excluding emergency generators, for all modes of operation shall not exceed the limits shown in Table 807.3.2.

**807.4 Structure-borne sounds.** Floor and ceiling assemblies between dwelling rooms or dwelling units and between dwelling rooms or dwelling units and public or service areas within the structure in occupancies classified as Group A1, A2, A3, B, E, I, M or R shall have an impact insulation classification (IIC) rating of not less than 50 where laboratory-tested and 45 where field-tested when tested in accordance with ASTM E 492. New laboratory tests for impact insulation class (IIC) of an assembly are not required where the IIC has been established by prior tests.

**807.5 Special inspections for sound levels.** An approved agency, funded by the building owner, shall furnish report(s) of test findings indicating that the sound level results are in compliance with this section, applicable laws and ordinances, and the construction documents. Discrepancies shall be brought to the attention of the design professional and code official prior to the completion of that work. A final testing report documenting required testing and corrections of any discrepancies noted in prior tests shall be submitted at a point in time agreed upon by the building owner, or building owner's agent, design professional, and the code official for purposes of demonstrating compliance.

**807.5.1 Testing for mechanical and electrical generator equipment outside of buildings.** Special inspections shall be conducted in accordance with Section 903.1 to demonstrate compliance with the requirements of Section 807.3.1. Testing shall be conducted following the complete installation of the equipment or generators, the installation of sound reduction barriers, and balancing and operation of the equipment or generators. Testing shall be at locations representing the four cardinal directions from the face of the project building. Such testing shall demonstrate that the equipment is capable of compliance with the night-time limits under normal night-time operating conditions, and if higher sound levels are possible during the daytime, compliance with the daytime limits shall also be demonstrated.

**807.5.2 Testing for building system background noise.** Special inspections shall be conducted in accordance with Section 903.1 to demonstrate compliance with the requirements of Section 807.3.2. Testing shall be executed within not less than 50 percent of the total number of rooms contained in a building or structure of the types listed in Table 807.3.2 for the given occupancy in accordance with Table 903.1. Testing shall occur following the complete installation of the equipment and systems, the installation of any sound reduction barriers, and balancing and operation of the equipment and systems.

**807.5.3 Separating assemblies.** Wall and floor-ceiling assemblies that separate a mechanical or emergency generator equipment room or space from the remainder of the building shall have a sound transmission class (STC) of not less than 60 determined in accordance with ASTM E 90 and ASTM E 413, or for concrete masonry and clay masonry assemblies as calculated in accordance with TMS 0302 or as determined in accordance with ASTM E 90 and ASTM E 413.

**807.5.4 HVAC background sound.** HVAC system caused background sound levels for all modes of operation within rooms shall be in accordance with the lower and upper noise criteria (NC) limits as shown in Table 807.3.2. Special inspections shall be required and conducted in accordance with Section 903.1 in order to demonstrate compliance.

**807.6 Special inspections for sound transmission.** An approved agency, employed by the building owner, shall furnish report(s) of test findings indicating that the results are in compliance with this section and the construction documents. Discrepancies shall be brought to the attention of the design professional and code official prior to the completion of that work. A final testing report documenting required testing and corrections of any discrepancies noted in prior tests shall be submitted at a point in time agreed upon by the building owner, or building owner's agent, design professional, and the code official for purposes of demonstrating compliance. **Exception:** Test reports are not required for approved assemblies with an established sound transmission class (STC) rating.

**807.6.1 Testing for mechanical and emergency generator equipment outside of buildings.** In accordance with Section 807.3.1, all mechanical and emergency generator equipment shall be field tested in accordance with Table 903.1. Testing shall be conducted following the complete installation of the equipment or generators, the installation of sound reduction barriers, and balancing and operation of the equipment or generators. Testing shall be at locations representing the four cardinal directions from the face of the project building. Such testing shall occur on a Tuesday, Wednesday or Thursday at both the day and night times within the periods shown in Table 807.3.1.

**807.6.2 Testing for building system background noise.** Testing shall be executed in accordance with Section 807.3.1 within not less than 50 percent of the total number of rooms contained in a building or structure, exclusive of closets and storage rooms less than 50 square feet (4.65 m<sup>2</sup>) in area, and exclusive of toilet facilities in accordance with Table 903.1. Testing shall occur following the complete installation of the equipment and systems, the installation of any sound reduction barriers, and balancing and operation of the equipment and systems.

**PROPOSED ACTION:** Move to Appendix A - Adopt as written (807.1 is a Jurisdictional Elective which includes 807.2 through 807.5.2)

**RATIONALE / IMPACT:** Good practice however impractical due to administrative issues to handle requirements for

post construction testing and costs associated with potential corrections; difficult to enforce; and unaddressed acoustical issues are not an overriding issue in typical projects.

**2011 ASHRAE 189.1 CORRELATION:** 8.3.2; 8.3.3

**TABLE 807.3.1  
MAXIMUM PERMISSIBLE OUTDOOR A-WEIGHTED SOUND LEVELS**

INITIATING PROPERTY	ADJACENT PROPERTY	MAXIMUM A-WEIGHTED SOUND LEVEL (dBA)	
		Day Time	Night Time
		7:00 AM to 10:00 PM	10:00 PM to 7:00 AM
All, except factory, industrial, or storage	All, except factory, industrial, or storage	65	55
Factory, industrial, or storage	All other, except factory, industrial, or storage	65	55
Factory, industrial, or storage	Factory, industrial, or storage	75	75

**SECTION 808 - DAYLIGHTING**

**808.1 General.** Fenestration shall be provided in building roofs and walls in accordance with Sections 808.2 and 808.3. Interior spaces shall be planned to benefit from exposure to the natural light offered by the fenestration in accordance with this section.

**808.1.1 Fenestration obstructions.** Advertisements or displays affixed or applied to a fenestration, or supported by the building shall not reduce daylighting below the levels prescribed herein. *Exception:* The ground floor and the story immediately above the ground floor.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 8.3.4, 8.4.1, and 8.5.1

**TABLE 807.3.2  
MAXIMUM PERMISSIBLE INDOOR BACKGROUND SOUND IN ROOMS**

OCCUPANCY TYPE	ROOM	NOISE CRITERIA (NC) LIMITS
Assembly A-1	Symphony, concert, recital halls	30
	Motion picture theaters	40
Assembly A-3	Places of religious worship, lecture halls not part of educational facilities	35
	Art gallery, exhibit hall, funeral parlor, libraries, and museums	40
	Courtsroom	35
	Educational occupancies above 12th grade	(See Educational)
Assembly A-4	Gymnasiums, natatoriums and arenas with seating areas	45
Business B	Office—enclosed greater than 300 square feet	35
	Office—enclosed less than or equal 300 square feet	40
	Office—open plan	45
	Corridors and lobbies	45
	Conference rooms	35
	Educational occupancies above 12th grade	(See Educational)
Educational E	Core learning lecture and classrooms that are less than or equal to 20,000 cubic feet in volume	ANSI/ASA S12.60 2010 Part 1 or ANSI/ASA S12.60 2009 Part 2
	Core learning lecture and classrooms that are greater than 20,000 cubic feet in volume	
	Open plan classrooms	
	Administrative offices and rooms	
	Music teaching studios	
	Music practice rooms	
Institutional I-2	Wards	2010 FGI-ASHI Guidelines for Design and Construction of Healthcare Facilities
	Private and semi-private patient rooms	
	Operating rooms	
	Corridors and public areas	
	Rooms or suites	
Residential R-1 and R-2	Bathroom, kitchen, utility room	25 to 35
		40
Residential R-1 and R-2	Meeting rooms	35
	Corridors and lobbies	45
	Service areas	45

1 sq. ft. = 0.0929 m<sup>2</sup>; 1 cubic foot = 28.31 L.

**808.2 Applicability.** Daylighting of building spaces in accordance with Section 808.3 shall be required for the following occupancies: 1. A Group A-3 occupancy where the specific use of the room or space is for reading areas in libraries, waiting areas in transportation terminals, exhibition halls, gymnasiums, and indoor athletic areas. 2. A Group B occupancy where the specific use of the room or space is for educational facilities for

students above the 12th grade, laboratories for testing and research, post offices, print shops, offices, and training and skill development not within a school or academic program. 3. Group E, F and S occupancies. 4. Those portions of Group M occupancies located directly underneath a roof, where the net floor area of the entire occupancy is 10,000 square feet (929 m<sup>2</sup> or greater. **Exception:** Daylighting is not required in the following rooms and spaces: 1. Building spaces where darkness is required for the primary use of the space, including, but not limited to, light-sensitive material handling and darkrooms. 2. Building spaces that are required to be cooled below 50°F (10°C). 3. Unconditioned buildings that are equipped with exterior doors that, when opened, provide equivalent daylighting. 4. Alteration, repair, movement, or change of occupancy of existing buildings.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 8.3.4, 8.4.1, and 8.5.1

**808.3 Daylit area of building spaces.** In buildings not greater than two stories above grade, not less than 50 percent of the net floor area shall be located within a daylit area. In buildings three or more stories above grade, not less than 25 percent of the net floor area shall be located within a daylit area. Buildings required to have more than 25,000 square feet (2323 m<sup>2</sup> of daylit area shall comply with Section 808.3.2. All other buildings shall comply with either Section 808.3.1 or Section 808.3.2. **Exception:** For buildings not less than three stories above grade with obstructed exterior walls or shaded roofs, the required daylit area shall be modified in accordance with Equation 8-1. Required daylit area  $\geq 25\%$  TDP (Equation 8-1) The total daylight potential (TDP) is a weighted average of the individual daylight potentials for each floor:  $TDP = \sum (DP_1 FA_1 / TF) + \sum (DP_2 FA_2 / TF) \dots$  For floors with roof area immediately above:  $DP_1 = 1 / (OW_1 / TW_1 + OR_1 / TR_1)$  For floors without roof area immediately above:  $DP_1 = 1 / (OW_1 / TW_1 + OR_1 / TR_1)$   $OW_1, 2$  The length of obstructed exterior wall for each floor that does not face a public way or a yard or court complying with Section 1206 of the International Building Code or where the distance to any buildings, structures, or geological formations in front of the wall is less than two times the height of the buildings, structures, or geological formations. For the purposes of this determination, the maximum allowed heights of buildings or structures on adjacent property under existing zoning regulations is permitted to be considered.  $TW_1, 2$  The total length of exterior wall for each floor.  $OR_1, 2$  The roof area immediately above each floor that is shaded during the peak sun angle on the summer solstice by permanent features of the building, or by permanent features of adjacent buildings.  $TR_1, 2$  The total roof area immediately above each floor.  $FA_1, 2$  The total floor area of each floor.  $TF$  The total building floor area.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 8.3.4, 8.4.1, and 8.5.1

**808.3.1 Daylight prescriptive requirements.** Daylit areas shall comply with Section 808.3.1.1 or 808.3.1.2. For determining the total daylit area, any overlapping daylit areas shall be counted only once. The total daylight area shall be the sum of the area of all sidelighting daylight zones and the area of all toplighting zones, except that sidelighting daylight zones shall not be included in the calculation of the area of toplighting daylight areas.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 8.3.4, 8.4.1, and 8.5.1

**808.3.1.1 Sidelighting.** The daylit area shall be illuminated by fenestration that complies with Table 808.3.1-1 and Figure 808.3-1-1(4). Where fenestration is located in a wall, the daylit area shall extend laterally to the nearest 56-inch-high (1422-mm) partition, or up to 1.0 times the height from the floor to the top of fenestration facing within 45 degrees (0.785 rad) of east or west or up to 1.5 times the height from the floor to the top of all other fenestration, whichever is less, and longitudinally from the edge of the fenestration to the nearest 56-inch-high (1422-mm) partition, or up to 2 feet (610 mm), whichever is less, as indicated in Figure 808.3-1-1(1). Where fenestration is located in a rooftop monitor, the daylit area shall extend laterally to the nearest 56-inch-high (1422-mm) partition, or up to 1.0 times the height from the floor to the bottom of the fenestration, whichever is less, and longitudinally from the edge of the fenestration to the nearest 56-inch-high (1422-mm) partition, or up to 0.25 times the height from the floor to the bottom of the fenestration, whichever is less, as indicated in Figures 808.3-1-1(2) and 808.3-1-1(3).  $EA = (AF \cdot VT) / DA$  (Equation 8-2) where:  $EA$  Effective aperture,  $AF$  Area of fenestration,  $VT$  Visible transmittance of the fenestration,  $DA$  Daylit area.

**PROPOSED ACTION:** Move to Appendix A using the following language in lieu of written text: The area adjacent to vertical fenestration which receives daylight through the fenestration. For purposes of this definition and unless more detailed analysis is provided, the daylight zone depth is assumed to extend into the space a distance of 15 feet (4572 mm) or to the nearest ceiling height opaque partition, whichever is less. The daylight zone width is assumed to be the width of the window plus 2 feet (610 mm) on each side, or the window width plus the distance to an opaque partition, or the window width plus one-half the distance to adjacent skylight or vertical fenestration, whichever is least.

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects. Language revision matches

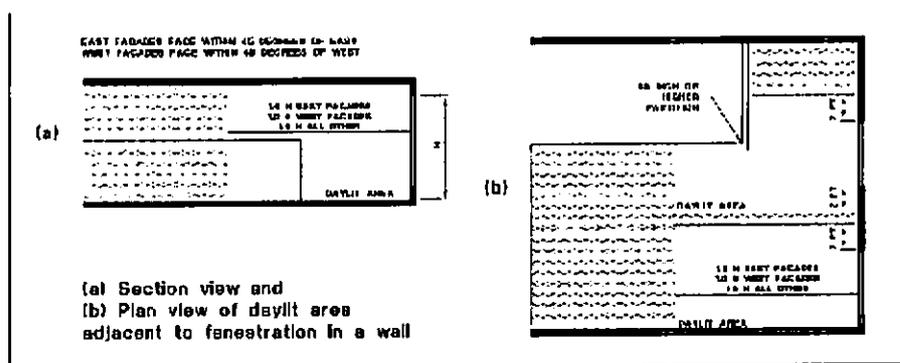
IECC Chapter 2 – Definitions; suggested to simplify calculations for design and administrative purposes – DPS to consider any other simple standard method as an alternative to proposed language.

**2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1**

**TABLE 808.3.1.1  
MINIMUM EFFECTIVE APERTURE**

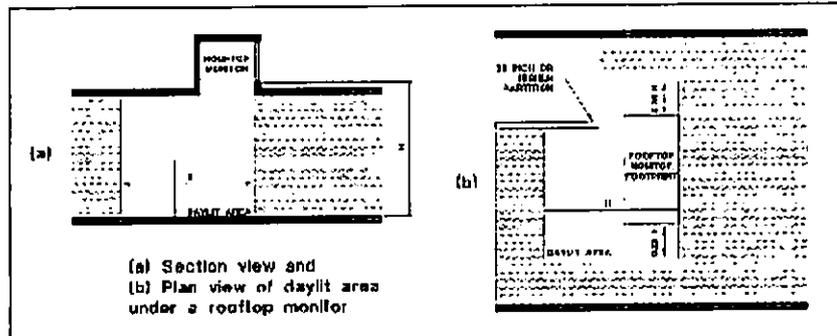
SKY TYPE	MINIMUM EFFECTIVE APERTURE (percentage)		
	Sidelighting from fenestration in a wall [see Figure 808.3.1.1(1)]	Sidelighting from rooftop monitor [see Figures 808.3.1.1(2) and 808.3.1.1(3)]	Toplighting (see Figure 808.3.1.2)
A*	10.0	5.0	1.0
B*	12.0	6.0	1.2
C*	16.0	8.0	2.2

- a. Sky Type A – more than 75 percent mean sunshine, in accordance with the NOAA Annual Mean Sunshine Percentage Table.
- b. Sky Type B – 45 percent to 75 percent mean sunshine, in accordance with the NOAA Annual Mean Sunshine Percentage Table.
- c. Sky Type C – less than 45 percent mean sunshine, in accordance with the NOAA Annual Mean Sunshine Percentage Table.



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.017 rad

**FIGURE 808.3.1.1(1)  
DAYLIT AREA ADJACENT TO FENESTRATION IN A WALL**



For SI: 1 inch = 25.4 mm

**FIGURE 808.3.1.1(2)  
DAYLIT AREA ADJACENT UNDER A ROOFTOP MONITOR**

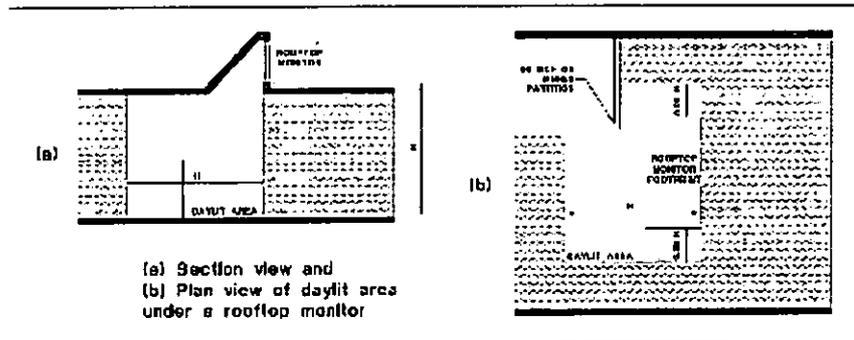


FIG. S1: 1 inch = 25.4 mm.

FIGURE 808.3.1.1(3)  
DAYLIT AREA ADJACENT UNDER A ROOFTOP MONITOR

**808.3.1.2 Toplighting.** The daylit area shall be illuminated by a roof fenestration assembly such as a skylight, sloped glazing or tubular daylighting device that complies with Table 808.3.1-1 and Figure 808.3.1-2. The daylit area extends laterally and longitudinally beyond the glazed opening of the roof fenestration assembly to the nearest 56-inch-high (1422-mm) partition, or up to 0.7 times the height from the floor to the bottom of the rough opening of the daylighting well, whichever is less, as indicated in Figure 808.3.1-2.

**PROPOSED ACTION:** Move to Appendix A using the following language in lieu of written text: The area under skylights whose horizontal dimension, in each direction, is equal to the skylight dimension in that direction plus either the floor-to-ceiling height or the dimension to a ceiling height opaque partition, or one-half the distance to adjacent skylights or vertical fenestration, whichever is least.

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects. Language revision matches IECC Chapter 2 – Definitions; suggested to simplify calculations for design and administrative purposes – DPS to consider any other simple standard method as an alternative to proposed language.

**2011 ASHRAE 189.1 CORRELATION:** 8.3.4, 8.4.1, and 8.5.1

**808.3.2 Daylight performance requirements.** Each daylit area shall comply with the requirements of either Section 808.3.2.1 or 808.3.2.2. Daylight analysis shall be conducted in accordance with Section 808.3.2.3.

**808.3.2.1 Morning illumination.** Not less than 28 foot-candles (300 lux) and not more than 418 foot-candles (4500 lux) of natural light shall be available at a height of 30 inches (750 mm) above the floor 3 hours before the peak solar angle on the spring equinox.

**808.3.2.2 Afternoon illumination.** Not less than 28 foot-candles (300 lux) and not more than 418 foot-candles (4500 lux) of natural light shall be available at a height of 30 inches (750 mm) above the floor 3 hours after the peak solar angle on the spring equinox.

**808.3.2.3 Daylight analysis.** A daylight analysis shall be performed that complies with the following: 1. Sky conditions shall be assumed to be clear. 2. Address the effects of exterior shading devices, buildings, structures, and geological formations on the fenestration of the proposed building and on the ground and other light reflecting surfaces. Include the effects of movable exterior fenestration shading devices. The configuration of fenestration with automatically controlled variable transmittance shall be adjusted to accurately represent the control system operation. 3. Exclude the effects of interior furniture systems, shelving, and stacks. 4. Use the actual reflectance characteristics of all materials. 5. Where blinds, shades and other movable interior fenestration shading devices are included in the analysis and the exact properties of such devices cannot be accurately modeled, such devices shall be assumed to be completely diffusing, with a visible transmittance of 5 percent for fabric shades, and 20 percent for horizontal or vertical blinds. 6. Calculation points shall be spaced not more than 39.4 inches (1 m) by 39.4 inches (1 m). The calculation grid shall start within 20 inches (508 mm) of each wall or partition. 7. Where details about the window framing, mullions, wall thickness and well depth cannot be included in the model, the visible transmittance of all fenestration shall be reduced by 20 percent.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 8.3.4, 8.4.1, and 8.5.1

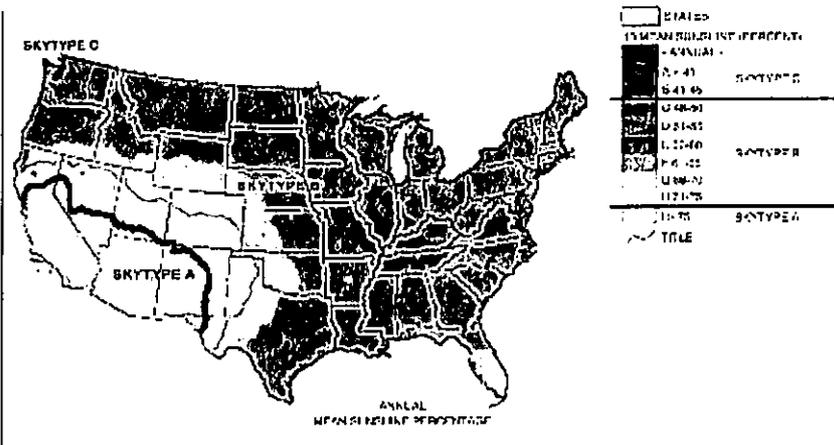


FIGURE 808.3.1.1(4)  
SKY TYPES

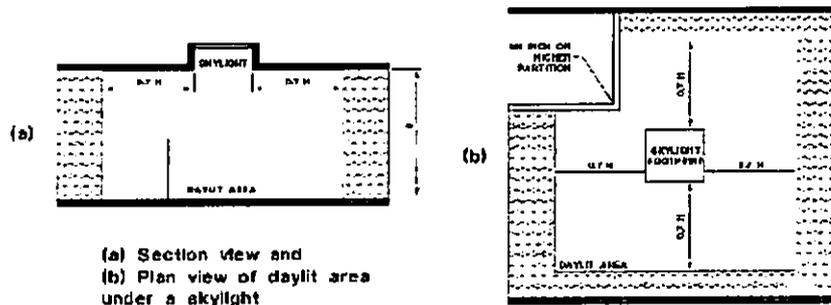


FIG. S1: 1 in. = 25.4 mm

FIGURE 808.3.1.2  
DAYLIT AREA UNDER A SKYLIGHT

**808.4 Sky types.** Sky types as described in Section 808.4.1 or 808.4.2 shall be used in determining the applicable effective aperture in Table 808.3.1.1

**808.4.1 United States sky types.** All states, counties, and territories shall be sky type B, except as named herein. The states and counties in sky type A shall be: all of Arizona; in Nevada the counties of Churchill, Lincoln, Nye, Washoe, and counties south; in New Mexico the counties of Lincoln, Otero, Sandoval, San Juan, Santa Fe, Torrance and counties south; in Texas the counties of Hudspeth, El Paso, and Jeff Davis; in Utah the counties of Iron, Kane, and Washington; and in California all counties except Del Norte, Siskiyou, Modoc, Humboldt, Trinity, and Mendocino. Alaska shall be sky type C.

**808.4.2 International sky types.** All international locations shall be sky type B, except as follows: locations with an annual average of more than 75 percent sunshine during daytime hours shall be sky type A, and locations with an annual average of less than 45 percent sunshine during daytime hours shall be sky type C.

**PROPOSED ACTION:** Move to Appendix A – Adopt as written

**RATIONALE / IMPACT:** Good practice; may be difficult to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 8.3.4, 8.4.1, and 8.5.1



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 9 – Commissioning, Operation and Maintenance

**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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**ASHRAE 189.1 CORRELATION:** Chapter 10, 10.1 Scope is comparable

~~**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.*~~

**PROPOSED ACTION:** Replace with IBC definition which is consistent with definition in Chapter 2 of IgCC: **[A]**  
**APPROVED AGENCY.** An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved.

**RATIONALE / IMPACT:** The definition is in conflict with the definition stated in Chapter 2 and therefore creates confusion; and the last sentence implies that the AHJ may take on an unnecessary role

**ASHRAE 189.1 CORRELATION:** None

**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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**ASHRAE 189.1 CORRELATION:** None

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

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**ASHRAE 189.1 CORRELATION:** None

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

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**ASHRAE 189.1 CORRELATION:** None

**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.

**PROPOSED ACTION:** Adopt as written. Note that ASHRAE 189.1 and LEED 2009 definitions of Commissioning Authority allow building owners to identify personnel for this role and do not specify qualifications or selection criteria; suggest alignment of definitions to eliminate inequity for administration of this process.

**RATIONALE / IMPACT:** Good practice

**ASHRAE 189.1 CORRELATION:** Chapter 10

**903.1.1 Preoccupancy 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.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**ASHRAE 189.1 CORRELATION:** 10.3.1.2.2

**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.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**ASHRAE 189.1 CORRELATION:** 10.3.1.2.3

**TABLE 903.1  
COMMISSIONING PLAN**

CONSTRUCTION OR SYSTEM REQUIRING VERIFICATION	PREOCCUPANCY	POST-OCCUPANCY	METHOD	OCCURRENCE		SECTION / REFERENCED STANDARD
				Preoccupancy	Post-occupancy	
<b>Chapter 4: Site Development and Land Use</b>						
Landscape irrigation systems	X		Field inspection	Installation		404.1
Storm water management system operation	X	X	Field inspection	Installation	Annually	Ch 19-13 County Code
Site lighting	X		Testing and report	Installation		409
<b>Chapter 6: Energy</b>						
<b>Energy consumption monitoring targeting and reporting</b>						
a. monitoring system	X	None	Inspection and verification	During construction and prior to occupancy	None	603.610.5
b. calibration	X	X	Testing and review and evaluation or test reports	During commissioning	Annually	603.610.5
<b>Mechanical systems completion-all buildings</b>						
a. air system balancing-provide the means for system balancing	X	None	Inspection and verification	During construction and prior to occupancy	None	611.1.2.1 and through reference to IEC C.
b. Hydronic system balancing-provide means for system balancing	X	None	Inspection and verification	During construction and prior to occupancy	None	611.1.2.2 and through reference to IEC C.
c. Mechanical systems manuals-construction documents to require O& M. manual	X	None	Verification of construction documents	Prior to use and occupancy permit	None	611.1.5.2
<b>Mechanical systems-buildings over 5000 ft.<sup>2</sup> total building or area</b>						
a. Commissioning required and noted in plans and specifications	X	None	Verification of construction documents	Plan review		611.1
b. Documentation required commissioning outcomes	X	None	Verification with the building owner	Subsequent to completion of all commissioning activities		611.1
c. Preparation and availability of a commissioning plan	X	None	Verification with the RDP or commissioning agent	Between plan review and commissioning initiation		611.1.1
d. Balance HVAC systems(both air and hydronic)	X	X	HVAC system installer/contractor or commissioning agent	After installation of HVAC systems and prior to occupancy		611.1.2
e. Functional performance testing of HVAC equipment	X	X	HVAC system installer/contractor or commissioning agent	After installation of HVAC systems and prior to occupancy		611.1.3
f. Functional performance testing of HVAC controls and control systems	X	X	HVAC system installer/contractor or commissioning agent	After installation of HVAC systems and prior to occupancy		611.1.3.2
g. Preparation of preliminary commissioning report	X	None	Commissioning agent	None	Subsequent to commissioning	611.1.4
h. Acceptance of HVAC systems and equipment/system verification report	X	None	Building owner	None	Letter verifying receipt of the commissioning report	611.1.4.1
i. Preparation and distribution of final HVAC system completion documentation that construction documents require drawings manuals balancing reports and commissioning report be provided to the owner and that they had been provide	None	X	RDP, contractor or commissioning agent	None	90 days after final certificate of occupancy	611.1.5

Chapter 6: Lighting						
Auto demand reduction control system functionality	X	X	Functional testing	Final inspection	18 to 24 months	604.4
Specified transformer nameplate deficiency rating	X	None	Field inspection	Final inspection	None	608.8.11
Verification of lamp	X	X	Field inspection	Final inspection	18 to 24 months	608.10
Verification of ballast	X	None	Field inspection	Final inspection	None	608.10
Lighting controls						
a. Installation	X	None	Field inspection	Post installation	None	608.11
b. Calibration	X	X	System installer/contractor or commissioning agent	Post installation	18 to 24 months	611.3.3
Chapter 7: Water Resource Conservation, Quality and Efficiency						
Appliances	X	None				702.6
Hot water distribution	X	None				702.8
Cooling tower performance		X				703.7.7
Metering	X	None				705.1.1
Chapter 8: Indoor Environmental Quality and Comfort						
Building construction, feature, operations and maintenance facilitation						
Air handling system access	X	X	Field inspection and verification	During construction and prior to occupancy	18 to 24 months	802.2
Air handling system builders	X	X	Field inspection and verification	During construction and prior to occupancy	18 to 24 months	802.3
HVAC systems						
Temperature and humidity in occupied space		X	Field inspection and verification		18 to 24 months	803.2
Specific indoor air quality and pollution control measures						
Listing, installation and venting of fireplaces and combustion appliance	X		Field inspection and verification	During construction and prior to occupancy		804.1

**904.1 General.** Building operations and maintenance documents in accordance with Section 904.3 shall be 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 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.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good Practice

**ASHRAE 189.1 CORRELATION:**

**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. 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. For sites that have previously been a brownfield, or required environmental corrective action, remediation or restoration at the federal, state or local level, copies of engineering and institutional control information shall be provided.
4. A copy of the Certificate of Occupancy.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**ASHRAE 189.1 CORRELATION:**

**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.
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:
  - 2.1. Vegetative shading, vegetative roofs and natural resource protections and setbacks.
  - 2.2. Water-conserving landscape and irrigation systems.
  - 2.3. Stormwater management systems.
  - 2.4. Permanent erosion control measures.
  - 2.5. Landscape or tree management plans.
3. Operations and maintenance documents for materials, products, assemblies and systems installed under or related to the provisions of this code for material resource conservation in accordance with Chapter 5 including, but not limited to, the following, as applicable:
  - 3.1. Care and maintenance instructions and recommended replacement schedule for flooring, including, but not limited to, carpeting, walk-off mats and tile.
  - 3.2. Care and maintenance instructions for natural materials including, but not limited to, wood, bio-based materials and stone.
  - 3.3. Available manufacturer's instructions on maintenance for:
    - 3.3.1. Exterior wall finishes.
    - 3.3.2. Roof coverings.
    - 3.3.3. Exterior doors, windows and sky-lights.
  - 3.4. Information and recommended schedule for required routine maintenance measures, including, but not limited to, painting and refinishing.
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:
  - 4.1. Heating, ventilating and air-conditioning systems including:
    - 4.1.1. Recommended equipment maintenance schedule.
    - 4.1.2. Air filters and fluid filters, including recommended replacement schedule and materials.
    - 4.1.3. Time clocks, including settings determined during commissioning.
    - 4.1.4. Programmable controls and thermostats, including settings determined during commissioning.
  - 4.2. Domestic hot water systems including performance criteria and controls.
  - 4.3. Building thermal envelope systems including:
    - 4.3.1. Glazing systems inspection schedule.
    - 4.3.2. Performance criteria for replacements and repairs.
    - 4.3.3. Information and recommended schedule on required routine maintenance measures, including but not limited to, sealants, mortar joints and screens.
  - 4.4. Electrical and lighting systems including:
    - 4.4.1. Technical specifications and operating instructions for installed lighting equipment.
    - 4.4.2. Luminaire maintenance and cleaning plan.
    - 4.4.3. Lamp schedule, recommended relamping plan, and lamp disposal information.
    - 4.4.4. Programmable and automatic controls documentation, including settings determined during commissioning.
    - 4.4.5. Occupant sensor and daylight sensors documentation, including settings determined during commissioning.
  - 4.5. Automatic demand reduction systems.
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 gray water catchment.
6. Operations and maintenance documents for equipment products and systems under or related to the provisions of this code for indoor environmental quality in accordance with Chapter 8, including, but not limited to, the following:
  - 6.1. Humidification/dehumidification.
  - 6.2. Green cleaning products, procedures and techniques.
  - 6.3. Recommended window cleaning schedule.
  - 6.4. Ventilation controls.
  - 6.5. Floor finishes.
  - 6.6. Fireplaces and combustion appliances.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good Practice

**ASHRAE 189.1 CORRELATION:**



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 10 – Existing Buildings

**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. Relocated existing buildings shall comply with Chapter 10. Existing building sites shall comply with Chapter 11.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** It is covered in FOREWORD on page #2

**1001.2 Building operation and maintenance.** *Previously commissioned buildings and parts thereof, shall be operated and maintained in conformance to the code edition applicable at the time of construction. The owner 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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

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

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1001.4 Existing materials, assemblies, configurations and systems.** *Materials, assemblies, configurations and systems already in use that conform to 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.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1002.1 General.** Additions to any site-built building or structure shall comply with the requirements of this code for new construction. Any addition to a modular building that is relocated within or into a jurisdiction that is in compliance with requirements or approvals in effect at the time of its construction shall comply with Section 1002 of this code.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 2.1.a.3

**1003.1 General.** Alterations to existing buildings and building systems shall be in accordance with the provisions of this code for those assemblies, systems and components being altered. Unaltered portions, components and systems of the building, including relocated modular buildings, shall be in accordance with the provisions of the code in force at the time of their construction. Alterations shall not be made to an existing building or structure that will cause the existing building or structure to be in violation of any provisions of this code.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 2.1.a.3

**1003.2 Requirements for alterations.** Alterations of portions or components of buildings shall comply with Sections 1003.2.1 through 1003.2.7. **Exceptions:** 1. The total cost of improvements required by Sections 1003.2.1 through 1003.2.7 shall not be required to exceed 10 percent of the costs of the alterations exclusive of land and building site improvements. 2. This section shall not require compliance that exceeds that required for systems regulated by Chapters 6 through 8 of this code. 3. Materials, assemblies and components regulated by Sections 1003.2.1 through 1003.2.7 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. Alterations are not required to comply with the requirements of Sections 1003.2.1 through 1003.2.7 where the code official determines the alterations to be infeasible based upon the existing configuration of spaces, unless those spaces or portions thereof will be reconfigured as part of the alteration project. 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. 6. Where the total cost of the alteration to the existing building is less than the percent of the value of the building as indicated in Table 1003.2, compliance with Section 1003.2 shall not be required. The percent value of the building shall be determined by the original construction cost plus completed improvement costs of the building.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**TABLE 1003.2  
MINIMUM VALUES FOR ADDITIONAL  
REQUIREMENTS TO ALTERATIONS**

BUILDING SIZE (square feet)	PERCENT OF BUILDING VALUE
Less than 5,000	20
5,000 – 50,000	10
50,001 – 500,000	1
over 500,000	0

For SI, 1 square foot = 0.0929 m<sup>2</sup>

**1003.2.1 Metering devices.** Dedicated individual utility or private metering devices that measure and verify energy and water use within the building or space shall be provided for at least one of the following: 1. Electrical energy consumption for individual tenant spaces. 2. Water consumption for individual tenant spaces. 3. Natural gas or fuel oil consumption for individual tenant spaces. 4. Lighting loads. 5. Motor and drive loads. 6. Chiller part-load efficiency. 7. Cooling loads. 8. Economizer and heat recovery loads. 9. Boiler efficiencies. 10. Building process systems and equipment loads. 11. Water consumption for landscape irrigation.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 2.1

**1003.2.2 Heating, ventilating and air-conditioning.** Heating, ventilating and air-conditioning systems and equipment shall be in accordance with the following: 1. Time clock and automatic time switch controls that can turn systems off and on according to building occupancy requirements shall be provided and connected to the following HVAC equipment: chillers and other space-cooling equipment, chilled water pumps, boilers and other space-heating devices, hot water pumps, heat exchanger circulation pumps, supply fans, return fans, and exhaust fans. Where occupant override is provided, it shall be designed with a timer to automatically revert to time clock and automatic time switch controls in not longer than 12 hours. **Exception:** A time clock or automatic time switch controls shall not be required for spaces where any of the following conditions exist: 1. A time clock is not required by Section C403.2.4.3 of the International Energy Conservation Code. 2. There is 24-hour occupancy materials with special atmospheric requirements dependent on 24-hour space conditioning. 3. A majority of the areas of the building served by the system are under setback thermostat control. 4. Manufacturer's specifications stipulate that the system must not be shut off. 2. Functional outside air economizers shall be provided on all cooling systems of more than 4 1/2 tons total cooling capability, 54,000 Btu/h, or more than 1800 cfm (9.144 m<sup>3</sup>/s @ m<sup>2</sup> air flow, provided manufacturer's guidelines are available for adding the economizer to the existing system. **Exception:** An outside air economizer shall not be required for buildings or special uses where 100 percent outside air for ventilation is required or where any of the following conditions exist: 1. Section C403.3.1 of the International Energy Conservation Code would not require an economizer. 2. The existing system has a water-based economizer. 3. The existing system does not have an outside air intake. 4. Special economizer operations such as, but not limited to, carefully controlled humidity would require more energy use than is conserved. 5. There is insufficient space to install necessary equipment. 6. Installation of an economizer would require major modifications to the building's life safety system. 7. The existing system is a multi-zone system where the same intake air is used at the same time for either heating or cooling in different parts of the building. 3. HVAC piping and ducts, including those located above suspended ceilings, shall comply with Sections 606.3 and 606.4. **Exception:** Additional insulation shall not be required for piping where any of the following conditions exist: 1. Additional insulation shall not be required for piping where any of the following conditions exist: 1.1. It is located within HVAC equipment; 1.2. It is located within conditioned space that conveys fluids between 60°F (15.6°C) and 105°F (40.6°C); 1.3. Piping that is already insulated and the insulation is in good condition; or 2. Where HVAC ducts and piping are installed in a building cavity or interstitial framing space of insufficient width to accommodate the duct or pipe and the insulation required by Section 606.3 and Table 606.4, the insulation thickness shall be permitted to have the maximum thickness that the wall can accommodate, but shall not be less than 1/2-inch (12.7 mm) thick. 4. Where central heat is intended to be replaced with individual electric space heaters, the application for the electrical permit shall include documentation demonstrating that the new electric heaters will not consume more energy than the existing nonelectric heaters. 5. Boiler systems shall have been cleaned and tuned within one year prior to the alteration. Boilers shall be equipped with an outdoor air lock-out thermostat or a temperature reset control. 6. Chillers shall be equipped with an outdoor air lock-out thermostat and chilled water reset control. 7. A maximum 5-year phase out plan shall be provided for buildings with existing systems that use CFC-based refrigerants. 8. Where mechanical and electrical systems and equipment are joined with microprocessors that communicate with each other or to a computer, a properly integrated building automation system shall be installed to optimize energy, operations, and indoor comfort. The building automation system shall: 8.1. Allow the owner to set up schedules of operation for the equipment and provide equipment optimal start with adaptive learning; 8.2. Provide trim and respond capabilities based on zone demand; 8.3. Offer the ability to monitor energy usage, including the ability to meter electric, gas, water, steam, hot water, chilled water, and fuel oil services; 8.4. Offer economizing based on enthalpy calculation and/or CO<sub>2</sub> set point control; 8.5. Offer load shedding when power companies are at peak demand and need; and 8.6. Offer the ability to send alarms to alert building owner, manager, or operator when problems occur due to system failures.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 2.1

**1003.2.3 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 comply with Section 607.6. The insulation shall not be required to extend beyond the building thermal envelope. 3. Circulating pump systems for hot water supply purposes other than comfort heating shall be controlled as specified in Section 607.7. 4. Showerhead, toilet, urinal and faucet flow rates shall be in accordance with this code.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 2.1

**1003.2.4 Lighting.** Lighting systems and equipment shall be in accordance with sections C405.2.2.3 and C405.2.4 of the International Energy Conservation Code.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 2.1

**1003.2.5 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 listed and labeled in accordance with ASTM F 1346, or a liquid pool cover feed system, for unoccupied hours. **Exception:** A cover shall not be required for indoor pools or spas in which water temperature is less than 80°F (26.7°C) during time of nonuse. 2. Backwash systems shall be based on pressure drop and shall not be based on a timer. 3. Pool and spa recirculation pumps shall be under timeclock control. **Exception:** Filtration pumps where the public health standard requires 24-hour pump operation. 4. Heaters shall have been cleaned and tuned for efficiency within one year prior to the alteration. Where this has not been done, the heaters shall be cleaned and tuned as part of the alteration work.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1003.2.6 Insulation of unconditioned attics.** In buildings with three or fewer stories above grade plane, ceiling insulation with a minimum R-value as required by this code shall be installed in accessible attic spaces that are directly above conditioned spaces. For the purposes of this section, accessible attic space is the space between ceiling joists and roof rafters where the vertical clear height from the top of a ceiling joist or the bottom chord of a truss, to the underside of the roof sheathing at the roof ridge, is greater than 24 inches (610 mm). Where the required R-value insulation cannot fit in the attic space, the maximum amount of insulation compatible with available space and existing uses shall be installed.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1003.2.7 Roof replacement insulation.** For roof replacement on an existing building with insulation entirely above the deck and where the roof slope is less than two units vertical in 12 units horizontal (16-percent slope), the insulation shall conform to the energy conservation requirements for insulation entirely above deck in the International Energy Conservation Code. **Exception:** Where the required R-value cannot be provided due to thickness limitations presented by existing rooftop conditions, including heating, ventilating and air-conditioning equipment, low door or glazing heights, parapet heights, proper roof flashing heights, the maximum thickness of insulation compatible with the available space and existing uses shall be installed.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**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 Sections 1001.3 and 1001.4 shall be required. **Exception:** Historic buildings in accordance with Section 1005 shall not be required to comply with Section 1004.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**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 such provisions would require a change in the visible configuration of building components in a manner that is not in keeping with the building's historic nature, as determined by the code official; or 2. Where compliance with such provisions would produce a conflict with a building function that is fundamental to the historic nature of the building.*

**PROPOSED ACTION:** Delete

**RATIONALE / IMPACT:** Regulated by Chapter 24A Montgomery County Code, Historic Resources Preservation

**2011 ASHRAE 189.1 CORRELATION:**

**1006.1 Deconstruction and demolition material and waste management plan.** *Where buildings, structures or portions thereof are deconstructed or demolished, a minimum of 50 percent of materials shall be diverted from landfills. A construction material and waste management plan shall be developed that is in accordance with Section 503.1, that includes procedures for deconstruction, and that documents the total materials in buildings, structures and portions thereof to be deconstructed or demolished and the materials to be diverted.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 9.3.1

#### **1007 JURISDICTIONAL REQUIREMENTS**

**1007.1 General.** *Sections 1007.2 and 1007.3 shall be mandatory and enforced only where specifically indicated by the jurisdiction in Table 302.1.*

**1007.2 Evaluation and certification of existing buildings and building sites.** *Where a permit application is accepted by a jurisdiction for the evaluation of an existing building and building site in accordance with the requirements of this code as applicable to a new project, and this code does not otherwise require compliance, evaluation shall be in accordance with the requirements of this section.*

**1007.2.1 Certificate of compliance.** *Where compliance with the requirements of this code as applicable to a new building is verified by the code official for an existing building and building site, a certificate shall be issued indicating compliance to this code, as modified by the limitations contained in Sections 1007.2.2 through 1007.2.3.2.*

**1007.2.2 Specific exclusions.** *Where evidence of compliance is not available, existing buildings evaluated under Section 1007.2 shall not be subject to the requirements of Section 806. Provisions of this code related to the project's construction phase, including Sections 401.2, 406.1, 406.2, 502, 503.1 and 803.1, those portions of Section 405 related to the construction phase, and other sections as approved by the code official, shall not be required for buildings evaluated under Section 1007.2. Where buildings do not comply with the aforementioned sections, the certification shall specifically list the sections for which compliance has not been required or verified.*

**1007.2.3 Existing concealed construction.** *Existing concealed construction in buildings regulated by Section 1007.2 shall be in accordance with Sections 1007.2.3.1 and 1007.2.3.2.*

**1007.2.3.1 Previously approved documents.** *Previously approved construction documents for the initial construction of an existing building and, where possible, description of changing uses and major upgrades over the building's lifetime for which a certificate of occupancy was previously issued shall be deemed an acceptable indication of materials, assemblies and equipment in concealed spaces, except where field inspection reveals sufficient evidence suggesting non-compliance, subject to the evaluation of the code official.*

**1007.2.3.2 Previously approved documents not available.** *Where previously approved construction documents for the initial construction of an existing project are not available, materials, assemblies and equipment in spaces in existing buildings and existing portions thereof that are concealed, including, but not limited to, materials in spaces within walls and floor/ceiling assemblies, shall be exposed and spot checked in limited areas as determined by the code official.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice, however may be somewhat confusing

**2011 ASHRAE 189.1 CORRELATION:** None

**1007.3 Post certificate of occupancy zEPI, energy demand, and CO 2 e emissions reporting.** Where the jurisdiction indicates in Table 302.1 that ongoing post certificate of occupancy zEPI, energy demand and CO 2 e emissions reporting is required, and where the jurisdiction has indicated in Table 302.1 that enhanced energy performance in accordance with Section 302.1 or CO 2 e emissions in accordance with Section 602.2 are required. zEPI, energy demand, and CO 2 e emissions reporting shall be provided in accordance with this section.

**1007.3.1 Purpose.** The purpose of this section is to provide for the uniform reporting and display of the total annual net energy use, peak demand for each energy form and emissions associated with building operations and building sites.

**1007.3.2 Intent.** The intent of these requirements is to provide for the ongoing reporting and display of the total annual net energy use, peak energy demand and emissions associated with operation of the building and its systems to document ongoing compliance with the provisions of Sections 601 and 602.

**1007.3.3 Reporting.** Reports in accordance with Sections 1007.3.3.1 through 1007.3.3.3 shall be generated.

**1007.3.3.1 Annual net energy use.** The zEPI associated with the operation of the building and the buildings on the site, as determined in accordance with Section 602.1, shall be reported by the building owner or the owner's registered agent to the [INSERT NAME OF APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY RESPONSIBLE FOR COLLECTING REPORTED INFORMATION]. Where there are multiple buildings on a building site, each building shall have its zEPI reported separately. Where there are energy uses associated with the building site other than the buildings on the site, the zEPI for the building site shall be reported separately. Energy use for the previous year shall cover the complete calendar year and be reported on, or before, March 1st of the following year.

**1007.3.3.2 Peak monthly energy demand reporting.** The peak demand of all energy forms serving each building and the building site shall be reported by the building owner or the owner's registered agent to the [INSERT NAME OF APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY RESPONSIBLE FOR COLLECTING REPORTED INFORMATION]. Where there are multiple buildings on a building site, each building shall have its energy demand reported separately. Where there are energy uses associated with the building site other than the buildings on the site, the energy demand for the building site shall be reported separately. Monthly energy demand data for the previous year shall cover the complete calendar year and be reported on, or before, March 1st of the following year.

**1007.3.3.3 Annual CO 2 e emissions reporting.** The annual emissions associated with the operation of the building and its systems, as determined in accordance with Section 602.2, shall be reported by the building owner or the owner's registered agent to the [INSERT NAME OF APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY RESPONSIBLE FOR COLLECTING REPORTED INFORMATION]. Where there are multiple buildings on a building site, each building shall have its annual emissions reported separately. Where there are energy uses associated with the building site other than the buildings on the site, the annual CO 2 e emissions for the building site shall be reported separately. Emissions reported for the previous year shall cover the complete calendar year and be reported on, or before, March 1st of the following year.

**PROPOSED ACTION:** Move to Appendix A - Adopt as written however note that 1007.3.3 requires DPS to identify government agency to collect reported information

**RATIONALE / IMPACT:** Good practice. May be impractical to implement for all projects

**2011 ASHRAE 189.1 CORRELATION:** 10.3.2.1.3.2



# 2012 IgCC RECOMMENDATION

Regarding:	2012 International Green Construction Code (IgCC) and 2011 ASHRAE 189.1	Date:	August 2, 2013
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## Chapter 11 – Existing Building Site Development

**1101.1 Scope.** *The provisions of this chapter shall control the alteration, repair, maintenance and operation of existing building sites and the alteration to building site improvements. Chapter 11 applies where building site improvements are being made, or where additions are made to, or changes of occupancy occur within, the existing buildings on the site.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** No action required

**2011 ASHRAE 189.1 CORRELATION:** None

**1101.2 Operation and maintenance.** *Building sites shall be operated and maintained in conformance to the code edition under which the site improvements were installed. The owner or the owner's designated agent shall be responsible for the operation and maintenance of building sites. To determine compliance with this section, the code official shall have the authority to require a building site to be reinspected. The requirements of this chapter shall not provide the basis for removal or abrogation of protections or systems from existing building sites.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1101.3 Compliance.** *Alterations and repairs to building sites shall comply with the provisions of this code unless provided otherwise in this chapter. Where differences occur between the provisions of this code and the provisions of other locally adopted land use, zoning or site development regulations, the provisions of the most restrictive code or regulation shall apply.*

**1101.4 Building site materials, systems and landscaping.** *Building materials used for building site development shall comply with the requirements of this section.*

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1104.4.1 Existing materials, assemblies, configurations and systems.** *Materials and systems already in use on a building site in compliance with the requirements or approvals in effect at the time of their installation shall be permitted to remain in use unless determined by the code official to be dangerous to the environment, 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. Existing buildings and site improvements located within or located closer to protected areas than permitted by Section 402.1 but that are in compliance with the requirements or approvals in effect at the time of their installation shall be permitted to remain in use unless determined by the code official to be dangerous to the environment, life, health and safety of the community and the occupants of the building site. Where such conditions are determined to be dangerous to the environment, life, health or safety, they shall be mitigated or made safe.*

**PROPOSED ACTION:** Adopt with following modification: Revise ~~1104.4.4~~ to read 1101.4.1

**RATIONALE / IMPACT:** Correct typo

**2011 ASHRAE 189.1 CORRELATION:** None

**1101.4.2 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 no hazard to the environment, life, health or property is created. Hazardous materials shall not be used where the code for new construction would not permit their use at building sites of similar occupancy, purpose and location.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1102.1 General.** Additions to any building site improvements shall comply with the requirements of this code for new construction. Unaltered portions of a building site shall be in accordance with the provisions of the code in force at the time of their construction. Where additions to a building, or additions to building site improvements result in the alteration of existing portions or improvements of the building site, those alterations shall comply with this section and Section 1103. Additions to an existing building site shall be made to ensure the following: 1. Existing building site improvements together with the additional or expanded improvements are not less conforming to the provisions of this code than the existing building site was prior to the addition; and 2. Where additions to any building reduces, or requires alteration to, building site improvements, the alterations to the building site together with unaltered site improvements shall not be less conforming to the provisions of this code prior to the addition to the building or structure.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1103.1 General.** Alterations to existing portions or site improvements on building sites shall be in accordance with the provisions of this code for those portions or building site improvements being altered. Unaltered portions and site improvements of the building site shall be in accordance with the provisions of the code in force at the time of their construction. Alterations shall be such that the existing building site is no less conforming to the provisions of this code than the existing building site was prior to the alteration. Unaltered portions and site improvements of a building site shall be in accordance with the provisions of the code in force at the time of their construction or preservation. **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.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** None

**1103.2 Changes to hardscapes and surface vehicle parking.** Where existing hardscapes are altered, the alterations shall comply with the provisions of this code. **Exceptions:** 1. Existing hardscapes and vegetation are permitted to be replaced with materials shown in previously approved construction documents. 2. Where existing vehicle surface parking lots are altered without changing parking space configuration or increasing the number of parking spaces, the altered parking lot shall not be required to comply with Section 407.4.

**PROPOSED ACTION:** Adopt as written,

**RATIONALE / IMPACT:** May be in conflict with MDE and DPS (storm water management) regulations

**2011 ASHRAE 189.1 CORRELATION:** 5.4.1.1

**1104.1 Conformance.** Where a change in the use or occupancy of a building or tenant space places it in a different division of the same group or occupancy or in a different group of occupancies, as determined in accordance with the provisions of the International Building Code, compliance with Section 1104.2 shall be required. Altered portions of, and additions to, existing buildings and existing building sites that are not a result of change of occupancy requirements, shall comply with Chapter 10 and this chapter.

**1104.2 Building site improvements.** Where a change in occupancy results in an increase in the occupant load of the building, bicycle parking shall comply with the following: 1. Short-term bicycle parking spaces shall be provided in accordance with Section 407.3 equivalent to a new building of the new occupancy. 2. Where the existing building and building site have parking for motorized vehicles, long-term bicycle parking shall be provided in accordance with Section 407.3 equivalent to a new building of the new occupancy. Where the existing building does not contain covered parking spaces for vehicles, only 25 percent of the long-term bicycle parking needs to be covered.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Good practice

**2011 ASHRAE 189.1 CORRELATION:** 5.4.1.1;

**1105.1 Historic building sites.** The provisions of this code relating to the construction, repair, alteration, addition and restoration of building sites and site improvements, where each individual provision is evaluated separately on its own merit, shall not be mandatory for historic building sites for any of the following conditions: 1. Where implementation of that provision would change the visible configuration of building site improvements in a manner that is not in keeping with the building site's historic nature, as determined by the code official, in consultation with the authority having jurisdiction over historic buildings or sites; 2. Where compliance with that provision would produce a conflict with a building site function that is fundamental to the historic nature of the building site, as determined by the code official, in consultation with the authority having jurisdiction over historic buildings or sites; or 3. Where such building sites are judged by the code official in consultation with the authority having jurisdiction over historic buildings or sites to not constitute a distinct environmental hazard.

**PROPOSED ACTION:** Adopt as written

**RATIONALE / IMPACT:** Current practice

**2011 ASHRAE 189.1 CORRELATION:** None