

2021 International Green Construction Code®

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PREFACE

Introduction

Internationally, code officials and designers recognize the need for a modern, up-to-date code governing the impact of buildings and structures on the environment. This code is designed to meet this need through model code regulations that contain clear and specific requirements with provisions that promote safe and sustainable construction in an integrated fashion with the ICC Family of Codes. This 2021 *International Green Construction Code*® (IgCC®) is the second fully integrated edition of the IgCC to be developed cooperatively by the ICC and ASHRAE.

This comprehensive green code establishes minimum regulations for building systems and site considerations using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and new mechanical designs. This 2021 edition is intended to be compatible with all of the International Codes® (I-Codes®) published by the International Code Council® (ICC®), including the *International Building Code*® (IBC®), *International Energy Conservation Code*® (IECC®), *International Existing Building Code*® (IEBC®), *International Fire Code*® (IFC®), *International Fuel Gas Code*® (IFGC®), *International Mechanical Code*® (IMC®), *International Code Council Performance Code*® (ICCPC®), *International Plumbing Code*® (IPC®), *International Private Sewage Disposal Code*® (IPSDC®), *International Property Maintenance Code*® (IPMC®), *International Residential Code*® (IRC®), *International Swimming Pool and Spa Code*® (ISPSA®), *International Wildland-Urban Interface Code*® (IWUIC®) and *International Zoning Code*® (IZC®).

This code has been developed in collaboration with the following Cooperating Sponsors: The American Institute of Architects (AIA), ASHRAE, the US Green Building Council (USGBC) and the Illuminating Engineering Society (IES). The ICC wishes to thank these Cooperating Sponsors for recognizing the need for the development of a comprehensive set of green regulations that are enforceable, usable and adoptable.

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

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

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

This code is founded on principles intended to establish provisions consistent with the scope of a green construction code that adequately protects the public health, safety and welfare; provi-

sions that do not unnecessarily increase construction costs; provisions that do not restrict the use of new materials, products, or methods of construction; and provisions that do not give preferential treatment to particular types or classes of materials, products or methods of construction. This is achieved by comprehensive provisions that are enforceable, usable and adoptable.

Development

The 2021 *International Green Construction Code* is the fourth edition of the IgCC. In 2015, the ICC and ASHRAE partnered in the development of the 2018 IgCC, sponsored by AIA, ASHRAE, ICC, IES and USGBC. The previous two editions (2012 and 2015) were developed utilizing the ICC's Code Development Process as part of the ICC Family of Codes.

As part of the partnership with ASHRAE, the responsibility for code provisions is now split between the ICC and ASHRAE processes. The ICC is responsible for Chapter 1, Scope and Administration. The ICC coordinated the technical provisions developed by ASHRAE with the provisions in Chapter 1 of the 2018 IgCC. The remainder of the code is the technical content that is based on the provisions of the 2020 edition of ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, developed using the American National Standards Institute (ANSI)-approved ASHRAE consensus process. The Standing Standards Project Committee 189.1 (SSPC) serves as the consensus body that developed the standard.

USER NOTE: The code is formatted utilizing the ICC's code format for chapter and section number designations. However, in order to provide the requisite road map to the technical provisions of Standard 189.1, the Standard 189.1 section number is included in parentheses following the IgCC section number; for example, Section 101.2 (2.3). The IgCC section number is "101.2" and the corresponding section number in Standard 189.1 is "2.3." In this instance, Section 101.2 was further modified in the ICC process to include the new first sentence, which is not in Section 2.3 of Standard 189.1.

Scope and Administration (ICC—Chapter 1)

As noted previously, the provisions in Chapter 1 are primarily based on Chapter 1 of the 2018 IgCC, with further changes approved by the ICC Code Development Process through 2019.

Technical Content (ASHRAE—Chapters 2–11 and appendices)

The technical content of the code contains the provisions from the 2020 edition of Standard 189.1, which was originally published in 2009 through a collaborative effort involving ASHRAE, IES, and USGBC. In 2015, the ICC was added as an additional cosponsor of the standard, which reflected a Memorandum of Understanding signed in 2014 by ASHRAE, AIA, ICC, IES, and USGBC to better align green building goals through Standard 189.1, the IgCC, and the LEED certification system. As part of that agreement, the 2017 edition of Standard 189.1 served as the technical content of 2018 IgCC. Prior to this agreement, the 2012 and the 2015 versions of the IgCC included Standard 189.1 as a project compliance option.

Building projects, which are defined in Standard 189.1 (and now in the IgCC), including both the building and the site, result in significant energy and environmental impacts through their design, construction and operation. The US Green Building Council reports that buildings in the United States produce 40 percent of US carbon dioxide emissions, are responsible for 41 percent of US energy consumption, account for 14 percent of US potable water consumption, and use 40 percent of raw materials in their construction and operation. In addition, building development frequently converts land from biologically diverse natural habitat that helps manage rainwater to impervious hardscape with reduced biodiversity. While buildings consume energy and have other environmental impacts, they exist primarily to serve occupants who live, work and otherwise use buildings, providing significant contributions to national economies. Based on a combination of research and practical experience, it is clear that buildings can provide these services with reduced energy use, greenhouse gas emissions, water use, construction waste, heat island and light pollution effects, and impacts on the atmosphere and other resources. A 2015 Economic Impact Study by USGBC finds that the US green building industry supports over 2 million jobs annually and results in a median state average economic contribution of \$934 million.

The far-reaching influence of buildings, and the benefits provided by high-performance green buildings, have led many organizations to pursue efforts to reduce their energy and environmental impacts. Based on ASHRAE's and the other cosponsors' ongoing responsibilities to support such actions, Standing Standard Project Committee (SSPC) 189.1 has contributed to building sustainability goals by updating Standard 189.1 in response to input from the building community, the public at large and project committee members. Compliance with this code will further reduce energy and environmental impacts through high-performance building design, construction and operation while providing indoor environments that support the activities, health and comfort of building occupants and contribute positively to local economics by providing high-quality jobs and conserving natural resources.

The project committee considers a variety of factors in developing the provisions of Standard 189.1, including published research, justification for proposals received from outside the committee and ultimately the committee members' professional judgment. Cost-benefit assessment, while an important consideration, is not a necessary criterion for inclusion of any given requirement in Standard 189.1. However, the practicality and existing application of any new requirements are considered before they are included. Standard 189.1, and now the IgCC, address site sustainability, water-use efficiency, energy-use efficiency, indoor environmental quality, materials and resources, and construction and plans for operation. The 2020 edition of Standard 189.1 reflects the approval of 70 separate addenda to the 2017 edition. Some highlights among these changes include the following:

- **Compliance.** Buildings that are within the scope of, and that comply with, ASHRAE/ASHE Standard 189.3, *Design, Construction, and Operation of Sustainable High-Performance Health Care Facilities*, are now in compliance with Standard 189.1.
- **General.** A new table of jurisdictional options has been added to indicate sections of the standard that may warrant particular attention as jurisdictions consider adoption of the IgCC. In general, the provisions listed in the table (and marked with [JO] in the body of the standard) are provisions that result in higher-performing buildings, while the other requirements are considered essential for a high-performing green building. Different criteria were used in assigning JO status, but in all cases the jurisdictional options have been identified for the benefit of jurisdictions adopting the IgCC. A new informative Appendix L also provides a list of requirements that align with LEED prerequisites or are aligned with LEED credits that are attained by a large percentage of projects.
- **Site.** Requirements for outdoor lighting were updated. Requirements for electric vehicle charging infrastructure were revised and clarified. Cool-roof requirements were extended to buildings in Climate Zones 4A and 4B.
- **Water.** Requirements were added to ensure proper pipe sizing in hot-water distribution systems. Requirements for cooling towers were updated and relocated to the mandatory portion of Section 6.
- **Energy.**
 - Lighting tables were updated with improved efficiencies, equipment efficiency tables were updated, and envelope requirements were revised. These changes reflect similar updates in ANSI/ASHRAE/IES Standard 90.1—2019.
 - SHGC multiplier and duct insulation requirements were reverted to those in Standard 90.1.
 - Dwelling unit lighting efficacy requirements were increased, and new requirements were added for dwelling unit lighting controls.
 - Fan efficiency and pump efficiency requirements were revised to use the Fan Efficiency Index (FEI) and Pump Efficiency Index (PEI), respectively.
 - Renewable energy requirements were upgraded such that the combination of on-site and off-site renewable energy must meet approximately half of expected building energy use. A new mandatory on-site PV system requirement was created for qualifying portions of the building roof area.
 - The Alternate Renewables Approach was limited to buildings with less than 25,000 square feet (2300 m²).
 - Requirements for fault detection and diagnostics were added, as were efficiency requirements for traction elevators with a rise height of 75 feet (23 m) or more.
 - Requirements were updated for occupancy-sensor-based controls in hotel/motel guestrooms.

- Clarifications were made to better specify where requirements of Sections 7 and 7.5 supersede related requirements in Standard 90.1.
 - A new section adds requirements for high-capacity service water heating systems. A new section on low-power ventilating systems aligns requirements for exhaust fans used in multifamily and small commercial buildings with those in the IECC.
 - New criteria were added for compliance with the performance energy path, including a Zero Energy Performance Index (zEPI) requirement, additional renewable energy requirements, and updated values for determining energy performance: BPF, source energy, and CO₂e emissions factors, the latter two of which are based on eGRID subregion location.
 - A new requirement to perform modeling in compliance with ASHRAE Standard 209 was also added to the performance path.
 - A new informative appendix was included to guide performance path users through the process used to develop source energy and CO₂e emission factors so that local jurisdictions can calculate energy performance factors based on their local data.
- **IEQ.** Requirements related to composite wood materials and the use of paints and coatings were further developed to limit VOC and formaldehyde emissions into the space. Pre-occupancy ventilation control requirements were clarified, and new requirements were added to prevent ozone emissions from air cleaning devices. The lighting quality section was updated to include requirements for dimming controls, color rendition and flicker. A requirement was also added that views to the outside be provided from certain space types.
 - **Materials and resources.** A clarification was added that the total waste provisions apply to new construction, and the threshold value was increased. Refrigerant requirements were removed in light of regulations developed by others.
 - **Construction and plans for operation.** Section 10 was reorganized to better group related topics and to clarify that this section does not distinguish between prescriptive and performance path requirements. Section 10 also received updates to align operating requirements with ASHRAE Standard 62.1—2019.

Maintenance

The maintenance responsibilities for updating the IgCC are shared between the ICC and ASHRAE as follows:

Scope and Administration (Chapter 1: ICC process)

Chapter 1 of the IgCC will be kept up to date through the review of proposed changes submitted by code enforcement officials, industry representatives, design professionals and other interested parties. Proposed changes are carefully considered through an open code development process in which all interested and affected parties may participate.

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

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

The contents of this work are subject to change through the code development cycles and by any governmental entity that enacts the code into law. For more information regarding the code development process, contact the Codes and Standards Development Department of the ICC. The next opportunity to propose changes to Chapter 1 of the IgCC will be the ICC's 2022 Group B Code Development Process. For more information, go to the ICC's website at iccsafe.org.

Technical Content (Chapters 2–11 and appendices: ASHRAE process)

The technical content of this code is based on Standard 189.1. SSPC 189.1 considers and administers changes to Standard 189.1 as a continuous maintenance standard and provides interpretations as requested. Proposed changes to the standard may originate within or outside of the committee. The committee welcomes proposals for improving the standard using the ANSI-approved ASHRAE continuous maintenance procedure. A continuous maintenance proposal (CMP) form can be found online at osr.ashrae.org, and may be completed and submitted at any time. The committee takes formal action on every proposal received, which may lead to changes to the published standard. ASHRAE posts approved addenda in publication notices on the ASHRAE website. To receive notice of all public reviews, approved and published addenda, errata, and interpretations as well as meeting notices, ASHRAE encourages interested parties to sign up for the free ASHRAE Internet Listserv for Standard 189.1. (<https://www.ashrae.org/technical-resources/standards-and-guidelines/project-committee-list-servers>).

Coordination of the International Codes

The coordination of technical provisions is one of the strengths of the ICC family of model codes. The codes can be used as a complete set of complementary documents, which will provide users with full integration and coordination of provisions. Individual codes can also be used in subsets or as stand-alone documents.

Italicized Terms

Terms italicized in code text, other than document titles, are defined in Chapter 3. The terms selected to be italicized have definitions that the user should read carefully to better understand the code. Where italicized, the Chapter 3 definition applies. If not italicized, common-use definitions apply.

Adoption

All copyright in this code belongs to the ICC and ASHRAE jointly. Maintaining copyright allows the ICC and ASHRAE to fund their respective missions through sales of books, in both print and electronic formats. The ICC welcomes adoption of its codes by jurisdictions that recognize and acknowledge the ICC's copyright in the code, and further acknowledge the substantial shared value of the public/private partnership for code development between jurisdictions and the ICC.

The ICC also recognizes the need for jurisdictions to make laws available to the public. All I-Codes and I-Standards, along with the laws of many jurisdictions, are available for free in a non-downloadable format on the ICC's website. Jurisdictions should contact the ICC at adoptions@iccsafe.org to learn how to adopt and distribute laws based on the IgCC in a manner that provides necessary access, while maintaining the ICC's copyright.

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

Section 101.1. Insert: [NAME OF JURISDICTION]

Section 103.1. Insert: [NAME OF DEPARTMENT]

Be sure to review the discussion of Chapter 1 under "Effective Use of the *International Green Construction Code*" for important information on "jurisdictional options [JO]."

Effective Use of the International Green Construction Code

Informative Note: Corresponding ASHRAE 189.1 section numbers have not been included in this Effective Use section but have been included throughout the chapters and appendices of this code.

The IgCC is a model code that provides minimum requirements to safeguard the environment, public health, safety and general welfare through the establishment of requirements that are intended to reduce the negative impacts and increase the positive impacts of the built environment on the natural environment and building occupants. The IgCC is fully compatible with the ICC family of codes, including the IBC, the ICCPC, the IECC, the IEBC, the IFC, the IFGC, the IMC, the IPC, the IPSDC, the IPMC, the IRC, the SPSC, the IWUIC, and the IZC.

The IgCC addresses the design, construction, addition, alteration, equipment, change of occupancy, relocation, replacement, demolition and removal of every building or structure or any appurtenances connected or attached to such buildings or structures and to the building site on which the building is located. Occupancy classifications shall be determined in accordance with the IBC. The code will be promulgated on a 3-year cycle to allow for new construction methods and technologies to be incorporated into the code. Innovative approaches and alternative materials, designs, and methods not specifically addressed in this code can be approved by the code official where the proposed innovative approaches or materials, designs or methods comply with the intent of the provisions of the code (see Section 105.4).

The IgCC applies to all occupancies other than single-family dwellings and multiple-family dwellings that are three stories or less in height (see Section 101.3.1). See the following discussion for additional information in Appendix M for residential construction.

Informative Note: [JO] after a section number (e.g., Section 501.3.5.2 (5.3.5.2) [JO] Walls) indicates that this requirement is a jurisdictional option. See further discussion regarding Chapter 1 in Arrangement and Format of the 2021 IgCC.

ARRANGEMENT AND FORMAT OF THE 2021 IgCC

Before applying the requirements of the IgCC, it is beneficial to understand its arrangement and format. The following table shows how the IgCC is divided. The ensuing chapter-by-chapter synopsis details the scope and intent of the provisions of the IgCC.

CHAPTER TOPICS

Chapter	Subjects
1	Scope and administration
2	Reserved
3	Definitions, abbreviations and acronyms
4	Reserved
5	Site sustainability
6	Water use efficiency
7	Energy efficiency
8	Indoor environmental quality (IEQ)
9	Materials and resources
10	Construction and plans for operation
11	Normative references
Normative Appendix A	Prescriptive building envelope tables
Normative Appendix B	Prescriptive equipment efficiency tables for the alternate reduced renewables and increased equipment efficiency approach in Section 701.4.1.1 (7.4.1.1)
Normative Appendix C	Performance option for energy efficiency
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Informative Appendix I	zEPI Conversion Methodology
Informative Appendix J	Derivation of source energy conservation factors and CO ₂ e emission factors
Informative Appendix K	Additional guidance for functional and performance testing (FPT) and the commissioning (Cx) process
Informative Appendix L	Requirements that overlap with core elements of the LEED rating system
Informative Appendix M	Option for residential compliance using the <i>National Green Building Standard</i>
Informative Appendix N	Addenda description information
Annex 1	Referenced standard reproduction annex—ASHRAE Standard 169

Chapter 1 Scope and Administration

Chapter 1 of the IgCC establishes the limits of applicability of the code and describes the manner in which the code is to be applied and enforced. Chapter 1 is divided into two parts: Part 1—Scope and Application (Sections 101 and 102) and Part 2—Administration and Enforcement (Sections 103–111).

Section 101 identifies which buildings and structures come under its purview and Section 102 references other adopted I-Codes, as applicable, and the application of referenced standards. Section 104 establishes the duties and powers of the code official, including enforcement and the authority granted to the code official to make inspections. Section 105 provides guidance to the code official in the approval of materials, methods of construction, designs, systems and innovative approaches where they are not specifically prescribed in the IgCC. Section 106 identifies the permitting process.

The provisions of Chapter 1 also establish the rights and privileges of the design professional, contractor and property owner.

The IgCC is intended to be adopted as a legally enforceable document and it cannot be effective without adequate provisions for its administration and enforcement.

New adoption considerations in Chapter 1, Section 101.5.1: For the 2020 version of ASHRAE Standard 189.1, the project committee identified “jurisdictional options” for the authority having jurisdiction (AHJ) to review as part of their adoption considerations. The intent is to allow the AHJ to “customize” their code based on the unique needs of the jurisdiction, thus providing more flexibility in the use and application of the code. In Section 101.5.1, the AHJ will find the specific directions for use in developing their code adoption ordinance.

Chapter 2 Reserved

Chapter 3 Definitions, Abbreviations and Acronyms

Codes are technical documents and every word, term and punctuation mark can impact the meaning of the code text and the intended results. The code often uses terms that have a unique meaning in the code and that code meaning can differ substantially from the ordinarily understood meaning of the term as used outside of the code. Where a definition is provided for understanding a particular code provision, the term is shown in italics wherever it appears in the code. The generally understood meaning of a term or phrase might not be sufficient or consistent with the meaning prescribed by the code; therefore, it is essential that the code-defined meaning be known.

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

Chapter 4 Reserved

Chapter 5 Site Sustainability

Chapter 5 contains requirements related to the selection and development of sites and the mitigation of heat island effect, light pollution and transportation impact.

Section 501.3 limits the type of sites that can be built on and the type of development that can occur.

Section 501.3.1.2 limits building development relative to elevation of the 100-year flood, near fish and wildlife habitat conservation areas and near wetlands.

Section 501.3.2 requires predesign site inventory and assessment.

Section 501.3.3 regulates plantings on the site.

Section 501.3.4 contains requirements for stormwater management systems.

Section 501.3.5 requires the mitigation of heat island effect.

Section 501.3.6 addresses light pollution.

Section 501.3.7 addresses transportation impacts.

Section 501.3.8.1 addresses building site waste management.

Chapter 6 Water Use Efficiency

Chapter 6 provides requirements that are intended to conserve potable and nonpotable water.

Section 601.3.1 reduces water use on sites by means of requirements related to landscape design and irrigation system design.

Section 601.3.2 regulates water consumption through limitations of fixture and fitting flow rates and by means of requirements related to specific equipment, appliances, and HVAC systems and equipment.

Section 601.3.3 regulates water use in hot water distribution pipes.

Section 601.3.4 regulates water use in ornamental fountains and water features.

Section 601.3.5 regulates water consumption management.

Sections 601.3.6, 601.3.7 and 601.3.8 regulate water softeners, reverse osmosis water treatment systems and on-site reclaimed water treatment systems, respectively.

Where a reclaimed water supply is available or is planned to be available within 5 years, Section 601.3.9 requires the installation of a dual water supply plumbing system wherein reclaimed water is supplied to urinals and water closets.

Chapter 7 Energy Efficiency

Chapter 7 contains requirements related to the effective use of energy in buildings and appliances and to on-site renewable energy systems. Chapter 7 references ANSI/ASHRAE/IES Standard 90.1 and contains many provisions that exceed those in Standard 90.1. It should also be noted that Appendix H is an alternative prescriptive energy compliance path that is built on the prescriptive provisions of the IECC as the baseline for Chapter 7.

Section 701.2 requires that building projects comply with the mandatory provisions of Section 701.3 and either the prescriptive provisions of Section 701.4 or the performance provisions of Section 701.5.

Section 701.3 contains mandatory provisions that are applicable to both the prescriptive and performance compliance paths. It includes provisions related to air barriers, on-site renewable energy systems, energy consumption management and automated demand response systems.

Section 701.4 contains the prescriptive-based energy compliance path. It includes provisions related to renewable energy systems, the building envelope, HVAC systems, service water heating, power, lighting and various other equipment.

Section 701.5 contains the performance-based energy compliance path. It is based on an annual energy cost concept that builds on Normative Appendix G of ANSI/ASHRAE/IES Standard 90.1. Compliance with Normative Appendix C of this code is also required for on-site renewable energy systems in the proposed design. Section 701.5.2 sets maximum annual carbon dioxide equivalent requirements.

Chapter 8 Indoor Environmental Quality (IEQ)

Chapter 8 is intended to ensure that the building's interior environment is conducive to the health of building occupants.

Section 801.2 requires compliance with the mandatory provisions of Section 801.3 and either the prescriptive-based provisions of Section 801.4 or the performance-based provisions of Section 801.5.

Section 801.3 contains mandatory provisions related to indoor air quality, thermal environmental conditions, acoustical control, soil gas control, lighting quality, moisture control and glare control.

Section 801.4 contains prescriptive-based provisions related to indoor environmental quality. It includes requirements for daylighting, material volatile organic compound emissions, and contents and lighting for presentations.

Section 801.5 contains performance-based provisions related to indoor environmental quality. It includes requirements for daylight simulation, material VOC emissions and lighting for presentations.

Chapter 9 Materials and Resources

Chapter 9 addresses the human health and environmental impacts of materials.

Section 901.2 requires that buildings comply with the mandatory provisions of Section 901.3 and either the prescriptive-based provisions of Section 901.4 or the performance-based provisions of Section 901.5.

Section 901.3 contains mandatory provisions related to the human health and environmental impacts of materials. It includes requirements for construction waste management; the extracting, harvesting and manufacturing of materials; refrigerants; the storage and collection of recyclables and discarded goods; and the mercury content levels of lamps.

Section 901.4 contains prescriptive-based requirements related to the human health and environmental impacts of materials. It includes provisions for recycled and salvaged material content, regional materials, biobased products and multiple-attribute product declaration/certification.

Section 901.5 contains performance-based requirements related to the health and environmental impacts of materials. It includes provisions for life-cycle assessment that address performance metrics, procedures and reporting.

Chapter 10 Construction and Plans for Operation

Chapter 10 addresses building commissioning and functional and performance testing during construction and requires plans for the subsequent operation and maintenance of building projects.

Section 1001.3 regulates the functional and performance testing of building systems.

Section 1001.3.2 regulates the building commissioning process.

Section 1001.4 regulates construction operations and start-up requirements.

Section 1001.5 regulates acoustical field measurements.

Section 1001.6 regulates building envelope airtightness.

Section 1001.7 addresses postconstruction building flush-out and air monitoring.

Section 1001.8 regulates soil-gas controls.

Section 1001.9 requires plans for building project operation. These plans are intended to help and encourage building owners and facility management staff to operate and maintain building projects in a manner, and at a performance level, as was originally intended by this code.

Section 1001.10 requires that a service life plan be developed for the building project.

Section 1001.11 requires that a transportation management plan be developed.

Chapter 11 Normative References

The code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 11 contains a comprehensive list of all standards that are referenced in the code. The standards are part of the code to the extent of the reference to the standard (see Section 102.4.2). Compliance with the referenced standard is necessary for compliance with this code. By providing specifically adopted standards, the construction and installation requirements necessary for compliance with the code can be readily determined. The basis for code compliance is, therefore, established and available on an equal basis to the code official, contractor, designer and owner.

Chapter 11 is organized in a manner that makes it easy to locate specific standards. It lists all of the referenced standards, alphabetically, by acronym of the promulgating agency of the standard. Each agency's standards are then listed in either alphabetical or numeric order based on the standard identification. The list also contains the title of the standard, the edition (date) of the standard referenced, any addenda included as part of the ICC adoption of the IgCC, and the section or sections of this code that reference the standard.

Appendices

User note: Appendices in this edition of the IgCC are treated differently than the appendices in the other I-Codes (see Sections 101.5.2 and 101.5.3).

In the IgCC, the technical content is based on Standard 189.1, including the appendices. These appendices are identified in two categories:

- Normative appendices. As noted in Section 101.5.2, where a normative appendix is referenced in the code, it is considered part of the mandatory provisions of the code.
- Informative appendices. As noted in Section 101.5.3, these appendices provide additional information but are not mandatory provisions and therefore are not part of the code.

Normative Appendix A Prescriptive Building Envelope Tables

This appendix is referenced in Section 701.4.2.2. This appendix includes minimum roof insulation values.

Normative Appendix B Prescriptive Equipment Efficiency Tables for the Alternate Reduced Renewables and Increased Equipment Efficiency Approach in Section 701.4.1.1 (7.4.1.1)

This appendix is referenced in Sections 701.4.1.1, 701.4.3.1, 701.4.4.1, 701.4.7.1 and 701.4.7.3.2. This appendix provides mandatory equipment efficiency information for the different types of mechanical equipment utilized for heating and cooling.

Normative Appendix C Performance Option for Energy Efficiency

This appendix is referenced in Section 701.5. This appendix provides a mandatory reference to ANSI/ASHRAE/IES Standard 90.1 for modeling requirements for on-site renewable energy systems and the required information to perform building performance calculations.

Normative Appendix D Building Concentrations

This appendix is referenced in Section 801.5.2. This appendix provides mandatory criteria to estimate building concentrations of materials for individual VOC concentrations.

Informative Appendix E Building Envelope Tables

As an informative appendix, this appendix is not referenced in the body of the code and is therefore not part of the code. This appendix provides *R*-values for common building assemblies such as roofs, walls, floors and doors. It also includes common fenestration values for glazed areas.

Informative Appendix F Integrated Design

As an informative appendix, this appendix is not referenced in the body of the code and is therefore not part of the code. This appendix provides details and concepts on the need for early collaboration in order to increase the predictability of project outcomes as early as possible in the design phase of the project. See the Chapter 3 definition for “integrated design process.”

Informative Appendix G Informative References

Even though this is an informative appendix, it is cited in Sections 102.4.2. However, as an informative appendix, it is not part of the code. This appendix includes potentially useful source documents that may be consulted.

Informative Appendix H Option for Energy Efficiency Using the IECC Prescriptive Compliance Path

As an informative appendix, this appendix is referenced in Section 101.5.1 and is not part of the code. This appendix provides an option for prescriptive energy compliance that is based on requirements in the IECC. This approach allows the use of the prescriptive provisions of the IECC without directly relying on the energy provisions of ANSI/ASHRAE/IES Standard 90.1.

Appendix H includes provisions related to renewable energy systems, the building envelope, HVAC systems, service water heating, power, lighting and various other equipment.

Informative Appendix I zEPI Conversion Methodology

As an informative appendix, this appendix is referenced in an informative note in Section 701.5.3 and is therefore not part of the code. This appendix provides a methodology for converting $zEPI_{2004}$ to zEPI.

Informative Appendix J Derivation of Source Energy Conservation Factors and CO₂e Emission Factors

As an informative appendix, this appendix is referenced in an informative note in Section 701.5.3 and is therefore not part of the code. This appendix provides procedures to develop source energy conversion factors where conditions are different than those listed in the code.

Informative Appendix K Additional Guidance for Functional and Performance Testing (FPT) and the Commissioning (Cx) Process

As an informative appendix, this appendix is not referenced in the body of the code and is therefore not part of the code. This appendix provides guidance on best practices for performance testing and commissioning. See Chapter 3 definitions for “functional and performance testing (FPT)” and “commissioning (Cx) process.”

Informative Appendix L Requirements That Overlap with Core Elements of the LEED Rating System

As an informative appendix, this appendix is not referenced in the body of the code and is therefore not part of the code. This appendix acknowledges the LEED rating system and how the provisions of the code align with LEED.

Informative Appendix M Option for Residential Compliance Using the National Green Building Standard

As an informative appendix, this appendix is referenced in Section 101.5.1 and is therefore not part of the code. This appendix provides an option for residential compliance using the *National Green Building Standard*. The provisions in the appendix are mandatory only when specifically adopted. The provisions can be adopted in total or by individual section(s) at the discretion of the authority having jurisdiction.

Informative Appendix N Addenda Description Information

As an informative appendix, this appendix is not referenced in the body of the code and is therefore not part of the code. This appendix provides the roadmap of approved addenda to the 2017 edition of Standard 189.1, which resulted in the 2020 edition of Standard 189.1 that forms the technical content for this code. As can be seen by the list, there were over 70 addenda to the 2017 edition.

Annex 1 Referenced Standard Reproduction Annex ASHRAE Standard 169

This annex contains pertinent information from ASHRAE Standard 169 for assessing climate zones. See also Normative Appendix A.

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