

2021 Washington State Energy Code—Residential Provisions
Chapter 51-11R WAC

Effective March 15, 2024

First Edition based on
WSR 23-02-060
Chapter 51-11R WAC

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PREFACE

Introduction

This code contains provisions for most low-rise residential buildings (three stories or less in height above grade). Multifamily residential buildings three stories or less in height where dwelling units are not accessed directly from the exterior are regulated under the Washington State Energy Code – Commercial Provisions.

Marginal Markings

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2018 edition of the IECC. Double vertical lines indicate a standing Washington State code amendment. A dotted vertical line indicates a new Washington State amendment to the code. Deletion indicators in the form of an arrow (➡) are provided in the margin where an entire section, exception or table has been deleted or an item in a list of items or row of a table has been deleted. An angle bracket [>] indicates where an entire section, exception or table has been deleted by a Washington State amendment.

Italicized Terms

Terms italicized in code text, other than document titles, are defined in Chapter 2. The terms selected to be italicized have definitions that the user should read carefully to better understand the code. Where italicized, the Chapter 2 definition applies. If not italicized, common-use definitions apply.

Adoption of the Washington State Energy Code—Residential Provisions

Authority: The *Washington State Energy Code—Residential provisions* (chapter 51-11R WAC) is adopted by the Washington State Building Code Council pursuant to chapter 19.27a RCW. This code was first adopted by reference by the Washington State Legislature in 1974. In 1985, the Legislature delegated the responsibility of adoption and amendment of these codes to the State Building Code Council.

Supersession of Previous Codes: Chapter 51-11R WAC supersedes chapter 51-11 WAC.

Conflicts: Where there is a conflict between codes, an earlier named code adopted under RCW 19.27.031 takes precedence over a later named code. In the case of conflict between the duct insulation requirements of the *International Mechanical Code* and the duct insulation requirements of the Energy Code, the Energy Code, or where applicable, a local jurisdiction's energy code, shall govern.

Where, in any specific case, different sections of this Code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.

Enforcement: The State Building Code Act requires that each local jurisdiction enforce the Code within its jurisdiction. Any jurisdiction can contract with another jurisdiction or an inspection agency to provide the mandated enforcement activities.

Amendments to the Code

The State Building Code Council has adopted review procedures and approval criteria for local amendments. These procedures and criteria are found in chapter 51-04 WAC. The Council has exempted from its review any amendments to the administrative provisions of the various codes.

Forms for proposing statewide amendments to the Code are available from the State Building Code Council staff.

- A. **Amendments of Statewide Application:** The State Building Code Council will consider proposals to amend the Code every three years to coincide with the model code publication. The Council is not scheduled to enter formal rulemaking until 2024 as part of its consideration of adoption of the 2024 series of codes.

Proposals to amend the Code shall be made on forms provided by the Building Code Council.

- B. **Local Amendments:** Jurisdiction may not amend the residential provisions of the State Energy Code (WAC 51-11R and WAC 51-11C).

Application forms for Council review of local amendments are available from the State Building Code Council Staff.

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Effective Date

These rules were adopted by the State Building Code Council on November 4, 2022. The rules are effective throughout the state on March 15, 2024. This code is based on WAC 51-52 as published in WSR 23-02-055. It is subject to review by the State Legislature during the 2023 session.

Building Permit Fees

The activities of the State Building Code Council are supported by permit fees collected by each city and county. Section 19.27.085 of the State Building Code Act requires that a fee of \$6.50 be imposed on each residential permit and \$25.00 on each commercial building permit issued by each city and county. In addition, a fee of \$2.00 per unit shall be imposed for each dwelling unit after the first unit, on each building containing more than one residential unit. For the purpose of this fee, WAC 51-05-200 defines building permits as any permit to construct, enlarge, alter, repair, move, improve, remove, convert or demolish any building or structure regulated by the Building Code. Exempt from the fee are plumbing, electrical, mechanical permits, permits issued to install a mobile/manufactured home, commercial coach or factory built structure, or permits issued pursuant to the International Fire Code.

Each city and county shall remit moneys collected to the state treasury quarterly. No remittance is required until a minimum of \$50.00 has accumulated.

These permit fees are the amounts current in January 2023. Such fees may be changed by the State Legislature.

Opinions

RCW 19.27.031 grants the council authority to render opinions relating to the building code at the request of a local code official. For the purposes of this section, the term “code official” means the local or state official, or their designee, responsible for implementation and enforcement of the specific code provision on which the opinion is requested.

At the request of a code official, the council will issue opinions relating to the codes adopted under chapters 19.27, 19.27A, and 70.92 RCW, and council amendments to the model codes. At the request of a local code official, the council may issue opinions on the applicability of WAC 51-04-030 to a local government ordinance regulating construction. Council related opinions may be developed and approved by a standing committee of the council. Opinions approved by a standing committee may be reviewed and modified by the council.

ARRANGEMENT AND FORMAT OF THE 2021 WSEC

The IECC contains two separate sets of provisions—one for commercial buildings and one for residential buildings. Each set of provisions is applied separately to buildings within their scope. The Residential Provisions apply to detached one- and two-family dwellings and multiple single-family dwellings as well as Group R-2, R-3 and R-4 buildings three stories or less in height, except for those R-2 buildings where the individual dwelling units are not accessed directly from the building exterior. The Commercial Provisions apply to all other buildings, including the R-2 buildings three stories and less where the individual dwelling units are not accessed directly from the building exterior. These scopes are based on the definitions of “Commercial building” and “Residential building,” respectively, in Chapter 2 of each set of provisions.

The following table shows how the WSEC-R is divided. The ensuing chapter-by-chapter synopsis details the scope and intent of the provisions of the code.

WSEC-R Chapter Topics

| Chapter | Subjects |
|----------------|--|
| 1–2 | Administration and definitions |
| 3 | Climate zones and general materials requirements |
| 4 | Energy efficiency requirements |
| 5 | Existing buildings |
| 6 | Referenced standards |
| CA | Optional energy efficiency measures – One step |
| CB | Optional energy efficiency measures – Two step |
| CC | Exterior design conditions |

Chapter 1 Scope and Administration

Chapters 1 [CE] and 1 [RE] contain provisions for the application, enforcement and administration of subsequent requirements of the code. In addition to establishing the scope of the code, Chapter 1 identifies which buildings and structures come under its purview. Chapter 1 is largely concerned with maintaining “due process of law” in enforcing the energy conservation criteria contained in the body of this code. Only through careful observation of the administrative provisions can the code official reasonably expect to demonstrate that “equal protection under the law” has been provided.

Chapter 2 Definitions

Terms that are defined in the code are listed alphabetically in Chapters 2 [CE] and 2 [RE]. While a defined term may be used in one chapter or another, the meaning provided in Chapter 2 is applicable throughout the code.

Additional definitions regarding climate zones are found in Tables C301.3 and R301.3. These are not listed in Chapter 2.

Where understanding of a term’s definition is especially key to or necessary for understanding of a particular code provision, the term is shown in italics. This is true only for those terms that have a meaning that is unique to the code. In other words, 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.

Guidance regarding tense, gender and plurality of defined terms as well as guidance regarding terms not defined in this code is provided.

Chapter 3 General Requirements

Chapters 3 [CE] and 3 [RE] specify the climate zones that will serve to establish the exterior design conditions. In addition, Chapter 3 provides interior design conditions that are used as a basis for assumptions in heating and cooling load calculations, and provides basic material requirements for insulation materials and fenestration materials. Climate has a major impact on the energy use of most buildings. The code establishes many requirements such as wall and roof insulation *R*-values, window and door thermal transmittance (*U*-factors) and provisions that affect the mechanical systems based on the climate where the building is located. This chapter contains information that will be used to properly assign the building location into the correct climate zone and is used as the basis for establishing or eliminating requirements.

Chapter 4 Energy Efficiency

Chapter 4 [CE] contains the energy-efficiency-related requirements for the design and construction of most types of commercial buildings and residential buildings greater than three stories in height above grade. This chapter defines requirements for the portions of the building and building systems that impact energy use in new commercial construction and new residential construction greater than three stories in height, and promotes the effective use of energy. In addition to energy conservation requirements for the building envelope, this chapter contains requirements that impact energy efficiency for the HVAC systems, the electrical systems and the plumbing systems. It should be noted, however, that requirements are contained in other codes that have an impact on energy conservation. For instance, requirements for water flow rates are regulated by the *International Plumbing Code*.

Chapter 4 [RE] contains the energy-efficiency-related requirements for the design and construction of residential buildings regulated under this code. It should be noted that the definition of a residential building in this code is unique for this code. In this code, residential buildings include detached one- and two-family dwellings and multiple single-family dwellings as well as R-2, R-3 or R-4 buildings three stories or less in height. All other buildings, including residential buildings greater than three stories in height, are regulated by the energy conservation requirements in the IECC—Commercial Provisions. The applicable portions of a residential building must comply with the provisions within this chapter for energy efficiency. This chapter defines requirements for the portions of the building and building systems that impact energy use in new residential construction and promotes the effective use of energy. The provisions within the chapter promote energy efficiency in the building envelope, the heating and cooling system and the service water-heating system of the building.

Chapter 5 Existing Buildings

Chapters 5 [CE] and [RE] contain the technical energy efficiency requirements for existing buildings. Chapter 5 provisions address the maintenance of buildings in compliance with the code as well as how additions, alterations, repairs and changes of occupancy need to be addressed from the standpoint of energy efficiency. Specific provisions are provided for historic buildings.

Chapter 6 Referenced Standards

The code contains numerous references to standards that are used to regulate materials and methods of construction. Chapters 6 [CE] and 6 [RE] list all standards referenced in their respective portions of the code. The standards are part of the code to the extent of the reference to the standard. 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 6 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; and the section or sections of this code that reference the standard.

ABBREVIATIONS AND NOTATIONS

The following table contains a list of common abbreviations and units of measurement used in this code. Some of the abbreviations are for terms defined in Chapter 2. Others are terms used in various tables and text of the code.

Abbreviations and Notations

| | |
|-------------------------|---|
| AFUE | Annual fuel utilization efficiency |
| bhp | Brake horsepower (fans) |
| Btu | British thermal unit |
| Btu/h × ft ² | Btu per hour per square foot |
| C-factor | See Chapter 2—Definitions |
| CDD | Cooling degree days |
| cfm | Cubic feet per minute |
| cfm/ft ² | Cubic feet per minute per square foot |
| ci | Continuous insulation |
| COP | Coefficient of performance |
| DCV | Demand control ventilation |
| °C | Degrees Celsius |
| °F | Degrees Fahrenheit |
| DWHR | Drain water heat recovery |
| DX | Direct expansion |
| E_c | Combustion efficiency |
| E_v | Ventilation efficiency |
| E_t | Thermal efficiency |
| EER | Energy efficiency ratio |
| EF | Energy factor |
| ERI | Energy rating index |
| F-factor | See Chapter 2—Definitions |
| FDD | Fault detection and diagnostics |
| FEI | Fan energy index |
| FL | Full load |
| ft ² | Square foot |
| gpm | Gallons per minute |
| HDD | Heating degree days |
| hp | Horsepower |
| HSPF | Heating seasonal performance factor |
| HVAC | Heating, ventilating and air conditioning |

(continued)

Abbreviations and Notations—continued

| | |
|-------------------|--|
| IEER | Integrated energy efficiency ratio |
| IPLV | Integrated Part Load Value |
| Kg/m ² | Kilograms per square meter |
| kW | Kilowatt |
| LPD | Light power density (lighting power allowance) |
| L/s | Liters per second |
| Ls | Liner system |
| m ² | Square meters |
| MERV | Minimum efficiency reporting value |
| NAECA | National Appliance Energy Conservation Act |
| NPLV | Nonstandard Part Load Value |
| Pa | Pascal |
| PF | Projection factor |
| pcf | Pounds per cubic foot |
| psf | Pounds per square foot |
| PTAC | Packaged terminal air conditioner |
| PTHP | Packaged terminal heat pump |
| R-value | See Chapter 2—Definitions |
| SCOP | Sensible coefficient of performance |
| SEER | Seasonal energy efficiency ratio |
| SHGC | Solar Heat Gain Coefficient |
| SPVAC | Single packaged vertical air conditioner |
| SPVHP | Single packaged vertical heat pump |
| SRI | Solar reflectance index |
| SWHF | Service water heat recovery factor |
| U-factor | See Chapter 2—Definitions |
| VAV | Variable air volume |
| VRF | Variable refrigerant flow |
| VT | Visible transmittance |
| W | Watts |
| w.c. | Water column |
| w.g. | Water gauge |

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