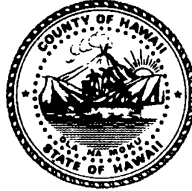


COUNTY OF HAWAI‘I



STATE OF HAWAI‘I

BILL NO. 126

ORDINANCE NO. 20 10

**AN ORDINANCE AMENDING CHAPTER 5, ARTICLE 5, SECTION 5-84, OF THE HAWAI‘I COUNTY CODE 1983 (2016 EDITION, AS AMENDED), RELATING TO ENERGY CONSERVATION.**

**BE IT ORDAINED BY THE COUNCIL OF THE COUNTY OF HAWAI‘I:**

**SECTION 1.** Chapter 5, article 5, section 5-84, of the Hawai‘i County Code 1983 (2016 Edition, as amended), is repealed.

**SECTION 2.** Chapter 5, of the Hawai‘i County Code 1983 (2016 Edition, as amended), is amended by adding a new article to be designated article 5, and to read as follows:

**“Article 5. Energy Conservation.**

Sections:

- |             |  |
|-------------|--|
| 5-84        | Purpose.   |
| 5-85(a)     | The International Energy Conservation Code incorporated.     |
| 5-85(b)(1)  | Subsection C101.1 amended.                                   |
| 5-85(b)(2)  | Subsection C101.4 amended.                                   |
| 5-85(b)(3)  | Subsection C102.1 amended.                                   |
| 5-85(b)(4)  | Subsection C103.1 amended.                                   |
| 5-85(b)(5)  | Subsections C103.3.2 and C103.3.3 deleted in their entirety. |
| 5-85(b)(6)  | Subsection C202 amended.                                     |
| 5-85(b)(7)  | Subsection C401.2 amended.                                   |
| 5-85(b)(8)  | Subsection C402.1.1 amended.                                 |
| 5-85(b)(9)  | Table C402.1.3 deleted in its entirety and replaced.         |
| 5-85(b)(10) | Subsection C402.2.3 amended.                                 |
| 5-85(b)(11) | Table C402.4 deleted in its entirety and replaced.           |
| 5-85(b)(12) | Subsection C402.4.3.5 added.                                 |
| 5-85(b)(13) | Subsection C402.5 amended.                                   |
| 5-85(b)(14) | Subsection C403.2.4.2.4 added.                               |

- 5-85(b)(15) Subsection C405.2 amended.
- 5-85(b)(16) Subsection C405.2.4 amended.
- 5-85(b)(17) Subsection C405.10 added.
- 5-85(b)(18) Subsection C406.3 amended.
- 5-85(b)(19) Subsection C408.2 amended.
- 5-85(b)(20) Subsection C408.2.4.1 deleted in its entirety.
- 5-85(b)(21) Subsection C408.3.1 amended.
- 5-85(b)(22) Subsection C501.4 amended.
- 5-85(b)(23) Subsection C503.3.1 amended.
- 5-85(b)(24) Subsection R101.1 amended.
- 5-85(b)(25) Subsection R103.1 amended.
- 5-85(b)(26) Subsections R103.3.2 and R103.3.3 deleted in their entirety.
- 5-85(b)(27) Subsection R202 amended.
- 5-85(b)(28) Subsection R401.2 amended.
- 5-85(b)(29) Subsection R401.2.1 amended.
- 5-85(b)(30) Subsection R401.3 amended.
- 5-85(b)(31) Subsection R402.1 amended.
- 5-85(b)(32) Table R402.1.2 deleted in its entirety and replaced.
- 5-85(b)(33) Subsection R402.1.2 amended.
- 5-85(b)(34) Subsection R402.2 amended.
- 5-85(b)(35) Subsection R402.2.5 amended.
- 5-85(b)(36) Subsection R402.3.2 amended.
- 5-85(b)(37) Subsection R402.4.1.2 amended.
- 5-85(b)(38) Subsection R403.5.5 added.
- 5-85(b)(39) Subsection R404.2 added.
- 5-85(b)(40) Subsection R404.3 added.
- 5-85(b)(41) Table R405.5.2(1) amended.
- 5-85(b)(42) Section R407 added. (Also adds Table R407.1)
- 5-85(b)(43) Subsection R501.4 amended.
- 5-85(b)(44) Subsection R502.1 amended.
- 5-85(b)(45) Subsection R503.1.1 amended.
- 5-85(b)(46) Subsection R503.2 amended.

#### **Section 5-84. Purpose.**

This article adopts with amendments, the International Energy Conservation Code, 2015 Edition, as it was incorporated into the Hawai‘i State Energy Conservation Code that became effective on March 31, 2017. The purpose of the resulting article is to promote the design of energy-efficient building envelopes and installation of energy-efficient mechanical, lighting, and power systems by establishing minimum standards that promote modern and up-to-date energy-efficient performance in the construction, alteration, or equipment of buildings or structures in the County of Hawai‘i.

#### **Section 5-85. International Energy Conservation Code adopted.**

- (a) The “International Energy Conservation Code, 2015 Edition” herein referred to as the “International Energy Conservation Code,” as copyrighted and published in 2015 by the International Code Council, Incorporated, 500 New Jersey Avenue, 6th Floor, Washington, DC 20001, is incorporated by reference and made a part of this chapter, subject to the amendments hereinafter set forth in this article. The appendices of the International Energy Conservation Code are not adopted except as provided in this article. A copy of the International Energy Conservation Code shall be available for public inspection at the Hilo and Kailua-Kona offices of the department of public works and at the office of the county clerk.
- (b) This incorporation by reference includes all parts of the International Energy Conservation Code, 2015 Edition, subject to the amendments hereinafter set forth.
  - (1) Subsection C101.1 of the International Energy Conservation Code is amended to read as follows:

**“C101.1 Title.** This code shall be known as the [~~International~~] Energy Conservation Code [~~of NAME OF JURISDICTION~~] and shall be cited as such. [~~It is referred to herein as “this code.”~~] “This code” when used within the International Energy Conservation Code as incorporated by reference herein, means the Energy Conservation Code of the County of Hawai‘i.”
  - (2) Subsection C101.4 of the International Energy Conservation Code is amended to read as follows:

**“C101.4 Applicability.** Where, in any specific case, different sections of this code or other adopted codes specify different materials, methods of construction or other requirements, the [~~most restrictive shall govern~~] code official shall determine which code requirements shall prevail. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.”

- (3) Subsection C102.1 of the International Energy Conservation Code is amended to read as follows:

**“C102.1 General.** This code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been *approved* by the *code official* as meeting the intent of this code.

The *code official* may allow alternative energy conservation standards for nonstandard building materials, unique or limitations of design, special methods of construction, and geographical location. The *code official* may require construction plans, research reports, and tests prepared by a registered design professional in order to determine whether to allow such lower standards.”

- (4) Subsection C103.1 of the International Energy Conservation Code is amended to read as follows:

~~“C103.1 General. [Construction documents and other supporting data shall be submitted in one or more sets with each application for a permit. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the *code official* is authorized to require necessary construction documents to be prepared by a registered design professional.~~

~~**Exception:** The *code official* is authorized to waive the requirements for construction documents or other supporting data if the *code official* determines they are not necessary to confirm compliance with this code.]~~

Construction documents and other supporting data shall be submitted to indicate compliance with this code. The construction documents shall be prepared, designed, approved, and observed by a duly registered licensed professional as required by chapter 464, Hawai‘i Revised Statutes and in accordance with the provisions of chapter 5, Hawai‘i County Code. The licensed professional shall certify via a signed statement on the plans, that the project complies with this code.

**Exception:** Any building work that is not required to be prepared, designed, approved, or observed by a licensed professional architect or engineer pursuant to chapter 464, Hawai‘i Revised Statutes, shall be certified by the owner.”

- (5) Subsections C103.3.2 and C103.3.3 of the International Energy Conservation Code are deleted in their entirety.

~~“[C103.3.2 Previous approvals. This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful permit has been heretofore issued or otherwise lawfully authorized,~~

and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.

**~~C103.3.3 Phased approval.~~** ~~The code official shall have the authority to issue a permit for the construction of part of an energy conservation system before the construction documents for the entire system have been submitted or approved, provided adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holders of such permit shall proceed at their own risk without assurance that the permit for the entire energy conservation system will be granted.]”~~

- (6) Subsection C202 of the International Energy Conservation Code is amended by adding the following new definitions to be appropriately inserted and to read as follows:

**“CODE OFFICIAL.** The director of the department of public works of the County of Hawai‘i, the director’s authorized representative, or other designated authority charged with the administration and enforcement of this code.”

**“COOL ROOF.** A cool roof is a roofing system that can deliver high solar reflectance, and high thermal emittance as specified in table C402.3.”

**“HABITABLE SPACE.** A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.”

**“OCCUPIABLE SPACE.** A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.”

**“UNCONDITIONED FLOOR AREA.** The horizontal projection of the floors associated with the unconditioned space.”

**“UNCONDITIONED SPACE.** An area, room or space that is enclosed within the building thermal envelope and is not directly nor indirectly heated or cooled.”

- (7) Subsection C401.2 of the International Energy Conservation Code is amended to read as follows:

**“C401.2 Application.** Commercial buildings shall comply with one of the following:

1. The requirements of ANSI/ASHRAE/IESNA 90.1.
2. The requirements of Sections C402 through C405. In addition, commercial buildings shall comply with Section C406 and tenant spaces shall comply with Section C406.1.1.

3. The requirements of Sections C402.5, C403.2, C404, C405.2, C405.3, C405.5, C405.6 and C407. The building energy cost shall be equal to or less than 85 percent of the standard reference design building.

**Exception:** For buildings 2,500 square feet or less with 4 tons of cooling or less where it is determined by the code official that the building configuration is similar to that of a residential building, the requirements in Sections R401.2.1 Tropical Zone shall be permitted to be used.”

- (8) Subsection C402.1.1 of the International Energy Conservation Code is amended to read as follows:

**“C402.1.1 Low-energy use buildings.** The following low-energy use buildings, or portions thereof separated from the remainder of the building by *building thermal envelope* assemblies complying with this section, shall be exempt from the *building thermal envelope* provisions of Section C402.

1. Those with a peak design rate of energy usage less than 3.4 Btu/h·ft<sup>2</sup> (10.7 W/m<sup>2</sup>) or 1.0 watt per square foot (10.7 W/m<sup>2</sup>) of floor area for space conditioning purposes.
2. [~~Those that do not contain conditioned space~~] Unconditioned space that does not contain occupiable space and/or habitable space.
3. Greenhouses.
4. Open park pavilions where there is no enclosed space.”

- (9) Table C402.1.3 from the International Energy Conservation Code is deleted in its entirety and replaced with the following:

**“TABLE C402.1.3  
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT  
MINIMUM REQUIREMENTS, R-VALUE METHOD<sup>a</sup> - CLIMATE ZONE 1”**

<b><u>CLIMATE ZONE 1</u></b>		
	<b><u>All other</u></b>	<b><u>Group R</u></b>
<b><u>Roofs</u></b>		
<u>Insulation entirely above roof deck</u>	<u>R-10ci</u>	<u>R-12.5ci</u>
<u>Metal buildings<sup>a, b</sup></u>	<u>R-30 or R-19 with cool roof<sup>c</sup></u>	<u>R-30 or R-19 with cool roof<sup>c</sup></u>

<u>Attic and other</u>	<u>R-30 or R-19 with cool roof<sup>c</sup></u>	<u>R-30 or R-19 with cool roof<sup>c</sup></u>
<b><u>Walls, above grade</u></b>		
<u>Mass</u>	<u>R-5.7ci<sup>d</sup></u>	<u>R-5.7ci<sup>d</sup></u>
<u>Metal building</u>	<u>R-13 + R-6.5ci</u>	<u>R-13 + R-6.5ci</u>
<u>Metal framed</u>	<u>R-13 + R-5ci</u>	<u>R-13 + R-5ci</u>
<u>Wood framed and other</u>	<u>R-13 + R-3.8ci or R-20</u>	<u>R-13 + R-3.8ci or R-20</u>
<b><u>Walls, below grade</u></b>		
<u>Below-grade wall</u>	<u>NR</u>	<u>NR</u>
<b><u>Floors</u></b>		
<u>Mass</u>	<u>NR</u>	<u>NR</u>
<u>Joist/framing</u>	<u>NR</u>	<u>NR</u>
<b><u>Slab-on-grade floors</u></b>		
<u>Unheated slabs</u>	<u>NR</u>	<u>NR</u>
<u>Heated slabs</u>	<u>R-7.5 for 12" below</u>	<u>R-7.5 for 12" below</u>
<b><u>Opaque doors</u></b>		
<u>Nonswinging</u>	<u>R-4.75</u>	<u>R-4.75</u>

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m<sup>2</sup>, 1 pound per cubic foot = 16 kg/m<sup>3</sup>.

ci = Continuous insulation, NR = No requirement, LS = Liner system.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.

b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.

c. Cool roof is defined as a roof with three-year aged solar reflectance of 0.55 and 3-year aged thermal emittance of 0.75 or 3-year aged solar reflectance index of 64.

d. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C 90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having maximum thermal conductivity of 0.44 Btu-in/h-ft<sup>2</sup>°F. See Section C402.2.3."

- (10) Subsection C402.2.3 of the International Energy Conservation Code is amended to read as follows:

**"C402.2.3 Thermal resistance of above-grade walls.** The minimum thermal resistance (*R*-value) of materials installed in the wall cavity between framing members and continuously on the walls shall be as specified in Table C402.1.3, based on framing type and construction materials used in the wall assembly.

**Exceptions:**

Continuous insulation for wood, metal framed, and mass walls are not required when at least one of the following conditions is met:

1. Walls have a covering with a reflectance of  $\geq 0.64$ .
2. Walls have overhangs with a projection factor equal to or greater than 0.3.  
The projection factor is the horizontal distance from the surface of the wall to the farthest most point of the overhang divided by the vertical distance from the first floor level to the bottom most point of the overhang.
3. Concrete, CMU, and similar mass walls are 6 inches or greater in thickness.

The *R*-value of integral insulation installed in concrete masonry units shall not be used in determining compliance with Table C402.1.3.

“Mass walls” shall include walls:

1. Weighing not less than 35 psf (170 kg/m<sup>2</sup>) of wall surface area.
2. Weighing not less than 25 psf (120 kg/m<sup>2</sup>) of wall surface area where the material weight is not more than 120 pcf (1900 kg/m<sup>3</sup>).
3. Having a heat capacity exceeding 7 Btu/ft<sup>2</sup> · °F (144 kJ/m<sup>2</sup> · K).
4. Having a heat capacity exceeding 5 Btu/ft<sup>2</sup> · °F (103 kJ/m<sup>2</sup> · K), where the material weight is not more than 120 pcf (1900 kg/m<sup>3</sup>).”

(11) Table C402.4 from the International Energy Conservation Code is deleted in its entirety and replaced with the following:

**“TABLE C402.4**  
**BUILDING ENVELOPE FENESTRATION**  
**MAXIMUM U-FACTOR AND SHGC REQUIREMENTS -**  
**CLIMATE ZONE 1**

<b><u>CLIMATE ZONE</u></b>	<b><u>1</u></b>
<b><u>Vertical fenestration</u></b>	
<b><u>U-factor</u></b>	
<b><u>Fixed fenestration</u></b>	<b><u>0.50</u></b>
<b><u>Operable fenestration</u></b>	<b><u>0.65</u></b>
<b><u>Entrance doors</u></b>	<b><u>1.10</u></b>



<u>SHGC<sup>b</sup></u>		
<u>Orientation<sup>a</sup></u>	<u>SEW</u>	<u>N</u>
<u>PF &lt; 0.2</u>	<u>0.25</u>	<u>0.33</u>
<u>0.2 ≤ PF &lt; 0.5</u>	<u>0.30</u>	<u>0.37</u>
<u>PF ≥ 0.5</u>	<u>0.40</u>	<u>0.40</u>
<u>Skylights</u>		
<u>U-factor</u>	<u>0.75</u>	
<u>SHGC</u>	<u>0.35</u>	

NR = No requirement, PF = Projection factor.

a. “N” indicates vertical fenestration oriented within 45 degrees of true north. “SEW” indicates orientations other than “N.” For buildings in the southern hemisphere, reverse south and north.

b. Exception: Jalousie windows are exempt from SHGC requirements.”

- (12) A new subsection C402.4.3.5 is added to the International Energy Conservation Code to read as follows:

**“C402.4.3.5 Area-weighted SHGC.** In commercial buildings, an area-weighted average of fenestration products shall be permitted to satisfy SHGC requirements.

**Exception:** Jalousie windows are exempt from SHGC requirements.”

- (13) Subsection C402.5 of the International Energy Conservation Code is amended to read as follows:

**“C402.5 Air leakage-thermal envelope (Mandatory).** The *thermal envelope* of buildings shall comply with Sections C402.5.1 through C402.5.8, or the building *thermal envelope* shall be tested in accordance with ASTM E 779 at a pressure differential of 0.3 inch water gauge (75 Pa) [~~or an equivalent method approved by the code official~~] and deemed to comply with the provisions of this section when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/ft<sup>2</sup> (0.2 L/s · m<sup>2</sup>). Where compliance is based on such testing, the building shall also comply with Sections C402.5.5, C402.5.6 and C402.5.7.”

- (14) A new subsection C403.2.4.2.4 is added to the International Energy Conservation Code to read as follows:

**“C403.2.4.2.4 Door switches.** Opaque and glass doors opening to the outdoors in hotel and motel sleeping units, guest suites, and time-share condominiums, shall be provided with controls that disable the mechanical cooling or reset the cooling

setpoint to 90° F or greater within five minutes of the door opening. Mechanical cooling may remain enabled if the outdoor air temperature is below the space temperature.”

- (15) Subsection C405.2 of the International Energy Conservation Code is amended to read as follows:

**“C405.2 Lighting controls (Mandatory).** Lighting systems shall be provided with controls as specified in Sections C405.2.1, C405.2.2, C405.2.3, C405.2.4 and C405.2.5.

**Exceptions:** Lighting controls are not required for the following:

1. Areas designated as security or emergency areas that are required to be continuously lighted.
2. Interior exit stairways, interior exit ramps and exit passageways.
3. Emergency egress lighting that is normally off.
4. Spaces where the designed lighting power densities are less than 70% of the lighting power densities specified in Table C405.4.2(1) and Table C405.4.2(2).”

- (16) Subsection C405.2.4 of the International Energy Conservation Code is amended to read as follows:

**“C405.2.4 Specific application controls.** Specific application controls shall be provided for the following:

1. Display and accent light shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space.
2. Lighting in cases used for display case purposes shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space.
3. Hotel and motel sleeping units [~~and~~], guest suites, and time-share condominiums shall have a master control device that is capable of automatically switching off all installed luminaires and switched receptacles within 20 minutes after all occupants leave the room.

**Exception:** Lighting and switched receptacles controlled by captive key systems.

4. Supplemental task lighting, including permanently installed under-shelf or under-cabinet lighting, shall have a control device integral to the luminaires or be controlled by a wall-mounted control device provided that the control device is readily accessible.
5. Lighting for nonvisual applications, such as plant growth and food warming, shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space.

6. Lighting equipment that is for sale or for demonstrations in lighting education shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space.”

- (17) A new subsection C405.10 is added to the International Energy Conservation Code to read as follows:

**“C405.10 Sub-metering (Mandatory).** In new buildings with tenants, metering shall be collected for the entire building and individually for each tenant occupying 1,000 ft<sup>2</sup> (total enclosed and unenclosed) (93 m<sup>3</sup>) or more. Tenants shall have access to data collected for their space. A tenant is defined as “one who rents or leases from a landlord.”

- (18) Subsection C406.3 of the International Energy Conservation Code is amended to read as follows:

**“C406.3 Reduced lighting power density.** The total interior lighting power (watts) of the building shall be determined by using [90] 80 percent of the lighting power values specified in Table C405.4.2(1) times the floor area for the building types, or by using [90] 80 percent of the interior lighting power allowance calculated by the Space-by-Space Method in Section C405.4.2.”

- (19) Subsection C408.2 of the International Energy Conservation Code is amended to read as follows:

**“C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements.** ~~[Prior to the final mechanical and plumbing inspections, the]~~ The registered design professional or approved agency shall provide evidence of mechanical systems *commissioning* and completion in accordance with the provisions of this section to the owner or owner’s authorized agent.

*Construction document* 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 or owner’s authorized agent and made available to the *code official* upon request in accordance with Sections C408.2.4 and C408.2.5.

**Exceptions:** The following systems are exempt:

1. Mechanical systems and service water heater systems in buildings where the total mechanical equipment capacity is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water-heating and space-heating capacity.

2. Systems included in Section C403.3 that serve individual *dwelling units* and *sleeping units*.”

- (20) Subsection C408.2.4.1 of the International Energy Conservation Code is deleted in its entirety.

~~“[C408.2.4.1 Acceptance of report. Buildings, or portions thereof, shall not be considered acceptable for a final inspection pursuant to Section C104.3 until the code official has received a letter of transmittal from the building owner acknowledging that the building owner or owner’s authorized agent has received the Preliminary Commissioning Report.]”~~

- (21) Subsection C408.3.1 of the International Energy Conservation Code is amended to read as follows:

**“C408.3.1 Functional Testing.** ~~[Prior to passing final inspection, the]~~ The registered design professional shall provide to the owner or owner’s representative evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the *construction documents* and manufacturer’s instructions. Functional testing shall be in accordance with Sections C408.3.1.1 and C408.3.1.2 for the applicable control type.”

- (22) Subsection C501.4 of the International Energy Conservation Code is amended to read as follows:

**“C501.4 Compliance.** *Alterations, repairs, additions* and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions and regulations for *alterations, repairs, additions* and changes of occupancy or relocation, [respectively, in the *International Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code* and NFPA 70] as adopted by the building official. ”

- (23) Subsection C503.3.1 of the International Energy Conservation Code is amended to read as follows:

**“C503.3.1 Roof replacement.** *Roof* ~~[replacements shall comply with Table C402.1.3 or C402.1.4 where the existing roof assembly is part of the building thermal envelope and contains insulation entirely above the roof deck.]~~ replacement of uninsulated roofs shall include at least one of the following:

1. Energy Star compliant roof covering;

2. Radiant barrier; or
3. Attic ventilation via solar attic fan(s), or ridge ventilation, or gable ventilation.”

- (24) Subsection R101.1 of the International Energy Conservation Code is amended to read as follows:

**“R101.1 Title.** This code shall be known as the [~~International~~] Energy Conservation Code [of NAME OF JURISDICTION], and shall be cited as such. [~~It is referred to herein as “this code.”~~] “This code” when used within the International Energy Conservation Code as incorporated by reference herein, means the Energy Conservation Code of Hawai‘i County.”

- (25) Subsection R103.1 of the International Energy Conservation Code is amended to read as follows:

**“R103.1 General.** [~~Construction documents, technical reports and other supporting data shall be submitted in one or more sets with each application for a permit. The construction documents and technical reports shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the code official is authorized to require necessary construction documents to be prepared by a registered design professional.~~]

**Exception:** ~~The code official is authorized to waive the requirements for construction documents or other supporting data if the code official determines they are not necessary to confirm compliance with this code.]~~

Construction documents and other supporting data shall be submitted to indicate compliance with this code. The construction documents shall be prepared, designed, approved, and observed by a duly registered licensed professional as required by chapter 464, Hawai‘i Revised Statutes and in accordance with the provisions of chapter 5, Hawai‘i County Code. The licensed professional shall certify via a signed statement on the plans, that the project complies with this code.

**Exception:** Any building, electrical, or plumbing work that is not required to be prepared, designed, approved, or observed by a licensed professional architect or engineer pursuant to chapter 464, Hawai‘i Revised Statutes, shall be certified by the owner.”

- (26) Subsections R103.3.2 and R103.3.3 of the International Energy Conservation Code are deleted in their entirety.

~~“[R103.3.2 Previous approvals. This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful permit has been heretofore issued or otherwise lawfully authorized, and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.~~

~~**R103.3.3 Phased approval.** The *code official* shall have the authority to issue a permit for the construction of part of an energy conservation system before the construction documents for the entire system have been submitted or *approved*, provided adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holders of such permit shall proceed at their own risk without assurance that the permit for the entire energy conservation system will be granted.]”~~

- (27) Subsection R202 of the International Energy Conservation Code is amended by adding the following new definitions to be appropriately inserted and to read as follows:

“**CODE OFFICIAL.** The director of the department of public works of the County of Hawai‘i, the director’s authorized representative, or other designated authority charged with the administration and enforcement of this code.”

“**COOL ROOF.** A cool roof is a roofing system that can deliver high solar reflectance, and high thermal emittance as specified in table C402.3.”

“**HABITABLE SPACE.** A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces, garages or carports, and similar areas are not considered habitable spaces.”

“**OCCUPIABLE SPACE.** A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.”

“**UNCONDITIONED FLOOR AREA.** The horizontal projection of the floors associated with the unconditioned space.”

“**UNCONDITIONED SPACE.** An area, room or space that is enclosed within the building thermal envelope and is not directly nor indirectly heated or cooled.”

- (28) Subsection R401.2 of the International Energy Conservation Code is amended to read as follows:

**“R401.2 Compliance.** Projects shall comply with one of the following:

1. Sections ~~[R401]~~ R401.3 through R404.
2. Section R405 and the provisions of Sections R401 through R404 labeled “Mandatory.”
3. An energy rating index (ERI) approach in Section R406.
4. The tropical zone requirements in Section R401.2.1 and R401.3.”

- (29) Subsection R401.2.1 of the International Energy Conservation Code is amended to read as follows:

**“R401.2.1 Tropical zone.** *Residential buildings* in the tropical zone at elevations below ~~[2,400 feet (731.5 m)]~~ 5,000 feet above sea level shall be deemed to comply with this chapter where the following conditions are met:

1. Not more than one-half of the ~~[occupied space]~~ dwelling unit area is air conditioned.
2. The ~~[occupied space]~~ dwelling unit is not heated.
3. Solar, wind, or other renewable energy source supplies not less than ~~[80]~~ 90 percent of the energy for service water heating.

**Exception:** A water heating device as approved via Solar Hot Water Heater Variance by the Department of Business, Economic Development & Tourism, Hawai‘i State Energy Office.

4. Glazing in ~~[conditioned space has a]~~ dwelling units shall have a maximum solar heat gain coefficient [of less than or equal to 0.40, or has an overhang with a projection factor equal to or greater than 0.30] as specified in Table R401.2.1.

Table 401.2.1  
Vertical Fenestration Glazing SHGC Requirements

<u>Projection Factor (pf) of overhang from base of average vertical fenestration glazing sill*</u>	<u>SHGC</u>
<u>&lt; 0.30</u>	<u>0.25</u>
<u>0.30 – 0.49</u>	<u>0.40</u>
<u>≥ 0.50</u>	<u>N/A</u>

**\*Exceptions:**

- a. North-facing vertical fenestration glazing with pf > 0.20 are exempt from SHGC requirements. Overhangs shall extend 2 feet on each side of vertical fenestration glazing or to nearest wall, whichever is less.

- b. Jalousie windows are exempt from SHGC requirements.
- c. “N” indicates vertical fenestration oriented within 45 degrees of true north.  
“SEW” indicates orientations other than “N”.

5. Skylights in dwelling units shall have a maximum U-factor as specified in Table R402.1.2.

[5]6. Permanently installed lighting is in accordance with Section R404.

~~[6. The exterior roof surface complies with one of the options in Table C402.3 or the roof/ceiling has insulation with an *R-value* of R-15 or greater. If present, attics above the insulation are vented and attics below the insulation are unvented.]~~

7. ~~[Roof surfaces have a minimum slope of 1/4 inch per foot of run. The finished roof does not have water accumulation areas.]~~

The roof/ceiling complies with one of the following options:

A. Comply with one of the roof surface options in Table C402.3 and install R-13 insulation or greater.

B. Install R-19 insulation or greater.

If present, attics above the insulation are vented and attics below the insulation are unvented.

**Exception:** The roof/ceiling assembly is permitted to comply with Section R407.

8. Operable fenestration provides ventilation area equal to not less than 14 percent of the floor area in each habitable room. Alternatively, equivalent ventilation of 2 air changes per hour is provided by a mechanical ventilation fan.

9. Bedrooms with exterior walls facing two different directions have operable fenestration on exterior walls facing two different directions.

10. Interior doors to bedrooms are capable of being secured in the open position.

11. A ceiling fan ~~[or]~~, ceiling fan rough-in, or whole-house fan is provided for bedrooms and the largest space that is not used as a bedroom.

12. Walls, floors, and ceilings separating air conditioned spaces from non-air conditioned spaces shall be constructed to limit air leakage in accordance with the requirements in Table R402.4.1.1. Blower door test is optional.”



- (30) Subsection R401.3 of the International Energy Conservation Code is amended to read as follows:

**“R401.3 Certificate (Mandatory).** A permanent certificate shall be completed by the builder or registered design professional and posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall ~~[list]~~:

1. List the predominant R-values of insulation installed in or on ceiling/roof, walls, ~~[foundation (slab, basement wall, crawlspace wall and floor)]~~ and ducts outside conditioned spaces; *U*-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing done on the building. Where there is more than one value for each component, the certificate shall list the value covering the largest area. ~~[The certificate shall list]~~
2. List the types and efficiencies of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall list “gas-fired unvented room heater,” “electric furnace” or “baseboard electric heater,” as appropriate. An efficiency shall not be *listed* for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.
3. Indicate which areas have been designed and constructed as conditioned or unconditioned space.
4. Include the following text: “The addition of mechanical cooling or heating to an unconditioned space requires a building permit. The addition of cooling without proper design and construction can have adverse health, safety, and conservation consequences.”

- (31) Subsection R402.1 of the International Energy Conservation Code is amended to read as follows:

**“R402.1 General (Prescriptive).**

The *building thermal envelope* shall meet the requirements of Sections R402.1.1 through R402.1.5.

**Exception:** The following low-energy buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this section shall be exempt from the *building thermal envelope* provisions of Section R402.

1. Those with a peak design rate of energy usage less than 3.4 Btu/h · ft<sup>2</sup> (10.7 W/m<sup>2</sup>) or 1.0 watt/ft<sup>2</sup> (10.7 W/m<sup>2</sup>) of floor area for space-conditioning purposes.
2. [~~Those that do not contain conditioned space.~~] Unconditioned space that does not contain habitable space.
3. Unconditioned dwellings with enclosed habitable areas less than 1,100 square feet.”
4. Dwellings with permitted, off-grid, self supplying photovoltaic with battery back up.”

(32) TABLE R402.1.2 of the International Energy Conservation Code is deleted in its entirety and replaced with the following:

**“TABLE R402.1.2**  
**INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>**

CLIMATE ZONE	FENESTRATION U-FACTOR <sup>b</sup>	SKYLIGHT U-FACTOR <sup>b</sup>	GLAZED FENESTRATION SHGC <sup>b, c, g</sup>	CEILING R-VALUE <sup>d</sup>	WOOD FRAME WALL R-VALUE <sup>d</sup>	MASS WALL R-VALUE <sup>e, f</sup>	FLOOR R-VALUE	BASEMENT WALL R-VALUE	SLAB R-VALUE & DEPTH	CRAWL SPACE WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	0	0	0	0

For SI: 1 foot= 304.8 mm

- a. R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in climate zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- c. Exception: If fenestration have overhangs with projection factors, the maximum solar heat gain coefficient shall be as specified in Table R401.2.1.
- d. R402.1.2 and R402.2 allow use of R407.
- e. The second R-value applies when more than half the insulation is on the interior of the mass wall.
- f. Exception: R-value for mass walls are not required if: mass walls have a covering with reflectance of ≥ 0.64; mass walls have overhangs with a projection factor equal to or greater than 0.3. CMU or similar mass walls are 6 inches or greater in thickness.
- g. Exception: Jalousie windows are exempt from SHGC requirements.”

(33) Subsection R402.1.2 of the International Energy Conservation Code is amended to read as follows:

**“R402.1.2 Insulation and fenestration criteria (Prescriptive).**

The *building thermal envelope* shall meet the requirements of Table R402.1.2, [~~based on the climate zone specified in Chapter 3.~~]

**Exception:** Insulation values of above-grade walls and ceilings shall be permitted to comply with Section R407.”

- (34) Subsection R402.2 of the International Energy Conservation Code is amended to read as follows:

**“R402.2 Specific insulation requirements (Prescriptive).**

In addition to the requirements of Section R402.1, insulation shall meet the specific requirements of Sections R402.2.1 through R402.2.13.

**Exception:** Above-grade walls and ceilings shall be permitted to comply with Section R407.”

- (35) Subsection R402.2.5 of the International Energy Conservation Code is amended to read as follows:

**“R402.2.5 Mass walls.** Mass walls for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs, or any other walls having a heat capacity greater than or equal to 6 Btu/ft<sup>2</sup> x °F (123 kJ/m<sup>2</sup> x K).

**Exception:** Insulation or *R*-value for mass walls, indicated in Table R402.1.2, is not required when at least one of the following conditions is met:

1. Walls have a covering with a reflectance of  $\geq 0.64$ .
2. Walls have overhangs with a projection factor equal to or greater than 0.3. The projection factor is the horizontal distance from the surface of the wall to the farthest most point of the overhang divided by the vertical distance from the first floor level to the bottom most point of the overhang.
3. Concrete, CMU, and similar mass walls are 6 inches or greater in thickness.”

- (36) Subsection R402.3.2 of the International Energy Conservation Code is amended to read as follows:

**“R402.3.2 Glazed fenestration SHGC.** Fenestration shall have a maximum solar heat gain coefficient as specified in Table R402.1.2. An area-weighted average of fenestration products more than 50-percent glazed shall be permitted to satisfy the SHGC requirements.

**Exceptions:**

1. Jalousie windows are exempt from SHGC requirements.
2. If fenestrations have overhangs with projection factors, the maximum solar heat gain coefficient shall be as specified in Table R401.2.1.

*Dynamic glazing* shall be permitted to satisfy the SHGC requirements of Table R402.1.2 provided the ratio of the higher to lower labeled SHGC is greater than or

equal to 2.4, and the *dynamic glazing* is automatically controlled to modulate the amount of solar gain into the space in multiple steps. *Dynamic glazing* shall be considered separately from other fenestration, and area-weighted averaging with other fenestration that is not dynamic glazing shall not be permitted.

**Exception:** *Dynamic glazing* is not required to comply with this section when both the lower and higher labeled SHGC already comply with the requirements of Table R402.1.2.”

- (37) Subsection R402.4.1.2 of the International Energy Conservation Code is amended to read as follows:

**“R402.4.1.2 Testing.** The building or dwelling unit ~~[shall]~~ may be tested and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zones 1 and 2, and three air changes per hour in Climate Zones 3 through 8. Testing shall be conducted in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). ~~[Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official.]~~ Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.
3. Interior doors, if installed at the time of the test, shall be open.
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed.
5. Heating and cooling systems, if installed at the time of the test, shall be turned off.
6. Supply and return registers, if installed at the time of the test, shall be fully open.”

- (38) A new subsection R403.5.5 is added to the International Energy Conservation Code to read as follows:

**“R403.5.5 Solar water heating.** Solar water heating systems are required for new single-family residential construction pursuant to section 196-6.5, Hawai‘i Revised Statutes.

**Exception:** A water heating device as approved via Solar Hot Water Heater Variance by the Department of Business, Economic Development & Tourism, Hawai'i State Energy Office.”

- (39) A new subsection R404.2 is added to the International Energy Conservation Code to read as follows:

**“R404.2 Ceiling Fans.** A ceiling fan, ceiling fan rough-in, or whole house fan may be provided for bedrooms and the largest habitable space that is not used as a bedroom.”

- (40) A new subsection R404.3 is added to the International Energy Conservation Code to read as follows:

**“R404.3 Electrical vehicle charger power.** An electrical rough-in of a 30 amp circuit for future electrical vehicle charger may be installed in garage/carport area.”

- (41) TABLE 405.5.2(1) of the International Energy Conservation Code is amended to read as follows:

**“TABLE R405.5.2(1)**  
**SPECIFICATIONS FOR THE STANDARD REFERENCE AND**  
**PROPOSED DESIGNS**

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass wall if proposed wall is mass; otherwise wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-factor: as specified in Table R402.1.4	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed
Basement and crawl space walls	Type: same as proposed	As proposed
	Gross area: same as proposed	As proposed
	U-factor: from Table R402.1.4, with insulation layer on interior side of walls	As proposed
Above-grade floors	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-factor: as specified in Table R402.1.4	As proposed
Ceilings	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-factor: as specified in Table R402.1.4	As proposed

Roofs	Type: composition shingle on wood sheathing	As proposed
	Gross area: same as proposed	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed
Attics <sup>i</sup>	Type: vented with aperture = 1 ft <sup>2</sup> per 300 ft <sup>2</sup> ceiling area	As proposed
Foundations	Type: same as proposed	As proposed
	Foundation wall area above and below grade and soil characteristics: same as proposed	As proposed
Opaque doors	Area: 40 ft <sup>2</sup>	As proposed
	Orientation: North	As proposed
	U-factor: same as fenestration from Table R402.1.4	As proposed
Vertical fenestration other than opaque doors	Total area <sup>h</sup> = (a) The proposed glazing area, where the proposed glazing area is less than 15 percent of the conditioned floor area (b) 15 percent of the conditioned floor area, where the proposed glazing area is 15 percent or more of the conditioned floor area	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).	As proposed
	U-factor: as specified in Table R402.1.4	As proposed
	SHGC: as specified in Table R402.1.2 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed
	Interior shade fraction: $0.92 - (0.21 \times \text{SHGC for the standard reference design})$	$0.92 - (0.21 \times \text{SHGC as proposed})$
	External shading: none	As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed
Air exchange rate	Air leakage rate of 5 air changes per hour in climate zones 1 and 2, and 3 air changes per hour in climate zones 3 through 8 at a pressure of 0.2 inches w.g (50 Pa). The mechanical ventilation rate shall be in addition to the air leakage rate and the same as in the proposed design, but no greater than $0.01 \times CFA + 7.5 \times (N_{br} + 1)$ where: CFA = conditioned floor area $N_{br}$ = number of bedrooms Energy recovery shall not be assumed for mechanical ventilation.	For residences that are not tested, the same air leakage rate as the standard reference design.  For tested residences, the measured air exchange rate <sup>a</sup> .  The mechanical ventilation rate <sup>b</sup> shall be in addition to the air leakage rate and shall be as proposed.

Mechanical ventilation	<p>None, except where mechanical ventilation is specified by the proposed design, in which case:</p> <p>Annual vent fan energy use:  <math>\text{kWh/yr} = 0.03942 \times CFA + 29.565 \times (N_{br} + 1)</math></p> <p>where:  <math>CFA</math> = conditioned floor area  <math>N_{br}</math> = number of bedrooms</p>	As proposed
Internal gains	$\text{IGain} = 17,900 + 23.8 \times CFA + 4104 \times N_{br}$ (Btu/day per dwelling unit)	Same as standard reference design
Internal mass	An internal mass for furniture and contents of 8 pounds per square foot of floor area	Same as standard reference design, plus any additional mass specifically designed as a thermal storage element <sup>c</sup> but not integral to the building envelope or structure.
Structural mass	For masonry floor slabs, 80 percent of floor area covered by R-2 carpet and pad, and 20 percent of floor directly exposed to room air.	As proposed
	For masonry basement walls, as proposed, but with insulation required by Table R402.1.4 located on the interior side of the walls	As proposed
	For other walls, for ceilings, floors, and interior walls, wood frame construction	As proposed
Heating systems <sup>d, e</sup>	<p><del>[As proposed for other than electric heating without a heat pump, where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section C403 of the IECC-Commercial Provisions.]</del></p> <p><u>Fuel type: same as proposed design.</u></p> <p><u>Efficiencies:</u>  <u>Electric: Air-source heat pump with prevailing federal minimum standards.</u></p> <p><u>Nonelectric furnaces: natural gas furnace with prevailing federal minimum standards.</u></p> <p><u>Nonelectric boilers: natural gas boiler with prevailing federal minimum standards.</u></p> <p>Capacity: sized in accordance with Section R403.7.</p>	<p>[As proposed]</p> <p><u>As proposed</u></p> <p><u>As proposed</u></p> <p><u>As proposed</u></p> <p><u>As proposed</u></p> <p><u>As proposed</u></p>

Cooling systems <sup>d, f</sup>	[As proposed] Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards. Capacity: sized in accordance with Section R403.7.	As proposed  As proposed
Service water heating <sup>d, e, f, g</sup>	[As proposed] Fuel type: same as proposed design Efficiency: in accordance with prevailing federal minimum standards. Use: Same as proposed design	[As proposed] As proposed As proposed  gal/day = $30 + (10 \times N_{br})$
Thermal distribution systems	Duct insulation: From Section R403.2.1  A thermal distribution system efficiency (DSE) of 0.88 shall be applied to both the heating and cooling system efficiencies for all systems other than tested duct systems. For tested duct systems, the leakage rate shall be 4 cfm (113.3 L/min) per 100 ft <sup>2</sup> (9.29 m <sup>2</sup> ) of conditioned floor area at a pressure of differential of 0.1 inches w.g. (25 Pa).	As tested or as specified in Table R405.5.2(2) if not tested. Duct insulation shall be as proposed.
Thermostat	Type: Manual, cooling temperature setpoint = 75°F; Heating temperature setpoint = 72°F	Same as standard reference

For SI: 1 square foot = 0.93 m<sup>2</sup>, 1 British thermal unit = 1055 J, 1 pound per square foot = 4.88 kg/m<sup>2</sup>, 1 gallon (US) = 3.785 L, °C = (°F-32)/1.8, 1 degree = 0.79 rad.

- Where required by the *code official*, testing shall be conducted by an *approved* party. Hourly calculations as specified in the *ASHRAE Handbook of Fundamentals*, or the equivalent shall be used to determine the energy loads resulting from infiltration.
- The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 *ASHRAE Handbook of Fundamentals*, page 26.24 and the “Whole-house Ventilation” provisions of 2001 *ASHRAE Handbook of Fundamentals*, page 26.19 for intermittent mechanical ventilation.
- Thermal storage element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.
- For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.
- For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design.
- For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.
- For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum energy factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.
- For residences with conditioned basements, R-2 and R-4 residences and townhouses, the following formula shall be used to determine glazing area:



$$AF = A_s \times FA \times F$$

where:

$AF$  = Total glazing area

$A_s$  = Standard reference design total glazing area.

$FA$  = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).

$F$  = (Above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below-grade boundary wall is any thermal boundary wall in soil contact.

Common wall area is the area of walls shared with an adjoining dwelling unit.

$L$  and  $CFA$  are in the same units.

- i. Unvented Attic Spaces. The attic space shall be permitted to be unvented when the design professional determines it would be beneficial to eliminate ventilation openings to reduce salt-laden air and maintain relative humidity 60 percent or lower to:
  - (1) Avoid corrosion to steel components,
  - (2) Avoid moisture condensation in the attic space, or
  - (3) Minimize energy consumption for air conditioning or ventilation by maintaining satisfactory space conditions in both the attic and occupied space below."

- (42) A new section R407 is added to the International Energy Conservation Code to read as follows:

#### **"SECTION R407** **POINTS OPTION**

**R407.1 General (Prescriptive).** Above-grade walls and roofs are permitted to comply with the points option as an alternative to complying with Sections R401.2.1, R402.1.2 and R402.2.

**R407.2 Requirements.** One or more efficiency measures shall be selected for roof and above-grade wall systems from Table R407.1 that cumulatively equal or exceed 0 (zero) points. As an alternative, above-grade walls and roofs are permitted to comply separately by scoring 0 (zero) or greater.

**TABLE R407.1**  
**POINTS OPTION**

		<b><u>Standard Home Points</u></b>	<b><u>Tropical Home Points</u></b>
<b><u>Wood Framed</u></b>			
<u>Roof Insulation</u> (Must choose 1)	<u>R-19 Roof Insulation</u>	<u>-1</u>	<u>0</u>
	<u>R-19 Roof Insulation + Cool roof membrane<sup>1</sup> or Radiant Barrier<sup>3</sup></u>	<u>0</u>	<u>1</u>
	<u>R-19 Roof Insulation + Attic Venting<sup>2</sup></u>	<u>0</u>	<u>1</u>
	<u>R-30 Roof Insulation</u>	<u>0</u>	<u>1</u>
<u>Wall Insulation</u> (Must choose 1)	<u>R-13 Cavity Wall Insulation</u>	<u>0</u>	<u>1</u>
	<u>R-13 Wall Insulation + high reflectance walls<sup>4</sup></u>	<u>1</u>	<u>2</u>
	<u>R-13 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances<sup>5</sup></u>	<u>1</u>	<u>2</u>
	<u>R-13 Wall Insulation + exterior shading wpf=0.3<sup>6</sup></u>	<u>1</u>	<u>2</u>
<u>Mechanical / Electrical Systems</u> (Choose ONLY if applies to scope of work)	<u>Ductless Air Conditioner<sup>7</sup></u>	<u>1</u>	<u>1</u>
	<u>1.071 X Federal Minimum SEER for Air Conditioner</u>	<u>1</u>	<u>1</u>
	<u>1.142 X Federal Minimum SEER for Air Conditioner</u>	<u>2</u>	<u>2</u>
	<u>No air conditioning installed</u>	<u>Not Applicable</u>	<u>2</u>
<u>Must choose if applies to new Construction and/or Additions</u> (House floor area to be considered as existing dwelling size plus new square footage)	<u>House floor area ≤ 1,000 SF</u>	<u>1</u>	<u>1</u>
	<u>House floor area ≥ 2,500 SF</u>	<u>-1</u>	<u>-1</u>
	<u>Energy Star Fans<sup>8</sup></u>	<u>1</u>	<u>1</u>
	<u>Install 1 kW or greater of solar electric</u>	<u>1</u>	<u>1</u>
	<u>Reduce fenestration from 14% to 10%</u>	<u>Not Applicable</u>	<u>-1</u>

<b><u>Metal Framed</u></b>			
<u>Wall Insulation</u> (Must choose 1)	<u>R-13 +R 3 Wall Insulation</u>	<u>0</u>	<u>1</u>
	<u>R-13 cavity Wall Insulation + R-0</u>	<u>-1</u>	<u>0</u>
	<u>R-13 Wall Insulation + high reflectance walls<sup>4</sup></u>	<u>0</u>	<u>1</u>
	<u>R-13 Wall Insulation + 90% high efficacy lighting and Energy Star Appliances<sup>5</sup></u>	<u>1</u>	<u>2</u>
	<u>R-13 Wall Insulation + exterior shading wpf=0.3<sup>6</sup></u>	<u>0</u>	<u>1</u>
<u>Roof Insulation</u> (Must choose 1)	<u>R-30 Roof Insulation</u>	<u>0</u>	<u>1</u>
	<u>R-19 Roof Insulation</u>	<u>-1</u>	<u>0</u>
	<u>R-19 + Cool roof membrane<sup>1</sup> or Radiant Barrier<sup>3</sup></u>	<u>0</u>	<u>1</u>
	<u>R-19 Roof Insulation + Attic Venting<sup>2</sup></u>	<u>0</u>	<u>1</u>
<u>Mechanical / Electrical Systems</u> (Choose ONLY if applies to scope of work)	<u>Ductless Air Conditioner<sup>7</sup></u>	<u>1</u>	<u>1</u>
	<u>1.071 X Federal Minimum SEER for Air Conditioner</u>	<u>1</u>	<u>1</u>
	<u>1.142 X Federal Minimum SEER for Air Conditioner</u>	<u>2</u>	<u>2</u>
	<u>No air conditioning installed</u>	<u>Not Applicable</u>	<u>2</u>
<u>Must choose if applies to new construction and/or additions</u> (house floor area to be considered as existing dwelling size plus new square footage)	<u>House floor area ≤ 1,000 SF</u>	<u>1</u>	<u>1</u>
	<u>House floor area &gt; 2,500 SF</u>	<u>-1</u>	<u>-1</u>
	<u>Energy Star Fans<sup>7</sup></u>	<u>1</u>	<u>1</u>
	<u>Install 1 kW or greater of solar electric</u>	<u>1</u>	<u>1</u>
	<u>Reduce fenestration from 14% to 10%</u>	<u>Not Applicable</u>	<u>-1</u>

SF = Square Feet

1 Cool roof with three-year aged solar reflectance of 0.55 and 3-year aged thermal emittance of 0.75 or 3-year aged solar reflectance index of 64.

2 One cfm/ft<sup>2</sup> attic venting.

3 Radiant barrier shall have an emissivity of no greater than 0.05 as tested in accordance with ASTM E-408. The radiant barrier shall be installed in accordance with the manufacturer's installation instructions.

4 Walls with covering with a reflectance of ≥ 0.64.

5 Energy Star rated appliances include refrigerators, dishwashers, and clothes washers and must be installed for the final inspection.

6 The wall projection factor is equal to the horizontal distance from the surface of the wall to the farthest most point of the overhang divided by the vertical distance from the first floor level to the bottom most point of the overhang.

7 All air conditioning systems in the house must be ductless to qualify for this credit.

8 Install ceiling fans in all bedrooms and the largest habitable space that is not used as a bedroom."

- (43) Subsection R501.4 of the International Energy Conservation Code is amended to read as follows:

**“R501.4 Compliance.** *Alterations, repairs, additions* and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions and regulations for *alterations, repairs, additions* and changes of occupancy or relocation, [respectively, in the *International Residential Code, International Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code* and NFPA 70] as adopted by the code official.”

- (44) Subsection R502.1. of the International Energy Conservation Code is amended to read as follows:

**“R502.1 General.** Additions to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code. Additions shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code where the addition alone complies, where the existing building and addition comply with this code as a single building, or where the building with the addition uses no more energy than the existing building. Additions shall be in accordance with Section R502.1.1 or R502.1.2.

**Exceptions:**

1. When addition includes unconditioned space that does not contain habitable space.
2. When both the existing building and addition are entirely comprised of habitable unconditioned space if total square footage does not increase more than 1,100 square feet.”

- (45) Subsection R503.1.1 of the International Energy Conservation Code is amended to read as follows:

**“R.503.1.1 Building envelope.** Building envelope assemblies that are part of the alteration shall comply with Section R402.1.2 or R402.1.4, Sections R402.2.1 through R402.2.13, R402.3.1, R402.3.2, R402.4.3 and R402.4.4.

**Exception:** The following alterations need not comply with the requirements for new construction provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.

3. Construction where the existing roof, wall or floor cavity is not exposed.
4. Roof recover.
5. ~~[Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.]~~ Roof replacement of uninsulated roofs which include at least one of the following:
  - a. Energy Star compliant roof covering;
  - b. Radiant barrier; or
  - c. Attic ventilation via solar attic fans or ridge ventilation or gable ventilation.
6. Surface-applied window film installed on existing single pane fenestration assemblies to reduce solar heat gain provided the code does not require the glazing or fenestration assembly to be replaced.”

(46) Subsection R503.2 of the International Energy Conservation Code is amended to read as follows:

**“R503.2 Change in space conditioning.**

Any nonconditioned or low-energy space that is altered to become *conditioned space* shall be required to be brought into full compliance with this code.

**[Exception] Exceptions:**

1. Where the simulated performance option in Section R405 is used to comply with this section, the annual energy cost of the proposed design is permitted to be 110 percent of the annual energy cost otherwise allowed by Section R405.3.
2. When specified in the tropical zone, and the total conditioned space does not exceed 50% of the habitable floor area, and, R-19 is installed over the conditioned space, and Split ductless air conditioner systems with a SEER rating in the top 25% of readily available units are installed.”

**SECTION 3.** The amendments to the “International Energy Conservation Code, 2015 Edition” set forth in this ordinance, are indicated through the use of Ramseyer formatting. Material to be repealed is bracketed and stricken. New material is underscored. In printing this ordinance, the brackets, bracketed and stricken material, and underscoring need not be included.

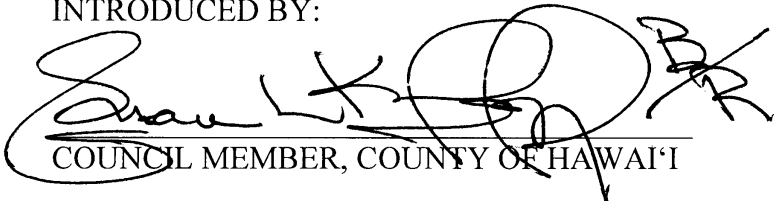
**SECTION 4.** Severability. If any provision of this ordinance, or the application thereof to any person or circumstance, is held invalid, the invalidity does not affect other provisions or applications of the ordinance which can be given effect without the invalid provision or application, and to this end the provisions of this ordinance are severable.

**SECTION 5.** Work performed under a permit issued before the effective date of this ordinance and which is inspected on or after the effective date shall be approved if it meets the requirements of either this code or the code being replaced by this ordinance.

**SECTION 6.** This ordinance shall apply to all applications for permits to be issued pursuant to chapters 5, 9, and 17, Hawai'i County Code, that are deemed complete by the Department of Public Works on or after the effective date of this ordinance. An application accepted before the effective date shall be approvable if it meets the requirements of either this ordinance or the code being replaced by this ordinance.

**SECTION 7.** This ordinance shall take effect upon its approval, but nothing in this ordinance shall be construed to prohibit any person from complying with the provisions of this article and any amendments thereto adopted prior to the enactment of this ordinance.

INTRODUCED BY:

  
COUNCIL MEMBER, COUNTY OF HAWAI'I

          Kona          , Hawai'i  
Date of Introduction: January 8, 2020  
Date of 1st Reading: January 8, 2020  
Date of 2nd Reading: January 22, 2020  
Effective Date: February 4, 2020

REFERENCE Comm. 646

OFFICE OF THE COUNTY CLERK  
County of Hawai'i  
Kona, Hawai'i

COUNTY CLERK  
COUNTY OF HAWAII  
270 FEB -4 PM 3:10

Introduced By: Susan L. K. Lee Loy (B/R)  
Date Introduced: January 8, 2020  
First Reading: January 8, 2020  
Published: January 18, 2020

REMARKS: \_\_\_\_\_  
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\_\_\_\_\_  
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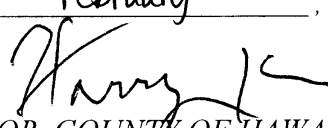
Second Reading: January 22, 2020  
To Mayor: January 30, 2020  
Returned: February 4, 2020  
Effective: February 4, 2020  
Published: February 15, 2020

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
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ROLL CALL VOTE				
	AYES	NOES	ABS	EX
Chung	X			
David	X			
Eoff			X	
Kaneali'i-Kleinfelder			X	
Kierkiewicz	X			
Lee Loy	X			
Poindexter	X			
Richards	X			
Villegas	X			
	7	0	2	0

ROLL CALL VOTE				
	AYES	NOES	ABS	EX
Chung			X	
David	X			
Eoff	X			
Kaneali'i-Kleinfelder			X	
Kierkiewicz	X			
Lee Loy	X			
Poindexter	X			
Richards	X			
Villegas	X			
	7	0	2	0

I DO HEREBY CERTIFY that the foregoing BILL was adopted by the County Council published as indicated above.

Disapproved this 4th day  
of February, 2020.  
  
MAYOR, COUNTY OF HAWAII

  
COUNCIL CHAIRPERSON  
  
COUNTY CLERK

Bill No.: 126  
Reference: C-646/PWMTC-20  
Ord No.: 20 10