

DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

Adoption of Chapter 3-181  
Hawaii Administrative Rules

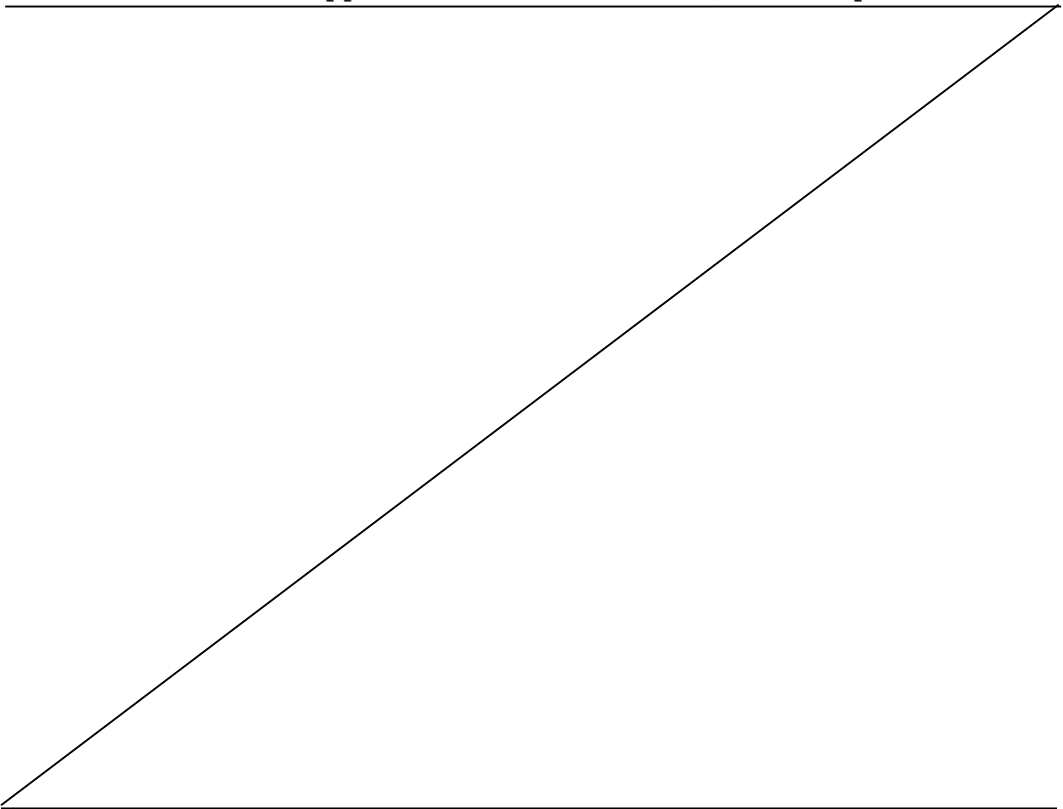
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SUMMARY

1. Chapter 181 of Title 3, Hawaii Administrative Rules, entitled "State Energy Conservation Code" adopting and amending the "*International Energy Conservation Code, 2006 Edition*", is repealed.

2. Chapter 181 of Title 3, Hawaii Administrative Rules, entitled "State Energy Conservation Code", amending the "*International Energy Conservation Code, ~~2009~~ 2012 2015 Edition*" to include amendments applicable to the state, is adopted.

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HAWAII ADMINISTRATIVE RULES

TITLE 3

DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

SUBTITLE 14

STATE BUILDING CODE COUNCIL

CHAPTER 181

STATE ENERGY CONSERVATION CODE

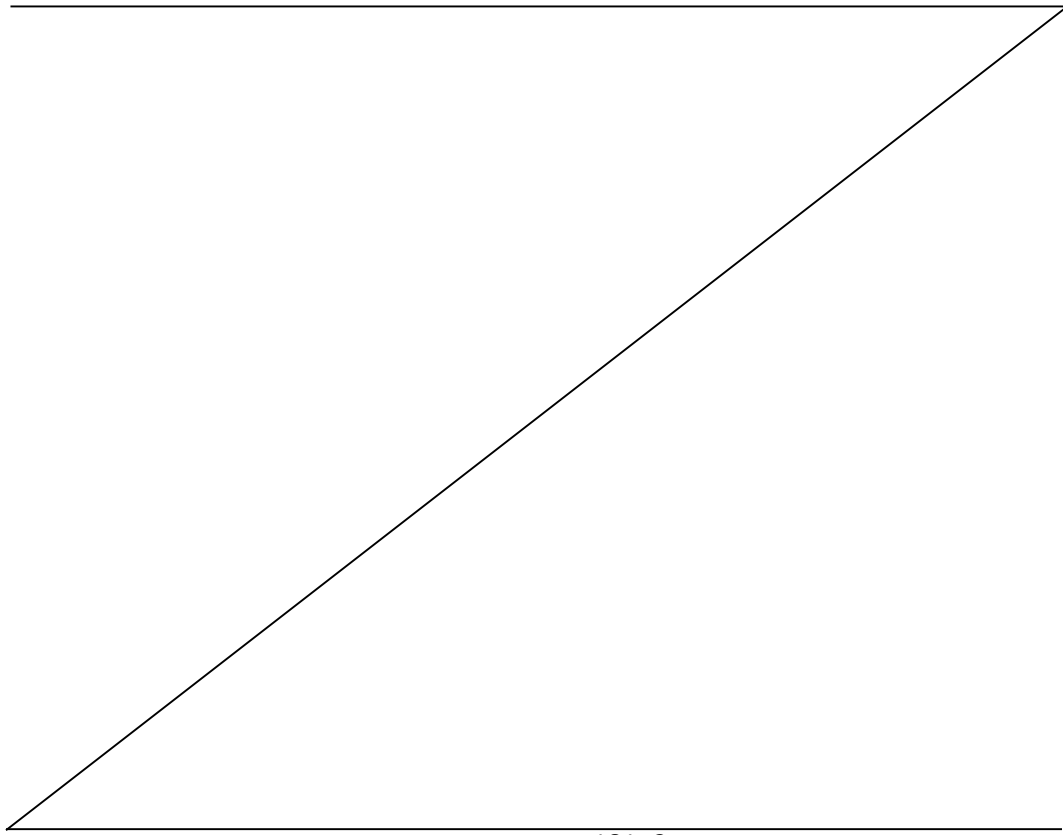
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§3-181-1

SUBCHAPTER 1

RULES OF GENERAL APPLICABILITY

**§3-181-1 Purpose.** The purpose of this chapter is to adopt the state energy conservation code as required by section 107-25, Hawaii Revised Statutes (HRS).

[Off ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Hawaii Revised Statutes (HRS) cited.

**§3-181-2 Scope.** This chapter sets forth minimum requirements for the design and construction of buildings for the effective use of energy and is intended to provide flexibility to allow the use of innovative approaches and techniques to achieve the effective use of energy.

[Off ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Standard administrative code language.

**§3-181-3 Definitions.** In this chapter, unless the context otherwise requires:

"ICC" means the International Code Council.

"IECC Section" means a section of a chapter of the *International Energy Conservation Code*.

"IECC" means the ICC, *International Energy Conservation Code*, [2006] ~~2009~~ 2012 2015 edition, as copyrighted by the International Code Council. [Off ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Hawaii Revised Statutes 107-29 requires continuous updating of the IECC in accord with national cycles.

**§3-181-4 Adoption of the *International Energy Conservation Code*.**

The "*International Energy Conservation Code, [2006] ~~2009~~ 2012 2015 Edition*" as copyrighted and published in [~~2006~~] ~~2009~~ 2012 2015 by International Code Council, Incorporated, 500 New Jersey Avenue, 6<sup>th</sup> Floor, Washington, DC 20001, is adopted by reference and made a part of this chapter. This incorporation by reference includes all parts of the *International Energy Conservation Code* subject to the amendments hereinafter set forth. The appendices of the ICC, IECC are not adopted except as provided in this chapter. [Off ]  
(Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Standard administrative code language.

**§3-181-5 Permit authorization.** Each county may, by ordinance, require that a permit be obtained from the building official for any area regulated by this chapter. [Off ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Hawaii Revised Statutes (HRS) cited.

SUBCHAPTER 2

The 2006 Energy Conservation Code of the State of Hawaii shall be deleted in its entirety and replaced by the 2015 International Energy Conservation Code with the proposed amendments.

**AMENDMENTS TO THE 2015+ ICC INTERNATIONAL ENERGY CONSERVATION CODE**

**§3-181-6 Title.** IECC section 101.1 is amended to read as follows:

**"101.1 Title.** This code shall be known as the [~~International~~] Energy Conservation Code of the State of Hawaii, and shall be cited as such. It is referred to herein as "this code"." [Eff ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Standard administrative code language.

**§3-181-7 General.** IECC section C103.1 is deleted in its entirety and replaced with the following:

**"103.1 General.** When the requirements in this code apply to a building as specified in Section C101.4, plans, specifications or other construction documents submitted for a building, electrical or plumbing permit required by the jurisdiction shall comply with this code and shall be prepared, designed, approved and observed by a design professional. The responsible design professional shall provide on the plans a signed statement certifying that the project is in compliance 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 Hawaii Revised Statutes." [Eff ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Standard administrative code language.

**§3-181-8 Low-energy use buildings.** IECC Section C402.1.1 is amended to read as follows:

"C402.1.1 Low-energy use buildings. 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 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. Unconditioned space that does ~~Those that do~~ not contain ~~conditioned~~ habitable space.
3. Greenhouses.

**Reason:**

The amended language ensures that habitable space, even if unconditioned, will be covered by the provisions of the energy code to increase occupant comfort and reduce the possibility of installing air conditioning in the future.

**§3-181-9 Thermal resistance of above-grade walls.** IECC Section C402.2.3 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 specific in Table C401.3, based on framing type and construction materials used in the wall assembly.

**Exceptions:**

Continuous insulation for wood and metal framed walls are not required when one of the following conditions are 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.

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:

**§3-181-9**

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 cal/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>."

[Off ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Modeling analysis shows that R-13 is the most impactful level of insulation for residential buildings and that removing continuous insulation on steel frame walls does not significantly impact whole building energy use. Adding shading to the wall system with a projection factor of at least 0.3 eliminates the need for continuous insulation in exterior wall systems resulting in an energy equivalent installation. In a tropical climate, the impact of wall insulation is diminished for commercial buildings with more importance placed on roof insulation and window SHGC. Envelope trade-offs for residential construction can be extrapolated to commercial construction for wall systems allowing the trade-off for a projection factor on wall systems to work for both residential and commercial buildings.

Adding reflective coatings on wall systems is also an effective trade-off for continuous insulation in residential exterior wall systems. As with the projection factor, this trade-off can be transferred to commercial buildings as an energy neutral trade-off. A reflective coating trade-off for continuous insulation is appropriate for commercial wall systems by providing an energy neutral trade-off. The full analysis is contained in the "Analyses and proposal of Hawaii amendments to The 2015 International Energy Conservation Code."



**§3-181-10 Area-weighted SHGC.** Section C402.4.3.5 is added to the IECC 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." [Eff \_\_\_\_\_] (Auth: HRS §107-29) (Imp: HRS §§107-24, 17

**Reason:**

Modeling by NREL indicated that shading fenestration was as effective as SHGC requirements in Hawaii's mild climate. Area weighting allows trade-offs between fenestration SHGC allowing a higher SHGC to be installed on the North elevation and offsetting that with lower SHGC requirements for windows on the East, West and South.

**§3-181-11 Door switches.** Section C403.2.4.2.3 is added to the IECC 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." [Eff \_\_\_\_\_] (Auth: HRS §107-29) (Imp: HRS §§107-24, 17

**Reason:**

The proposed change would require automatic controls that reset the cooling system temperature in a hotel and motel sleeping unit, guest suites and time share condominiums when doors to the outdoors are left open. A similar requirement is contained in ASHRAE 90.1-2013 Section 6.5.10. Research indicates that there is a potential for significant savings when in-room energy management systems are employed. A study by Pacific Gas and Electric as well as research by Magnum Energy Solutions, found that key card energy control systems provided an estimated savings of 35% - 45% per room. Additionally, prior research conducted for the State of Hawaii indicated that occupancy-based guest room controls could provide at least 5% savings for the entire hotel.

A study conducted in 2002 by Jeff Stein of Taylor Engineering and created for the California Statewide Utility Codes and Standards Program estimated savings of almost 60% for operable windows and/or doors with switches versus operable windows and/or doors without switches. The full analysis is contained in the "Analyses and proposal of Hawaii amendments to The 2015 International Energy Conservation Code."

**§3-181-12**

**§3-181-12 Specific application controls.** IECC Section C405.2.4 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. [Eff ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 17

**Reason:**

The current 2015 IECC code language only includes a master control device for hotel and motel sleeping units and guest suites. Time share condominiums are added to the requirements because they have the same transient use pattern as a hotel and motel overnight room and the energy savings potential will be similar.

**§3-181-13 Sub-metering (Mandatory).** Section C405.10 is added to the IECC 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>2</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." [Eff ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 17

**Reason:**

Numerous studies indicate that sub-metering, combined with tenant access to consumption data, results in substantial energy use reduction and is cost effective.

**§3-181-14 Compliance.** IECC Section C501.4 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, as adopted by the authorities having jurisdiction. ~~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.~~*

**Reason:**

The proposed amendment strikes language requiring existing building projects to comply with the suite of International codes when these codes may not have been adopted by the local jurisdiction. This amendment is consistent with Hawaii Revised Statutes 107-25.

**§3-181-15 Roof Replacement.** Section C503.3.1 is amended to read as follows (note that options are provided for this amendment):

**C503.3.1 Roof replacement.** *Roof replacements shall comply with Table C402.1.3 or C402.1.4 where the existing roof assembly is uninsulated and is part of the building thermal envelope. ~~and contains insulation entirely above the roof deck.~~*

**§3-181-16**

**Reason:**

The proposed language will ensure that roofs for existing buildings that are currently not insulated will meet the requirements of the IECC as part of a roof replacement. This will increase the efficiency of the commercial buildings. Option 2 requires that the roof system also meet the cool roof requirements in the code as part of roof replacement.

**§3-181-16 General.** IECC section R103.1 is deleted in its entirety and replaced with the following:

"R103.1 General. When the requirements in this code apply to a building as specified in Section R101.4, plans, specifications or other construction documents submitted for a building, electrical or plumbing permit required by the jurisdiction shall comply with this code and shall be prepared, designed, approved and observed by a design professional. The responsible design professional shall provide on the plans a signed statement certifying that the project is in compliance 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 Hawaii Revised Statutes." [Eff \_\_\_\_\_ ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 107-25)

**Reason:**

Standard administrative code language.

**§3-181-17 Compliance.** IECC Section R401.2 is amended to read as follows:

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

1. Sections R401.3 through R404
2. Sections R405 and the provisions of Section 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.

**Reason:** The amendment provides clarifying language on the options available to the code user and specifically references the Tropical zone requirements as an option.

§3-181-18 Tropical zone. IECC Section R401.2.1 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) 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 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.
4. Glazing in dwelling units ~~conditioned space has~~ shall have a maximum solar heat gain coefficient as specified in Table R402.2.1. of less than or equal to 0.40, or has an overhang with a projection factor equal to or greater than 0.30.

**Table R402.2.1. Window SHGC Requirements**

<u>Projection Factor of overhang from base of average window sill<sup>b</sup></u>	<u>SHGC</u>
<u>&lt; .30</u>	<u>.25</u>
<u>.30 - .50</u>	<u>.40</u>
<u>≥ .50</u>	<u>N/A</u>

<sup>b</sup>Exception: North-facing windows with pf > .20 are exempt from the SHGC requirement. Overhangs shall extend 2 feet on each side of window or to nearest wall, whichever is less.

5. Skylights in dwelling units shall have a maximum U-factor as specified in Table R402.1.2.
56. Permanently installed lighting is in accordance with Section R404.
67. The ~~exterior roof surface~~ roof/ceiling complies with one of the following options:
  1. Comply with one of the roof surface options in Table C402.3 and install R-13 insulation or greater.
  2. Install R-19 insulation or greater.

~~in Table C402.3 or the roof/ceiling has insulation with an R-value of R-15 greater~~

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

§3-181-18

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

- ~~78.~~ Roof surfaces have a minimum slope of ¼ inch per foot of run. The finished roof does not have water accumulation areas.
- ~~89.~~ Operable fenestration provides ventilation area equal to not less than 14 percent of the floor area in each room.

Alternatively, equivalent ventilation is provided by a ventilation fan.

- ~~910.~~ Bedrooms with exterior walls facing two different direction have operable fenestration or exterior walls facing two different directions.
- ~~1011.~~ Interior doors to bedrooms are capable of being secured in the open position.
- ~~1112.~~ A ceiling fan or ceiling fan rough-in is provided for bedrooms and the largest space that is not used as bedroom.
13. Jalousie windows shall have an air infiltration rate of no more than 1.2 cfm per square foot (6.1 L/s/m<sup>2</sup>)."
14. 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. [Eff ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 17

**Reason:**

Changes were proposed to the Tropical Zone requirements to correct wording from the 2015 IECC, to bring in flexibility to the code and to add state amendments to bring the code in line with current state requirements.

*Occupied space* is changed to *dwelling unit* because *occupied space* includes all buildings within a project e.g. an unconditioned garage that would be considered out of the scope of this code provision. *Dwelling unit* is a more appropriate term.

Solar systems per HRS 196-6.5 are specified to be consistent with state legislation.

An SHGC projection factor trade-off is provided for the vertical fenestration SHGC to account for the shading effects of overhangs. This provides an energy neutral trade-off.

No thermal or SHGC requirements for skylights were included in Tropical Zone requirements. The skylight provision addition provides a link to the prescriptive requirements in the 2015 IECC. Installing lower SHGC skylights will reduce the cooling load in the space and will increase occupant comfort.

R-13 roof/ceiling insulation with the addition of a cool roof membrane or R-19 insulation only performs equally based on analysis. The analysis shows significant savings using insulation in addition to a cool roof membrane instead of relying on a cool roof membrane only.

Increasing the thermal efficiency in the attic for a Tropical Zone house will increase thermal comfort to the occupant and, with the use of ceiling fans, will eliminate the need for installing cooling systems in the house. A Points trade-off approach (See Section R407) provides the ability to trade-off efficiencies in the roof for increased efficiencies in other parts of the house for an energy neutral trade-off.

Increased air infiltration rates are proposed for Jalousie windows for Tropical Zone houses. These windows aid cross ventilation which eliminates the need for air conditioning in semi-heated houses. Jalousie windows cannot meet the current air infiltration rate of 0.3 cfm/ft<sup>2</sup> currently in the 2015 IECC.

Air sealing between the air conditioned space and non-air conditioned space is important to keep the space conditioning in the areas where it was intended. Sealing up assemblies between the two spaces will also reduce the possibility of moisture issues within the framed cavities.

The full analysis and background information is contained in the "Analyses and proposal of Hawaii amendments to The 2015 International Energy Conservation Code."

**§3-181-19 General (Prescriptive).** IECC Section R402.1 is amended to read as follows:

"C402.1.1 Low-energy use buildings. 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 per square foot (10.7 W/m<sup>2</sup>) of floor area for space conditioning purposes.
2. Unconditioned space that does ~~Those that do~~ not contain ~~conditioned~~ habitable space.

### §3-181-20

**Reason:**

The amended language ensures that habitable space, even if unconditioned, will be covered by the provisions of the energy code to increase occupant comfort and reduce the possibility of installing air conditioning in the future.

**§3-181-20 Specific insulation requirements (Prescriptive).** IECC Section R402.2 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."

**Reason:**

The addition of a Points Option (see Section R407) provides energy neutral trade-offs allowing efficiencies in wall the wall system to be traded-off with increased efficiency levels in other parts of the building. This will allow a prescriptive trade-off for continuous insulation in metal framed walls to be traded off with reflective paint on the walls or shading the walls with an overhang. The full analysis and background information is contained in the "Analyses and proposal of Hawaii amendments to The 2015 International Energy Conservation Code."

**§3-181-21 Fenestration (Prescriptive).** IECC Section R402.3.2 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."

*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 the 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.



**§3-181-22**

**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 R402.1.1." [Eff ]  
(Auth: HRS §107-29) (Imp: HRS §§107-24, 17)

**Reason:**

The added language links the allowance for an area weighted average SHGC with the specific SHGC requirement in Section R402.3.2. This change will clarify the requirement.

**§3-181-22 Solar water heating.** Section R403.5.4 is added to the IECC to read as follows:

**"Section R403.5.5 Solar water heating.** Solar water heating systems are required for new single-family residential construction pursuant to HRS 196-6.5. [Eff ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 17)

**Reason:**

Solar systems per HRS 196-6.5 are specified to be consistent with state legislation.

**§3-181-23 Ceiling Fans (Mandatory).** IECC Section R404.2 is amended to read as follows:

**"R404.2 Ceiling Fans (Mandatory).** A ceiling fan or ceiling fan rough-in is provided for bedrooms and the largest space that is not used as bedroom." [Eff ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 17)

**Reason:**

The effect of ceiling fans can be significant in increasing thermal comfort for the occupants of the space. Ceiling fans result in a perceived cooling effect of 5.4°F to 12.6°F based on fan speed (air speed of approximately 3.3 ft/s to 9.84 ft/s respectively). Ceiling fans, coupled with the thermal envelope requirements will reduce the need to cool the space with traditional air conditioning. At a minimum, the ceiling fan rough-in would allow the home owner to easily install a ceiling fan after the house is occupied. The cost of the installation would include only the cost of the fan and installation. Without the rough-in the cost would include providing power to the fan location in addition to support for the fan which could be a barrier to installing fans in the house.

§3-181-24

§3-181-24 Simulated performance alternative. IECC Table R405.5.2(1) 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
Heating Systems	<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 ICC 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>  <u>Nonelectric furnaces: natural gas furnace with prevailing federal minimum standards</u>  <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>As proposed</p> <p>As proposed</p> <p>As proposed</p> <p>As proposed</p>
Cooling systems	<p><del>As proposed</del></p> <p><u>Fuel type: Electric</u></p> <p><u>Efficiency: in accordance with prevailing federal minimum standards</u></p> <p>Capacity: sized in accordance with Section R403.7</p>	<p>As proposed</p> <p>As proposed</p>
Service water heating	<p><del>As proposed</del></p> <p><u>Fuel type: same as proposed design</u></p> <p><u>Efficiency: in accordance with prevailing federal minimum standards</u></p> <p>Use: Same as proposed design</p>	<p>As proposed</p> <p><u>As proposed</u></p> <p><u>gal/day = 30+(10x Nbr)</u></p>

**Reason:**

Energy neutral trade-offs are proposed by including the ability to trade-off high efficiency heating, cooling and water heating system efficiencies with building envelope features.

§3-181-25 **Points Option.** Section R407 is added to the IECC 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 Section R401.2.1 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**

<u>Walls</u>		<u>Standard Home Points</u>	<u>Tropical Home Points</u>
<b>Wood Framed</b>			
	R-13 Cavity Wall Insulation	<u>0</u>	<u>1</u>
	R-19 Roof Insulation	<u>-1</u>	<u>0</u>
	R-19 Roof Insulation + Cool roof membrane <sup>1</sup> or Radiant Barrier <sup>3</sup>	<u>0</u>	<u>1</u>
	R-19 Roof Insulation + Attic Venting <sup>2</sup>	<u>0</u>	<u>1</u>
	R-30 Roof Insulation	<u>0</u>	<u>1</u>
	R-13 Wall Insulation + high reflectance walls <sup>4</sup>	<u>1</u>	<u>2</u>
	R-13 Wall insulation + 90% high efficacy lighting and Energy Star Appliances <sup>5</sup>	<u>1</u>	<u>2</u>
	R-13 Wall Insulation + exterior shading wpf=0.3 <sup>6</sup>	<u>1</u>	<u>2</u>
	Ductless Air Conditioner <sup>7</sup>	<u>1</u>	<u>1</u>
	1.071 X Federal Minimum SEER for Air Conditioner	<u>1</u>	<u>1</u>
	1.142 X Federal Minimum SEER for Air Conditioner	<u>2</u>	<u>2</u>
	No air conditioning installed	Not Applicable	<u>2</u>
	House floor area ≤ 1,000 ft <sup>2</sup>	<u>1</u>	<u>1</u>
	House floor area ≥ 2,500 ft <sup>2</sup>	<u>-1</u>	<u>-1</u>
	Energy Star Fans <sup>8</sup>	<u>1</u>	<u>1</u>
	Install 1 kW or greater of solar electric	<u>1</u>	<u>1</u>
<b>Metal Framed</b>			
	R-13 +R 3 Wall Insulation	<u>0</u>	<u>1</u>
	R-13 cavity Wall insulation + R-0	<u>-1</u>	<u>0</u>
	R-13 Wall Insulation + high reflectance walls <sup>4</sup>	<u>0</u>	<u>1</u>
	R-13 wall insulation + 90% high efficacy lighting and Energy Star Appliances <sup>5</sup>	<u>1</u>	<u>2</u>
	R-13 Wall Insulation + exterior shading wpf=0.3 <sup>6</sup>	<u>0</u>	<u>1</u>
	R-30 Roof Insulation	<u>0</u>	<u>1</u>
	R-19 Roof Insulation	<u>-1</u>	<u>0</u>
	R-19 + Cool roof membrane <sup>1</sup> or Radiant Barrier <sup>3</sup>	<u>0</u>	<u>1</u>

<u>R-19 Roof Insulation + Attic Venting<sup>2</sup></u>	<u>0</u>	<u>1</u>
<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>House floor area ≤ 1,000 ft<sup>2</sup></u>	<u>1</u>	<u>1</u>
<u>House floor area ≥ 2,500 ft<sup>2</sup></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>

<sup>1</sup> 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.

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

<sup>3</sup> 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.

<sup>4</sup> Walls with covering with a reflectance of ≥ 0.64.

<sup>5</sup> Energy Star rated appliances include refrigerators, dishwashers, and clothes washers and must be installed for the Certificate of Occupancy

<sup>6</sup> 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.

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

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

[Eff ] (Auth: HRS §107-29) (Imp: HRS §§107-24, 17

**Reason:**

The Points Option provides energy neutral trade-offs for different building assembly types. A prescriptive format was selected to increase the usability of the compliance approach. Energy analysis and research was done to determine the point allowances for each feature. All of the features are given +/- 1 point with the exception of high efficiency cooling equipment which is either given one (1) or two (2) points based on the SEER rating. The options that are included in the code reflected trade-offs from earlier versions of the Hawaii code e.g. eliminating continuous insulation for metal framed walls by using reflective paint or high SEER cooling equipment as a trade-off for continuous insulation.

**§3-181-25 Compliance.** IECC Section R501.4 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, as adopted by the authorities having jurisdiction. ~~respectively, in the International Residential Code, International Building Code,~~

**§3-181-27**

~~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.~~

**Reason:**

The proposed amendment strikes language requiring existing building projects to comply with the suite of International codes when these codes may not have been adopted by the local jurisdiction. This amendment is consistent with Hawaii Revised Statutes 107-25.

**§3-181-27 Building envelope.** IECC Section R503.1.1 is amended to read as follows:

**R503.1.1 Building envelope.**

5. Roof without insulation in the cavity and where the sheathing or insulation is exposed during a roof replacement ~~reroofing~~ shall ~~be insulated either above or below the sheathing.~~ meet one of the following:

1. R-30 cavity insulation or the cool roof requirements in Section C402.3 for residential buildings.
2. R-19 cavity insulation or the cool roof requirements in Section C402.3 for Tropical Zone residential buildings.

**Reason:**

The proposed language clarifies roof replacement requirement in the code and provides the ability to meet the requirements by installing a cool roof as an option to installing additional roof ceiling insulation.

DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

Chapter 3-181, Hawaii Administrative Rules, on the Summary Page dated \_\_\_\_\_, was adopted on \_\_\_\_\_, following a public hearing held on \_\_\_\_\_, after public notice was given in the Honolulu Star-Advertiser on \_\_\_\_\_.

The adoption of chapter 3-181 shall take effect ten days after filing with the Office of the Lieutenant Governor.

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DOUGLAS MURDOCK

State Comptroller and Chairperson, State  
Building Code Council

APPROVED:

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DAVID Y. IGE

GOVERNOR

STATE OF HAWAII

Dated: \_\_\_\_\_

APPROVED AS TO FORM:

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Deputy Attorney General

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Filed