

2020

Understanding Hawai'i's Residential Tropical Energy Code Option



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Hawai'i Energy

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2015 Hawai'i Energy Code for Residential Buildings Complying with Tropical Requirements

The 2015 Hawai'i Energy Code (HEC) supports Hawai'i's journey to 100% clean energy by updating the existing conservation code to provide greater energy savings. This document reviews the new Tropical Energy Code for residential construction and renovation for unheated homes at elevations below 2,400 feet that air condition not more than 50% of the applicable space (R401.2.1, as amended for Hawai'i). Homes with more than 50% air conditioning must follow the regular 2015 HEC for residential. All citations refer to the 2015 International Energy Conservation Code (IECC) as amended for Hawai'i. This document is not an exhaustive review of the required energy code—please refer to the full 2015 HEC (HAR Chapter 3-181.1) for compliance purposes. More information can be found at HawaiiEnergy.com.

BUILDING ENVELOPE REQUIREMENTS

Windows and Skylights

Glazing in dwelling units shall have a maximum solar heat gain coefficient (SHGC) as specified in Table R402.2.1.

TABLE R402.2.1: WINDOW SHGC REQUIREMENTS

Projection Factor of overhang ¹ from base of average window sill ²	SHGC
< 0.30	0.25
0.30 - 0.50	0.40
≥ 0.50	N/A

1. Overhangs shall extend two feet on each side of window or to nearest wall, whichever is less.
2. Exception: North-facing windows with pf > 0.20 are exempt from the SHGC requirement.

Jalousie windows shall have an air infiltration rate of no more than 1.2 cfm per square foot (6.1 L/s/m²).

Skylights in dwelling units shall have a maximum U-factor of 0.75.

Roof

The roof/ceiling must comply 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; or
2. Install R-19 insulation or greater.

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

TABLE C402.3:
MINIMUM ROOF REFLECTANCE AND EMITTANCE OPTIONS

Three-year aged solar reflectance of 0.55
and 30-year aged thermal emittance of 0.75
Three-year aged solar reflectance index of 64.

See the complete 2015 IECC Table 402.3 for specific details of these options.

Roof surfaces have a minimum slope of ¼ inch per foot of run. The finished roof does not have water accumulation areas.

Interior Air Sealing

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.

SOLAR WATER HEATING

Solar water heating systems, photovoltaic solar, wind, or other renewable energy source must supply at least 90% of the energy for service water heating (R401.2.1).

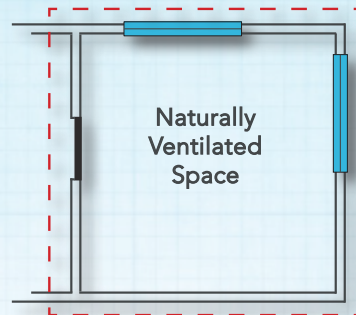
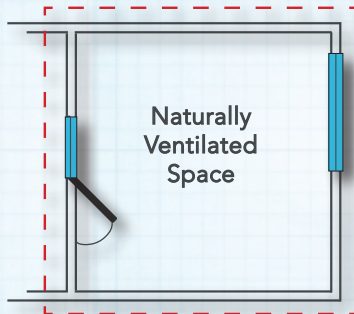


NATURAL VENTILATION REQUIREMENTS

Fenestration

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.

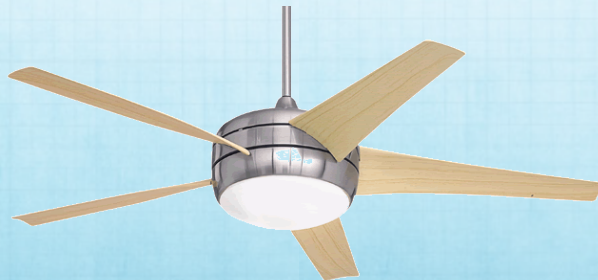
Bedrooms with exterior walls facing two different directions have operable fenestration on exterior walls facing two different directions.



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

Ceiling Fans

A ceiling fan or ceiling fan rough-in is required for bedrooms and the largest space that is not used as bedroom (R404.2).



LIGHTING REQUIREMENTS

Permanently installed lighting must be in accordance with Section R404, which states that not less than 75 percent of the lamps in permanently installed lighting fixtures must be high-efficacy lamps or not less than 75 percent of the permanently installed lighting fixtures must contain only high-efficacy lamps. An exception to this requirement is low-voltage lighting.



High-efficacy lamps are LED's, compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:

Lamp Wattage	Efficacy
> 40 watts	60 lumens/watt
15 - 40 watts	50 lumens/watt
< 15 watts	40 lumens/watt

ALTERNATIVE COMPLIANCE PATH

Energy Rating Index (ERI) Approach

The ERI performance path allows homes to comply with the 2015 HEC by achieving an ERI of 52 or greater. The ERI is based on a number of variables, including but not limited to equipment and appliance upgrades, air leakage of the home, and leakage in the heating and cooling distribution system.

Points Option

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.

One or more efficiency measures shall be selected for roof and above-grade wall systems from Table R407.1 (back page) 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

Wood Framed Walls	Tropical Home Points
R-13 Cavity wall insulation	1
R-19 Roof insulation	0
R-19 Roof insulation + cool roof membrane ¹ or radiant barrier ³	1
R-19 Roof insulation + attic venting ²	1
R-30 Roof insulation	1
R-13 Wall insulation + high reflectance walls ⁴	2
R-13 Wall insulation + 90% high efficacy lighting and ENERGY STAR appliances ⁵	2
R-13 Wall insulation + exterior shading wpf=0.3 ⁶	2
Ductless air conditioner ⁷	1
1.071 X Federal minimum SEER for air conditioner	1
1.142 X Federal minimum SEER for air conditioner	2
No air conditioning installed	2
House floor area ≤ 1,000 ft ²	1
House floor area ≥ 2,500 ft ²	-1
ENERGY STAR fans ⁸	1
Install 1 kW or greater of solar electric	1

Metal Framed Walls	Tropical Home Points
R-13 + R-3 wall insulation	1
R-13 Cavity wall insulation + R-0	0
R-13 Wall insulation + high reflectance walls ⁴	1
R-13 Wall insulation + 90% high efficacy lighting and ENERGY STAR appliances ⁵	2
R-13 Wall insulation + exterior shading wpf=0.3 ⁶	1
R-30 Roof insulation	1
R-19 Roof insulation	0
R-19 + Cool roof membrane ¹ or radiant barrier ³	1
R-19 Roof insulation + attic venting ²	1
Ductless air conditioner ⁷	1
1.071 X Federal minimum SEER for air conditioner	1
1.142 X Federal minimum SEER for air conditioner	2
No air conditioning installed	2
House floor area ≤ 1,000 ft ²	1
House floor area ≥ 2,500 ft ²	-1
ENERGY STAR fans ⁸	1
Install 1 kW or greater of solar electric	1

1. Cool roof with three-year aged solar reflectance of 0.55 and three-year aged thermal emittance of 0.75 or three-year aged solar reflectance index of 64.
2. One cfm/ft² 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 Certificate of Occupancy.
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 space that is not used as a bedroom.



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For more information on cash rebates available for energy-efficient equipment, go to hawaiienergy.com/for-homes