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Key changes to Hawai'i's residential energy code for conditioned homes



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Hawai'i Energy

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2015 Hawai'i Energy Code for Air Conditioned Residential Buildings

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 highlights the key changes in the code for residential construction and renovation for homes with over 50% conditioned space (homes with 50% or less air conditioning can follow an alternative Tropical Code described separately). 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

Insulation Requirements

Table R402.1.2 shows the specific insulation requirements. See Table R402.2.6 for the steel frame insulation requirements.

TABLE R402.1.2: PRESCRIPTIVE ENVELOPE REQUIREMENTS

Fenestration U-Factor	NR
Skylight U-Factor	0.75
Glazed Fenestration SHGC	0.25
Ceiling R-Value*	30
Wood Frame Wall R-Value	13
Mass Wall R-Value	3/4
Floor R-Value	NA
Foundation Insulation	0

* May also follow the points option alternative compliance path (R407).

Air Barrier

Homes must be tested and verified as having less than or equal to five air changes per hour at 50 Pascal (ACH50). All components must be installed in accordance with manufacturer's instructions and in accordance with Table R402.4.1.1.

TABLE R402.2.6 STEEL -FRAME CEILING, WALL, AND FLOOR INSULATION (R-VALUE)

Wood Frame R-Value Requirement	Cold-Formed Steel Equivalent R-Value
Steel Truss Ceilings	
R-30	R-38 or R-30+ 3 or R-26 + 5
R-38	R-49 or R-38 + 5
R-49	R-38 + 5
Steel Joist Ceilings	
R-30	R-38 in 2x4 or 2x6 or 2x8, R-49 in any framing
R-38	R-49 in 2x4 or 2x6 or 2x8 or 2x10
Steel-Framed Wall, 16" on Center	
R-13	R-13+4.2 or R-19 + 2.1 or R-21 + 2.8 or R-0 + 9.3 or R-15 + 3.8 or R-21 + 3.1
R-13 + 3	R-0 + 11.2 or R-13 + 6.1 or R-15 + 5.7 or R-19 + 5.0 or R-21 + 4.7
R-20	R-0 + 14.0 or R-13 + 8.9 or R-15 + 5.7 or R-19 + 5.0 or R-21 + 4.7
R-20 + 5	R-13 + 12.7 or R-15 + 12.3 or R-19 + 11.6 or R-19 + 8.4 or R-21 + 8.1 or R-25 + 7.7
R-21	R-0 + 14.6 or R-13 + 9.5 or R-15 + 9.1 or R-19 + 8.4 or R-21 + 8.1 or R-25 + 7.7
Steel-Framed Wall, 24" on Center	
R-13	R-0 + 9.3 or R-13 + 3.0 or R-15 + 2.4
R-13 + 3	R-0 + 11.2 or R-13 + 4.9 or R-15 + 4.3 or R-19 + 3.5 or R-21 + 3.1
R-20	R-0 + 14.0 or R-13 + 7.7 or R-15 + 7.1 or R-19 + 6.3 or R-21 + 5.9
R-20 + 5	R-13 + 11.5 or R-15 + 10.9 or R-19 + 10.1 or R-21 + 9.7 or R-25 + 9.1
R-21	R-0 + 14.6 or R-13 + 8.3 or R-15 + 7.7 or R-19 + 6.9 or R-21 + 6.5 or R-25 + 5.9
Steel Joist Floor	
R-13	R-19 in 2x6, or R-19 + 6 in 2x8 or 2x10
R-19	R-19 + 6 in 2x6, or R-19 + 12 in 2x8 or 2x10
<i>Cavity insulation R-value is listed first, followed by continuous insulation R-value. Insulation exceeding the height of the framing shall cover the framing.</i>	

MECHANICAL REQUIREMENTS

Duct Leakage Testing

Ducts must be tested at either the rough-in stage or at post construction. See R403.3.3 and R403.3.4 for specific requirements.

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.



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

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).



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	Conditioned Home Points
R-13 Cavity wall insulation	0
R-19 Roof insulation	-1
R-19 Roof insulation + cool roof membrane ¹ or radiant barrier ³	0
R-19 Roof insulation + attic venting ²	0
R-30 Roof insulation	0
R-13 Wall insulation + high reflectance walls ⁴	1
R-13 Wall insulation + 90% high efficacy lighting and ENERGY STAR appliances ⁵	1
R-13 Wall insulation + exterior shading wpf=0.3 ⁶	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
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	Conditioned Home Points
R-13 + R-3 Wall insulation	0
R-13 Cavity wall insulation + R-0	-1
R-13 Wall insulation + high reflectance walls ⁴	0
R-13 Wall insulation + 90% high efficacy lighting and ENERGY STAR appliances ⁵	1
R-13 Wall insulation + exterior shading wpf=0.3 ⁶	0
R-30 Roof insulation	0
R-19 Roof insulation	-1
R-19 + Cool roof membrane ¹ or radiant barrier ³	0
R-19 Roof insulation + attic venting ²	0
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
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