

# RESIDENTIAL CHECKLIST

## IECC 2015 with State Amendments



### SUPPLEMENTAL COUNTY CHECKLISTS

This checklist covers requirements of the 2015 IECC with State-adopted amendments. Supplemental checklists are available that identify requirements that are different in County-adopted versions of the code. See <https://energy.hawaii.gov/hawaii-energy-building-code>

### SCOPE

Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane. The code applies to new construction, additions and alterations. See a separate Commercial Checklist for high-rise residential and commercial buildings.

### RESIDENTIAL COMPLIANCE OPTIONS

Tropical Zone	Prescriptive	Simulated Performance Alternative	Energy Rating Index Compliance Alternative
Allowed when: 1. ≤50% air conditioned, 2. not heated, and 3. elevation < 2,400 feet.	Includes three options for walls and roof compliance: 1. Prescriptive 2. Total UA (typically with ResCheck software) 3. Points option (added by Hawaii amendment)	Simulated energy performance analysis for heating, cooling and SHW. Proposed design must have annual energy cost less than or equal to energy cost of reference design.	Third-party Home Energy Rating System (HERS) calculation. Allows the designer to pick and choose from many efficiency options. Scores range from 100 to 0. The 100 score indicates compliance with the 2006 IECC. Each efficiency measure beyond 2006 lowers the score. A passing score for Climate Zone 1 is 52.
See Tropical Zone Checklist below	See Prescriptive Checklist below. See Points Option tables below.	See code Section R405	See code Section R406

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## TROPICAL ZONE REQUIREMENTS CHECKLIST

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
<b>Tropical zone qualification</b>	<ul style="list-style-type: none"> <li>▪ ≤ 50% of occupied space has AC</li> <li>▪ No heating installed</li> <li>▪ Elevation &lt; 2,400 ft<sup>2</sup></li> </ul>	R401.2.1*†	Dwellings that do not meet all these criteria must use another compliance option.	<input type="checkbox"/> AC space clearly indicated (if applicable)
<b>Certification</b>	Responsible design professional certification on plans	R103.1*		<input type="checkbox"/> Signed statement on plans
<b>Construction documents</b>	Include: <ul style="list-style-type: none"> <li>▪ Insulation R-values</li> <li>▪ Fenestration U-factors and solar heat gain coefficients (SHGCs)</li> </ul>	R103.2		
<b>Water heating - solar</b>	Solar, wind or other renewable source supplies ≥ 90% of energy for water heating	R401.2.1*	Waiver for instant-on water heater permitted.	<input type="checkbox"/> Solar water heating system specs on plans
<b>Windows – solar heat gain coefficient (SHGC)</b>	≤ <b>0.25</b> if projection factor < 0.30 ≤ <b>0.40</b> if projection factor 0.30-0.50 N/A: projection factor ≥ 0.5. N/A: north windows if PF > 0.20	R401.2.1*	SHGC = solar heat gain factor.  Low SHGC typically requires dual-pane glazing with a low-emittance coating that is designed to reduce solar heat gain.  Projection factor = horizontal projection of overhang ÷ vertical distance from overhang to bottom of window.  Overhang must extend at least 2 ft on each side of the window or to the nearest wall, whichever is less.	<input type="checkbox"/> SHGC indicated on plans <input type="checkbox"/> Overhang dimensions on plans, if applicable
<b>Skylights – U-factor</b>	≤ <b>0.75</b>	R401.2.1*	Skylights must have dual-pane glazing.	<input type="checkbox"/> Skylight U-factor on plans
<b>Lighting</b>	≥ 75% of lamps or fixtures are high efficacy	R404.1	High efficacy lamps are defined as: <ul style="list-style-type: none"> <li>▪ T-8 or smaller diameter fluorescent</li> <li>▪ Compact fluorescent</li> <li>▪ 60 lumens/watt if &gt;40W</li> <li>▪ 50 lumens/watt if &gt;15W and ≤40W</li> <li>▪ 40 lumens/watt if ≤15W</li> </ul> Most, but not all, LED lamps will qualify. Applies to permanently-installed fixtures. Low-voltage lighting is exempt.	<input type="checkbox"/> Lighting fixture locations on plans <input type="checkbox"/> Lighting fixture schedule includes input power and lumen output

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
<b>Roof – insulation and membrane</b>	<input type="checkbox"/> <b>R-13</b> + cool roof, <input type="checkbox"/> <b>R-19</b> , or <input type="checkbox"/> <i>Points option (section R407)</i>	R401.2.1*	<p>Qualifying cool roof membranes must meet one of the following (per Table C402.3):</p> <ol style="list-style-type: none"> <li>Aged reflectance <math>\geq 0.55</math> &amp; aged thermal emittance <math>\geq 0.75</math></li> <li>Aged solar reflectance index (SRI) <math>\geq 0.64</math></li> </ol> <p>Qualifying cool roofs will typically be white in color. Typical options include white painted metal, white tile, white liquid applied coating, and white single-ply membranes.</p> <p>If present, attics above insulation must be vented and attics below insulation must be unvented.</p>	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans <input type="checkbox"/> Membrane specs on plans (if applicable)
<b>Roof – slope</b>	$\geq \frac{1}{4}$ in. per foot	R401.2.1*	No water accumulation areas allowed.	<input type="checkbox"/> Roof slope indicated on plans
<b>Walls and floor</b>	No requirement			
<b>Natural ventilation</b>	<ul style="list-style-type: none"> <li>Opening area <math>\geq 14\%</math> of floor area in each room.</li> <li>Bedrooms with exterior walls facing two different directions have operable fenestration facing two directions</li> <li>Interior doors to bedrooms capable of being secured open</li> </ul>	R401.2.1*	<p>Operable windows and/or skylights are required for natural ventilation.</p> <p>Ventilation fans can be provided as an alternative.</p>	<input type="checkbox"/> Operable openings on plans
<b>Ceiling fans</b>	Ceiling fans or rough-ins required for: <ul style="list-style-type: none"> <li>Each bedroom</li> <li>Largest space not used as a bedroom</li> </ul>	R401.2.1*		<input type="checkbox"/> Ceiling fan locations on plans
<b>Jalousie windows</b>	Infiltration rate $\leq 1.2$ cfm/sf	R401.2.1*	Manufacturer test data specs required for jalousies	<input type="checkbox"/> Jalousie specs on plans
<b>Air leakage</b>	Walls, floor and ceilings that separate AC spaces and non-AC spaces use air-tight construction	R401.2.1*	For air conditioned spaces, see section R402.4: <ul style="list-style-type: none"> <li>Continuous air barrier</li> <li>Breaks or joints are sealed</li> <li>Recessed lighting</li> <li>Fenestration air leakage</li> </ul>	<input type="checkbox"/> Plan notes indicate installation requirements

\* Code section added or modified by Hawaii amendment

† See Kauai County supplemental checklist

‡ See Maui County supplemental checklist

END OF TROPICAL ZONE CHECKLIST



## PRESCRIPTIVE REQUIREMENTS CHECKLIST

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
<b>Certification</b>	Responsible design professional certification on plans	R103.1*		<input type="checkbox"/> Signed statement on plans
<b>Construction documents</b>	Include: <ul style="list-style-type: none"> <li>▪ Insulation R-values</li> <li>▪ Fenestration U-factors and solar heat gain coefficients (SHGCs)</li> </ul>	R103.2		
<b>Roof – wood frame</b>	<input type="checkbox"/> <b>R-30</b> or <b>U-0.035</b> , <input type="checkbox"/> Total UA alternative, or <input type="checkbox"/> Points option	R402.1, R402.1.5, R407*	Some R-30 options: <ul style="list-style-type: none"> <li>• 10 in. batt insulation</li> <li>• 5 to 8 in. spray foam</li> </ul>	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans
<b>Roof – metal truss</b>	<input type="checkbox"/> <b>R-38</b> or <b>U-0.035</b> , <input type="checkbox"/> <b>R-30 + R-3</b> , or <input type="checkbox"/> <b>R-26 + R-5</b> , <input type="checkbox"/> Total UA alternative, or <input type="checkbox"/> Points option	R402.1, R402.2, R402.1.5, R407*	Metal frame creates a thermal bridge, and more insulation is required. “R-3” and R-5” refer to continuous insulation, typically foam board.	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans
<b>Roof – metal joist</b>	<input type="checkbox"/> <b>R-30</b> in 2x4, 2x6 or 2x8 framing, or <input type="checkbox"/> <b>R-49</b> in any framing <input type="checkbox"/> Total UA alternative, or <input type="checkbox"/> Points option	R402.1, R402.2, R402.1.5, R407*		<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans
<b>Wall – wood frame</b>	<input type="checkbox"/> <b>R-13</b> or <b>U-0.084</b> <input type="checkbox"/> Total UA alternative, or <input type="checkbox"/> Points option	R402.1, R402.1.5, R407*	Some R-13 options: <ul style="list-style-type: none"> <li>• 3.5 in. batt insulation</li> <li>• 2 to 3.5 in. spray foam</li> </ul>	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans
<b>Wall – metal frame</b>	Framing 16 in. on center: <input type="checkbox"/> <b>R-13 + R-4.2</b> <input type="checkbox"/> <b>R-19 + R-2.1</b> <input type="checkbox"/> <b>R-21 + R-2.8</b> Framing 24 in. on center: <input type="checkbox"/> <b>R-13 + R-3.0</b> <input type="checkbox"/> <b>R-15 + R-2.4</b> <input type="checkbox"/> Total UA alternative, or <input type="checkbox"/> Points option	R402.1, R402.2, R402.1.5, R407*	Requires insulation in framing cavity plus a layer of continuous insulation (typically foam board).	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans
<b>Wall – mass (CMU or concrete)</b>	<input type="checkbox"/> <b>R-3</b> exterior, <b>R-4</b> interior or <b>U-0.197</b> <input type="checkbox"/> Total UA alternative, or <input type="checkbox"/> Points option	R402.1	Requires either exterior or interior insulation, typically foam board. CMU integral insulation does not comply.	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
<b>Raised floor</b> – wood or concrete	<input type="checkbox"/> <b>R-13</b> or <b>U-0.064</b> <input type="checkbox"/> <i>Total UA alternative, or</i> <input type="checkbox"/> <i>Points option</i>	R402.1	(Note: counties are considering an amendment to remove the floor insulation requirement)	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans
<b>Raised floor</b> – metal frame	<input type="checkbox"/> <b>R-19</b> in 2x6 framing <input type="checkbox"/> <b>R-19 + R-6</b> in 2x8 or 2x10 framing <input type="checkbox"/> <i>Total UA alternative, or</i> <input type="checkbox"/> <i>Points option</i>	R402.1	(Note: counties are considering an amendment to remove the floor insulation requirement)	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans
<b>Slab-on-grade floor</b>	No requirement			
<b>Windows &amp; skylights</b>	SHGC ≤ <b>0.25</b> Area-weighted average permitted as long as no window or skylight has SHGC > 0.50. Up to 15 ft <sup>2</sup> exempt.	R402.3	SHGC is solar heat gain coefficient. Typically requires dual-pane glazing with a low-emittance coating that is designed to reduce solar heat gain. The 15 ft <sup>2</sup> exemption allows a small amount of clear glazing.	<input type="checkbox"/> SHGC indicated on plans
<b>Air leakage</b> – installation	<ul style="list-style-type: none"> <li>▪ Continuous air barrier</li> <li>▪ Breaks or joints are sealed</li> <li>▪ Recessed lighting</li> <li>▪ Fenestration air leakage</li> </ul>	R402.4	<ul style="list-style-type: none"> <li>▪ Applies to air-conditioned space.</li> <li>▪ Code includes a list of installation requirements.</li> <li>▪ Recessed lighting is IC rated and sealed.</li> <li>▪ Jalousie windows unlikely to comply</li> </ul>	<input type="checkbox"/> Plan notes indicate installation requirements
<b>Air leakage - testing</b>	Leakage ≤ 5 air changes per hour tested at pressure of 0.2 in. w.g. (50 Pascals)	R402.4.1.2	Written report required. Test is typically performed using a blower door.	<input type="checkbox"/> Plan notes indicate testing requirements
<b>AC controls</b>	Programmable thermostat	R403.1.1		<input type="checkbox"/> Thermostat included on plans
<b>Duct insulation</b>	In unconditioned attic: <b>R-8</b> for ducts ≥ 3 in. diameter <b>R-6</b> for ducts < 3 in. diameter Other locations: <b>R-6</b> for ducts ≥ 3 in. diameter <b>R-4.2</b> for ducts < 3 in. diameter Within building thermal envelope: <b>No requirements</b>	R403.3.1	Applies to both supply and return ducts. Typical insulation thickness: R-8: 3.0 in. duct wrap/flex. R-6: 2.2 in. duct wrap/flex. R-4.2: 1.5 in. duct wrap/flex.	<input type="checkbox"/> Insulation R-value on plans

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
<b>Duct testing</b>	Rough-in before air handler installed: ≤ <b>3 cfm/100 ft<sup>2</sup></b> at 0.1 in. w.g. (25 Pa) Rough-in after air handler installed: ≤ <b>4cfm/100 ft<sup>2</sup></b> at 0.1 in. w.g. (25 Pa) Postconstruction: ≤ <b>4cfm/100 ft<sup>2</sup></b> at 0.1 in. w.g. (25 Pa) (No testing required if ducts are located completely within the thermal envelope.)	R403.3.3, R403.3.4	Written test report to be delivered to the code official. Test typically performed with a “duct blaster”.	<input type="checkbox"/> Plan notes indicate testing requirements
<b>Water heating</b> – circulation systems	Pump required. Automatic controls required.	R403.5.1.1		<input type="checkbox"/> Controls indicated on plans
<b>Water heating</b> – heat trace systems	Automatic controls required	R403.5.1.2		<input type="checkbox"/> Controls indicated on plans
<b>Water heating</b> – demand recirculation systems	Control requirements	R403.5.2		<input type="checkbox"/> Controls indicated on plans
<b>Water heating</b> – pipe insulation	R-3 insulation for all the following pipe conditions: <ul style="list-style-type: none"> <li>• diameter ≥ ¾ in. diameter</li> <li>• serves more than one dwelling</li> <li>• outside conditioned space</li> <li>• from water heater to manifold</li> <li>• under floor slab</li> <li>• buried</li> <li>• circulation systems</li> </ul>	R403.5.3	R-3 pipe insulation is typically ½ in. thick.	<input type="checkbox"/> Insulation location on plans <input type="checkbox"/> Insulation R-value on plans
<b>Water heating</b> – solar systems	Required for new single-family	R403.5.5*	Hawaii amendment to 2015 IECC. Solar water heating required on new single-family homes per existing state law.	<input type="checkbox"/> Solar water heating system shown on plans.
<b>Pools and permanent spas</b>	Heaters. Electric power switch required. No gas pilot. Automatic time switches on heater and pumps. Covers required (except with solar heating) Comply with APSP-15 standard.	R403.10 R403.12		<input type="checkbox"/> Controls on plans <input type="checkbox"/> Cover on plans

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
<b>Lighting</b>	≥ 75% of lamps or fixtures are high efficacy	R404.1	High efficacy lamps are defined as: <ul style="list-style-type: none"> <li>▪ T-8 or smaller diameter fluorescent</li> <li>▪ Compact fluorescent</li> <li>▪ 60 lumens/watt if &gt;40W</li> <li>▪ 50 lumens/watt if &gt;15W and ≤40W</li> <li>▪ 40 lumens/watt if ≤15W</li> </ul> Most, but not all, LED lamps will qualify. Applies to permanently-installed fixtures. Low-voltage lighting is exempt.	<input type="checkbox"/> Lighting fixture locations on plans <input type="checkbox"/> Lighting fixture schedule includes input power and lumen output
<b>Ceiling fans</b>	A ceiling fan or ceiling fan rough-in is provided for bedrooms and the largest space that is not used as bedroom.	R404.2*	Added by Hawai'i amendment.	<input type="checkbox"/> Ceiling fan locations on plans

\* Code section added or modified by Hawaii amendment

END OF PRESCRIPTIVE CHECKLIST



## RESIDENTIAL ADDITIONS AND ALTERATIONS CHECKLIST

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
<b>Additions</b>	<p>Requirements for new construction apply to additions.</p> <p>Unaltered portions of the existing building are not required to comply.</p>	R502	<p>New construction requirements apply to all these elements if they are part of an addition:</p> <ul style="list-style-type: none"> <li>▪ Building envelope assemblies</li> <li>▪ New HVAC systems and components</li> <li>▪ New water heating systems</li> <li>▪ New lighting systems</li> </ul> <p>As an alternative, the Simulated Performance Alternative can be use for the combination of the existing building and addition.</p>	See requirements for new construction
<b>Alterations – roof recover</b>	No requirements	R503.1.1		
<b>Alterations – roof replacement</b>	<p>Meet requirements for new construction (see separate checklist), with the following exceptions:</p> <ol style="list-style-type: none"> <li>1. Where sheathing or insulation is not exposed during construction</li> <li>2. Ceiling cavity is filled with insulation</li> <li>3. Roof meets a minimum of two efficiency measures. See list to the right</li> </ol>	R503.1.1*	<p>Compliance option for roofs; choose two or more from this list:</p> <ol style="list-style-type: none"> <li>1. Energy Star compliant roof covering</li> <li>2. Radiant barrier</li> <li>3. Attic ventilation via solar attic fans or ridge ventilation or gable ventilation</li> <li>4. A minimum of two exceptions (listed in C402.3) for portions of the roof that include or are covered by the following: <ul style="list-style-type: none"> <li>▪ Photovoltaic systems or components.</li> <li>▪ Solar air or water-heating systems or components.</li> <li>▪ Roof gardens or landscaped roofs.</li> <li>▪ Above-roof decks or walkways.</li> <li>▪ Skylights.</li> <li>▪ HVAC systems and components, and other opaque objects mounted above the roof.</li> </ul> </li> </ol>	
<b>Alterations – walls</b>	<p>Meet requirements for new construction (see separate checklist), with the following exceptions:</p> <ol style="list-style-type: none"> <li>1. Wall cavity is not exposed</li> <li>2. Wall cavity is filled with insulation</li> </ol>	R503.1.1		

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
<b>Alterations – windows and skylights</b>	<p>No requirements for glazing-only repairs of existing windows and skylights</p> <p>New construction requirements for solar heat gain coefficient (SHGC) apply for replacements that include sash and glazing.</p>	R504		
<b>Alterations – air conditioning</b>	New systems and components meet new construction requirements, except for duct extensions of less than 40 ft in unconditioned space	R503.1.2		
<b>Alterations - lighting</b>	New lighting systems meet new construction requirement (high efficacy) unless fewer than 50% of fixtures are replaced and total lighting power does not increase.	R503.1.4		

\* Code section added or modified by Hawaii amendment

END OF ADDITIONS AND ALTERATIONS CHECKLIST

## POINTS OPTION

The Points Option is an alternative to the prescriptive compliance for residential walls and roofs. This option is added to the energy code by Hawai'i amendment as Section R407.

Select one or more efficiency measures for the roof and walls so that the total score  $\geq 0$ . Roof and walls may comply separately.

There are two columns: one for dwellings following the standard prescriptive compliance path and another for dwellings following the Tropical Zone compliance path.

### Points Option for Dwellings with Wood-Framed Walls

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

See next page for notes

## Points Option for Dwellings with Metal-Framed Walls

Measure	Standard Home Points	Tropical Home Points
R-13 +R 3 Wall Insulation	0	1
R-13 cavity Wall insulation + R-0	-1	0
R-13 Wall Insulation + high reflectance walls <sup>4</sup>	0	1
R-13 wall insulation + 90% high efficacy lighting and Energy Star Appliances <sup>5</sup>	1	2
R-13 Wall Insulation + exterior shading wpf=0.3 <sup>6</sup>	0	1
R-30 Roof Insulation	0	1
R-19 Roof Insulation	-1	0
R-19 + Cool roof membrane <sup>1</sup> or Radiant Barrier <sup>3</sup>	0	1
R-19 Roof Insulation + Attic Venting <sup>2</sup>	<u>0</u>	<u>1</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	<u>Not Applicable</u>	<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>

### Notes:

<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.