COMMERCIAL CHECKLIST
2018 IECC with Maui Amendments

HAWAIʻI STATE ENERGY OFFICE

Hawaii Energy
YOUR CONSERVATION & EFFICIENCY PROGRAM

This checklist covers requirements of the Maui Energy Conservation Code, approved November 23, 2022. This code is an amended version of the 2018 International Energy Conservation Code (IECC), with Maui amendments applied to the State amended version (December 15, 2020).

- State amendments: https://energy.hawaii.gov/hawaii-building-energy-code
- Subsequent Maui amendments: https://www.mauicounty.gov/1308/Building-Plans-Review-Section
- View the 2018 IECC here: https://codes.iccsafe.org/content/iecc2018

Red text in this checklist indicates changes compared to the IECC with State amendments

SCOPE

Commercial and high-rise residential buildings. More specifically, all buildings except 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 Residential Checklist for low-rise residential buildings.

COMMERCIAL COMPLIANCE OPTIONS

Prescriptive	Total Building Performance Alternative	ASHRAE Standard 90.1-2016
Separate requirements for envelope, mechanical systems, water heating systems, lighting and electrical systems. Also includes “additional efficiency” requirements. Includes solar-ready zone and electric vehicle infrastructure requirements	Simulated energy performance analysis for heating, cooling, lighting and SHW. Proposed design must have annual energy cost less than or equal to energy cost of reference design. Includes solar-ready zone requirements	Includes both prescriptive and performance compliance options.
See prescriptive and additional efficiency checklists below	See code Section C407	See separate standard, available from www.ashrae.org

CHECKLIST CONTENTS

Sponsor: State of Hawaii, Department of Business, Economic Development and Tourism
Acknowledgment: This material is based upon work supported by the Department of Energy under Award Number SE0000134

COMMERCIAL CHECKLIST
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ENVELOPE REQUIREMENTS

HAWAIʻI STATE ENERGY OFFICE

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Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
ENVELOPE REQUIREMENTS				
Roof – insulation above deck	☐ **R-25** or **U-0.039** (group R) ☐ **R-20** or **U-0.048** (others) At least two insulation layers, with staggered edge joints	C402.1, C402.2.1	Typically foam board on the roof deck. If tapered, R-value in some areas can be lower than the requirement if designer shows that weighted-average U-factor complies. Two layers not required where insulation tapers to the roof deck, such as near a drain.	☐ Insulation location on plans ☐ Insulation R-value on plans
Roof – metal building	**R-19 + R-11** or **U-0.044** (with thermal block and liner system)	C402.1, C402.2	Typically two layers of batt insulation. One parallel to and between purlins supported by fabric liner. The second draped over purlins and compressed when roof deck is installed. Also with R-5 foam block between purlins and metal roof deck.	☐ Insulation R-value on plans ☐ Thermal block indicated on plans
Roof – attic or other	**R-38** or **U-0.027**	C402.1, C402.2	This category includes attics, cathedral ceilings, and insulation installed under the roof deck. Insulation on top of suspended ceiling is not allowed for compliance.	☐ Insulation location on plans ☐ Insulation R-value on plans
Roof – skylight curbs	**R-5** minimum	C402.2.1.1	Unit skylights with U-factor labeled per NFRC 100 do not need insulated curb	☐ Insulation location on plans ☐ Insulation R-value on plans
Wall – mass (CMU or concrete)	**R-5.7** or **U-0.151** Insulation not required where: ▪ light reflectance ≥ 0.64, ▪ shading PF ≥ 0.3 ▪ thickness ≥ 6 inches	C402.1, C402.2 C402.2.2*	Requires either exterior or interior insulation. CMU integral insulation does not comply. State amendment provides exceptions.	☐ Insulation location on plans ☐ Insulation R-value on plans
Wall – metal building	**R-13 + R6.5** or **U-0.079** (R-6.5 continuous insulation not required with light reflectance ≥0.64 or shading PF ≥ 0.3)*	C402.1, C402.2	Typically two layers of batt insulation. One installed horizontally between girts. The second layer draped outside the girts and compressed as the wall panel is installed. State amendment provides exceptions.	☐ Insulation shown on plans ☐ Insulation R-value on plans
Wall – metal frame	**R-13 + R-5** or **U-0.077** (R-5 continuous insulation not required with light reflectance ≥0.64 or shading PF ≥ 0.3)*	C402.1, C402.2*	Requires insulation in framing cavity plus a layer of continuous insulation (typically foam board). Cavity insulation complies on its own with shading or high reflectance. State amendment provides exceptions.	☐ Insulation location on plans ☐ Insulation R-value on plans ☐ Shading or wall reflectance shown (if exception is applied)

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Wall – wood frame and other	**R-13 + R3.8** or **R-20** or **U-0.064** (R-3.8 not required with light reflectance ≥0.64 or shading PF≥0.3)*	C402.1, C402.2*	2x4 requires cavity insulation plus continuous insulation (with exception for shading or high reflectance). 2x6 OK with R-20 cavity insulation. State amendment provides exceptions.	☐ Insulation location on plans ☐ Insulation R-value on plans ☐ Shading or wall reflectance shown (if exception is applied)
Door - swinging	**U-0.61**	C402.1	Most hollow or filled-core opaque metal or wood doors comply.	
Door – non-swinging	**R-4.75**	C402.1	Insulated door required for roll-up and sliding applications.	☐ Insulated door shown on plans ☐ Door R-value on plans or specs
Door – garage <14% glazing	**U-0.31**	C402.1	Insulated door required	
Low-slope roof membrane	**Aged solar reflectance ≥0.55 + aged emittance ≥0.75**, or **aged solar reflectance index ≥0.64** (exceptions available)	C402.3	For roofs less than 2-in-12 slope and directly above conditioned space. Exceptions such as shaded roofs and portions covered by PV or solar water heating.	☐ Aged reflectance and emittance shown in plans or specs
Windows – maximum area	**≤ 30%** of gross wall area (≤ 40% when meeting daylighting requirements)	C402.4.1	Daylighting requirements for 40%: ▪ ≥50% daylighted floor area (≤ 2 stories) or ≥25% daylighted floor area (> 2 stories) ▪ Daylight responsive lighting controls ▪ Glazing visible transmittance ≥ 1.1*SHGC If the project cannot comply with the prescriptive limit on window area, then it must comply with Section C407 Total Building Performance.	☐ ≤30% window area Or ☐ ≤40% window area, and ☐ meets daylighting requirements
Windows– solar heat gain coefficient (SHGC) – east, south, west	≤ **0.25** if projection factor < 0.2. ≤ **0.30** if projection factor 0.2-0.5. ≤ **0.40** if projection factor ≥ 0.5. (Area-weighted average permitted)* Jalousie windows exempt*	C402.4.3*	Projection factor = horizontal projection of overhang ÷ vertical distance from overhang to bottom of window. Area-weighted average SHGC allowed (by Hawaii amendment).	☐ SHGC indicated on plans ☐ Overhang dimensions on plans, if applicable
Windows – solar heat gain coefficient (SHGC) – north	≤ **0.33** if projection factor < 0.2. ≤ **0.37** if projection factor 0.2-0.5. ≤ **0.40** if projection factor ≥ 0.5. (Area-weighted average permitted)* Jalousie windows exempt*	C402.4.3*		☐ SHGC indicated on plans ☐ Overhang dimensions on plans, if applicable
Windows – U-factor	≤ **0.50** fixed fenestration ≤ **0.65** operable fenestration ≤ **1.10** entrance doors (Area-weighted average permitted)	C402.4.3	U-factor must include glazing and frame, not just center-of-glass. Typically requires dual-pane, low-e glazing. Metal frame ok. Entrance doors can be single-pane.	☐ U-factor indicated on plans

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Skylights – minimum area	Skylights and daylight responsive controls required for certain spaces ≥2,500 ft^2 with ceiling height ≥15 ft.	C402.4.2	Required for following space types: office, lobby, atrium, concourse, corridor, storage space, gymnasium/exercise center, convention center, automotive service area, space where manufacturing occurs, nonrefrigerated warehouse, retail store, distribution/sorting area, transportation depot or workshop. Several exceptions, including when lighting power <0.5 W/sf.	☐ Adequate skylight area shown on plans (if applicable) ☐ Daylight responsive lighting controls shown on plans (if applicable)
Skylights – maximum area	**≤ 3%** of gross roof area (≤ 6% when meeting daylighting requirements)	C402.4.1.2	Up to 6% allowed when space under the skylight has daylight-responsive controls. If the project cannot comply with the prescriptive limit on skylight area, then it must comply with Section C407 Total Building Performance.	
Skylights – solar heat gain coefficient (SHGC)	**≤ 0.35** (≤ 0.60 with daylighting control)	C402.4.3	Area-weighted average SHGC allowed (by Hawaii amendment). Higher SHGC allowed if space has daylight-responsive lighting control.	☐ SHGC indicated on plans
Skylights – U-factor	**≤ 0.75** (≤ 0.90 with daylighting control)	C402.4.3	Higher U-factor allowed if space has daylight-responsive lighting control.	☐ U-factor indicated on plans
Air leakage	▪ Continuous air barrier ▪ Fenestration air leakage ▪ Openings to shafts, chutes, stairways and elevator lobbies ▪ Air intakes, exhaust openings, stairways, and shafts. ▪ Loading-dock weatherseals ▪ Recessed lighting	C402.5	▪ Code includes a list of acceptable air barrier materials. ▪ Max. fenestration leakage rates in Table C402.5.2. ▪ Openings to shafts, chutes, stairways and elevator lobbies are gasketed, weather-stripped or sealed. ▪ Air intakes, exhaust openings, stairways, and shafts have dampers. ▪ Loading-dock doors have weatherseals. ▪ Recessed lighting is IC rated and sealed.	

* Code section added or modified by State amendment

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
MECHANICAL SYSTEM REQUIREMENTS				
Mechanical system commissioning	For buildings with ≥480kBtu/hr cooling capacity: ▪ Include construction document notes indicating commissioning requirements ▪ Provide evidence of commissioning prior to final inspection.	C408.2	Likely to apply to air-conditioned buildings of about 20,000 sf or larger. Plans may refer to specifications for detailed commissioning requirements. Requires: ▪ Commissioning plan ▪ Systems adjusting and balancing ▪ Functional performance testing ▪ Preliminary commissioning report ▪ Final commissioning report	☐ Notes on plans indicate commissioning requirements
Zone isolation	HVAC systems that serve more than 25,000 ft^2 or more than one floor and that also serve areas with different operating schedules must include isolation devices and controls. Some exceptions.	C403.2.1	The intent is that the system is able to shut off conditioning to non-occupied zones while continuing to supply conditioning to occupied zones.	☐ Isolation devices and controls on plans, if applicable
Ventilation	Outdoor air ventilation per IMC (International Mechanical Code)	C403.2.2	Natural or mechanical ventilation required for all spaces.	☐ Outdoor air ventilation rates listed on plans
HVAC equipment performance	Tables C403.3.2(1) - C403.3.2(9)	C403.3.2	Cooling efficiency rated by SEER, EER, or kW/ton. Requirement varies by equipment type and cooling capacity. ▪	☐ Cooling efficiency listed on plans ☐ Cooling capacity listed on plans
Hot gas bypass	Not allowed unless multiple steps or continuous cooling capacity unloading provided	C403.3.3	Per Table C403.3.3 ≤240kBtu/hr – 50% max. hot gas bypass >240kBtu/hr – 25% max.	

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Thermostatic controls and off-hour controls	▪ Thermostat required ▪ Cooled vestibule setpoint ≥85F ▪ Automatic setback and shutdown ▪ Automatic start	C403.4.1 C403.4.2	Automatic controls must be capable of seven different daily schedules and retain programming during power loss up to 10 hours. Automatic start controls must be configured to automatically adjust the daily start time of the HVAC system in order to bring each space to the desired occupied temperature immediately prior to scheduled occupancy. Off-hour controls not required for: ▪ Zones that are operated continuously ▪ Zones with cooling demand <6,800 Btu/hr	☐ Appropriate controls indicated on plans
Hydronic part-load controls	For systems ≥300 kBtu/hr ▪ Supply water temperature reset ▪ Variable flow and variable speed pumps	C403.4.4	▪ Reset supply temperature by at least 25% of design delta-T. Some exceptions. ▪ Variable-flow required for CHW loops and heat-rejection loops for water-cooled air conditioners that have ≥2 hp pump power and ≥3 control valves. ▪ Variable-speed drive required for pumps ≥2 hp (exception for primary pumps needed to meet equipment manufacturer requirements for minimum flow)	☐ Pump control on plans (if applicable)
Pump isolation	For plants with multiple parallel chillers, automatically reduce flow through chillers that shut down	C403.4.5		☐ Pump control on plans (if applicable)
Multiple-zone systems	▪ Variable air flow ▪ Supply air temperature reset control ▪ Static pressure reset control	C403.4.6	▪ Reheat not permitted except when airflow is reduced to a minimum level specified in the code (limits changed in 2018 IECC and dual-maximum VAV box control required, with some exceptions). ▪ Supply air temperature reset required for systems with reheat (with some exceptions) ▪ Reset duct static pressure setpoint based on zone damper positions, for systems with DDC. ▪ Locate duct static pressure sensor so that setpoint is not greater than 1.2 in. w.c.	☐ VAV box max. and min. airflow shown on plans (if applicable) ☐ Sequence of operations includes supply air temperature and static pressure reset (if applicable)
Demand control ventilation	Demand controlled ventilation	C403.7.1	Required for spaces meeting all these conditions: ▪ Space > 500 ft^2 ▪ Occupant load ≥25 people per 1000 ft^2 ▪ System outdoor airflow >3,000 cfm Some exceptions	☐ Controls provided (if applicable)
Parking garage ventilation	Parking garage ventilation control	C403.7.2	Automatic fan control required for enclosed parking garages in many cases.	
Energy recovery	Energy recovery effectiveness ≥ 50%	C403.7.4	Energy recovery required in many cases, depending on supply air flow, ventilation rate and operating hours (Table C403.7.4)	☐ Energy recovery device specs on plans

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Kitchen exhaust	▪ Limit on direct makeup air in hood. ▪ For flow > 5,000 cfm o UL listed hoods required o Limit on cfm/ft o Additional requirements	C403.7.5	▪ Kitchen exhaust systems allowed ≤10% replacement air directly into hood. ▪ For kitchens > 5,000 cfm exhaust, UL listed hoods are required plus one of the following is required: 1) transfer air ≥50%, 2) demand-control ventilation, or 3) energy recovery	☐ Kitchen hood and exhaust fan specs on plans
Guest room controls	▪ Door switches for guest-rooms* ▪ Temperature setpoint controls ▪ Ventilation controls	C403.2.3* C403.7.6	State amendment for 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. In addition, automatic occupancy-based control of guestroom temperature setpoint and ventilation and exhaust fans required for buildings with more than 50 guestrooms. (C403.7.6)	☐ Appropriate controls indicated on plans
Shutoff dampers	Dampers required on outdoor air intake and exhaust openings and stairway and shaft vents	C403.7.7	Gravity dampers allowed in Hawaii's climate zone. Max. leakage at 1.0 in w.g.: ▪ ≤20 cfm/ft^2 for dampers ≥ 24 in. ▪ ≤40 cfm/ft^2 for dampers < 24 in.	
HVAC fans	When fan motors' total hp ≥ 5hp ▪ Allowable fan horsepower ▪ Motor nameplate horsepower ▪ Fan efficiency ▪ Fraction hp fan motors	C403.8	▪ Allowed fan hp = function of airflow. ▪ Nameplate hp limited to smallest that meets bhp requirement ▪ Fan efficiency grade ≥67; some exceptions ▪ Fractional hp motors (1/12 ≤ hp < 1hp) must be electronically commutated motors (ECMs); some exceptions	☐ Hp or bhp for all supply, return, exhaust, and terminal-unit fans on plans. ☐ Airflow for all fans on plans.
Fan airflow control	Two-stage or variable airflow control	C403.8.5	At least 2-stage fan control required: ▪ DX cooling ≥ 65kBtu/hr ▪ Chilled water systems ≥0.25 hp fan	☐ Fan control on plans (if applicable)
Heat rejection equipment fan speed control and fan type	▪ Speed control for cooling tower fans ≥ 5 hp ▪ Multiple-cell cooling tower fan control ▪ Limitation on centrifugal fan open-circuit cooling towers ▪ Tower flow turndown	C403.9	▪ Cooling tower fans ≥5hp required to have multi-speed or variable-speed control; some exceptions. ▪ Multiple-cell towers with variable speed fans controlled to run maximum number of cells	☐ Cooling tower fan motor hp on plans ☐ Fan control on plans (if applicable)

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Heat recovery for service water heating	Condenser heat recovery for systems operating 24 hr/day with water-cooled cooling capacity ≥6,000 kBtu/hr and service water heating load ≥1,000 kBtu/hr	C403.9.5	Most typically applies to hotels, high-rise residential buildings, and hospitals.	
Refrigeration systems	▪ Refrigeration equipment performance ▪ Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and freezers ▪ Refrigerated display cases ▪ Condenser requirements ▪ Compressor requirements	C403.10	See code for specific requirements for commercial refrigeration systems.	☐ Refrigeration equipment kWh/day rating on plans
Duct and plenum insulation	≥ R-6 in unconditioned space ≥ R-8 outdoors	C403.11.1		☐ Duct insulation R-value on plans
Duct and plenum sealing	Constructed and sealed per IMC	C403.11.2		
Piping insulation and protection	▪ Minimum thickness per Table C403.11.3. ▪ Protection for piping insulation exposed to weather.	C403.11.3		☐ Pipe insulation thickness on plans

* Code section added or modified by State amendment

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
SERVICE WATER HEATING REQUIREMENTS				
System commissioning	For buildings with ≥600kBtu/hr combined space heating and service water heating capacity: ▪ Include construction document notes indicating commissioning requirements ▪ Provide evidence of commissioning prior to final inspection.	C408.2	Likely to apply to buildings with significant hot water demand such as high-rise residential, hotels, and hospitals. Plans may refer to specifications for detailed commissioning requirements. Requires a commissioning plan.	☐ Notes on plans indicate commissioning requirements
Service water-heating equipment efficiency	Efficiency per Table C404.2	C404.2	Table covers electric resistance, heat pump, storage gas, instantaneous gas, and pool heaters.	☐ Equipment capacity and efficiency listed on plans
Heat traps for hot water storage tanks	For storage water heaters and hot water storage tanks in non-circulating systems provide equipment with integral heat traps or provide heat traps on supply and discharge piping.	C404.3	Intent is to prevent thermosiphoning in non-circulating systems. Heat trap may be integral to the water heater. May be a 180 degree bend in inlet and outlet pipe.	☐ Heat trap(s) indicated on plans (if applicable)
Hot water pipe insulation	Insulation thickness per Table C403.11.3: ▪ 1" for pipes <1½" diameter ▪ 1½" for pipes ≥1½" diameter Circulating systems: all supply pipe. Non-circulating storage systems: first 8 ft from tank (or from tank to heat trap) on inlet and outlet.	C404.4		☐ Insulation location and thickness indicated on plans
Maximum hot water supply pipe length or volume	Table C404.5.1 lists maximum hot water supply pipe length or volume, which varies with pipe diameter. Alternatively, insulate pipe	C404.5	These limits apply to the length of pipe from the source of hot water to the fixture supply pipe. The source might be a water heater or could also be a hot-water circulation loop. Allowed length for pipes to public lavatories is much shorter than for other fixtures, ranging from 6' for ¼" pipe to only 0.5' for ¾" or larger pipe.	☐ Maximum hot water pipe length indicated on plans

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Circulation system controls	Automatic controls to start pump based on demand and to automatically shut off pump based on temperature and on lack of demand	C404.6.1	Automatic control turns on circulation pump based on demand, such as with a flow sensor. Automatic controls turn off circulation pump when water in the loop is at the desired temperature. Controls must be accessible.	☐ Automatic controls indicated on plans
Demand recirculation system controls	Controls limit the temperature of water entering the cold water pipe to ≤104°F	C404.7	A demand recirculation system has a pump that recirculates water from a hot water supply pipe back to the water heater through a cold water supply pipe. The pump is activated based on a signal from a user or an appliance and must be controlled so that the temperature of water entering the cold water supply pipe does not exceed 104°F.	☐ Controls indicated on plans
Pool and spas	▪ Readily accessible on/off switch ▪ No continuous pilot light ▪ Time switch for heater and pumps ▪ Pool covers required, except with >75% site-recovered heat	C404.9	Site recovered heat for the purpose of the pool cover exception may be a heat pump or an on-site renewable energy system	☐ Readily accessible pool heater on/off switch ☐ Time switch on heater and pump ☐ Pool cover or ☐ site-recovered heat

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Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
LIGHTING AND ELECTRICAL REQUIREMENTS				
Lighting system functional testing	Prior to final inspection the registered design professional provides evidence of testing. ▪ Occupant sensor controls ▪ Time-switch controls ▪ Daylight responsive controls Construction documents specify that drawings, manuals and test report be provided to the owner within 90 days of certificate of occupancy.	C408.3	Intent is 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	☐ Plans indicate that functional test certification documents will be provided to owner ☐ Registered design professional provides evidence of testing
Dwelling unit lighting in multi-family buildings	Lighting equipment ≥90% high efficacy lamps	R404.1	High efficacy lamps are defined as: ▪ T-8 or smaller diameter fluorescent ▪ Compact fluorescent ▪ 60 lumens/watt if >40W ▪ 50 lumens/watt if >15W and ≤40W ▪ 40 lumens/watt if ≤15W Applies to permanently-installed fixtures. Low-voltage lighting is exempt.	☐ Lighting fixture locations on plans ☐ Lighting fixture schedule includes input power and lumen output ☐ Plans show ≥90% high efficacy lamps
Dwelling unit in other than multi-family buildings	Lighting power ▪ High efficacy lamps ≥90% per R404.1 or ▪ Allowed power per C405.3 Controls ▪ Occupancy sensor or multi-level control	R404.1 C405.2.4 C405.3	Allows choice of lighting power compliance options. DWELLING UNIT. A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.	☐ Lighting fixture locations on plans ☐ Lighting fixture schedule includes input power and lumen output ☐ Plans show ≥90% high efficacy lamps (if applicable)

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Sleeping unit lighting	Lighting power ▪ High efficacy lamps ≥90% per R404.1 or ▪ Allowed power per C405.3 Controls ▪ Auto-off control for permanent lights and switched receptacles	R404.1 C405.2.4 C405.3	SLEEPING UNIT. A room or space in which people sleep, that can include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are part of a dwelling unit are not sleeping units.	☐ Lighting fixture locations on plans ☐ Lighting fixture schedule includes input power and lumen output ☐ Plans show ≥90% high efficacy lamps (if applicable)
Controls - occupant sensor	Required in many specific spaces. Manual-on type required in most cases.	C405.2.1	Required in these space types: 1. Classrooms/lecture/training rooms. 2. Conference/meeting/multipurpose rooms. 3. Copy/print rooms. 4. Lounges/breakrooms 5. Enclosed offices. 6. Open plan office areas. 7. Restrooms. 8. Storage rooms. 9. Locker rooms. 10. Other spaces 300 sf or less that are enclosed by floor-to-ceiling height partitions. 11. Warehouse storage areas	☐ Occupant sensor controls on plans, where applicable
Controls - time-switch	Required where occupant sensors are not used. Specific spaces exempt but must use light-reduction controls.	C405.2.2	Time switch controls not required in the following spaces if manual light-reduction controls are used: 1. Spaces where patient care is directly provided. 2. Spaces where an automatic shutoff would endanger occupant safety or security. 3. Lighting intended for continuous operation. 4. Shop and laboratory classrooms.	☐ Time switch controls on plans, where applicable
Controls – light reduction	Required where occupant sensors are not used. Requires manual control to allow occupant to reduce lighting power by at least 50%	C405.2.2.2	Requires reasonably uniform illumination at the reduced light level. Not required for daylighted zones that meet the control requirements in C405.2.3	☐ Circuiting or controls on plans indicate multi-level control

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Controls - daylight-responsive	Required in spaces with ≥150W of lighting within daylit zones. Some exceptions, such as patient care areas and ground-floor retail. Exception for new buildings where the project's total lighting power is below a limit defined by an equation. Definitions provided for sidelit and toplit daylight zones.	C405.2.3	**Sidelit daylight zone** is the floor area adjacent to windows with a depth equal to the window head height and width equal to two feet to either side of the window. **Toplit daylight zone** is the floor area under a skylight extending to 0.7 times the ceiling height on all sides of the skylight. (See the code for further details and exceptions) The exception for new buildings set a limit based on the fraction of floor area in daylight zones, and ranges from 100% to 60% of the normal lighting power allowance.	☐ Automatic daylight responsive lighting controls indicated, where applicable
Controls – display & accent lighting	Display lighting, accent lighting and display-case lighting controlled separately from general lighting and include either occupancy sensor control or time-switch control	C405.2.4		☐ Controls indicated on plans
Controls – sleeping units	Shall have master control to automatically switch off luminaires and switched receptacles within 20 minutes after all occupants leave the unit	C405.2.4	Applies to hotel and motel timeshare sleeping units and guest suites. Rooms for patient care excepted. Typically key-card or motion-sensor based controls.	☐ Controls indicated on plans
Controls – dwelling units	Permanently installed luminaires have occupancy sensor control or light reduction control	C405.2.4	Applies to dwelling units that are not in multi-family buildings. If occupancy sensor control is not provided, then controls are required that reduce lighting power by at least 50%. Manual dimming controls would comply.	☐ Controls indicated on plans
Exterior lighting controls	Photo cell and time-based control required. ▪ For façade and landscape lighting, automatic on/off off-hour required. ▪ Otherwise, automatic reduction ≥30% required during off-hours. ▪ Some exceptions apply.	C405.2.6	Automatically turn off lights as a function of daylight. In addition: ▪ Façade and landscape lighting off no later than 1 hour after closing and on no earlier than 1 hour before opening. ▪ For all others controls automatically reduce lighting power by ≥30% from midnight to 6am (or other options).	☐ Controls indicated on plans

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Total connected interior lighting power	Includes input power for all proposed luminaires, with exceptions for some lighting applications. Specifies how power is to be determined for different types of luminaires	C405.3.1	In general, use the rated input power for the luminaire. Track lighting is a special case, where the input power shall be one of the following ▪ Wattage of luminaires, but not less than 8 watts per linear foot ▪ The wattage limit of a permanent current-limiting device ▪ The wattage limit of the transformer	☐ All fixtures located and identified on plans ☐ Fixture schedule includes input power for each fixture
Interior lighting power allowance	Total connected power shall be no greater than allowance. Two calculation methods for allowance: ▪ Building area method ▪ Space-by-space method (includes extra allowance for retail and decorative lighting)	C405.3.2	Though not required by code, ideally the designer includes a table on the plans showing the allowed lighting power calculation (listing space types and floor areas) along with a total of the connected lighting power.	
Exterior building lighting power	Maximum allowed power listed in Table C405.4.2(2) includes base allowance plus allowances for lighted areas. Additional individual lighting power allowances in Table C405.4.3(3) may be applied only to luminaires serving those applications, such as drive-up windows. Allowances vary by lighting zone per Table C405.5.2(1)	C405.4.2	Though not required by code, ideally the designer includes a table on the plans showing the allowed lighting power calculation separately for the standard exterior lighting allowance and for the individual lighting power allowances along with a total of the connected exterior lighting power.	☐ All fixtures located and identified on plans ☐ Fixture schedule includes input power for each fixture
Gas lighting	Continuously burning pilot ignition system prohibited	C405.4.3		
Electricity meters	Each dwelling unit in R-2 building has a separate electric meter.	C405.5		☐ Meters indicated on plans
Electrical transformers	Electric transformers meet efficiency requirements of Table C405.6. Some exceptions apply.	C405.6	See code for list of exempted types of transformers.	☐ Transformer efficiency indicated on plans
Electrical motors	Electric motors meet the efficiency requirements of Tables C405.7(1)-(4)	C405.7		☐ Electric motor efficiency indicated on plans

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Vertical and horizontal transportation systems	▪ Elevator cab lighting ≥35 lumens/watt. ▪ Elevator cab fan ≤0.33 W/cfm. ▪ Escalator and moving walkway automatic speed control. ▪ Escalator regenerative drive.	C405.8	Elevator cab lighting will need to be fluorescent or LED.	
Voltage drop in feeders and branch circuits	Voltage drop ≤5%	C405.9		
Electrical sub-metering	In new buildings with tenants, metering shall be collected for the entire building and individually for each tenant occupying ≥1,000 ft² (total enclosed and unenclosed). Tenants shall have access to data collected for their space.	C405.10*	Hawaii amendment.	☐ Meters indicated on plans
Solar-ready zone	▪ Area reserved for future installation of solar photovoltaic or solar thermal system ▪ Pathways for routing of conduit or plumbing ▪ Electric panel reserved space ▪ Permanent certificate near electrical panel	C405.10† App. CA	Applicable for buildings ≤ 5 stories. Exceptions: ▪ Building with permanently installed renewable system ▪ Building where solar-ready zone is shaded for more than 70% of daylight hours annually ▪ When a licensed design professional certifies that incident solar radiation is not suitable or the solar ready area cannot be met because of extensive rooftop equipment, skylights, vegetative roof area or other obstructions Minimum solar ready zone area: ▪ 40% of horizontally projected roof area exclusive of skylights, occupied roof decks, vegetative areas, and mandatory setback and access required by fire code. Solar ready area orientation is between 110° (east-southeast) and 270° (west) from north or is on low-slope roof. Roof load calculation and documentation requirements.	☐ Solar ready zone ☐ Roof load ☐ Conduit/piping routing pathway

* Code section added or modified by State amendment

† Code section added or modified by Maui amendment

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
ADDITIONAL EFFICIENCY REQUIREMENTS				
Requirements	Project must meet the electric vehicle (EV) infrastructure requirement in C406.10 and at least one of the following requirements in C406.2 to C406.9.	C406.1†	Maui amendment adds the requirement for EV infrastructure. In addition, new construction projects must meet at least one of the other additional efficiency requirements.	
More efficient HVAC equipment	10% better than minimum efficiency	C406.2	Requires cooling efficiency at least 10% better than code. In the case of EER, a higher value is better. For example, if the Table C403.2.3 requirement is 10.0 EER, then the project would need ≥11.0 EER. For water cooled chillers the requirement is in kW/ton and lower is better. If the requirement is 0.660 kW/ton, then the proposed chiller must be ≤0.594 kW/ton.	
Reduced lighting power density	10% lower allowed lighting power	C406.3	The connected interior lighting power for the proposed design must be at least 10% lower than the allowed interior lighting power.	
Enhanced digital lighting controls	Continuous dimming and digitally-addressable luminaires	C406.4	In this type of lighting control system each luminaire, or small group of luminaires, is connected via a digital network. Luminaires can be dimmed and turned on/off individually or in small groups based on signals from networked sensors. Sequence of operations must be included in the construction documents.	
On-site renewable energy	≥0.5 W/ft^2, or ≥3% of mechanical, water heating and lighting energy.	C406.5	Two options. An on-site renewable energy system provides: 1. ≥0.50 watts per sf of conditioned floor area. 2. ≥3% of the energy required for HVAC, water heating and lighting. Very roughly, the area of PV panels required to meet #1 would be 1 sf per every 20-30 sf of conditioned floor area.	

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Dedicated outdoor air system	For multiple-zone systems, include independent system with total heat recovery to condition ventilation air.	C406.6	To meet this requirement, a separate system provides 100% conditioned outdoor air to each space. Energy recovery from exhaust air is also required. An example of a typical system is fan-coils serving individual zones, with conditioned outdoor air delivered from a central air handler to each fan coil. Exhaust air is ducted back to the air handler for energy recovery.	
Reduced energy in service water heating system	For specific building types, ≥60% solar or waste heat recovery for water heating.	C406.7	Applies to the following building types: 1. Group R-1: Boarding houses, hotels or motels. 2. Group I-2: Hospitals, psychiatric hospitals and nursing homes. 3. Group A-2: Restaurants and banquet halls or buildings containing food preparation areas. 4. Group F: Laundries. 5. Group R-2 6. Group A-3: Health clubs and spas. 7. Buildings showing a service hot water load of 10 percent or more of total building energy loads.	
Enhanced envelope performance	Total envelope UA 15% less than minimum requirement	C406.8	New option in 2018 IECC	
Reduced air infiltration	Tested to show leakage less than 0.25 cfm/ft^2 at 0.3 in. w.c.	C406.9	New option in 2018 IECC	

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Electric vehicle infrastructure	Minimum percentage of parking stalls that: ▪ Are EV capable ▪ Are EV ready ▪ Have EV chargers installed	C406.10†	Residential with ≥8 stalls: 70% EV capable 20% EV charger ready 10% EV chargers installed Commercial with ≥10 stalls: 40% EV capable 10% EV chargers installed Exceptions: **DC fast charging:** substitute 7 AC level 2 chargers with 1 DC fast charger ≥20kW **Retail**: reduce required stalls by 20% **Affordable housing, 100-140% median income**: reduce stalls by 50% **Affordable housing, ≤100% median income**: no stalls required Definitions: **EV capable**: conduit is provided to connect the parking stall to a charging station **EV charger ready**: wire, conduit, electrical panel capacity, overcurrent protection devices and suitable termination points Charge method AC level 2 **Enclosed attached residential garages**: 208/240VAC/20-100A Minimum 30A **Other**: 208/240VAC/40-100A Minimum 32A Requirements also apply to altered buildings when: ▪ Work area >50% of building area, or ▪ >10 parking spaces are being substantially modified	☐ Solar ready zone ☐ Roof load ☐ Conduit/piping routing pathway

* Code section added or modified by State amendment

† Code section added or modified by Maui amendment

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
ADDITIONS				
General	Requirements for new construction apply to additions. Unaltered portions of the existing building are not required to comply.	C502.1	There are two general compliance options: 1. The addition alone 2. The addition + existing building as one building	
Windows – maximum area	▪ Total building window area including addition ≤ 30% of gross wall area ▪ Or, window area in addition alone ≤ 30% of gross added wall area (≤ 40% when meeting daylighting requirements)	C502.2.1	If the project cannot comply with the prescriptive limit on window area, then it must comply with either Section C402.1.5 Component Performance Alternative or Section C407 Total Building Performance.	
Window – U-factor and SHGC	Same as new construction. See envelope checklist	C502.2.1	Requirements do not apply when glass is replaced in an existing sash (C504.2).	
Skylights – maximum area	▪ Total building skylight area including addition ≤ 3% of gross roof area ▪ Or, skylight area in addition alone ≤ 3% of gross roof area (≤ 5% when meeting daylighting requirements)	C502.2.2	If the project cannot comply with the prescriptive limit on skylight area, then it must comply with either Section C402.1.5 Component Performance Alternative or Section C407 Total Building Performance.	
Skylight – U-factor and SHGC	Same as new construction. See envelope checklist	C502.2.2		
Mechanical systems	Requirements for new systems and equipment serving additions are the same as for new construction. See the mechanical checklist.	C502.2.3	Unaltered portions are not required to comply.	

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Service water heating	Requirements for new equipment, controls and piping serving additions are the same as for new construction. See the service water heating section of this checklist.	C502.2.4	Unaltered portions are not required to comply.	
Pools and spas	Requirements for new pools and in-ground spas are the same as for new construction. See the service water heating section of this checklist.	C502.2.5		
Interior lighting	Requirements for lighting systems in additions are the same as for new construction. See the lighting section of this checklist. **Interior lighting power options**: ▪ Addition alone complies ▪ Addition + existing building complies	C502.2.6.1	Requirements do not apply when bulbs and/or ballasts are replaced within existing luminaires (C504.2)	
Exterior lighting	Requirements for exterior lighting systems for additions are the same as for new construction. See the lighting section of this checklist. **Exterior lighting power options**: ▪ Addition alone complies ▪ Addition + existing building complies	C502.2.6.2	Requirements do not apply when bulbs and/or ballasts are replaced within existing luminaires (C504.2)	

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
ALTERATIONS				
General	New-construction requirements apply to altered portions of the building. Unaltered portions are not required to comply.	C503.1		
Change in space conditioning	Full compliance is required for previously unconditioned spaces that are altered to become conditioned	C503.2	Exceptions ▪ Envelope compliance if UA is no greater than 110% of target UA per C402.1.5. ▪ Total building performance compliance if proposed design energy cost is no greater than 110% of otherwise permitted energy cost.	
Roof - repair	No requirement	C504	"Roof repair" is reconstruction or renewal of any part of an existing roof for the purpose of its maintenance.	
Roof – recover	No requirement	C503.1	"Roof recover" is the process of installing an additional roof covering over an existing roof covering without removing the existing roof covering.	
Roof - replacement	Options (State amendment) ▪ New construction requirements ▪ Initial solar reflectance ≥85% and aged reflectance ≥63% ▪ At least one of: 1. EnergyStar compliant covering 2. Radiant barrier 3. Attic ventilation via solar fan(s), ridge ventilation or gable vents 4. One or more exceptions in Section C402.3	C503.3.1*	"Roof replacement" is the process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering. Exceptions listed in section C402.3 include: 1. Portions covered by the following: ▪ Photovoltaic systems or components. ▪ Solar air or water-heating systems or components. ▪ Roof gardens or landscaped roofs. ▪ Above-roof decks or walkways. ▪ Skylights. ▪ HVAC systems and components, and other opaque objects mounted above the roof. 2. Portions shaded during summer solstice 3. Portions ballasted with stone 17 lb/sf	

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Wall	No requirement: ▪ Wall cavity is not exposed New-construction requirements: ▪ Wall cavity is exposed (exception if cavity is filled with insulation)	C503.1	If a wall cavity is exposed during alteration, then it shall be insulated to meet the new-construction requirement. However, it is acceptable to install a lower R-value if the cavity is filled (i.e. not deep enough to meet the code requirement).	
Windows – maximum area	▪ Total building window area after added windows ≤ 30% of gross wall area ▪ Or, window area in space with added windows alone ≤ 30% of gross wall area (≤ 40% when meeting daylighting requirements)	C503.3.2	If the project cannot comply with the prescriptive limit on window area when new windows are added, then it must comply with either Section C402.1.5 Component Performance Alternative or Section C407 Total Building Performance. If the existing building already exceeds the prescriptive window limit, then the alteration is exempt from the window area limit as long as window area is not increased.	
Window – U-factor and SHGC	Same as new construction. See the envelope checklist	C503.3.2 C401.2.1	Requirements do not apply when glass is replaced in an existing sash (C504.2).	
Skylights – maximum area	▪ Total building skylight area after added skylights ≤ 3% of gross roof area ▪ Or, skylight area in space with added skylight(s) alone ≤ 3% of gross roof area (≤ 5% when meeting daylighting requirements)	C503.3.3	If the project cannot comply with the prescriptive limit on skylight area when new skylights are added, then it must comply with either Section C402.1.5 Component Performance Alternative or Section C407 Total Building Performance.	
Skylight – U-factor and SHGC	Same as new construction. See envelope section of this checklist.	C503.3.3		
Mechanical systems	New heating, cooling and duct systems are required to meet new construction requirements.	C503.4	For example, replacement air conditioners must meet the efficiency requirements, and new ducts must meet the insulation requirements. Unaltered portions of the system are not required to comply.	
Service water heating systems	New water heating systems are required to meet new construction requirements.	C503.5	Unaltered portions of the system are not required to comply.	

Component/System	Requirement	Code Section	Plan Review Notes	Info on Plans
Lighting systems	New lighting systems that are part of an alteration are required to meet new construction requirements. ▪ Exception if less than 10% of luminaires in a space are replaced and installed lighting power does not increase		Requirements do not apply when bulbs and/or ballasts are replaced within existing luminaires (C504.2)	

* Code section added or modified by Hawaii amendment