Single-family Buildings

What's Changed in 2022

What Does this Fact Sheet Cover?

This fact sheet describes changes made to the 2019 Title 24, Part 6 Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) and incorporated in the 2022 Energy Code for single-family residential buildings.

The 2022 Energy Code now classifies these buildings as belonging to the single-family residential buildings:

- Single-family dwellings
- Duplexes
- Townhomes of any size
- Accessory dwelling units

In the 2019 Energy Code, multifamily buildings with one to three stories (low rise) were grouped in the same code sections as single-family buildings. The 2022 Energy Code reorganizes low-rise and high-rise multifamily buildings into one building type and moves requirements for multifamily buildings to their own subchapters (Subchapters 10-12).

When & How to Use this Fact Sheet

Use this fact sheet if you need to examine the language of the Energy Code for single-family residential buildings.

- Energy Code changes are organized by building feature.
- Each building feature section includes explanatory notes on all applicable sections.
- When language has been added or substantially revised, the intent of the language of the 2022 Energy Code is included.
- Notes are provided as needed.
- For a summary, refer to the Single-family Buildings: What's New in 2022 fact sheet (coming soon).
- To review Energy Code updates for other occupancy types, refer to these fact sheets: Multifamily Buildings: What's Changed in 2022 (coming soon) and Nonresidential Buildings: What's Changed in 2022 (coming soon).

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Why Did the Energy Code Change?

The 2022 Energy Code is an important part of California's work to reduce carbon emissions and fight climate change. The Energy Code is updated every three years with the mandate to increase building energy efficiency while staying cost-effective for building owners over the lifespan of a building.

Increases in energy efficiency and on-site generation:

- Reduce utility bills
- Improve indoor comfort and air quality
- Increase market value
- Reduce greenhouse gas emissions (GHG)

The California Energy Commission (CEC) estimates that over 30 years the 2022 Energy Code will provide $1.5 billion in consumer benefits and reduce 10 million metric tons of GHGs – equivalent to taking nearly 2.2 million cars off the road for a year.

For single-family homes, the CEC estimates that the 2022 Energy Code change from using natural gas furnaces to electric heat pumps to heat new homes for most climate zones reduce net CO2 emissions by 16,230 mTon/yr compared to the 2019 Energy Code, the equivalent of taking 3,641 gas cars off the road each year.

BENEFITS OF THE 2022 ENERGY CODE ACROSS ALL BUILDING TYPES

- Increases on-site renewable energy generation from solar
- Increases electric load flexibility to support grid reliability
- Reduces emissions from newly constructed buildings
- Reduces air pollution for improved public health
- Encourages adoption of environmentally beneficial efficient electric technologies

DECARBONIZATION GOALS

California is aiming to reduce its greenhouse gas emissions (GHG) while creating an energy system that is resilient to climate risks, spurring innovation and a low-carbon transition nationally and internationally. California's climate goals are among the most ambitious in the country.

GHG Emission Reduction Goals

Assembly Bill 32:

1990 levels by 2020

Senate Bill 32:

40% below 1990 levels by 2030

Executive Order S-3-05:

80% below 1990 levels by 2050

This can be achieved through a variety of measures, such as incremental steps toward "carbon neutral" buildings, and timely balancing of onsite energy production and consumption in support of a healthy, stable grid. The Energy Code is designed to support reaching these goals.

Learn more here: https://www.energy.ca.gov/data-reports/reports/building-decarbonization-assessment

2022 ENERGY CODE: ✳ *NEW* ➤ *MAJOR REVISION*

Mechanical Systems: Single-family Buildings

Building Application	Mandatory		Prescriptive Subchapter 8 (§§140.0-9)	Performance Subchapter 8 (§150.1)	Additions Alterations Subchapter 9 (§150.2)	Reference Appendices
	All Occupancy Subchapters 1-2 (§§100.0-110.12)	Residential Occupancy Subchapter 7 (§150.0)				
General	§§100.0, 100.1-2, 110.0-1	§150.0	§§150.1(a), 150.1(c)	§§150.1(a)-(b)	§§150.2(a)-(b)	JA1 Definitions, JA2 Weather/Climate JA3 TDV
Heating, Ventilation and Air Conditioning (HVAC) (conditioned spaces)	§§110.2, 110.5	§§150.0(h)-(j), 150.0(m), 150.0(o)				RA1 HERS Refrigerant Charge RA2 HERS Procedures RA3 HERS Test Protocols
Water Heating	§110.3	§§150.0(j), 150.0(n)				RA4.4 Water Heating Special Measures JA13 HPWH Demand Management
Pool and Spa	§§110.4-5	§150.0(p)	N/A	N/A		N/A

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Title 24, Part 1 Subchapter 10 – ADMINISTRATIVE REGULATIONS FOR THE CALIFORNIA ENERGY COMMISSION (CEC)			
Section 10-103 – PERMIT, CERTIFICATE, INFORMATIONAL, AND ENFORCEMENT REQUIREMENTS FOR DESIGNERS, INSTALLERS, BUILDERS, MANUFACTURERS, AND SUPPLIERS			
➤ Revised	**10-103(b)4A**	**Ventilation Information**	Enforcement agency to confirm that at occupancy the homeowner, building owner or building maintenance crew is provided with instructions for proper operation and maintenance of all local exhaust system(s), such as occupant-controlled kitchen range hood and bathroom exhaust fans, in addition to whole-building ventilation systems.
Title 24, Part 6 Subchapter 1 – ALL OCCUPANCIES – GENERAL PROVISIONS			
Section 100.0 – SCOPE			
➤ Revised	**100.0**	**Scope**	Multifamily building standards are moved from the subchapters on low-rise residential buildings to new subchapters devoted to multifamily buildings. The group of buildings that was previously called *low-rise residential* is now called *single-family* and includes duplexes, townhomes, and accessory dwelling units (ADUs), in addition to single-family homes.

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Section 100.1 – DEFINITIONS AND RULES OF CONSTRUCTION			
New	**100.1(b)**		**AHAM** is the Association of Home Appliance Manufacturers. **AHAM HRH-2** is the Association of Home Appliance Manufacturers document titled *"Residential Kitchen Range Hood Performance Test Procedures"* 2020 (AHAM HRH-2). **AHAM RKRH-CPPG** is the Association of Home Appliance Manufacturers document titled "*Residential Kitchen Range Hood Certification Program Procedural Guide"* 2020 (version 3).
New			**Combined Energy Efficiency Ratio (CEER)** is the ratio of net cooling capacity (in Btu/hr) to total rate of electrical energy input (in watts) of a cooling system under designated operating conditions, including standby mode, as determined using the applicable test method in the *Appliance Efficiency Regulations.*
New			**Drain Water Heat Recovery (DWHR)** is a system that recovers heat from effluent in waste piping and uses it to preheat water in a domestic or service water heating system in order to reduce water heating energy usage.
New			**Dual-fuel Heat Pump** is an electric heat pump with gas furnace supplemental heat that alternates between the two fuel sources.
New			**Dwelling Unit, Junior Accessory (JADU)** is a dwelling unit that is no more than 500 square feet in size and contained entirely within an existing single family building. A JADU includes a kitchen, a separate entrance from the main entrance to the building, and an interior entry to the main living area. A JADU may include separate sanitation facilities, or may share sanitation facilities with the existing single family building.
New			**Energy Efficiency Ratio 2 (EER2)** is the EER metric for residential central air conditioners effective January 1, 2023, as created by the U.S. Department of Energy "ISSUANCE 2016-11-30 Energy Conservation Program: Test Procedures for Central Air Conditioners and Heat Pumps, Final Rule."
New			**Enthalpy Recovery Ratio (ERR)** is a ratio of the change in enthalpy of the outdoor air supply to the difference in enthalpy between the entering supply airflow and the entering exhaust airflow, with no adjustment to account for that portion of the psychometric change in the leaving supply airflow that is the result of leakage of entering exhaust airflow rather than exchange of heat or moisture between the airstreams.
New			**Heating Seasonal Performance Factor 2 (HSPF2)** is the HSPF metric for residential central heat pumps effective January 1, 2023, as created by the U.S. Department of Energy "ISSUANCE 2016-11-30 Energy Conservation Program: Test Procedures for Central Air Conditioners and Heat Pumps, Final Rule."
New			**Net Sensible Coefficient of Performance (COP)** is defined by AHRI 1360 and includes all indoor unit power and air-cooled condenser/condensing unit power for air-cooled units and includes all indoor unit power and the power allowance for pump and heat rejection as described in the Heat Rejection/Cooling Fluid Standard Rating Conditions table of AHRI 1360 for water, glycol, and chilled water units.
New			**Seasonal Energy Efficiency Ratio 2 (SEER2)** is the SEER metric for residential central air conditioners and heat pumps effective January 1, 2023, as created by the U.S. Department of Energy "ISSUANCE 2016-11-30 Energy Conservation Program: Test Procedures for Central Air Conditioners and Heat Pumps, Final Rule."

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Section 100.1 – DEFINITIONS AND RULES OF CONSTRUCTION (continued)			
New	**100.1(b)**		**Sensible Energy Recovery Ratio** is a ratio of the change in the dry-bulb temperature of the outdoor air supply to the difference in dry-bulb temperature between the outdoor air and entering exhaust airflow, with no adjustment to account for that portion of the dry-bulb temperature change in the leaving supply airflow that is the result of leakage of entering exhaust airflow rather than heat exchange between the airstreams.
Revised			**Single-family Building** is any of the following: a residential building of Occupancy Group R-3 with two or less dwelling units, a building of Occupancy Group R-3, other than a multifamily building or hotel/motel building, a townhouse, a building of Occupancy Group R-3.1, or a building of Occupancy Group U when located on a residential site.
Revised			**Single Zone System** is an air distribution system that supplies air to one thermal zone controlled by a single thermostat.
Revised			**Space-conditioning System** is a system that provides *mechanical* heating, or *mechanical* cooling within or associated with conditioned spaces in a building, and may incorporate use of components such as chillers/compressors, fluid distribution systems (e.g., air ducts, water piping, refrigerant piping), pumps, air handlers, cooling and heating coils, air or water cooled condensers, economizers, terminal units, and associated controls.
New			**Uniform Energy Factor (UEF)** of a water heater is a measure of overall water heater efficiency, as determined using the applicable test method in the *Appliance Efficiency Regulations*.
Revised			**Ventilation System, Central Fan Integrated (CFI)** is a ventilation system configuration in which the ventilation ductwork is connected to the duct system of a dwelling unit space conditioning system to enable distribution of ventilation air to the dwelling unit while the space conditioning system air handling unit is operating.
Section 100.2 – CALCULATION OF TIME DEPENDENT VALUATION (TDV) ENERGY: No change			

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Title 24, Part 6 Subchapter 2 – ALL OCCUPANCIES – MANDATORY REQUIREMENTS FOR THE MANUFACTURE, CONSTRUCTION AND INSTALLATION OF SYSTEMS, EQUIPMENT AND BUILDING COMPONENTS			
Section 110.0 –SYSTEMS AND EQUIPMENT – GENERAL: No change			
Section 110.1 – MANDATORY REQUIREMENTS FOR APPLIANCES: No change			
Section 110.2 – MANDATORY REQUIREMENTS FOR SPACE-CONDITIONING EQUIPMENT			
Minor	**110.2(a)**	**Revised Efficiency Tables**	Updated efficiencies on tables include: • 110.2-A Air Conditioners and Condensing Units • 110.2-B Heat Pumps • 110.2-E Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps • 110.2-F (formerly 110.2-G) Heat Rejection Equipment • 110.2-H (formerly 110.2-I) Electrically Operated Variable Refrigerant Flow Air-to-Air and Applied Heat Pumps • 110.2-I (formerly 110.2-J) Warm-Air Furnaces and Combination Warm-Air Furnaces/Air-Conditioning Units • 110.2-J (formerly 110.2-K) Gas and Oil-Fired Boilers
New			New efficiencies on tables include: • 110.2-K DX-DOAS Units, Single Package and Remote Condenser • 110.2-N Heat Pump and Heat Recovery Chillers
Section 110.3 – MANDATORY REQUIREMENTS FOR SERVICE WATER-HEATING SYSTEMS AND EQUIPMENT: Minor changes			
Section 110.4 – MANDATORY REQUIREMENTS FOR POOL AND SPA SYSTEMS AND EQUIPMENT: Minor changes			
Section 110.5 – NATURAL GAS CENTRAL FURNACES, COOKING EQUIPMENT, POOL AND SPA HEATERS, AND FIREPLACES: PILOT LIGHTS PROHIBITED: No change			
Title 24, Part 6 Subchapter 7 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – MANDATORY FEATURES AND DEVICES			
Section 150.0 – MANDATORY FEATURES AND DEVICES			
No Change	**150.0(e)**	**Installation of Fireplaces, Decorative Gas Appliances and Gas Logs**	No change
No Change	**150.0(h)**	**Space-conditioning Equipment**	No change
No Change	**150.0(i)**	**Thermostats**	No change

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Section 150.0 – MANDATORY FEATURES AND DEVICES (continued)			
Revised	**150.0(j)**	**Insulation for Piping and Tanks**	**Storage Tank Insulation:** REMOVED 1. **Water Piping, Solar Water-heating System Piping and Space-conditioning System Line Insulation Thickness and Conductivity:** All domestic hot water piping must be insulated as specified in §609.11 of the California Plumbing Code. There is no longer any specific language related to minimum pipe insulation as required specifically for Title 24, Part 6, except that the piping of space-conditioning systems, solar water-heating system collector loop and distribution piping of steam and hydronic heating system must meet requirements of §120.3(c). **Exceptions: 1-4:** No change 2. **Insulation Protection:** No change
Revised	**150.0(m)**	**Air Distribution and Ventilation System Ducts, Plenums and Fans**	1. **California Mechanical Code Compliance:** A. **Meeting California Mechanical Code:** No change B. **Insulation:** Supply and return air ducts and plenums of space heating and cooling must have either ≥R-6 or higher insulation except when a Home Energy Rating System (HERS) Rater verifies that the ducts are entirely below a ceiling that separates occupied conditioned space from attic space with no penetrations to unconditioned space and are draft stopped per the California Fire Code using materials compliant with the California Mechanical Code to prevent air infiltration into the cavity. C-E**.** No change 2- 10. No change 11. **Duct System Sealing and Leakage Testing:** Air leakage is now based on air handler airflow. It is no longer based on nominal system air handler airflow. 12. **Air Filtration:** A. **MERV-13 Air Filter Requirements:** It is clarified that makeup supply-only ventilation air systems are also subject to the MERV-13 air filter requirements. B. **System Design and Installation:** Filters and grilles now are required to use gaskets, sealing or other means to close gaps around the inserted filter in order to prevent air from bypassing the filter. C-E**.** No change 13. **Space-conditioning System Airflow Rate and Fan Efficacy:** No change

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Section 150.0 – MANDATORY FEATURES AND DEVICES (continued)			
➤ Revised	**150.0(n)**	**Water-heating System** *New requirements are added when gas water heaters are installed to support future heat pump water heater installation.*	1. **When a gas or propane water heater is used,** a space at least 2.5 ft x 2.5 ft x 7 ft tall for a future heat pump water heater (HPWH) is required meeting either of the requirements below (meeting all applicable California Electrical Code requirements): A. **If the HPWH space is within 3 ft of the installed water heater,** the following are required: i. A dedicated, 125-volt, 20-amp electrical receptacle that is connected to the electric panel with a 120/240-volt 3 conductor, 10-AWG copper branch circuit within 3 ft of the water heater ii. Labeling both ends of the unused conductor "Spare" and isolating them electrically iii. A reserved single pole circuit breaker space in the electrical panel adjacent to the circuit breaker for the branch circuit in i above and label it "Future 240V Use" iv. A condensate drain that is no more than 2 inches higher than the base allowing for natural draining B. **If the HPWH space is >3 ft from the installed water heater,** the following are required: i. A dedicated, 240-volt branch circuit rated at 30 amps minimum installed within 3 ft of the space labeled as "240V ready" ii. Reserved space in the main electrical service panel to allow for the installation of a double pole circuit breaker permanently labeled "For Future 240V use" iii. Dedicated cold water supply to (or cold water supply running through) the HPWH space *before* it serves the installed water heater iv. Hot water supply from the installed water heater that is routed to the HPWH space *before* serving any fixtures v. Hot and cold water supply that are exposed and readily accessible for future HPWH vi. A condensate drain that is no more than 2 inches higher than the base allowing for natural draining 2- 4. No change

2022 ENERGY CODE: NEW MAJOR REVISION

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Section 150.0 – MANDATORY FEATURES AND DEVICES (continued)			
Revised	**150.0(o)**	**Requirements for Ventilation and Indoor Air Quality** *ASHRAE 62.2 requirements and tables are now included in the Energy Code (not just referenced), which adds new code sections and tables to support compliance to these requirements.* *There are new airflow ventilation and verification requirements for kitchen hoods dependent upon whether a range is run by electricity or natural gas.* *New minimum efficacy and verification requirements apply for heat recovery ventilation and energy recovery ventilation fan systems, when used.*	1. **Amendments to ASHRAE 62.2 requirements:** A. **Window Operation:** No change B. **Central Fan Integrated (CFI) Ventilation Systems:** These systems must not be continuous when used for whole-building ventilation. They must use a motorized outdoor air damper, meet damper control requirements and meet available ventilation demands independently from comfort conditioning. C. **Whole-dwelling Unit Mechanical Ventilation for Single-family Detached and Townhouses:** No change D. **Air Filtration:** No change E-F. **"RESERVED:"** Multifamily standards are moved to §160.2(b). G. **Local Mechanical Exhaust:** ASHRAE 62.2 requirements are now spelled out. In new requirements for local kitchen exhaust, capture efficiency for demand-controlled kitchen hoods may be used to show compliance or provide a minimum airflow. Capture efficiency requirements differ based on whether the hood is over an electric or natural gas range. See Tables 150.0-E and G. v. Additional verification is required depending on which method is used for compliance: a. The captured efficiency rating used requires installing a product listed by the CEC and tested airflow rates. A HERS Rater must verify airflow and certified product listing if this method is used. b. The system BOTH meets the requirements of Table 150.0-H AND is eligible. An eligible system has total duct length ≤25 ft, with three or fewer elbows and an exterior termination fitting hydraulic diameter that is greater than the duct diameter but not less than the hydraulic diameter of the fan outlet. HERS verification is required for this method. H. **Airflow Measurement of Whole-dwelling Unit Ventilation:** This airflow must be tested per Residential Appendix RA3.7. Balanced ventilation airflow is the average of the supply and exhaust fan flows. I. **Sound Ratings for Whole-dwelling Unit Ventilation Systems:** Per ASHRAE 62.2 §7.2, the required sound rates are determined by the airflow measurement required in §150.0(o)1C. J. **Label for Whole-dwelling Unit Ventilation System ON/OFF Control:** The manual ON/OFF control for whole-building ventilation must be labeled with this message or the equivalent: "This switch controls the indoor air quality ventilation for the home. Leave switch in the "on" position at all times unless the outdoor air quality is very poor." K. **Combustion Air and Compensating Outdoor Air or Makeup Air:** The California Mechanical Code, Chapter 7, Combustion Air must be used along with ASHRAE 62.2 §6.4 (Combustion and Solid-Fuel-Burning Appliances). 2. **Field Verification and Diagnostic Testing:** Changes include new vented kitchen hood requirements and new language in which heat recovery ventilation (HRV) and energy recovery ventilation (ERV) must have a fan efficacy of ≤1.0 W/CFM verified by a HERS Rater per Residential Appendix RA3.7.4.4.
Minor	**150.0(p)**	**Pool Systems and Equipment Installation**	Minor changes
New	**150.0(t)**	**Heat Pump Space Heater Ready**	If a natural or propane gas furnace is installed: 1. A dedicated, 240-volt branch circuit rated at 30 amps minimum must be installed within 3 ft of the installed furnace, accessible to the furnace with no obstructions and labeled "240V ready." 2. The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker that is permanently labeled "For Future 240V use."

2022 ENERGY CODE: ***NEW*** ***MAJOR REVISION***

Level of Change	Section	Subtitle & Notes	Performance Change Summaries
Section 150.1(b) – PERFORMANCE STANDARDS			
Revised	**150.1(b)1**	**Newly Constructed Buildings**	Energy design rating (EDR) scores now include *source energy* AND time-dependent valuation (TDV) accounting for both the Energy Efficiency Design Rating and the Solar Electric Generation and Demand Flexibility Design Rating. The Proposed Building must separately comply with the *Source Energy Design Rating*, Energy Efficiency Design Rating and the Total Energy Design Rating.
Revised	**150.1(b)**	**Performance Standards: Field Verification**	i. EER/*EER2*/SEER/*SEER2/CEER*/HSPF/*HSPF2* Rating ii. A variable capacity heat pump (VCHP) compliance option is added that applies to mini ductless and ducted direct expansion (DX) meeting the installation requirements of Residential Appendix RA3.4.4.3 when using this as a Performance credit. (The 2019 Energy Code included this as a compliance option after code language was adopted.) iii-ix No change

Level of Change	Section	Subtitle & Notes	Prescriptive Change Summaries
Title 24, Part 6 Subchapter 8 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES			
Section 150.1 – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES FOR SINGLE-FAMILY RESIDENTIAL BUILDINGS			
No Change	**150.1(a)**	**Basic Requirements**	No change
Revised	**150.1(c)6**	**Heating System Type** *New Prescriptive space-heating heat pump HVAC equipment requirements are added.*	Climate Zones 3, 4, 13 and 14 are now Prescriptively required to use a heat pump system or to pursue the Performance Approach. Otherwise, there are no changes.
No Change	**150.1(c)7**	**Space Heating and Space Cooling**	No change

Level of Change	Section	Subtitle & Notes	Prescriptive Change Summaries
Section 150.1 – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES FOR SINGLE-FAMILY RESIDENTIAL BUILDINGS (continued)			
➤ Revised	**150.1(c)8**	**Domestic Water-heating Systems** *New Prescriptive heat pump domestic hot water equipment requirements are added.*	Unless the Performance Method is used, a water heater must be one of the following: A. In all Climate Zones: One 240-volt heat pump water heater with a storage tank installed in the garage or conditioned space AND i. In Climate Zones 1 and 16 only: HERS-verified compact hot water distribution AND ii. In Climate Zone 16 only: HERS-verified drain water heat recovery system B. In all Climate Zones: One 240-volt, NEEA Tier 3 or greater heat pump water heater installed AND in Climate Zone 16 only: HERS-verified drain water heat recovery system with a storage tank installed in the garage or conditioned space C. In all Climate Zones: One solar water-heating system, with an annual solar saving fraction of 0.7 or greater, with electric backup and HERS-verified per Residential Appendix RA4 EXCEPTIONS: 1. In Climate Zones 3, 4, 13 and 14 only: Tankless gas or propane instantaneous water heater with an input of ≤200,000 Btuh (no storage tank allowed) *when space-heating system is a heat pump per §150.1(c)6* 2. In all Climate Zones in new dwelling units with a conditioned floor area of ≤500 ft²: an instantaneous electric resistance water heater installed with HERS-verified point-of-use distribution 3. In all Climate Zones: One 120-volt heat pump water heater for a new one bedroom or studio dwelling unit
No Change	**150.1(c)9**	**Space-conditioning Distribution Systems**	No change
➤ Revised	**150.1(c)10**	**Central Fan Integrated Ventilation Systems** *Be aware of the new Mandatory requirements for central fan integrated ventilation systems §150.0(o)1B.*	Small duct, high-velocity air-handling units must have a HERS-verified 0.62 W/CFM or better airflow rate and fan efficacy. For all other equipment types, requirements stay the same: gas furnaces 0.45 W/CFM or better, and non-gas-fueled air-handling units 0.58 W/CFM or better.
➤ Revised	**150.1(c)12**	**Ventilation Cooling**	There is a new exception to ventilation cooling for new dwelling units with a conditioned floor area of ≤500 ft².
No Change	**150.1(c)13**	**HVAC System Bypass Ducts**	No change

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries	Prescriptive Change Summaries	Performance Change Summaries
Title 24, Part 6 Subchapter 9 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – ADDITIONS AND ALTERATIONS TO EXISTING RESIDENTIAL BUILDINGS					
Section 150.2 – ENERGY EFFICIENCY STANDARDS FOR ADDITIONS AND ALTERATIONS TO EXISTING SINGLE-FAMILY RESIDENTIAL BUILDINGS					
Revised	**150.2(a)**	**Additions**	EXCEPTIONS: 1. ~~IAQ exception for additions ≤ 1,000 ft²~~ REMOVED but still is an exception per 150.2(a)1Cia1. 1-3. Formerly numbered 2-4, and there is no change except the numbering. 4. When any length of new ducting is added to a distribution system, HERS duct testing requirements for altered distribution systems per §150.2(b)1Di and ii now are required. (Formerly, HERS verification was required when adding >40 ft of new ducting.) 5-6. No change 7. New or replacement space heating systems serving Additions may be heat pump or gas heating systems.		
Revised	**150.2(a)1C**	**Mechanical Ventilation for Indoor Air Quality**	• There is a new exception to whole-building ventilation of §§150.0(o)1C, E and F for detached junior accessory dwelling units (JADUs). • It is clarified that applicable local exhaust fan requirements of §§150.0(o)1G and 150.0(o)2 apply for Additions.		
Revised	**150.2(a)1D**	**Water Heater**	When a second water heater is installed as part of an Addition, one of the following types of water heaters must be installed: i. A single heat pump water heater with storage tank on R-10 and not located outside with communication interface per 110.12(a) or ANSI/CTA-2045-B communication port OR ii. A single NEEA Tier 3 or greater heat pump water heater OR iii. A gas or propane instantaneous water heater with input < 200,000 Btuh with no storage tank OR iv. When an Addition is ≤500 ft², an instantaneous electric resistance point-of-use water heater is allowed with HERS-verified point-of-use per Reference Residential Appendix RA4.4.5 OR v. When approved by the CEC Executive Director as not using more energy than specified above		
Revised	**150.2(a)2**	**Performance Approach**	• There is a new exception to whole-building ventilation of §§150.0(o)1C, E and F for JADUs. • It is clarified that applicable local exhaust fan requirements of §§150.0(o)1G and 150.0(o)2 apply to Additions.		
Revised	**150.2(b)1C**	**Entirely New/Complete Replacement Space-conditioning Systems**	When replacing all components of an HVAC system (indoor unit, outdoor unit, packaged unit and ducting and distribution), all of the requirements that apply to new homes apply to a new or complete replacement HVAC scope of work per §150.0(h) (Equipment efficiency), §150.0(i) (Thermostats), §§150.0(j)1 and 2 (Pipe Insulation), §§150.0(m)1-10 and 12-13 (Air-Distribution and Ventilation System Ducts, Plenums and Fans), §150.2(b)1D (Duct Leakage), §150.1(c)7 (Heating and Cooling Systems), §150.2(b)1G (Altered Space Heating System) and Table 150.2-A.		
Revised	**150.2(b)1D**	**Altered Duct Systems: Duct Sealing** *New ceiling insulation requirements apply when altering ducts if air handler or ducts are in a vented attic.*	• When >25 ft of new ducting is added to a distribution system, HERS duct testing requirements for altered distribution systems now apply. (Formerly, HERS verification was required when adding >40 ft of new ducting.) • Change to Table 150.2-A Duct Insulation R-Value: Climate Zones 3 and 5-7 require R-6 insulation; Climate Zones 1, 2, 4 and 8-16 require R-8 insulation. • If the air handler and ducts are in a vented attic, then §150.2(b)1J applies, requiring ceiling insulation. • Extended ducts added to an existing system have new HERS duct testing leakage rate requirements of 10% (formerly 15%) and 7% (formerly 10%) for HERS-measured duct leakage to the outside.		
Revised	**150.2(b)1E**	**Altered Space-conditioning System: Duct Sealing**	Altered HVAC systems with ducting have new HERS duct testing leakage rate requirements of 10% (formerly 15%) and 7% (formerly 10%) for HERS measured duct leakage to outside.		

2022 ENERGY CODE: NEW MAJOR REVISION

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries	Prescriptive Change Summaries	Performance Change Summaries
Section 150.2 – ENERGY EFFICIENCY STANDARDS FOR ADDITIONS AND ALTERATIONS TO EXISTING SINGLE-FAMILY RESIDENTIAL BUILDINGS (continued)					
No Change	**150.2(b)1F**	**Altered Space-conditioning System – Mechanical Cooling**	No change		
Revised	**150.2(b)1G**	**Altered Space- heating System**	Altered or replacement heating systems must not use electric resistance as the primary heat source. EXCEPTIONS: 1. When replacing a ducted, electric resistance space-heating system, electric resistance is NOT allowed, but a non-ducted, electric resistance space-heating system is allowed as an exception. 2. When replacing a ducted, electric resistance space-heating system, if the existing space-heating system is electric resistance and a ducted space-cooling system is not being replaced or installed, an electric resistance space-heating system is allowed. 3. In Climate Zones 7 and 15 only: When replacing any type of electric resistance space-heating system, electric resistance is allowed.		
Revised	**150.2(b)1H**	**Water-heating System**	Altered or replacement service water-heating systems or components must meet the applicable requirements below: i. Pipe Insulation: Minor change ii. Distribution System: No change iii. Water-heating Systems: Replacement water heater has been changed to be one of the following: a. A natural gas or propane water heater OR b. Single heat pump water heater: The storage tank must not be located outdoors and must be placed on an incompressible, rigid insulated surface with a minimum thermal resistance of R-10. The water heater must be installed with a communication interface that meets either the requirements of §110.12(a) or has an ANSI/CTA-2045-B communication port. OR c. One NEEA Tier 3 or greater heat pump water heater OR d. Replacing existing electric resistance water heater with a consumer electric water heater OR e. A water-heating system determined by the CEC Executive Director to use no more energy than the one specified in Item c above; or, if no natural gas is connected to the existing water heater location, a water-heating system determined by the Executive Director to use no more energy than Item d above		
New	**150.2(b)1L**	**Mechanical Ventilation for Indoor Air Quality: Entirely New or Complete Replacement Ventilation Systems**	When installing a new system that includes new fans and entirely new ducting (defined as ≥75% new duct material and existing duct material that is accessible and can be sealed), §150.0(o) (Requirements for Ventilation and Indoor Air Quality) must be met in its entirety.		
New	**150.2(b)1M**	**Mechanical Ventilation for Indoor Air Quality: Altered Ventilation Systems**	• When replacing or altering whole-building ventilation systems, it must be determined if the requirements of §150.0(o) (Requirements for Ventilation and Indoor Air Quality) applied to any previously permitted work. If so, then all of the requirements under this 2022 Energy Code cycle apply, including the airflow and sone requirements of ASHRAE 62.2 §7.1 and §7.2 AND the air filter requirements of §150.0(m)12. If not, then they do not apply. • If replacing or altering local exhaust bathroom and ventilation fans, then all applicable requirements of this 2022 code cycle apply. • When replacing or altering kitchen local exhaust, it must be determined if the requirements of 2019 Energy Code §150.0(o)1G airflow, sone or certification requirements applied to previously permitted work. If so, then the new airflow or capture efficiency requirements of §150.0(o)1G also apply. Airflow for vented kitchen range or exhaust fans in which the previous building permit airflow requirements are met, or 100 CFM, whichever is greater, meets the requirements. If not and the changes were not subject to the 2019 Energy Code for previously applicable permitted work, then they do not apply.		
Revised	**150.2(b)2**	**Performance Approach**	When using the Performance Method, entirely new or replacement ventilation systems are subject to §150.2(b)1L, and altered ventilation is subject to §150.2(b)1M. Otherwise, there are no changes.		

Envelope: Single-family Buildings

2022 ENERGY CODE: ✳ *NEW* ➤ *MAJOR REVISION*

Building Application	Mandatory		Prescriptive	Performance	Additions Alterations	Reference Appendices
	All Occupancy Subchapters 1-2 (§§100.0-110.12)	Residential Occupancy Subchapter 7 (§150.0)	Subchapter 8 (§§140.0-9)	Subchapter 8 (§150.1)	Subchapter 9 (§150.2)	
General	§§100.0, 100.1-2, 110.0, 110.1	§150.0	§§150.1(a), 150.1(c)	§§150.1(a)- (b)	§§150.2(a)-(b)	JA1 Definitions JA2 Weather/Climate JA3 TDV
Envelope (conditioned)	§§110.6, 110.7, 110.8	§§150.0(a)-(g), 150.0(q)				JA4 U-factor/C-Factor/Thermal Mass NA6 Alternate Fenestration Method (COG) RA2 HERS Procedures RA3 HERS Test Protocols RA4.3 Envelope Special Measures

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Title 24, Part 6 Subchapter 1 – ALL OCCUPANCIES – GENERAL PROVISIONS			
Section 100.0 – SCOPE			
➤ Revised	**100.0**	**Scope**	Multifamily building standards are moved from the subchapters on low-rise residential buildings to new subchapters devoted to multifamily buildings. The group of buildings that was previously called *low-rise residential* is now called *single-family* and includes duplexes, townhomes, and accessory dwelling units (ADUs), in addition to single-family homes.
Section 100.1 – DEFINITIONS AND RULES OF CONSTRUCTION			
✳ New	**100.1(b)**		**Dwelling Unit, Junior Accessory (JADU)** is a dwelling unit that is no more than 500 square feet in size and contained entirely within an existing single family building. A JADU includes a kitchen, a separate entrance from the main entrance to the building, and an interior entry to the main living area. A JADU may include separate sanitation facilities, or may share sanitation facilities with the existing single family building.
➤ Revised			**Single-family Building** is any of the following: a residential building of Occupancy Group R-3 with two or less dwelling units, a building of Occupancy Group R-3, other than a multifamily building or hotel/motel building, a townhouse, a building of Occupancy Group R-3.1, or a building of Occupancy Group U when located on a residential site.
Section 100.2 – CALCULATION OF TIME DEPENDENT VALUATION (TDV) ENERGY: No change			
Title 24, Part 6 Subchapter 2 – ALL OCCUPANCIES – MANDATORY REQUIREMENTS FOR THE MANUFACTURE, CONSTRUCTION AND INSTALLATION OF SYSTEMS, EQUIPMENT AND BUILDING COMPONENTS			
Section 110.6 – MANDATORY REQUIREMENTS FOR FENESTRATION PRODUCTS AND EXTERIOR DOORS: No change for single-family buildings			
Section 110.7 – MANDATORY REQUIREMENTS TO LIMIT AIR LEAKAGE: No change			
Section 110.8 – MANDATORY REQUIREMENTS FOR INSULATION, ROOFING PRODUCTS AND RADIANT BARRIERS: Minor changes			

2022 ENERGY CODE: ✳ *NEW* ➤ *MAJOR REVISION*

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Title 24, Part 6 Subchapter 7 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – MANDATORY FEATURES AND DEVICES			
Section 150.0 – MANDATORY FEATURES AND DEVICES			
➤ Revised	**150.0(a)**	**Roof Deck, Ceiling and Rafter Roof Insulation** *New Mandatory U-factor requirements apply for the roof deck of new attics.*	1. In Climate Zones 4 and 8-16: If the air handler and ducts are located outside the conditioned space in a new attic, the roof deck separating attic spaces from ambient air has a new mandatory area weighted U-factor ≤0.184 (R-5 insulation above or below the roof deck). EXCEPTIONS: • The space-conditioning system air handler and ducts are located entirely in conditioned space below the ceiling separating the occupiable space from the attic. • The space-conditioning system air handler is located in unconditioned space and has ≤12 linear feet of supply duct, including the length of the air handler and the plenum, located in unconditioned space, with all other portions of the supply ducts located in conditioned space below the ceiling separating the occupiable space from the attic. 2. The ceiling and rafter roof area weighted U-factor of 0.043 (R-22) requirement remains the same, including the exception for U-factor ≤0.054 (existing framing using R-19 insulation).
No Change	**150.0(b)-(g)**		No change
➤ Revised	**150.0(q)**	**Fenestration Products**	Fenestration area weighted U-factor is now ≤0.45 (previously 0.58). Exceptions still apply for 10 ft² or 5% of conditioned floor area, whichever is greater, and 30 ft² of greenhouse or garden windows.

Level of Change	Section	Subtitle & Notes	Performance Change Summaries
Section 150.1(b) – PERFORMANCE STANDARDS			
➤ Revised	**150.1(b)1**	**Newly Constructed Buildings**	Energy design rating (EDR) scores now include *source energy* AND time-dependent valuation (TDV) accounting for both the Energy Efficiency Design Rating and the Solar Electric Generation and Demand Flexibility Design Rating. The Proposed Building must separately comply with the *Source Energy Design Rating*, Energy Efficiency Design Rating and the Total Energy Design Rating.

Level of Change	Section	Subtitle & Notes	Prescriptive Change Summaries
Title 24, Part 6 Subchapter 8 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES			
Section 150.1 – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES FOR SINGLE-FAMILY RESIDENTIAL BUILDINGS			
No Change	**150.1(a)**	**Basic Requirements**	No change
No Change	**150.1(c)1-5**	**Prescriptive Standards/ Component Packages**	No change

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries	Prescriptive Change Summaries	Performance Change Summaries
Title 24, Part 6 Subchapter 9 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – ADDITIONS AND ALTERATIONS TO EXISTING RESIDENTIAL BUILDINGS					
Section 150.2 – ENERGY EFFICIENCY STANDARDS FOR ADDITIONS AND ALTERATIONS TO EXISTING SINGLE-FAMILY RESIDENTIAL BUILDINGS					
Revised	**150.2(a)1B**	**Additions ≤700 ft²**	The Climate Zone trigger for roof and ceiling insulation for vented attics has changed: a) In Climate Zones 1, 2, 4 and 8-16: Overall assembly must have a U-factor ≤0.025 (wood-framed assemblies using insulation with R-value of ≥R-38). b) In Climate Zones 3 and 5-7: Overall assembly must have a U-factor ≤0.031 (wood-framed assemblies using insulation with R-value of ≥R-30). All other requirements remain the same		
No Change	**150.2(b)1A and B**	**Added and Replacement Fenestration**	No change		
Revised	**150.2(b)1I**	**Roofs** *More Climate Zones will trigger the rated roofing product requirements.* *Tables 150.20 B and C have different insulation value requirements.*	i. **Steep-sloped Roofs:** The Climate Zone trigger has changed in addition to revised exceptions. In Climate Zones 4 and 8-15, new roofing products must have minimum aged solar reflectance ≥0.20 AND minimum thermal emittance ≥ 0.75 OR SRI of 16. EXCEPTIONS: • Buildings with ceiling assemblies U-factors ≤0.025 (wood-framed assemblies using insulation with R-value of ≥R-38) • Buildings with attic radiant barrier (not including radiant barrier directly above spaced sheathing) per §150.1(c)2 • In Climate Zones 2, 4, 9, 10, 12 and 14: No ducts in the attic • Buildings with ≥R-2 above or below the roof deck • Roof area covered with integrated photovoltaic (PV) or solar thermal panels • Roofs ≥25 lb/ft² in weight ii. **Low-sloped Roofs:** a. **New Roofing Products:** The Climate Zone trigger has changed in addition to revised exceptions. In Climate Zones 4 and 6-15, new roofing product must have minimum aged solar reflectance ≥0.63 AND minimum thermal emittance ≥0.75 OR SRI of 75 (applicable). EXCEPTIONS: • Revised roofing product requirements if insulation added per Table 150.2-B • Roof area covered with integrated PV or solar thermal panels • Roofs ≥25 lb/ft² in weight b. **Roof Insulation:** In Climate Zones 1, 2, 4 and 8-16, continuous insulation ≥R-14 and overall assembly U-factor ≤0.039 are required (R-11 in wood-framed cavity and R-14 at roof deck.). See Table 150.2. EXCEPTIONS: 1. Existing roof with ≥R-10 continuous insulation above or below the roof deck 2. In Climate Zones 1, 2, 4 and 8-10: Existing roof with assembly U-factor ≤0.056 (R-19 between wood framing) AND insulation in contact with roof deck *(continued)*		

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Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries	Prescriptive Change Summaries	Performance Change Summaries
Section 150.2 – ENERGY EFFICIENCY STANDARDS FOR ADDITIONS AND ALTERATIONS TO EXISTING SINGLE-FAMILY RESIDENTIAL BUILDINGS (continued)					
➤ Revised	**150.2(b)1I**	*Be aware that the altered roof insulation exceptions have changed.*	*(continued)* 3. R-4 is allowed if one or more of the following is true: i. Mechanical equipment will not be lifted for reroofing efforts, and insulation beyond the R-4 will cause flashing issues per manufacturer installation requirements. (See California Residential Code §R900.) ii. Sidewall or parapet walls will have flashing issues if insulated beyond R-4 per manufacturer installation requirements (See California Residential Code §R900.) provided that the sidewall and parapet walls are finished with material other that the roof covering membrane material, or sidewall and parapet cladding material would have to be replaced to maintain minimum flashing height, or the ratio of the replaced roof area to the linear dimension of affected sidewall or the parapet is <25 ft² per linear ft. Note: Increased insulation will cause flashing issues for existing fenestration or door manufacturer's installation instructions or via design professional flashing design. (See California Residential Code §§R703.4, R905.2.8.3.) When sloping towards roof drains, an alternative U-factor/R-value is allowed as long as overall weighted U-factor/R-value meets requirements. 4. The continuous insulation requirements in Table 150.2-C may be reduced where increasing the thickness of above deck insulation would reduce the flashing around an existing exterior wall opening below what is permitted by the fenestration or door manufacturer's installation instructions, or registered design professionals approved flashing design, as per the California Residential Code §R703.4 or §R905.2.8.3. 5. Tapered insulation with thermal resistance less than prescribed at the drains and other low points may be used provided that the thickness of insulation is increased at the high points of the roof so that the average thermal resistance equals or exceeds the required value.		
✳ New	**150.2(b)1J**	**Ceiling**	i. In Climate Zones 1-4, 6 and 8-16: Overall weighted U-factor must be ≤0.20 (≥R-49 at ceiling). There is an exception for Climate Zones 1, 3 and 6 with existing R-19 insulation. ii. In Climate Zones 2, 4 and 8-16: Air sealing of the ceiling plane between attic and conditioned space is required per §110.7. There are exceptions for when ≥R-19 ceiling insulation exists or when atmospherically vented space heating or water-heating combustion appliances are located inside the pressure boundary of the dwelling unit. iii. In Climate Zones 1-4 and 8-16: Recessed can lights must be covered with same depth of insulation as the rest of the ceiling. If they are not insulation contact (IC) rated, they must be replaced with IC-rated cans or retrofitted with fire-proof covers allowing for insulation coverage. There is an exception for Climate Zones 1-4 and 8-10 using R-19 at the ceiling. iv. Attic ventilation must follow requirements of the California Building Code. EXCEPTIONS: 1. There is existing ≥R-38 insulation at the ceiling. 2. The Alteration would directly disturb asbestos. 3. Knob and tube wiring is present in vented attic space. 4. There is not enough accessible space in the attic to accommodate the R-value, in which the entire accessible space will be utilized while not violating California Residential Code §806.3. 5. When attic space is shared with other dwelling units, only the attic space above the altered dwelling unit is required to meet these requirements.		
✳ New	**150.2(b)1N**	**Exterior Solid Doors**	Alterations that increase exterior door area must meet U-factor requirements of §150.1(c)5.		
No Change	**150.2(b)2**	**Performance Approach**	No change		

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Photovoltaic and Battery Systems and Solar, Electric and Battery Ready: Single-family Buildings

Building Application	Mandatory		Prescriptive Subchapter 8 (§§140.0-9)	Performance Subchapter 8 (§150.1)	Additions Alterations Subchapter 9 (§150.2)	Reference Appendices
	All Occupancy Subchapters 1-2 (§§100.0-110.12)	Residential Occupancy Subchapter 7 (§150.0)				
Photovoltaic (PV) Systems (conditioned buildings)	§§100.0, 100.1-2	N/A	§150.1(c)14	§§150.1(a), 150.1(b)	N/A	JA11 PV Qualifications
Solar Ready (when no PV)	§110.10	§150.0(r)	N/A	N/A	N/A	N/A
Battery Storage Ready and Installation	§110.10	§150.0(s)	N/A	§150.1(b)	N/A	JA12 Battery Qualifications
Electric Ready (when gas used)	N/A	§§150.0(t)-(v)	N/A	N/A	N/A	N/A

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Title 24, Part 6 Subchapter 1 – ALL OCCUPANCIES – GENERAL PROVISIONS			
Section 100.0 – SCOPE			
➤ Revised	**100.0**	**Scope**	Multifamily building standards are moved from the subchapters on low-rise residential buildings to new subchapters devoted to multifamily buildings. The group of buildings that was previously called *low-rise residential* is now called *single-family* and includes duplexes, townhomes, and accessory dwelling units (ADUs), in addition to single-family homes.

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Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Section 100.0 – SCOPE (continued)			
✳ New	**100.1(b)**		**Azimuth** is the degrees of clockwise rotation from true north.
✳ New			**Dwelling Unit, Junior Accessory (JADU)** is a dwelling unit that is no more than 500 square feet in size and contained entirely within an existing single family building. A JADU includes a kitchen, a separate entrance from the main entrance to the building, and an interior entry to the main living area. A JADU may include separate sanitation facilities, or may share sanitation facilities with the existing single family building.
✳ New		*These definitions are added to support new battery-ready requirements of §150.0(s).*	**Energy Storage System (ESS)** is one or more devices, assembled together, that are capable of storing energy used for safely supplying electrical energy to selected loads at a future time. **ESS-Ready Interconnection Equipment** is equipment, including but not limited to an ESS-ready panelboard, that can accommodate the connection of a distributed energy resource or an ESS capable of either automatic or manual isolation from the utility power source. **ESS-Ready Panelboard** is a panelboard that can accommodate either automatic or manual switching between a utility power source to a distributed energy resource or an energy storage system, such as a split bus panelboard.
➤ Revised			**Single-family Building** is any of the following: a residential building of Occupancy Group R-3 with two or less dwelling units, a building of Occupancy Group R-3, other than a multifamily building or hotel/motel building, a townhouse, a building of Occupancy Group R-3.1, or a building of Occupancy Group U when located on a residential site.
Section 100.2 – CALCULATION OF TIME DEPENDENT VALUATION (TDV) ENERGY: No change			
Title 24, Part 6 Subchapter 2 – ALL OCCUPANCIES – MANDATORY REQUIREMENTS FOR THE MANUFACTURE, CONSTRUCTION AND INSTALLATION OF SYSTEMS, EQUIPMENT AND BUILDING COMPONENTS			
Section 110.0 – SYSTEMS AND EQUIPMENT – GENERAL: No change			
Section 110.1 – MANDATORY REQUIREMENTS FOR APPLIANCES: No change			
Section 110.10 – MANDATORY REQUIREMENTS FOR SOLAR READY READINESS: Minor changes			
Section 110.12 – MANDATORY REQUIREMENTS FOR DEMAND MANAGEMENT: No change for single-family buildings			

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Title 24, Part 6 Subchapter 7 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – MANDATORY FEATURES AND DEVICES			
Section 150.0 – MANDATORY FEATURES AND DEVICES			
New	**150.0(s)**	**Energy Storage Systems (ESS) Ready**	Energy Storage Systems (ESS) Ready: In all single-family residences that include one or two dwelling units, all electrical components must be installed in accordance with the California Electrical Code and must meet the following requirements: 1. At least one of the following must be provided: A. ESS-ready interconnection equipment with a minimum backed up capacity of 60 amps and a minimum of four ESS-supplied branch circuits OR B. A dedicated raceway from the main service to a panelboard (subpanel) that supplies the branch circuits in §150.0(s)(2). All branch circuits are permitted to be supplied by the main service panel prior to the installation of an ESS. The trade size of the raceway must be not less than one inch. The panelboard that supplies the branch circuits (subpanel) must be labeled "Subpanel shall include all backed-up load circuits." AND 2. A minimum of four branch circuits must be identified and have their source of supply collocated at a single panelboard suitable to be supplied by the ESS. At least one circuit must supply the refrigerator, one must supply the lighting circuit near the primary egress, and at least one circuit must supply a sleeping room receptacle outlet; AND 3. The main panelboard must have a minimum busbar rating of 225 amp; AND 4. Sufficient space must be reserved to allow future installation of a system isolation equipment or transfer switch within 3 ft of the main panelboard. Raceways must be installed between the panelboard and the system isolation equipment or transfer switch location to allow the connection of backup power source.
New	**150.0(t)**	**Heat Pump Space Heater Ready**	If natural or propane gas furnaces are installed: 1. Dedicated, 240-volt branch circuit wiring must be installed within 3 ft from the furnace and accessible to the furnace with no obstructions. The branch circuit conductors must be rated at 30 amps minimum. The blank cover must be labeled "240V ready." All electrical components must be installed in accordance with the California Electrical Code; AND 2. The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker permanently labeled "For Future 240V use."
New	**150.0(u)**	**Electric Cooktop Ready**	Systems using a gas or propane cooktop to serve individual dwelling units must include the following: 1. Dedicated, 240-volt branch circuit wiring must be installed within 3 ft from the cooktop and accessible to the cooktop with no obstructions. The branch circuit conductors must be rated at 50 amps minimum. The blank cover must be labeled "240V ready." All electrical components must be installed in accordance with the California Electrical Code; AND 2. The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future electric cooktop installation. The reserved space must be permanently labeled "For Future 240V use."
New	**150.0(v)**	**Electric Clothes Dryer Ready**	Clothes dryer locations with gas or propane plumbing to serve individual dwelling units must include the following: 1. Dedicated, 240-volt branch circuit wiring must be installed within 3 ft from the clothes dryer location and accessible to the clothes dryer location with no obstructions. The branch circuit conductors must be rated at 30 amps minimum. The blank cover must be labeled "240V ready." All electrical components must be installed in accordance with the California Electrical Code; AND 2. The main electrical service panel must have a reserved space to allow for the installation of a double pole circuit breaker for a future electric clothes dryer installation. The reserved space must be permanently labeled "For Future 240V use."

Level of Change	Section	Subtitle & Notes	Performance Change Summaries
Section 150.1(b) – PERFORMANCE STANDARDS			
➤ Revised	**150.1(b)1**	**Newly Constructed Buildings**	Energy design rating (EDR) scores now include *source energy* AND time-dependent valuation (TDV) accounting for both the Energy Efficiency Design Rating and the Solar Electric Generation and Demand Flexibility Design Rating. The Proposed Building must separately comply with the *Source Energy Design Rating*, Energy Efficiency Design Rating and the Total Energy Design Rating.

Level of Change	Section	Subtitle & Notes	Prescriptive Change Summaries
Title 24, Part 6 Subchapter 8 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES			
Section 150.1 – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES FOR SINGLE-FAMILY RESIDENTIAL BUILDINGS			
➤ Revised	**150.1(c)14**	**Photovoltaic System Requirements** *Clarifications are made to help determine a building's solar access roof area in order to calculate the minimum photovoltaic system kW requirements and determine if a project is eligible for an exception.* *Note the revised exceptions.*	The annual electrical output of a newly installed photovoltaic (PV) system and modules must be no less than the smaller of a PV system size determined using Equation 150.1-C, or the maximum PV system size that can be installed on the building's Solar Access Roof Area (SARA) meeting the minimum qualification requirements of JA11. A. **SARA includes** the area of the building's roof space capable of structurally supporting a PV system and the area of all roof space on covered parking areas, carports and all other newly constructed structures on the site that are compatible with supporting a PV system per California Building Code §1511.2. B. **SARA does NOT include:** i. Any roof area that has <70% annual solar access. Annual solar access is determined by dividing the total annual solar insolation, accounting for shading obstructions, by the total annual solar insolation if the same areas were unshaded by obstructions. For steep-slope roofs, only shading from existing permanent natural or manmade obstructions that are external to the dwelling, including but not limited to trees, hills and adjacent structures, must be considered for annual solar access calculations. For low-slope roofs, all obstructions including those that are external to the dwelling unit, and obstructions that are part of the building design and elevation features must be considered for the annual solar access calculations. ii. Occupied roof areas are specified by California Building Code §503.1.4. iii. Roof area that is otherwise not available due to compliance with other building code requirements if confirmed by the California Energy Commission Executive Director. EXCEPTIONS: 1. **Steep-sloped Roofs:** SARA must not consider roof areas with a northerly azimuth that lies between 300 degrees and 90 degrees from true north. No PV system is required if the SARA is <80 contiguous ft². 2. **Minimum PV System Size Specified by §150.0(c)14 <1.8 kWdc:** No PV system is required. 3. **Snow Loads:** Buildings with enforcement authority-approved roof designs, where the enforcement authority determines it is not possible for the PV system, including panels, modules and components and supports and attachments to the roof structure, to meet the requirements of the American Society of Civil Engineers (ASCE), Standard 7-16, Chapter 7, Snow Loads. 4. **Reduced PV kW in Subdivisions:** For buildings that are approved by the local planning department prior to January 1, 2020, with mandatory conditions for approval in which shading from roof designs and configurations for steep-sloped roofs and roof areas that are not allowed to have PVs required by the mandatory conditions for approval, must not be considered in determining the SARA. 5. **Reduced PV kW with Battery Storage Systems:** PV system sizes that are determined using Equation 150.1-C may be reduced by 25% if installed in conjunction with a battery storage system. The battery storage system must meet the qualification requirements specified in Reference Joint Appendix JA12 and minimum usable capacity of ≥7.5 kWh.

2022 ENERGY CODE: *NEW* *MAJOR REVISION*

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries	Prescriptive Change Summaries	Performance Change Summaries
Title 24, Part 6 Subchapter 9 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – ADDITIONS AND ALTERATIONS TO EXISTING RESIDENTIAL BUILDINGS					
Section 150.2 – ENERGY EFFICIENCY STANDARDS FOR ADDITIONS AND ALTERATIONS TO EXISTING SINGLE-FAMILY RESIDENTIAL BUILDINGS					
No Change	**150.2(a)**	**Additions**	PV still is not required. New battery and appliance electric-ready requirements are not required either. However, be aware of new Addition and Alteration requirements for HVAC and water-heating systems.		
No Change	**150.2(b)**	**Alterations**			

Lighting: Single-Family Buildings

Building Application	Mandatory		Prescriptive Subchapter 8 (§§140.0-9)	Performance Subchapter 8 (§150.1	Additions Alterations Subchapter 9 (§150.2)	Reference Appendices
	All Occupancy Subchapters 1-2 (§§100.0-110.12)	Residential Occupancy Subchapter 7 (§150.0)				
General	§§100.0, 100.1-2, 110.0, 110.1	§150.0	N/A	N/A	§150.0(k)	JA8 - Qualification for High Efficacy Light Sources JA10 - Test Method for Measuring Flicker
Indoor Lighting	§110.9	§150.0(k)				
Outdoor Lighting	§110.9	§150.0(k)				

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Title 24, Part 6 Subchapter 1 – ALL OCCUPANCIES – GENERAL PROVISIONS			
Section 100.0 – SCOPE			
Revised	**100.0**	**Scope**	Multifamily building standards are moved from the subchapters on low-rise residential buildings to new subchapters devoted to multifamily buildings. The group of buildings that was previously called *low-rise residential* is now called *single-family* and includes duplexes, townhomes, and accessory dwelling units (ADUs), in addition to single-family homes.

2022 ENERGY CODE: ***NEW*** ***MAJOR REVISION***

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Section 100.1 – DEFINITIONS AND RULES OF CONSTRUCTION			
Revised	**100.1(b)**		**Inseparable Solid State Lighting (SSL) Luminaire** is a luminaire featuring solid state lighting components such as LEDs, light engines, and/or driver components which cannot be easily removed or replaced by the end user, thus requiring replacement of the entire luminaire. Removal of solid state lighting components may require the cutting of wires, use of a soldering iron, or damage to or destruction of the luminaire. *If solid state lighting components are not removable without destruction to the luminaire, the luminaire is deemed inseparable.*
New			**Tunable Lighting** are light sources with the ability to alter their luminous flux and/or spectral power distribution. Tunable lighting includes the following types: • **Dim-to-warm (also known as warm dim)** light source is capable of simultaneously decreasing its correlated color temperature as its light output decreases, typically resembling the change in color temperature of an incandescent lamp as it dims. • **Tunable white** light source is capable of adjusting its correlated color temperature while maintaining its relative light output and capable of adjusting its light output while maintaining its correlated color temperature. • **Color tunable** light source is capable of emitting highly saturated light of varying hues, as well as white light, for example by varying the relative intensity of individual emitters within the light source.
Revised			**Single-family Building** is any of the following: a residential building of Occupancy Group R-3 with two or less dwelling units, a building of Occupancy Group R-3, other than a multifamily building or hotel/motel building, a townhouse, a building of Occupancy Group R-3.1, or a building of Occupancy Group U when located on a residential site.
Title 24, Part 6 Subchapter 2 – ALL OCCUPANCIES – MANDATORY REQUIREMENTS FOR THE MANUFACTURE, CONSTRUCTION AND INSTALLATION OF SYSTEMS, EQUIPMENT AND BUILDING COMPONENTS			
Section 110.1 – MANDATORY REQUIREMENTS FOR APPLIANCES: No change			
Section 110.9 – MANDATORY REQUIREMENTS FOR LIGHTING CONTROLS: No change for single-family buildings			

<table>
<tr><th>Level of Change</th><th>Section</th><th>Subtitle & Notes</th><th>Mandatory Change Summaries</th></tr>
<tr><td colspan="4">Title 24, Part 6 Subchapter 7 – SINGLE-FAMILY RESIDENTIAL BUILDINGS – MANDATORY FEATURES AND DEVICES</td></tr>
<tr><td colspan="4">Section 150.0 – MANDATORY FEATURES AND DEVICES</td></tr>
<tr><td>➤
Revised</td><td>150.0(k)1</td><td>Luminaire Requirements

Table 150.0-A has been revised.

Requirements are put in a new order; otherwise, the changes are minimal.

There are new exceptions to the high-efficacy requirements of Table 150.0-A.</td><td>A. Luminaire Efficacy: All installed luminaires must meet the requirements in Table 150.0-A.

Table 150.0-A Classification of High Luminous Efficacy Light Sources
<table>
<tr><th>Automatically considered high luminous efficacy (does NOT require JA8 certification)</th><th>Must be JA8 certified/marked</th></tr>
<tr><td>1. LED light sources installed outdoors</td><td>7. All light sources installed in ceiling recessed downlight luminaires: Note that ceiling-recessed downlight luminaires must not have screw base sockets regardless of lamp type, as specified in §150.0(k)1C.</td></tr>
<tr><td>2. Inseparable solid state lighting (SSL) luminaires containing colored light sources that are installed to provide decorative lighting</td><td rowspan="6">8. Anything not listed in this table</td></tr>
<tr><td>3. Pin-based linear fluorescent or compact fluorescents with electronic ballasts</td></tr>
<tr><td>4. High-intensity discharge (HID) light sources including pulse start metal halide and high-pressure sodium light sources</td></tr>
<tr><td>5. Luminaires with a hardwired, high-frequency generator and induction lamp</td></tr>
<tr><td>6. Ceiling fan lights kits subject to federal appliance regulations</td></tr>
</table>
EXCEPTIONS:
1. Integrated Device Lighting: Lighting integral to exhaust fans, kitchen range hoods, bath vanity mirrors and garage door openers
2. Navigation Lighting: Lighting such as night lights, step lights and path lights less than 5 watts
3. Cabinet Lighting: Lighting internal to drawers, cabinetry and linen closets with an efficacy of 45 lumens per watt or greater
B. Screw-based Luminaires: Screw-based luminaires must contain lamps that comply with Reference Joint Appendix JA8.
C. Recessed Downlight Luminaires in Ceilings: There is a new exception to the airtight labeling and installation requirements for recessed luminaires that are either marked for use in fire-rated installations or are installed in non-insulated ceilings.
D. Light Sources in Enclosed or Recessed Luminaires: No change, although this section has been reorganized.
E. Blank Electrical Boxes: Language is added about how the blank electrical boxes must be served for dimmer, vacancy sensor control, low voltage wiring or fan speed control.</td></tr>
</table>

2022 ENERGY CODE: *NEW* *MAJOR REVISION*

Level of Change	Section	Subtitle & Notes	Mandatory Change Summaries
Section 150.0 – MANDATORY FEATURES AND DEVICES (continued)			
Revised	**150.0(k)2**	**Indoor Lighting Controls**	A-D. Minor changes to support clean-up. E. **Automatic-off Controls:** Walk-in closets have been added in addition to bathrooms, garages, laundry room and utility rooms as spaces requiring an occupancy/vacancy sensor with automatic-off functionality. It was clarified that lighting in opaque-fronted drawers and cabinetry must be controlled with automatic-off when a drawer or door is closed. F. **Dimming Controls:** Dimmers that are required for lighting in habitable spaces (e.g., living rooms, dining rooms, kitchens and bedrooms) must have readily accessible dimming controls. Forward phase-cut dimmers controlling LED light sources in these spaces must comply with NEMA SSL 7A. EXCEPTIONS: 1. Ceiling fans with integrated lighting may use remote control. 2. Luminaires connect to a circuit in which the controlled lighting power is <20 watts OR controlled by an occupancy/vacancy sensor providing automatic-off functionality. 3. Lighting is under <5 watts for navigation (e.g., night lights, step lights and path lights), or lighting is internal to opaque-fronted drawers and cabinetry (which may alternatively use automatic-off controls). G. **Independent Controls:** The following must be controlled independently: • Integrated lighting of exhaust fans from the fan function • Undercabinet lighting • Undershelf lighting • Interior lighting of display cabinets • Switched outlets
No Change	**150.0(k)3**	**Residential Outdoor Lighting**	No change
No Change	**150.0(k)4**	**Internally Illuminated Address Sign**	No change
No Change	**150.0(k)5**	**Residential Garages for Eight or More Vehicles**	No change

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