

2025

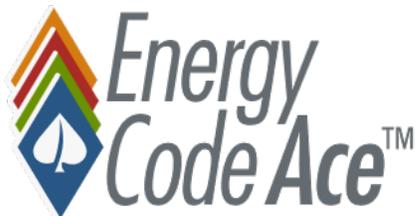
CODE BREAKER

Overview of Single-family Changes

Solving the Energy Code Puzzle One Piece at a Time

Participant Handout

August 2025



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ABOUT THE STATEWIDE CODES AND STANDARDS PROGRAM

The Statewide Codes and Standards Program (C&S Program) is jointly managed by the Pacific Gas and Electric Company, Southern California Edison, and San Diego Gas and Electric Company. The C&S Program saves energy on behalf of ratepayers by directly influencing standards and code-setting bodies to strengthen energy efficiency regulations, by improving compliance with existing codes and standards, and working with local governments to develop ordinances that exceed statewide minimum requirements.

This class is one of many free courses, tools, and resources that the C&S Program offers. Please visit <http://energycodeace.com/> or contact info@energycodeace.com to find out more about all program offerings.



AIA Information

Code Breaker: Single-family Overview of 2025 Energy Code Changes

Learning Units: 1 AIA LU | HSW

Energy Code Ace

Provider Number: 404109083

AIA
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Provider

Course Description

We will review the 2025 Energy Code Mandatory and Prescriptive requirements for Single-family envelope, mechanical, photovoltaic and heated pool and spa requirements. In addition, we will review the new electric-ready and performance compliance metrics introduced in the 2025 Energy Code.

Course Objectives

- State (or identify) when the 2025 Energy Code requirements go into effect
- Describe the 2025 Energy Code changes to Single-family Mandatory and Prescriptive envelope, mechanical and renewable measures
- Identify major 2025 Energy Code updates to the Single-family heated pool and spa requirements
- Be aware of additional tools, training and resources available

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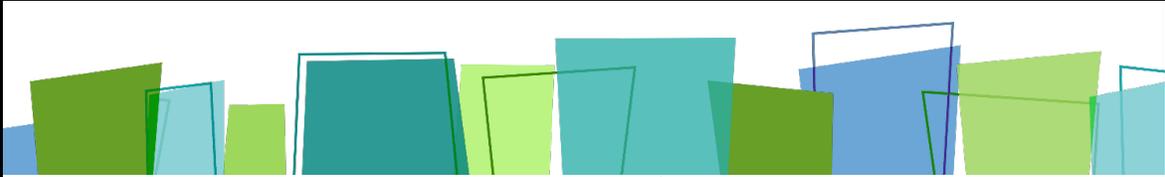
Credit(s) earned on completion of this course will be reported to **AIA CES** for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with **AIA CES** for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

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Welcome



2025 **CODE BREAKER** * **Overview of Single-family Changes**
Solving the Energy Code Puzzle One Piece at a Time

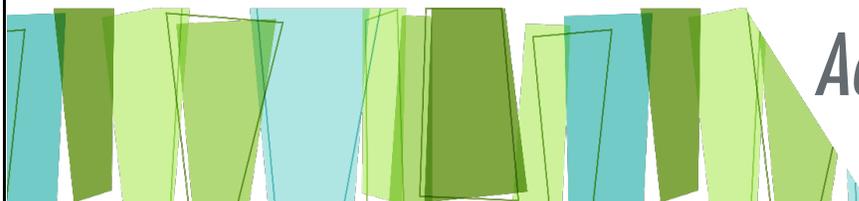
Gina Griffiths Rodda
Energy Code Ace Instructor
Gabel Energy

Continuing Education Information	
AIA Provider ID: 40410982	AIA Course Number: 25 CB OV SF
ICC Provider ID: 1534	ICC Course Number: 46154



Documenting Continuing Education Units (CEUs)

- ✦ Attendees who meet the completion criteria receive “standard” certificates of completion:
 - ✦ Typically sent within two weeks of course delivery
 - ✦ Certificate includes:
 - ◆ Course IDs (AIA & ICC)
 - ◆ Energy Code Ace Provider info (AIA & ICC)
- ✦ You may use this certificate to “self-certify” with a number of organizations in addition to AIA & ICC
 - ✦ If you entered your AIA member number when you registered, we will submit your course-completion information to AIA for you



Ace Training™

Training Objectives

- State (or identify) when the 2025 Energy Code requirements go into effect
- Describe the 2025 Energy Code changes to Single-family Mandatory and Prescriptive envelope, mechanical and renewable measures
- Identify major 2025 Energy Code updates to the Single-family heated pool and spa requirements
- Be aware of additional tools, training and resources available





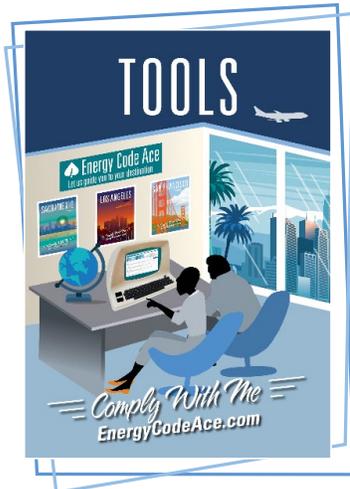
Ace * Tools™

Ace * Training™

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Your one-stop shop for no-cost tools, training and resources to help you comply with California's Title 24, Part 6 building energy code and Title 20 appliance standards.

We're powered by the California Statewide Codes & Standards Program and vetted by the California Energy Commission.



Ace * Training™

Ace * Resources™

A suite of interactive tools to help you understand the compliance process, required forms, installation techniques and energy efficiency regulations applicable to building projects and appliances in California

Our Tools include:

- + Energy Code Product Finder
- + Forms Ace
- + Image Ace
- + Navigator Ace
- + Nonres. Indoor Lighting Wheel
- + Q&Ace
- + Reference Ace
- + Timeline Ace
- + Virtual Compliance Assistant

Ace*Tools™

Ace*Resources™

A portfolio of on-demand and live online and in-person training alternatives on California's Energy Code and Title 20 regulations, tailored to a variety of industry professionals and addressing key measures

Our Training includes a variety of formats:

- ✦ In-person instructor-led
- ✦ Online instructor-led
- ✦ Online self-study
- ✦ Recorded webinars
- ✦ YouTube — live streaming & videos

Ace*Tools™

Ace*Training™

An array of downloadable materials providing practical and concise guidance on how and when to comply with California's building and appliance energy efficiency standards

Our Resources include:

- ✦ Application Guides
- ✦ Checklists
- ✦ Fact Sheets
- ✦ Submit a Question
- ✦ Trigger Sheets
- ✦ Useful Links



Join us at
www.EnergyCodeAce.com

Course Conventions

Mandatory	Prescriptive	Performance
 <ul style="list-style-type: none">Always required regardless of compliance approach used	 <ul style="list-style-type: none">Required when using the Prescriptive compliance approach	 <ul style="list-style-type: none">Optional feature accounted for when doing Performance-based computer modeling



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Overview

2025 Code Breaker: Overview of Single-family Changes

- 1. Overview**
- 2. Mandatory Measures
- 3. Prescriptive Measures
- 4. Next Steps

✦ **Explore changes in overall scope and application in:**

- ✧ Applicable Occupancy Types
- ✧ Timeline for Code Implementation
- ✧ Building Energy Efficiency Ratings (Performance Approach)
- ✧ Field Verification Terminology (HERS/ECC)



Occupancy Types

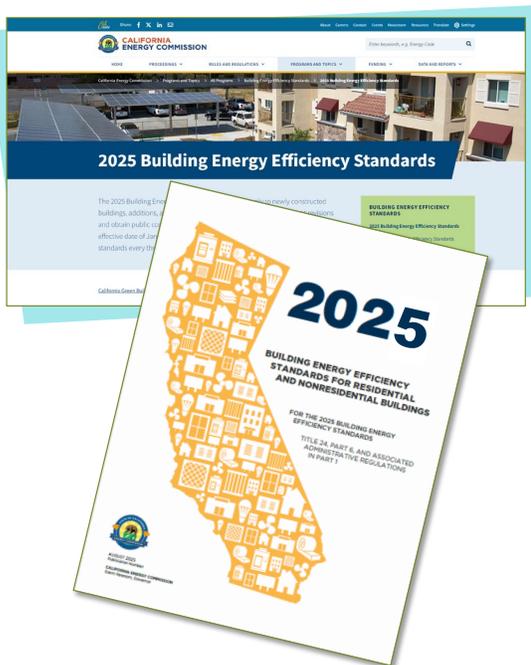
Group	Occupancy Type	Examples	
A	Assembly	Theaters, churches, arenas, amusement parks	
B	Business	Office buildings, banks, schools above 12 th grade	
C	Organized Camps	Outdoor group living experience (exempt from Energy Code)	
E	Education	K-12 schools	
F	Factory	Food processing, airports, dry cleaning, foundries	
H	High Hazard	Detonation, accelerated burning, health hazards	
I	Institutions	Convalescent homes, board and care (24 hours), hospitals	
	I-2	Hospitals and 24-hour medical care facilities	
	I-3	Correctional facilities (exempt from Energy Code)	
	I-4	Daycare facilities (exempt from Energy Code)	
New	L	Laboratories	Buildings with one or more lab suites
	M	Mercantile	Grocery stores, department stores
	R	Residential	Any building used for sleeping purposes:
	R-1	Hotels, motels and similar businesses	
	R-2	Apartment buildings, dormitories and multi-user residences with more than 2 dwelling units	
	R-3	Single-family homes and duplexes, as well as other permanent dwellings	
	R-4	Care facilities and similar businesses	
	S	Storage	Home goods, tires, food products, parking garages
	U	Miscellaneous	Agricultural, barns, greenhouses, carports

Uses MF code →

Uses SF or MF →

Uses MF code →

2025 Energy Code



- Implementation Date
 - January 1, 2026
 - Any projects that apply for a permit on or after this date will be subject to the 2025 Energy Code requirements
- Information and documents available on the CA Energy Commission website at:
 - <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>

Evolving Building Energy Efficiency Ratings

For Single-family Construction



Energy Design Rating (EDR):

An alternate way to express the energy performance of a home using a scoring system where 100 represents the energy performance of a reference design building meeting the envelope requirements of the 2006 International Energy Conservation Code (IECC). A score of 0 represents the energy consumption of a building that has zero net energy consumption. The lower the score, the better.

Source Energy Design Rating (EDRs):

A separate EDR metric based on "hourly source energy," which establishes a "carbon-proxy" analysis of the building in kBtu/sf-yr units to support decarbonization and electrification policy goals.

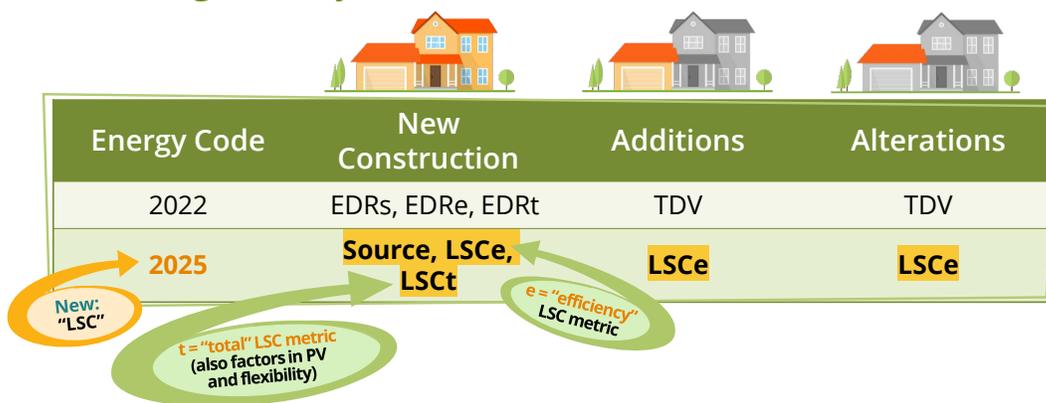
Time Dependent Valuation (TDV):

"TDV Energy" is the time varying energy used by the building to provide space conditioning, water heating and specified building lighting. It accounts for the energy used at the building site and consumed in producing and delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.



Evolving Building Energy Efficiency Ratings

For Single-family Construction



Source Energy (Source):

The long run marginal source energy of fossil fuels that are combusted as a result of building energy consumed either directly at the building site or to meet the electrical demand of the building considering the long-term marginal hourly resources of Commission-projected electric system resource procurement. For a given hour, the value in that hour for each forecasted year is averaged to get a lifetime average source energy.

Long-term System Cost (LSC):

CEC-projected present value of costs to California's energy systems over a period of 30 years. Does not represent a prediction of individual utility bills. Ensures that all modeled building features are specified on a one-for-one equivalent energy use or equivalent energy cost basis. Consists of large data sets that convert electricity, gas and propane to LSC energy. The rate of conversion varies for each hour of the year, climate zone, energy type (electricity, natural gas and propane), and building type (low-rise residential, high-rise residential, nonresidential, and hotel/motel).



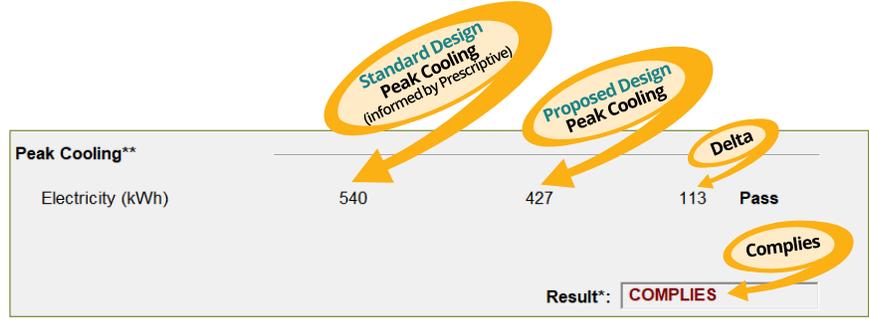
Peak Cooling



- ★ **Peak Cooling** is defined as:
"mechanical cooling during hours of 4:00 pm – 9:00 pm"
- ★ Will play a role in **2025 Long-term System Cost (LSC)** Performance metric calculations **only** for **Single-family New Construction**
- ★ To comply under the Performance Approach in **Climate Zones 4 & 8-15:**
 - ✦ **Proposed Design Peak Cooling** value must be **less than** Standard Design value



New



2025 Single-Family Residential ACM Reference Manual will provide more information on peak cooling limit



LSC as a Compliance Metric (2025)



Efficiency LSC
a score representing the building energy efficiency expressed in terms of LSC based metric

Includes energy used by:

- ★ Envelope
- ★ Indoor Fans
- ★ HVAC
- ★ DHW
- ★ Other loads (self-utilization credit and lighting when applicable)

Total LSC
a score representing the building's Total LSC while also factoring in PV + Flexibility

Includes energy used by:

- ★ Efficiency measures
- ★ Indoor Fans
- ★ Photovoltaics
- ★ Batteries
- ★ Precooling

Source
a score representing the building energy efficiency expressed in terms of an hourly source carbon based metric

Includes energy used by:

- ★ Envelope
- ★ Indoor Fans
- ★ HVAC
- ★ DHW
- ★ Photovoltaics
- ★ Batteries
- ★ Other loads

A building complies **ONLY** if **all three** compliance scores are met (**each** Proposed Design score is **lower or equal** to Standard Design score)



LSC as a Compliance Metric (2025)



Efficiency LSC
a score representing the building energy efficiency expressed in terms of LSC based metric

Total LSC
a score representing the building's Total LSC while also factoring in PV + Flexibility

Source
a score representing the building energy efficiency expressed in terms of an hourly source carbon based metric

Single Family Title 24 Performance														
Calculation	Heating	Cooling	Int Lighting	Ext Lighting	Appliances	Receptacle	PV	Batt	IAQ	DHW	LSCe	LSCt	Source	
Standard	1.87	2.83	1.75	0.42	5.79	6.96	-6.81	0.00	0.90	0.90	3.26	8.86	16.97	10.08
Proposed	2.01	3.65	1.75	0.42	5.80	6.96	-8.14	0.00	0.90	0.90	2.68	9.24	16.03	5.82

LSC shown as \$/sqft-yr of conditioned floor area

Does NOT Comply - Review LSCe, LSCt and Source Scores

All three ratings must show Proposed values that are equal or better (lower) than Standard

2025 Title 24 / 2019 ASHRAE

A building complies ONLY if **all three** compliance scores are met (each Proposed Design score is **lower or equal** to Standard Design score)

Terminology Change: "HERS" is now "ECC"

§10-102



Through 2022 Energy Code Cycle	Starting 2025 Energy Code Cycle	Definition
"HERS"	"ECC"	<ul style="list-style-type: none"> ECC = "Energy Code Compliance" Program Confirms compliance with Energy Code via field verification and diagnostic testing as applicable in Residential construction: <ul style="list-style-type: none"> New Construction Additions Alterations Program requirements moved from T20 to T24
HERS Provider	ECC-Provider	<ul style="list-style-type: none"> An organization approved by the CEC to administer the ECC program per Energy Code Section 10-103.3
HERS Rater	ECC-Rater	<ul style="list-style-type: none"> A person trained, tested, and certified by an ECC-Provider Performs ECC field verification and diagnostic testing
	ECC-Rater Company	<ul style="list-style-type: none"> An organization certified by an ECC-Provider Offers field verification and diagnostic testing services by the ECC-Rater Company's ECC-Raters
HERS Measures	ECC Measures	<ul style="list-style-type: none"> Building feature installations that must demonstrate compliance with Energy Code via field verification and diagnostic testing

Meets new requirements

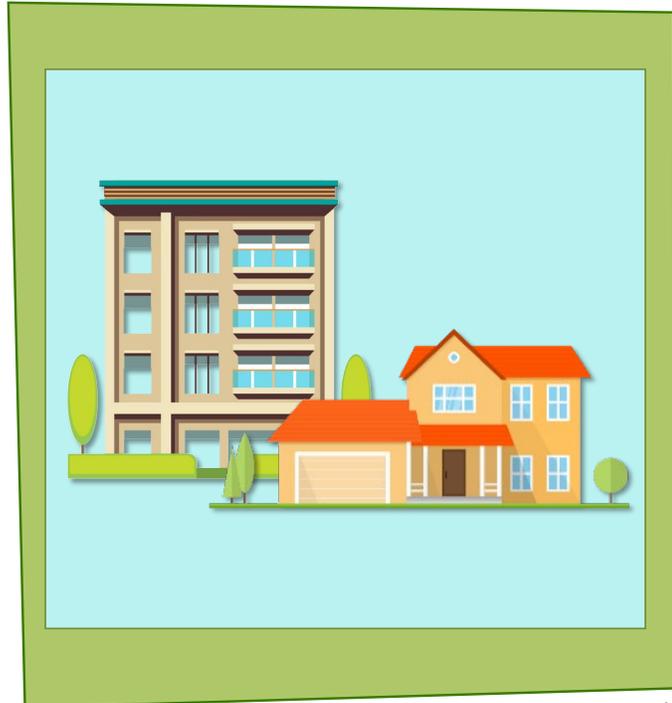


CYU #1

What do you think?

1. Which energy efficiency rating is used to evaluate single-family building performance under 2025 Energy Code?

- a) EDR (Energy Design Rating)
- b) LSC (Long-term System Cost)
- c) TDV (Time Dependent Valuation)
- d) LCC (Life Cycle Cost)



CYU #2

What do you think?

2. A new single-family home requires **field verification and diagnostic testing** for Quality Insulation Installation (QII). Under 2025 Energy Code, who must perform this work?

- a) HERS-Rater
- b) Installing Contractor
- c) ECC-Rater



Mandatory

2025 Code Breaker: Overview of Single-family Changes

- 1. Overview
- 2. Mandatory**
- 3. Prescriptive Measures
- 4. Next Steps

✦ Mandatory Requirements for:

- ✦ Envelope
- ✦ HVAC equipment
- ✦ Battery Energy Storage System (BESS) Readiness
- ✦ Indoor Air Quality
- ✦ Heated Pools and Spas
- ✦ Updates on Fluorescent Lighting Technology



Wall Insulation

§150.0(c)



Mandatory Measure Updates

- ❖ **2 x 4** framing shall have an overall assembly **maximum U-factor of 0.095**
 - ◆ Exception – existing walls that are:
 - ❖ Insulated to a maximum U-factor of 0.110 **OR**
 - ❖ Insulated between framing members (installed thermal resistance of R-11 or greater)
- ❖ **2 x 6** framing shall have an overall assembly **maximum U-factor of 0.069**
- ❖ In **wood framed assemblies**, compliance with U-factors may be demonstrated by installing wall insulation with:
 - ◆ **R-15** in **2 x 4** assemblies
 - ◆ **R-21** in **2 x 6** assemblies
 - ◆ 16 inches on center spacing

Reduced from 0.102

Reduced from 0.071

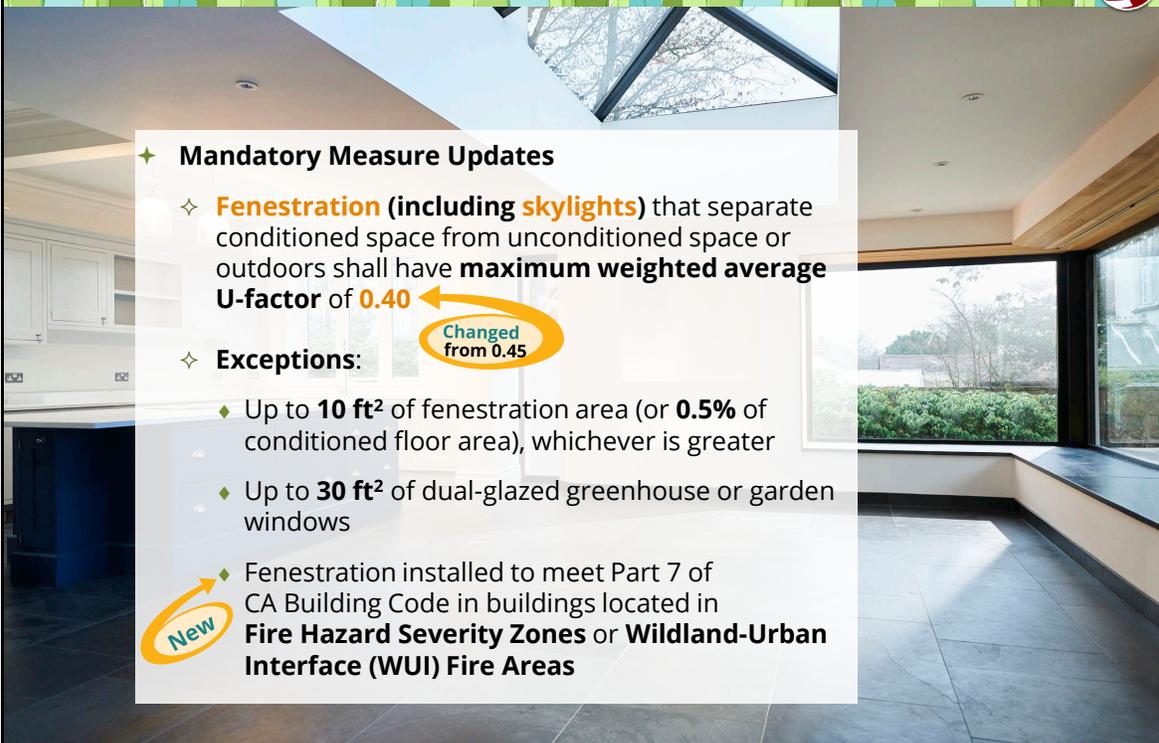
Increased from R-13

Increased from R-20



Fenestration

§150.0(q)



Mandatory Measure Updates

- ❖ **Fenestration (including skylights)** that separate conditioned space from unconditioned space or outdoors shall have **maximum weighted average U-factor of 0.40**
- ❖ **Exceptions:**
 - ◆ Up to **10 ft²** of fenestration area (or **0.5%** of conditioned floor area), whichever is greater
 - ◆ Up to **30 ft²** of dual-glazed greenhouse or garden windows
 - ◆ Fenestration installed to meet Part 7 of CA Building Code in buildings located in **Fire Hazard Severity Zones** or **Wildland-Urban Interface (WUI) Fire Areas**

Changed from 0.45

New



Fenestration

§150.0(q)



TABLE 110.6-A DEFAULT FENESTRATION PRODUCT U-FACTORS

Frame	Product Type	Single Pane ^{3,4} U-Factor	Double Pane ^{1,3,4} U-Factor	Glass Block ² U-Factor
Metal	Operable	1.28	0.79	0.87
Metal	Fixed	1.19	0.71	0.72
Metal	Greenhouse/Garden Window	2.26	1.40	N.A.
Metal	Glazed Doors	1.25	0.75	N.A.
Metal	Skylight	1.98	1.30	N.A.
Metal, Thermal Break	Operable	N.A.	0.66	N.A.
Metal, Thermal Break	Fixed	N.A.	0.55	N.A.
Metal, Thermal Break	Greenhouse/Garden Window	N.A.	1.12	N.A.
Metal, Thermal Break	Glazed Doors	N.A.	0.59	N.A.
Metal, Thermal Break	Skylight	N.A.	1.11	N.A.
Nonmetal	Operable	0.99	0.58	0.60
Nonmetal	Fixed	1.04	0.55	0.57
Nonmetal	Glazed Doors	0.99	0.53	N.A.
Nonmetal	Greenhouse/Garden Windows	1.94	1.06	N.A.
Nonmetal	Skylight	1.47	0.84	N.A.

None of the Default U-factors meet the maximum 0.40 requirement



Space Conditioning Equipment Selections

§150.0(h)5



Mandatory Measure Updates

✦ Limitations on Equipment Selections

◇ Cooling Capacity

- ◆ No minimum capacity limit

◇ Heating Capacity

- ◆ **Furnaces:** Selected based on **ACCA Manual S-2023, Table N2.5**

◆ Heat Pumps:

- ◇ Minimum: To meet minimum requirements of the CBC not including any supplementary heating
- ◇ Maximum: No limit

New but limited (more to come in Prescriptive)

New (more to come in Prescriptive)



Supplemental Electric Strip Heat

§150.0(h)8



Sizing Limit

Mandatory Measure Update

- ✦ Once load is met, any **heat pumps** using **Supplemental Electric resistance heat**:
 - ✧ Electric resistance heat capacity shall **NOT** exceed nominal cooling capacity (at 95°F ambient conditions) multiplied by 2.7 kW per ton, rounded up to closest kW.



Heat Pump Setback Thermostats

§150.0(i)



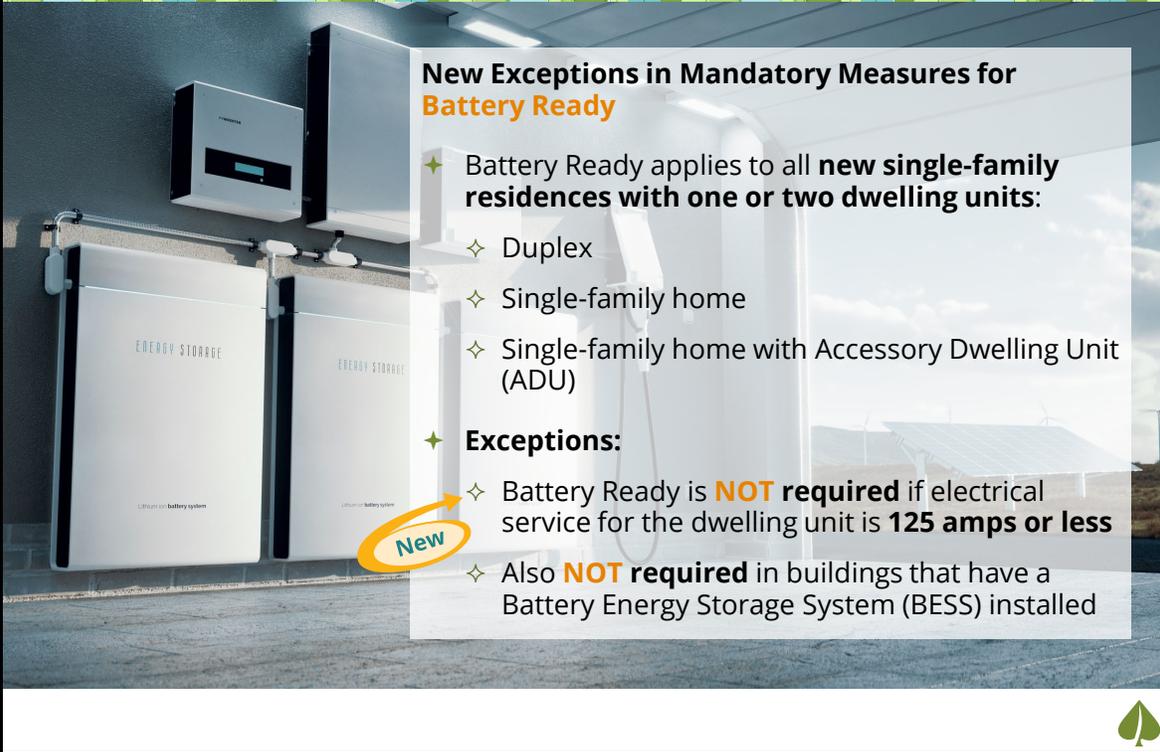
+ Mandatory Measure Updates

- ✧ **Heat pumps/dual-fuel heat pumps** with **supplementary heating** (whether **electric** resistance or **gas** furnace) shall have a **setback thermostat** that:
 - ◆ Displays outdoor air temperature*
 - ◆ Receives outdoor air temperature from an outdoor air sensor or internet weather service*
 - ◆ Locks out supplementary heat when outdoor air temperature is over 35°F*
 - ◆ Has an indicator to notify when supplementary or emergency heat in use
 - ✧ Supplementary heat operation permitted above 35°F during defrost or when user selects emergency heating
 - ✧ **Installer to certify** on **Certificate of Installation (CF2R)** that system has been **tested** in accordance with required testing procedure (shown on form)
 - ✧ **Exceptions:**
 - ◆ Systems compliant with Exception 1 to §150.0(h)7:
 - ◇ Buildings with a CFA < 500 ft², and for buildings of any size in CZ 7 & 15
 - ◆ Room air-conditioner heat pumps
- * If supplementary heat is already locked out above 35°F by another control device per §150.0(h)7, outdoor air temperature requirements do **not** apply



Battery Ready

\$150.0(s)



New Exceptions in Mandatory Measures for Battery Ready

- ✦ Battery Ready applies to all **new single-family residences with one or two dwelling units:**
 - ✧ Duplex
 - ✧ Single-family home
 - ✧ Single-family home with Accessory Dwelling Unit (ADU)
- ✦ **Exceptions:**
 - ✧ Battery Ready is **NOT required** if electrical service for the dwelling unit is **125 amps or less**
 - ✧ Also **NOT required** in buildings that have a Battery Energy Storage System (BESS) installed

New

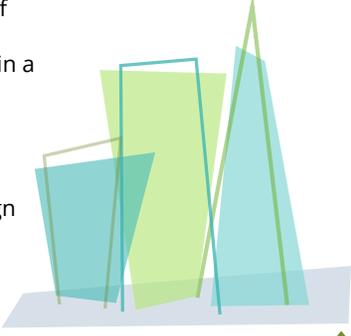


Ventilation and Indoor Air Quality

\$150.0(o)1Civ



- ✦ **Mandatory Measure Updates**
 - ✧ **For Balanced and Supply Only Ventilation** *New*
 - ✦ **IAQ filter and HRV/ERV Accessibility**
 - ✧ System air filters and HRV/ERV heat/energy recovery cores shall be located to be **accessible for service** from occupiable spaces, basements, garages, balconies, and mechanical closets
 - ✧ If behind access panels, access doors, or grilles, to be located **no more than 10 ft. above a walking surface**
 - ✦ **Exceptions**
 - ✧ Systems that require servicing from **inside the attic** shall have:
 - A **Fault Indicator Display (FID)** meeting requirements of Reference Appendix **JA17**
 - Attic **access door** located in a wall, or if access provided in a ceiling, an **attic access hatch with integrated ladder**
 - A **walkway** from the attic access door to the HRV/ERV
 - ✦ **To comply with CA Mechanical Code**
 - ✧ Must meet "Service Accessibility" and "Outdoor Intake Design including Location and Accessibility" requirements (FID meeting **JA17** exempts location and accessibility requirements)



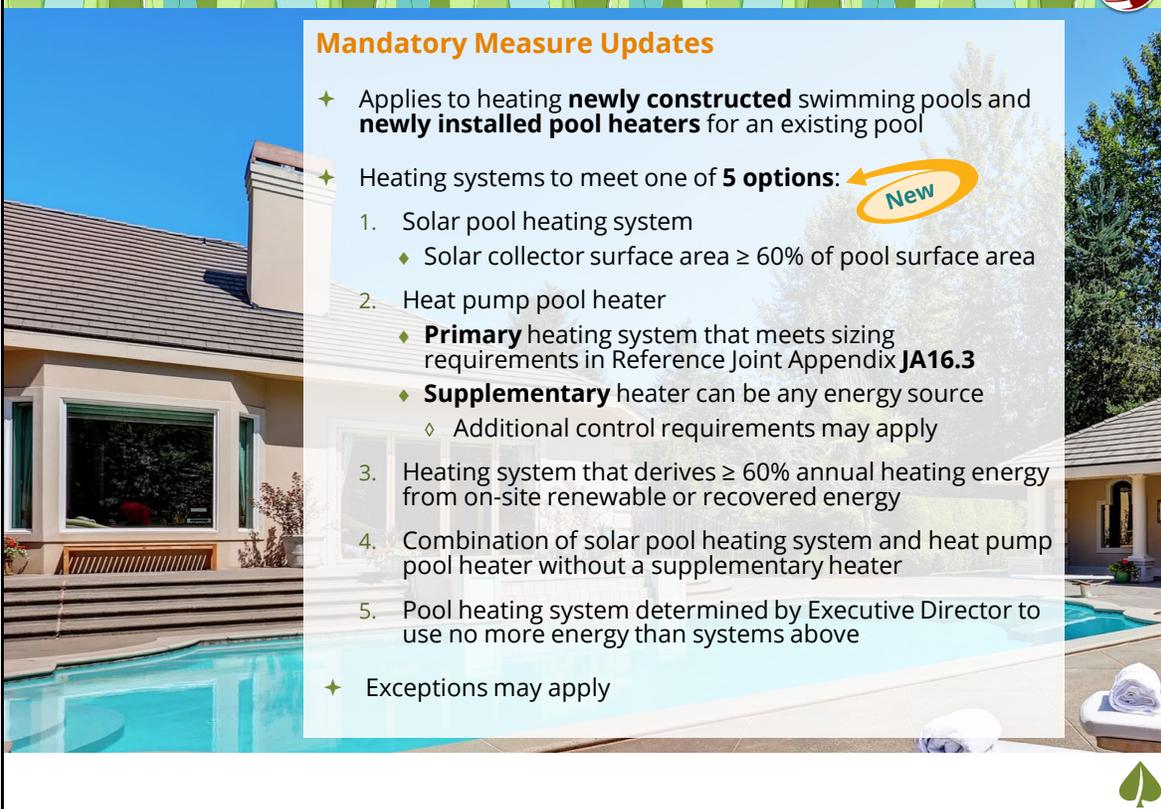


Mandatory Measure Updates

- ✦ Applies to heating **newly constructed** swimming pools and **newly installed pool heaters** for an existing pool
- ✦ Heating systems to meet one of **5 options**: 

 1. Solar pool heating system
 - ◆ Solar collector surface area \geq 60% of pool surface area
 2. Heat pump pool heater
 - ◆ **Primary** heating system that meets sizing requirements in Reference Joint Appendix **JA16.3**
 - ◆ **Supplementary** heater can be any energy source
 - ◆ Additional control requirements may apply
 3. Heating system that derives \geq 60% annual heating energy from on-site renewable or recovered energy
 4. Combination of solar pool heating system and heat pump pool heater without a supplementary heater
 5. Pool heating system determined by Executive Director to use no more energy than systems above

- ✦ Exceptions may apply



“High-efficacy Lighting” in 2022 vs 2025 Code



- ✦ **What’s the Same in 2025?**
 - ◇ All installed luminaires and light sources must be high efficacy
 - ◇ All lighting requirements are Mandatory Measures
 - ◇ Anything rated as JA8-2016/2019/2022 can be used
- ✦ **What’s Changed for 2025?**
 - ◇ Code was simplified: **Table 150.0-A** has been incorporated into the code language and no longer lives as a standalone table
 - ◇ 2025 high-efficacy lighting is now supported with the JA8-certification and marking requirements



Fluorescents



What's New: CA State Assembly Bill AB 2208

- ✦ **No longer allowed for sale** in California:
 - ◇ **As of Jan 1, 2024**
 - ◆ Screw-base compact fluorescent (CFL) lamps
 - ◆ Bayonet-base CFL lamps



- ◇ **As of Jan 1, 2025**
 - ◆ Pin-base CFL lamps
 - ◆ Linear fluorescent lamps
- ✦ **Rationale**
 - ◇ All fluorescent lamps contain mercury, a harmful neurotoxin

What's New in Title 24

- ✦ **Fluorescents removed** as lighting option from high-efficacy list
 - ◇ Lighting designs should no longer include fluorescents



CYU #3

What do you think?

1. This product label shows use of R-13 insulation in a 2x4 wood-framed wall of a new single-family home. Would it comply under 2025 Energy Code?

- a) Yes
- b) No
- c) Possibly (under the Performance Approach)



2x4 wood-framed wall





What do you think?

2. What is the maximum electrical service allowed for a new single-family dwelling unit to claim a Battery Ready exception?

- a) 125 amps or less
- b) 200 amps or less
- c) 100 amps or less



Prescriptive

2025 Code Breaker: Overview of Single-family Changes

- 1. Overview
- 2. Mandatory Measures
- 3. Prescriptive**
- 4. Next Steps

◆ Prescriptive Requirements for:

- ◆ Envelope
- ◆ HVAC Equipment
- ◆ Water Heating
- ◆ Solar PV System Sizing

Cathedral Ceilings

Table 150.1-A



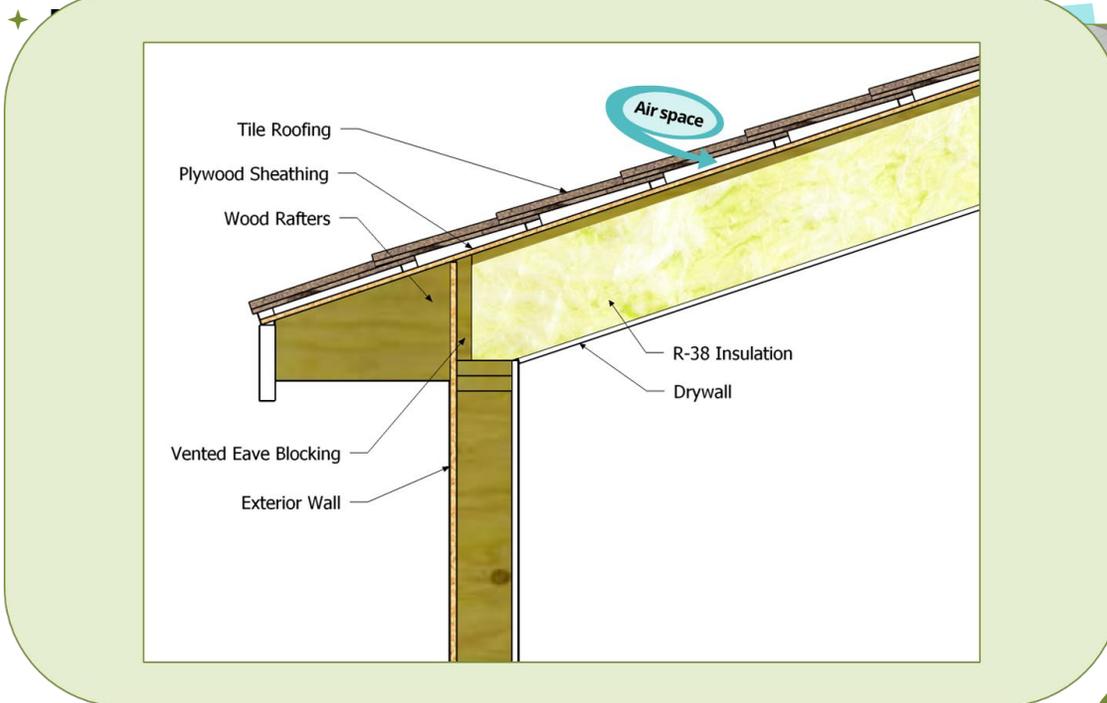
✦ Per Table 150.1-A, which outlines **Prescriptive Single-family** requirements by climate zone:

- ✦ Insulation for **Cathedral Ceilings** (Option C)
 - ◆ **R-38** for all climate zones
 - ◆ **Air space** needs to be present **between roofing and roof deck**



Cathedral Ceilings

Table 150.1-A



Fenestration Performance Values

Table 150.1-A



✦ **Per Table 150.1-A, which outlines Prescriptive Single-family requirements by climate zone:**

- ✦ Maximum fenestration **U-factor** updated for majority of CA climate zones
- ✦ For **SHGC**, only **CZ 15** changed



Excerpt of Table 150.1-A: Component Package – Single-family Prescriptive Building Design

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Maximum Value																
Fenestration Maximum U-factor ¹²	0.27	0.27	0.27	0.27	0.27	0.30	0.30	0.30	0.30	0.30	0.27	0.27	0.27	0.27	0.30	0.27
Fenestration Maximum SHGC	NR	0.23	NR	0.23	NR	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.20	NR

¹² New dwelling units with a conditioned floor area ≤ 500 ft² in CZ 5 may comply with a maximum U-factor of 0.30

NR = No requirement



Refrigerant Charge Verification

Table 150.1-A



✦ **Per Table 150.1-A, which outlines Prescriptive Single-family requirements by climate zone:**

- ✦ New table row on requirements for refrigerant charge verification (RCV) for **heat pumps**
 - ◆ Heat pumps require RCV in **all** climate zones

Excerpt of Table 150.1-A: Component Package – Single-family Prescriptive Building Design

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RCV Requirement																
Refrigerant Charge Verification: Heat Pumps	REQ															
Refrigerant Charge Verification: Air Conditioners	NR	REQ	NR	NR	NR	NR	NR	REQ	NR							

NR = No Requirement REQ = Required



Fault Indicator Display Verification

Table 150.1-A



✦ Per Table 150.1-A, which outlines Prescriptive Single-family requirements by climate zone:

✦ New verification requirement (ONLY if doing heat recovery):

- ◆ All heat/energy recovery (HRV/ERV) ventilation systems serving individual dwelling units shall have a **Fault Indicator Display (FID)** device that is **ECC-rater field verified**
- ◆ Applies to all climate zones

Excerpt of Table 150.1-A: Component Package – Single-family Prescriptive Building Design

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FID Requirement																
FID required if HRV/ERV systems installed §150.1(c)15	REQ															

REQ = Required

Verification procedure is specified in Joint Reference Appendix JA17.



Fault Indicator Display Requirements

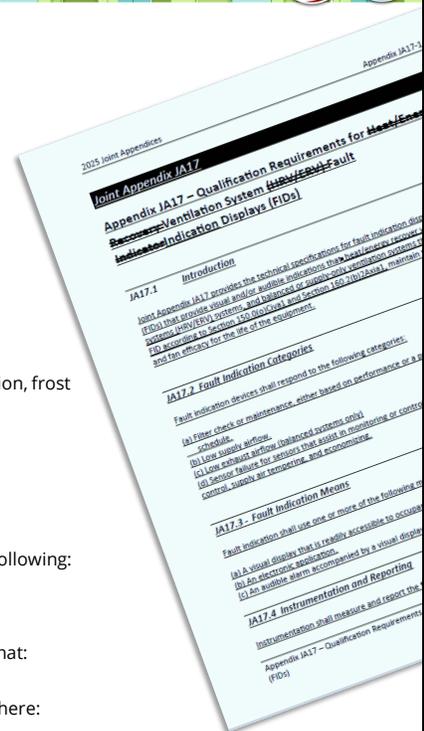


✦ Fault Indicator Displays (FIDs) can be triggered as either:

- ✦ A Prescriptive requirement in 150.1(c)15 meeting requirements of JA17
- ✦ A Mandatory requirement in §150.0(o)1Civa1 when using:
 - ◆ Exception to §150.0(o)1Civa1 OR
 - ◆ Exception to §150.0(o)1Civd

✦ In either case, FIDs shall meet these JA17 requirements:

- ✦ **JA17.2 Fault Indication Categories** – FID shall respond to:
 - ◆ Filter check or maintenance (either based on performance or a predetermined schedule)
 - ◆ Low supply airflow
 - ◆ Low exhaust airflow (balanced systems only)
 - ◆ Failure of sensors assisting in monitoring or controlling airflow regulation, frost control, supply air tempering, and economizing
- ✦ **JA17.3 Fault Indication Means** – Shall use one of the following:
 - ◆ Visual display that is readily accessible to occupants of dwelling unit
 - ◆ An electronic app
 - ◆ An audible alarm accompanied by a visual display
- ✦ **JA17.4 Instrumentation and Reporting** – Shall measure and report the following:
 - ◆ Airflow
 - ◆ Fan power
- ✦ **JA17.5 Manufacturer Certification** – Manufacturers shall certify to CEC that:
 - ◆ FID systems meet requirements of JA17.2-17.4
 - ✦ The CEC's listing of certified Residential FID products can be found here: <https://www.energy.ca.gov/media/7020>



Space Heating Updates

✦ Per Table 150.1-A, which outlines **Prescriptive Single-family** requirements by climate zone:

✦ Prescriptive options updated:

- ✦ **Gas space heating** is **NOT allowed Prescriptively** for New Construction (Only way to use gas furnace is via Performance Approach)
- ✦ All mentions of HSPF changed to HSPF2; SEER to SEER2

Excerpt of Table 150.1-A: Component Package - SF Prescriptive Building Design

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Space Heating - if gas AFUE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
Space Heating - Electric Resistance Allowed	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Space Heating - If Heat Pump, HSPF/HSPF2	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN

"NA" entries in bold font were formerly "MIN"

Just HSPF2 now

NA = Not Allowed



Domestic Hot Water (DHW)

2025 Updates to DHW



✦ **Required Prescriptively in Single-Family New Construction:**

- ✦ A single 240-volt Heat Pump Water Heater (HPWH)*
 - ✦ With or without NEEA Tier 3 rating
- OR**
- ✦ Solar water-heating system with electric backup and a minimum 70% solar savings fraction (SSF)

✦ Gas Tankless Water Heaters **NOT** Allowed Prescriptively for New Construction

New

✦ **Exceptions:**

1. New dwelling units ≤ 500 ft² CFA with point of use distribution may have electric water heater
2. New dwellings with 1 bedroom or less may use 120-volt HPWH

2022 Exception to allow gas tankless WH option in some climate zones removed in 2025

"Instantaneous" language removed in 2025

* Additional requirements may apply for Heat Pump Water Heaters in CZ 1 & 16. See Energy Code §150.1(c)8. (These are unchanged from 2022 code cycle.)



Solar Photovoltaic (PV)

§150.1(c)14



New formula for Prescriptive PV sizing using SARA

✦ Single-family solar PV requirement is expressed as a **kW (DC Rating)**

✦ Can be met by the **smaller of two options:**

✦ PV system size by using **Equation 150.1-C**

✦ The total **Solar Access Roof Area (SARA)** multiplied by:

✦ **18 W/ft²** (for steep-sloped roofs)

✦ **14 W/ft²** (for low-sloped roofs)

No change to equation

New

✦ **No Solar Photovoltaic (PV) Prescriptively required** on a new home if minimum required Prescriptive size < **1.8 kW per Equation 150.1-C**

✦ Required Size (not Proposed Size)



PV Exceptions

§150.1(c)14



No PV system is required if:

✦ The **SARA** is < **80 contiguous square feet**

✦ For **steep-sloped roofs**, SARA shall not consider roof areas with a northerly azimuth that lies between 300 degrees and 90 degrees from true north

Steep-sloped roofs

✦ The minimum PV system size specified by §150.1(c)14 is < **1.8 kWdc**

✦ The building has an enforcement-authority-approved roof design, and the enforcement authority determines it is **not possible** for the PV system to meet **ASCE 7-16, Chapter 7, Snow Loads**

✦ "PV System" includes panels, modules, components, supports and attachments to the roof structure

✦ The building is approved by the local planning department **prior to January 1, 2020** with mandatory conditions for approval

Required minimum PV system may be reduced by 25% if:

✦ Installed in conjunction with a **battery energy storage system**

✦ Battery storage system shall meet Joint Appendix JA12 qualification requirements and have a minimum **cycling capacity of 7.5 kWh**



Prescriptive Requirement Updates



Additions

- ✦ §150.2(a)1D:
When an **additional water heater** is installed to serve an Addition, it must be a **heat pump water heater**
- ◇ **Exception:**
Additions ≤ 500 ft² with point of use distribution may have electric water heater



Alterations

- ✦ §150.2(a)1A:
Glazing Alterations that **add fenestration area** in **Climate Zone 15** shall have a Solar Heat Gain Coefficient of:
- ◇ **SHGC ≤ 0.23**



Space-Conditioning System Capacity

HVAC System Selection Requirements for Additions



Additions

- ✦ §150.2(a)1E:
 - ◇ **New requirements include:**
 - ◆ Minimum capacity
 - ◆ Maximum capacity
 - ◇ **Exceptions:**
 - ◆ Ductless HVAC systems
 - ◆ Variable/multi-speed systems meeting **Table 150.2-A**; or
 - ◆ ECC-verified airflow (350 cfm/ton or better)



★ HVAC System Sizing Requirements – Additions:

✧ Minimum capacity:

- ◆ To meet capacity limits and supplemental heating requirements of §150.0(h)

✧ Maximum capacity:

- ◆ Depends on:
 - ✧ Calculated heating and cooling design load (envelope leakage used in load calculations to meet Table 150.2-C unless ECC blower door testing supports alternate value)
 - ✧ Type of HVAC system
 - ✧ Duct sizing

✧ Exceptions:

- ◆ Ductless HVAC systems
- ◆ Variable/multi-speed systems meeting Table 150.2-A; or
- ◆ ECC-verified airflow (350 cfm/ton or better)

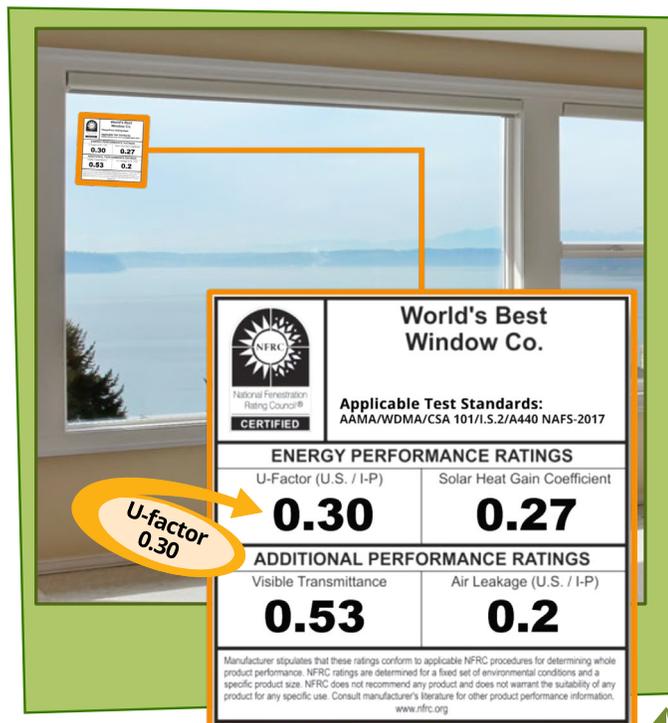


CYU #5

What do you think?

1. This is the window label in a new single-family home in San Francisco (Climate Zone 3). Does the window's U-factor meet 2025 Prescriptive requirements?

- a) Yes
- b) No



 National Fenestration Rating Council® CERTIFIED		World's Best Window Co. Applicable Test Standards: AAMA/WDMA/CSA 101/I.S.2/A440 NAFS-2017	
ENERGY PERFORMANCE RATINGS			
U-Factor (U.S. / I-P)		Solar Heat Gain Coefficient	
0.30		0.27	
ADDITIONAL PERFORMANCE RATINGS			
Visible Transmittance		Air Leakage (U.S. / I-P)	
0.53		0.2	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>			



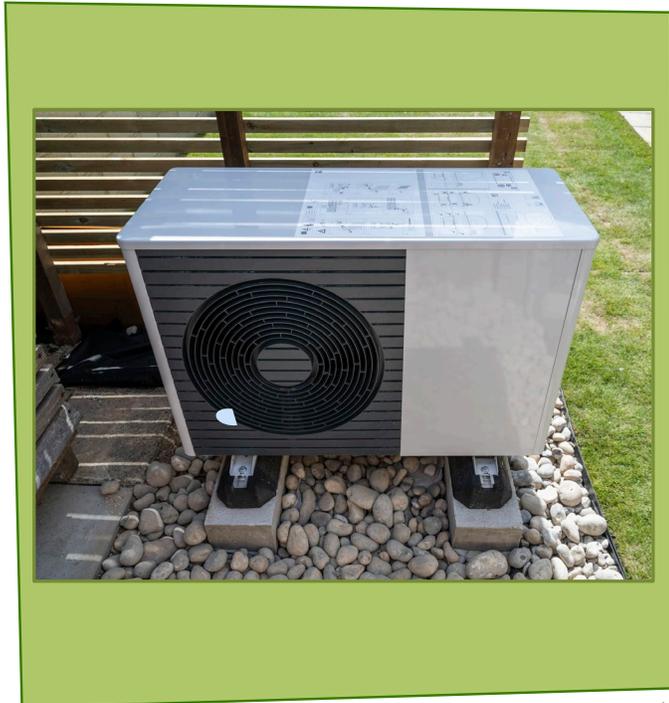


What do you think?

2. When is heat pump refrigerant charge verification

Prescriptively required for new single-family buildings?

- a) When a large heat pump (over 36,000 Btuh) is installed
- b) When the heat pump is installed in CZ 2 and 8-15
- c) When the heat pump is installed in any climate zone
- d) It is not Prescriptively required



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Next Steps

2025 Code Breaker: Overview of Single-family Changes

1. Overview
2. Mandatory Measures
3. Prescriptive Measures
- 4. Next Steps**

- ✦ **Energy Code Ace**
 - ✧ Resources
 - ✧ Classes
 - ✧ Tools: Q & Ace and Helpdesk



Fact Sheets on Energy Code Ace

2025 Title 24, Part 6 Fact Sheet
Single-family Buildings
What's New in 2025?

Using
 Use this fact sheet to answer the following questions about single-family, multifamily, hotel, motel, or nonresidential requirements for pool or spa installations, alterations, and repairs. These requirements are mandatory and set the minimum requirements that must be met (when applicable). The Performance Approach cannot be used to gain flexibility.

2025 Title 24, Part 6 Fact Sheet
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2025 Title 24, Part 6 Fact Sheet
Nonresidential, Single-family, and Multifamily
Pool and Spa Heating

What's Included:
 This fact sheet covers swimming pool and spa requirements from California's 2025 Building Energy Efficiency Standards (Title 24, Part 6 of the Energy Code) and applicable Appliance Efficiency Regulations (Title 20).

Table of Contents

Why Does the Energy Code Have Requirements for These Systems?	2
Project Scope Triggers	3
Key Terms	4
Applying the Pool and Spa Requirements	5
Pool and Spa Heating Sources and Sizing	7
Compliance Forms for Pool and Spas	15
For More Information	17

How Does this Fact Sheet Apply to Your Project?
 Use this fact sheet to answer the following questions about single-family, multifamily, hotel, motel, or nonresidential requirements for pool or spa installations, alterations, and repairs. These requirements are mandatory and set the minimum requirements that must be met (when applicable). The Performance Approach cannot be used to gain flexibility.

1. What requirements does your project need to meet to comply with the Energy Code?
2. What are the certification requirements for pool and spa equipment?
3. How should you document your project's compliance?

What's New:
 New heating source, sizing, and controls requirements for newly installed pool and spa heating systems.

RESOURCES
 ACE NEWS
 Comply With Me
 EnergyCodeAce.com

EnergyCodeAce
 2025 Title 24, Part 6 | Nonresidential, Single-family, and Multifamily: Pool and Spa Heating
 Page 1 of 18

Virtual Classes



What's New in 2025 Nonresidential Energy Code
 Online Live Event



What's New in 2025 Residential Energy Code
 Online Live Event



Q & Ace and Helpdesk

Q&Ace

Quickly find the answers to all your questions in our online knowledge base. Check out the Top Topics below or use the filters on the right.

Home Forms Buildings Appliances Collections My Account

EnergyCodeAce™
Comply With Me

Your one-stop shop for no-cost tools, training and resources to help you comply with California's [Title 24, Part 6 building energy code](#) and [Title 20 appliance standards](#). We're powered by the California Statewide Codes & Standards Program and vetted by the California Energy Commission.

TOOLS

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Let us guide you in your transition

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Contacts & Conclusion



Thank you

Please feel free to reach out to us with your questions and comments!

Contact	Role	Email	Phone
Gina Griffiths Rodda	Instructor	Use the Energy Code Ace Helpdesk! I answer the "nonresidential" questions	
Jill Marver	Energy Code Ace Program Manager	Jill.Marver@PGE.com	(925) 788-6312
Energy Code Ace	Multiple	http://energycodeace.com/content/contact	



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Please complete our course evaluation: <https://www.surveymonkey.com/r/cb-2025-sf-overview>

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