Single-family Buildings

Accessory Dwelling Units

What Are the Residential Accessory Dwelling Unit (ADU) Requirements?

The 2022 California Building Energy Efficiency Standards (Energy Code or Title 24, Part 6) includes requirements for single family and multifamily accessory dwellings units (ADUs).

An ADU is accessory to a primary residence and has complete independent living facilities for one or more persons. It is supported in the Energy Code as a single-family project when the ADU is associated with a single-family occupancy, and multifamily when associated with a multifamily occupancy. This fact sheet will concentrate on single-family ADU types.

Single-family Building: *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.*

How Does this Fact Sheet Apply to Your Project?

ADU Energy Code requirements differ depending upon the ADU type. Use this fact sheet to determine your ADU type and the Energy Code compliance options and requirements applicable to that ADU type. This includes requirements for envelope, mechanical systems, renewables and electric readiness.

Importance of Compliance

California continues to encourage and support ADUs through the legislative process via Assembly and Senate bills, in addition to recent changes in the Government Code §65852.150. Complying with the building codes assures health, safety and cost-effective energy efficiency measures, many of which aim to reduce California's greenhouse gas emissions.

It is important to confirm the ADU development and design standards of the local jurisdiction because each jurisdiction determines how compliance to California legislation supporting ADU construction impacts the local concerns such as parking, height and setback.

California Department of Housing and Community Development

To learn more about ADU laws and requirements, see the California Department of Housing and Community Development (HCD) website. The HCD maintains the *Accessory Dwelling Unit Handbook* and other useful information on the HCD website at https://www.hcd.ca.gov/policy-and-research/accessory-dwelling-units

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Key Terms

Alteration ADU Type

These are ADUs that are converting existing permitted conditioned space, such as a family room, to an ADU.

Upper Level ADU

An Existing Bedroom on the Second Floor Converted to an ADU

Addition ADU Type

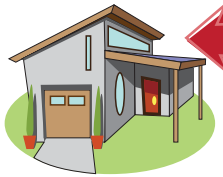
These are ADUs that are converting an existing space or building that was not habitable space and is considered "newly conditioned space" in the Energy Code or that are adding new conditioned floor area and volume to an existing single-family or multifamily building.

Garage Conversion ADU

An Existing Unconditioned Space (such as a Garage) Converted to an ADU

Attached ADU

A New ADU Added to an Existing Home

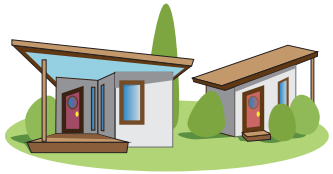


Above garage ADU

A New ADU Added above an Existing Garage

New Construction ADU Type

These are ADUs that are not being attached to any other structure on the property and are all New Construction.



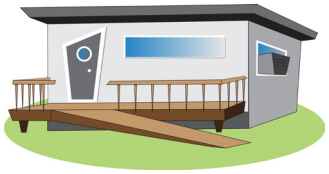
Detached ADU

Factory-built ADU Type

Typically considered a New Construction ADU type, these are factory-constructed versions of site-built ADUs that are manufactured and then transported to their permanent installation locations. These are regulated by the California Department of Housing and Community Development (HCD) under Title 25, which incorporates Title 24 as the applicable building code for design and construction. These ADUs are reviewed and approved through HCD Factory-built Housing (FBH) requirements with the on-site installation and assembly under the jurisdiction of the local authority (typically the local building department). As these are constructed off-site, many of the Home Energy Rating System (HERS) verifications are to be performed at the factory. Information can be found about the FBH program at https://www.hcd.ca.gov/building-standards/manufactured-modular-factory-built/factory-built-housing/docs/hcdfbh314.pdf.

Manufactured ADU Type

Previously known as mobile homes, these are ADUs that are transportable in one or more sections and include use of a permanent chassis. These are not subject to the California Building Code and must show compliance to Title 25. *Note that Title 25 requirements are not supported in this fact sheet.*



California Climate Zones

To know which efficiency requirements of the Energy Code apply to a project, it is important to identify the Climate Zone where the building is located. The California Energy Commission (CEC) has developed the EZ Building Climate Zone Finder to identify the applicable Climate Zone based on the building's location address: bit.ly/CEC-Climate-Zone-Finder

Compliance Requirements

Mandatory Requirements

Projects must meet applicable Mandatory requirements for existing features of the conditioned building that are being altered or any features that are being added as new.

Requirement Type	Alteration ADU Altered Features		Addition ADU New Features		New Construction ADU	
	Mandatory	Prescriptive	Mandatory	Prescriptive	Mandatory	Prescriptive
Envelope					Yes	Yes
Insulation	Yes	Yes for ceiling	Yes	Yes		
Fenestration	Yes	Yes	Yes	Yes		
Rated Roofing	N/A	Yes if > 50% replaced	N/A	Yes if Addition > 300 ft^2		
HVAC					Yes	Yes
Equipment	Yes	Yes	Yes	Yes		
HERS Measures	Yes	Yes	Yes	Yes		
Indoor Air Quality	Yes	N/A	Yes	N/A	Yes	N/A
Water Heating	Yes for pipe insulation	Yes for equipment	Yes for pipe insulation	Yes for equipment	Yes	Yes
***Lighting**	**Yes**	N/A	**Yes**	N/A	**Yes**	N/A
Photovoltaics	N/A	N/A	N/A	N/A	N/A	Yes
Battery Storage	N/A	N/A	N/A	N/A	N/A	Credit allowed in Performance Approach
Battery Readiness	N/A	N/A	N/A	N/A	Yes if no battery installed	N/A
Electric Readiness	N/A	N/A	N/A	N/A	Yes	N/A
Solar Readiness	N/A	N/A	N/A	N/A	Yes in subdivisions	N/A

***See the 2022 Residential Lighting Fact Sheet:** https://www.energycodeace.com/resources/?itemId=70413
ADU = *accessory dwelling unit;* **HERS =** *Home Energy Rating System.*

Table 1. *When ADU Projects Trigger the Energy Code*

Prescriptive Requirements

Using the Prescriptive Approach for compliance, projects must meet applicable Prescriptive requirements for existing features of the conditioned building that are being altered or any features that are being added as new. Altered feature requirements may differ based on the scope of work. Addition ADU Types have alternate requirements for extended walls and converted walls in which the siding remains.

Performance Requirements

Using the Performance Approach for compliance may allow more design flexibility than meeting the Prescriptive measures, although Mandatory Measures are still required. California Energy Commission (CEC)-approved software identifies Performance compliance options and can be found here: bit.ly/CEC-2022-Compliance-Software

Under the 2022 Energy Code, compliance is determined by assessing the Proposed Design features against the Standard Design features. A project complies when the proposed compliance values are equal to or better than the standard compliance values.

- Alteration ADU Type: Buildings comply when the altered building efficiency features (such as insulation and mechanical equipment efficiency) show compliance.
- Addition ADU Type: Buildings comply when the building efficiency features associated with the Addition (such as insulation and mechanical equipment efficiency) show compliance.
- New Construction ADU Type: Buildings comply when all of the metrics listed below show compliance:
  - Building efficiency features (such as insulation and mechanical equipment efficiency)
  - Photovoltaics (PV) and battery storage systems
  - Source energy determined by a carbon-proxy analysis of the building in kBTU/sf-yr (to support decarbonization and electrification policy goals)

Alteration ADU Type

Upper Level ADU

An Existing Bedroom on the Second Floor Converted to an ADU

Mandatory
Prescriptive
Performance

Envelope - Alteration ADU Type §150.2(b)

Roof §§150.2(b)1I-J

Insulation at Ceiling

CZ 1-4, 6, 8-16

- Altered vented attics require ≥ R-49 or equivalent U-factor ≤ 0.020.*

CZ 2, 4, 8-16

- Vented attic air sealing and recessed downlight insulation requirements must be met.*

CZ 1, 3, 5-7

- Existing insulation ≥ R-19 is allowed to remain and exempts the project from air sealing and recessed downlight insulation requirements.
- If existing insulation is < R-19, then ≥ R-49 is required.
- Non-vented attics require R-19, per §150.0(a)2-4.

CZ 1, 3, 6

- If existing insulation is < R-19, then > R-49 is required and air sealing and recessed downlighting insulation requirements must be met.

CZ 1, 2, 4, 8-16

- Low-sloped roof replacements require R-14 continuous insulation or U-factor of 0.039.*

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Wall §150.0(c)

Insulation

Framed

- 2 x 4: Require ≥ R-13 or equivalent U-factor ≤ 0.102.**
- 2 x 6: Require ≥ R-20 or equivalent U-factor ≤ 0.071.**

Non-Framed

- Require U-factor ≤ 0.102 (per applicable JA4.3 table).

Masonry

- Insulation is required with the R-value depending on CZ, location of wall and insulation placement (per Table 150.1-A).

Floor §§150.0(d), 150.0(f)

Insulation

Raised

- Require ≥ R-19 or equivalent U-factor ≤ 0.037.**

Slab on Grade

- Heated Slab: Perimeter insulation requirements of §150.0(f) apply.
- Unheated Slab: The above perimeter insulation requirements do not apply.

Fenestration §§150.2(b)1A-B

Altered Fenestration

≤ 75 ft² Altered Fenestration

- U-factor: Require ≤ 0.40.
- SHGC: In CZ 2, 4, 6-15, require ≤ 0.35.
- Area Limits: None apply. ***

> 75 ft² Altered Fenestration

- U-factor: Require ≤ 0.30.
- SHGC: In CZ 2, 4, 6-15, require ≤ 0.23.
- Area Limits: None apply.***

Any Skylights

- U-factor: Require ≤ 0.55.
- SHGC: Require ≤ 0.30.
- Area Limits: None apply. ***

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HERS Measures §150.2(b)

Quality Insulation Installation (QII)

- QII is not Prescriptively required nor allowed as a Performance credit.

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Envelope - Alteration ADU Type §150.2(b)				
Roof §§150.2(b)1I-J	**Wall §150.0(c)**	**Floor §§150.0(d), 150.0(f)**	**Fenestration §§150.2(b)1A-B**	**HERS Measures §150.2(b)**
All CZs Vented attics are exempt from the above requirements in any of the following situations: ✦ R-38 or greater ceiling insulation exists. ✦ Asbestos would be disturbed. ✦ Knob and tube wiring is located in the vented attic. ✦ When the accessible space does not support R-49, it must be filled with what is allowed per Title 24, Part 2.5. ✦ When sharing the attic with other dwelling units, only the attic over altered dwelling unit must meet these requirements. **Roofing Replacement** **CZ 4, 6-15** ✦ Rated roofing material must be CRRC certified. ✦ Minimum requirements differ based on roof slope.* **CZ 1-3, 5, 16** ✦ The above roofing material requirements do not apply. **CZ 1, 2, 4, 8-16** ✦ See insulation requirements on p. 4 when reroofing low-sloped roofs.			**Added Fenestration** **Any ft² Added Fenestration** ✦ U-factor: Require ≤ 0.30. ✦ SHGC: In CZ 2, 4, 6-15, require ≤ 0.23. ✦ Area Limits: *** ◊ ≤ 75 ft²: None apply. ◊ > 75 ft²: In all CZ, limited to 20% of CFA. In CZ 2, 4, 6-15, limited to 5% of west-facing CFA and 20% total CFA. **Skylights ≤ 16 ft²** ✦ U-factor: Require ≤ 0.55. ✦ SHGC: Require ≤ 0.30. ✦ Area Limits: None apply. *** **Skylights > 16 ft²** ✦ See **Any ft² Added Fenestration** above.	

Notes

***ADU** = accessory dwelling unit; **CFA** = conditioned floor area; **CRRC** = Cool Roof Rating Council; **CZ** = Climate Zone; **QII** = quality insulation installation; **SHGC** = solar heat gain coefficient.*

** Exceptions may apply.*

*** Use equivalent U-factor for non-wood-framed assembly (such as metal).*

**** "Area limits" refers to Prescriptive maximum total fenestration and total west-facing fenestration area limits for the whole building.*

***Table 2.** Alteration ADU Type - Energy Code Envelope Requirements*

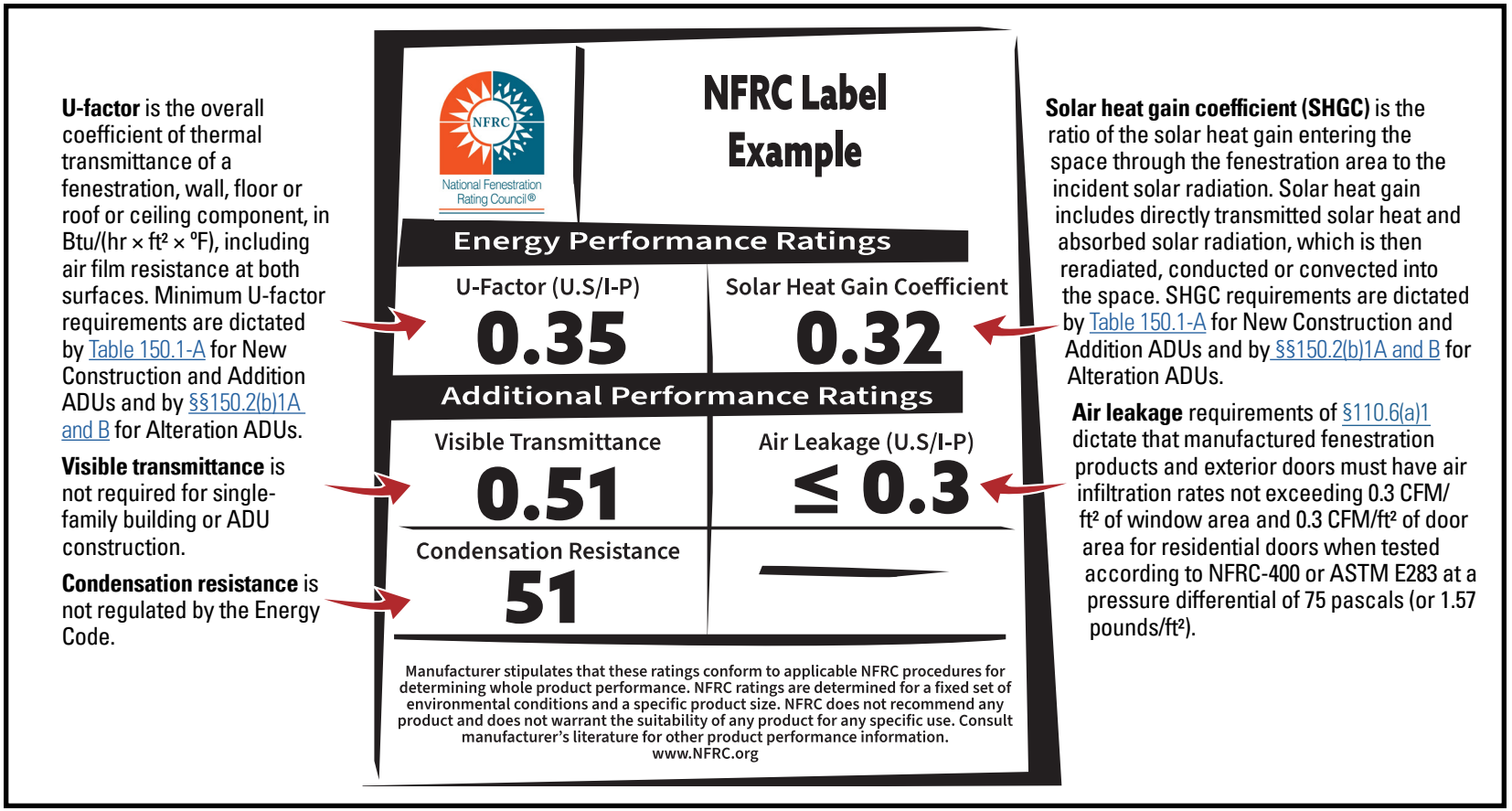


Figure 1. *National Fenestration Rating Council (NFRC) Label*

Fenestration

U-factor of 0.40 and solar heat gain coefficient (SHGC) of 0.35 represent a National Fenestration Rating Council (NFRC)-rated dual-paned, non-metal-framed, low-e² product that was required by previous Energy Code cycles. This requirement allows a home that is altering or adding a minimum amount of fenestration to look cohesive.

U-factor of 0.30 and SHGC of 0.23 represent an NFRC-rated dual-paned, non-metal-framed, low-e³ product which may have an appearance that differs from fenestration meeting low-e² requirements.

HERS-verified Existing Conditions

Performance compliance credit can be gained for single-family buildings when existing building features are improved and their existing conditions are Home Energy Rating System (HERS) verified before going for permit. For more information, see the *2022 Single-family Residential Alternative Calculation (ACM) Reference Manual* at bit.ly/CEC-2022-SF-ACM-Ref-Manual.

Mechanical Systems - Alteration ADU Type

Heating or Cooling Systems §§150.2(b)1C-G	IAQ Systems §150.2(b)1M	Water-heating Systems §150.2(b)1H	Electric Readiness
Extension of Existing Ducted HVAC System for ADU ✦ Return air from one dwelling unit shall not discharge into another dwelling unit through the heating or cooling air system per 2022 California Mechanical Code §311.4. **Added Ducted HVAC System for ADU** ✦ This system has the same requirements as New Construction except that heat pump space heating is not required. **Added Ductless HVAC System for ADU** ✦ This system has the same requirements as New Construction that include minimum equipment efficiency and HERS refrigerant charge testing in CZ 2, 8-15.	**Addition of New Dwelling Unit to an Existing Home** **Whole-building IAQ System** ✦ Required to be sized per §150.0(o)1C and meet the sone requirements. ✦ When an IAQ system is installed, airflow must be verified by a HERS Rater. ✦ Required when replacing or altering and IAQ system. ✦ Not applicable to replaced IAQ systems not previously subject to these requirements which started in the 2008 Energy Code. **Local Exhaust** ✦ Vented kitchen hoods can be used instead of local exhaust at the kitchen. ✦ For new kitchen hoods, minimum airflow must be based on cooktop fuel source and minimum sone rating in §150.0(o)1G. This does not apply to replaced kitchen hoods that were subject to these requirements which started in the 2008 Energy Code. ✦ Bathroom local exhaust requirements may apply.	**Water-heating System** **Extended Hot Water Piping to Serve ADU** ✦ Must meet pipe insulation requirements. **Added Water Heater** ✦ The Performance Approach is required when adding a new water heater of any type to serve an ADU alteration project. **Recirculation Pump** ✦ If a recirculation pump is installed, manual-ON control is required for the Prescriptive Approach or use the Performance Approach for other control options.	Not required for Alterations to existing homes.

Notes ***ADU*** *= accessory dwelling unit;* ***CZ*** *= Climate Zone;* ***HERS*** *= Home Energy Rating System (HERS) Program;* ***IAQ*** *= indoor air quality;* ***NEEA*** *= Northwest Energy Efficiency Alliance.*

Table 3. *Alteration ADU Type - Energy Code Mechanical Requirements*

Renewable Energy Systems - Alteration ADU Type

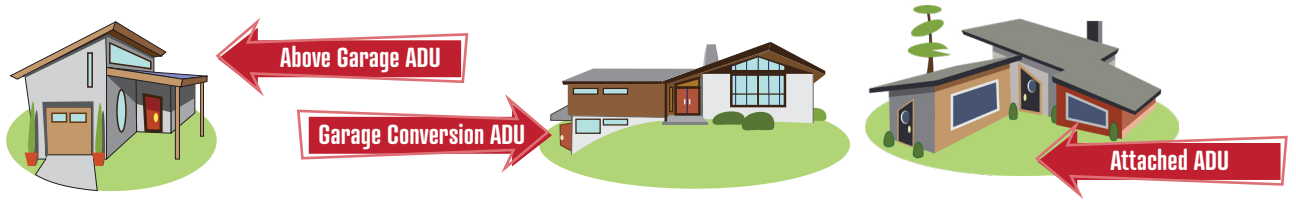
Photovoltaics	Battery Storage Systems	ESS Readiness	Solar Readiness
There are no requirements for photovoltaics and no ability to take Performance credit for new or altered systems	There are no requirements for battery storage systems and no ability to take Performance credit for new or altered systems.	Alterations to existing homes are not required to be energy storage system (ESS) ready.	Alterations to existing homes are not required to be solar ready.

Table 4. *Alteration ADU Type - Energy Code Renewable Requirements*

Single-family Buildings HVAC Additions and Alterations Fact Sheet

For more information on altered or added HVAC systems, see the Energy Code Ace™ Single-family Buildings HVAC Additions and Alterations Fact Sheet at bit.ly/ECA-building-fact-sheets.

Addition ADU Type



Mandatory
Prescriptive
Performance

Envelope - Addition ADU Type §150.2(a)

Roof §150.2(a)

CZ 3, 5-7

Attic Roof

- Require ≥ R-30 at ceiling or equivalent U-factor ≤ 0.031** with radiant barrier.

Rafter Roof

- Use the Performance Approach.

CZ 1-2, 4, 8-16

≤ 700 ft² with Attic Roof

- Require ≥ R-38 at ceiling or equivalent U-factor ≤ 0.025** with radiant barrier in CZ 2-15.

> 700 ft² with Attic Roof

- See below in New Construction ADU Type.

CZ 3, 5-7

≤ 700 ft² with Attic Roof

- Require ≥ R-30 at ceiling or equivalent U-factor ≤ 0.031.*

> 700 ft² with Attic Roof

- See below in New Construction ADU Type.*

Rafter Roof

- Use Performance Approach.

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Wall §150.2(a)

Framed

New

- CZ 1-5, 8-16: Require ≥ R-21 + R-5 continuous or equivalent U-factor ≤ 0.048.**
- CZ 6-7: Require ≥ R-13 + R-5 continuous or equivalent U-factor ≤ 0.065.**

Extended or Converted

- 2 x 4: Require ≥ R-15.
- 2 x 6: Require ≥ R-21.

Masonry

- Insulation is required with the R-value depending on CZ, location of wall and insulation placement (per Table 150.1-A).

Other Wall Types

- See Table 150.1-A or use the Performance Approach.

Floor §150.2(a)

Insulation

Raised

Framed

- Require ≥ R-19 or equivalent U-factor ≤ 0.037.**

Raised Mass

- CZ 1-2,11,13-14,16: Require ≥ R-8.
- CZ 12 and 15: Require ≥ R-4.

Slab on Grade

All CZs

- Heated slab floors must meet perimeter insulation requirements of §150.0(f). The perimeter insulation requirements do not apply to unheated slab floors.

CZ 16

- Require R-7 or equivalent U-factor ≤ 0.58.

Fenestration §150.2(a)1

All Addition Type ADUs

U-factor

- Require ≤ 0.30.

SHGC

- CZ 2, 4, 6-15: Require ≤ 0.23.

Area Limits

Additions ≤ 400 ft²

- Limited to ≤ 75 ft² or 30% of the CFA, whichever is greater.

Additions ≤ 700 ft² and > 400 ft²

- Limited to ≤ 120 ft² or 25% of the CFA, whichever is greater.

Additions > 700 ft²

- CZ 1, 3, 5, 16: Limited to ≤ 20% of CFA.
- CZ 2, 4, 6-15: Limited to ≤ 5% of west-facing CFA and 20% total CFA.

Skylights

Use the Performance Approach.

HERS Measures §150.2(a)1

Quality Insulation Installation (QII)

Additions ≤ 700 ft²

- QII is not required.

Additions > 700 ft²

- QII is required.

When an ADU is converted from existing space: The following QII measures are not required:

1. Insulated headers on existing door or windows
2. Air barrier when existing air barrier is not being removed or replaced

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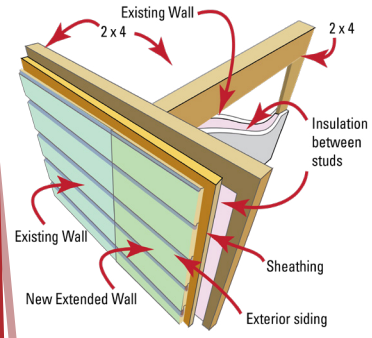
Envelope - Addition ADU Type §150.2(a)				
Roof §150.2(a)	**Wall §150.2(a)**	**Floor §150.2(a)**	**Fenestration §150.2(a)1**	**HERS Measures §150.2(a)1**
Roofing > 300 ft² **CZ 10-15** ✦ Rated roofing material must be CRRC certified. ✦ Minimum requirements differ based on roof slope.* **CZ 1-9,16** ✦ The above roofing material requirements do not apply.				
Notes	***ADU** = accessory dwelling unit; **CFA** = conditioned floor area; **CRRC** = Cool Roof Rating Council; **CZ** = Climate Zone; **QII** = quality insulation installation; **SHGC** = solar heat gain coefficient.* ** Exceptions may apply.* ***Use equivalent U-factor when using non-wood-framed assembly (such as metal).*			

Table 5. *Addition ADU Type - Energy Code Envelope Requirements*



Walls and Insulation Allowance

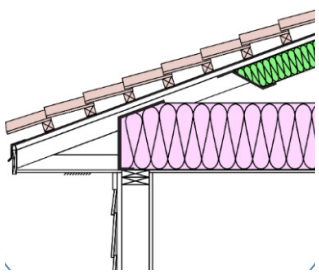
Extended wall: Extending from an existing wall, either vertically or horizontally from the existing wall.

Converted wall: Existing wall to an unconditioned space being converted to newly conditioned space. To use the "converted" wall alternate insulation allowances, existing exterior siding must remain.

2 x 4 = R-15

2 x 6 = R-21

Figure 2. *Walls and Insulation Allowance*



High-performance Attic Features

A high-performance attic includes all of the following features:

✦ Air space below roofing (common with tile roof)
✦ ≥ R-19 insulation below the roof deck
✦ Ventilated attic
✦ ≥ R-38 insulation at ceiling

Figure 3. *High-performance Attic Features*

Mechanical Systems - Addition ADU Type

Heating or Cooling Systems §150.2(a)

Extension of Existing Ducted HVAC System for ADU

- Return air from one dwelling unit shall not discharge into another dwelling unit through the heating or cooling air system per 2022 California Mechanical Code §311.4.

Added Ducted HVAC System for ADU

- This system has the same requirements as New Construction except that heat pump space heating is not required.

Added Ductless HVAC System for ADU

- This system has the same requirements as New Construction that include minimum equipment efficiency and HERS refrigerant charge testing in CZ 2, 8-15.
- Ventilation cooling is not required for Additions ≤ 1,000 ft².

IAQ Systems §150.2(a)1C

Addition of New Dwelling Unit to an Existing Home

Whole-building IAQ System

- Required to be sized per §150.0(o)1C and meet the sone requirements.
- Airflow must be verified by a HERS Rater.

Local Exhaust

- Vented kitchen hoods can be used instead of kitchen local exhaust.
- For kitchen hoods, minimum airflow must be based on cooktop fuel source and minimum sone rating in §150.0(o)1G.
- Bathroom local exhaust requirements may apply.

Water-heating Systems §150.2(a)1D

Water-heating System

Extended Hot Water Piping to Serve ADU

- Must meet pipe insulation requirements.

Added Water Heater

- A single 240-volt heat pump water heater is allowed, but additional requirements apply if not using a NEEA Tier 3 unit.
- A gas or propane instantaneous water heater with an input ≤ 200,000 Btuh is allowed.
- For ADU Additions ≤ 500 ft², an instantaneous electric water heater with point-of-use distribution as specified in RA4.4.5 is allowed.

Recirculation Pump

- If a recirculation pump is installed, manual-ON control is required.

Electric Readiness §150.0(n)

Water Heating

Each electric-ready item requires breaker space and labeling in the panel.

- Gas or propane water heaters must be installed in or adjacent to a space large enough to accommodate a heat pump water heater (2.5' x 2.5 x 7').
- If the future installation space is within 3 ft of the water heater, it requires a dedicated 125-volt/20-amp outlet with a 120/240-volt 3 conductor branch circuit.
- If the future installation space is more than 3 ft from the water heater, it requires a 24-volt/30-amp electrical feed.

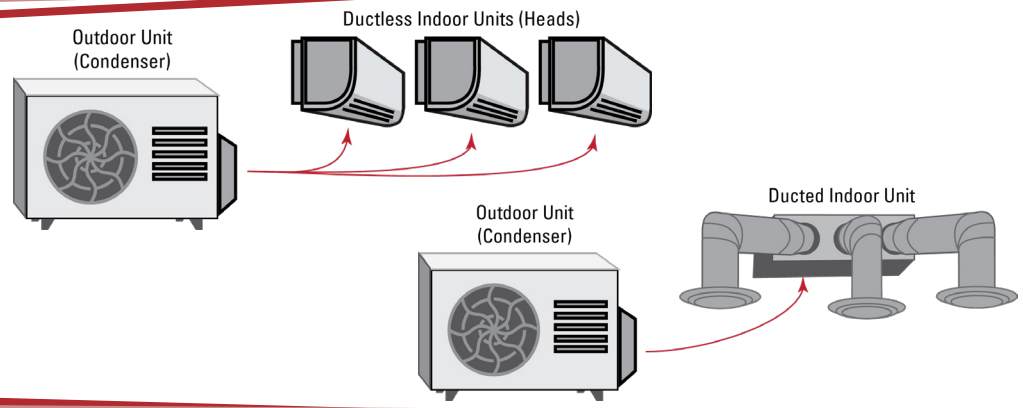
Plumbing Configuration

- Either a dedicated cold water supply must be installed or the cold water supply must be routed through the designated HPWH location just before reaching the gas or propane water heater.
- The hot water supply pipe coming out of the gas or propane water heater must be routed through the designated HPWH location before serving any fixtures.
- Hot and cold water piping must be exposed and readily accessible at the designated HPWH location for future installation of a HPWH.

Notes ***ADU*** *= accessory dwelling unit;* ***CZ*** *= Climate Zone;* ***HERS*** *= Home Energy Rating System (HERS) Program;* ***IAQ*** *= indoor air quality;* ***NEEA*** *= Northwest Energy Efficiency Alliance.*

Table 6. *Addition ADU Type – Energy Code Mechanical Requirements*

Variable Capacity Heat Pump HERS-verified Performance Credit (per RA3.4.4.3)



- Location of the indoor units (heads) and ducts must be entirely within conditioned space (thermal envelope).
- Airflow to all habitable spaces must be provided either by use of a ductless indoor unit located in the room or by use of ducts connected directly to the supply air outlet of a ducted indoor unit. See the CEC Ducted Variable Heat Pump web page at bit.ly/CEC-Ducted-VCHP.
- Refrigerant charge verification is required in all Climate Zones.
- Each zone > 150 ft^2 must be supplied by its own indoor unit (if ductless), and each indoor unit is required to have a wall-mounted thermostat, rather than a remote control.
- Ducted systems have additional requirements including certification that units are low static. See the CEC Ducted Variable Heat Pump web page at bit.ly/CEC-Ducted-VCHP.

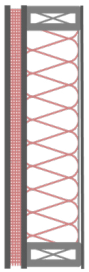
Figure 4. *Variable Capacity Heat Pumps*

Renewable Energy Systems - Addition ADU Type

Photovoltaics	Battery Storage Systems	ESS Readiness	Solar Readiness
There are no requirements for photovoltaics and no ability to take Performance credit for new or altered systems.	There are no requirements for battery storage systems and no ability to take Performance credit for new or altered systems.	Additions to existing homes are not required to be energy storage system (ESS) ready.	Additions to existing homes are not required to be solar ready.

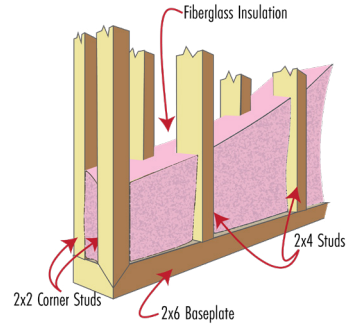
Table 7. *Addition ADU Type – Energy Code Renewables Requirements*

Wall Assembly Examples



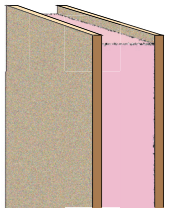
High-performance walls have a U-factor that reflects insulation within the framed cavity in addition to a layer of continuous insulation that is not interrupted by framing. This continuous insulation can be installed by placing rigid insulation outside the framing on the inside or outside face of the wall.

Figure 5. *High Performance walls*



Continuous insulation also can be installed by using a staggered stud assembly in which the continuous insulation is within the wall.

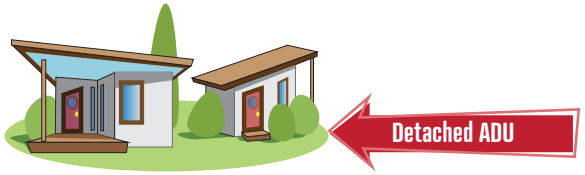
Figure 6. *Staggered Stud Wall with Continuous Insulation*



Another option is to look at alternative wall assemblies such as structurally insulated walls panels (SIPS), insulated concrete forms (ICF) or dual-panel hollow wall (DPH per CEC-400-2020-009) that have little to no framing. See the CEC BamCore Prime Wall Exceptional Method Compliance Option web page at bit.ly/CEC-BamCore-PrimeWall-Method.

Figure 7. *Structurally Insulated Wall Panels*

New Construction ADU Type



Mandatory
Prescriptive
Performance

Envelope - New Construction ADU Type

Roof §§150.0(a), 150.1(c)1A, 150.1(c)2

CZ 3, 5-7

Attic Roof

- Require ≥ R-30 at ceiling or equivalent U-factor ≤ 0.031** with radiant barrier.

Rafter Roof

- Use the Performance Approach.

CZ 1-2, 4, 8-16

Attic (Vented) Roof

- Prescriptive: High performance attic measures are required per Table 150.1-A.
- Mandatory: The roof deck U-factor must be ≤ 0.184 if the HVAC system is ducted and has ducts outside of conditioned space.

Rafter Roof

- Use the Performance Approach.

Roofing

CZ 10-15

- Rated roofing material must be CRRC certified.
- Minimum requirements differ based on roof slope.*

CZ 1-9,16

- The above roofing material requirements do not apply.

Wall §150.1(c)1B

Framed

New

- CZ 1-5, 8-16: Require ≥ R-21 + R-5 continuous or equivalent U-factor ≤ 0.048.**
- CZ 6-7: Require ≥ R-13 + R-5 continuous or equivalent U-factor ≤ 0.065.**

Masonry

- Insulation is required with the R-value depending on CZ, location of wall and insulation placement (per Table 150.1-A).

All Other Wall Types

- See Table 150.1-A or use the Performance Approach.

Floor §§150.1(c)1C-D

Insulation

Raised

Framed

- Require ≥ R-19 or equivalent U-factor ≤ 0.037.**

Raised Mass

- CZ 1-2,11,13,16: Require ≥ R-8.
- CZ 12 and 15: Require ≥ R-4.

Slab on Grade

All CZs

- Heated slab floors must meet perimeter insulation requirements of §150.0(f). The perimeter insulation requirements do not apply to unheated slab floors.

CZ 16

- Require R-7 or equivalent U-factor ≤ 0.58.

Fenestration §§150.1(c)3-4

All New Construction Type ADUs

U-factor

- Require ≤ 0.30.

SHGC

- CZ 2, 4, 6-15: Require ≤ 0.23.

Area Limits

- CZ 1, 3, 5, 16: Limited to ≤ 20% of CFA.
- CZ 2, 4, 6-15: Limited to ≤ 5% of west-facing CFA and 20% total CFA.

Skylights

- Use the Performance Approach.

HERS Measures §150.1(c)1E

Quality Insulation Installation (QII)

QII requirements apply to newly constructed ADUs of any size.

Notes

ADU *= accessory dwelling unit;* ***CFA*** *= conditioned floor area;* ***CRRC*** *= Cool Roof Rating Council;* ***CZ*** *= Climate Zone;* ***QII*** *= quality insulation installation;* ***SHGC*** *= solar heat gain coefficient.*

** Exceptions may apply.*

***Use equivalent U-factor when using non-wood-framed assembly (such as metal).*

Table 8. *New Construction ADU Type - Energy Code Envelope Requirements*

Mechanical Systems - New Construction ADU Type

Heating or Cooling Systems §§150.0(h), (i), (m); 150.1(c)6, 7, 9, 12, 13

Ducted HVAC System for ADU

- Prescriptive: In CZ 3, 4, 13-14, heat pump space heating is required.
- Mandatory: All HERS measures are required such as duct testing, fan efficacy and fan watt draw.
- Prescriptive: HERS refrigerant charge testing is required in CZ 2, 8-15.

Ductless HVAC System for ADU

- Mandatory: Minimum equipment efficiency is required.
- Prescriptive: HERS refrigerant charge testing is required in CZ 2, 8-15.

Whole-building Ventilation Cooling (Whole House Fan)

- In CZ 8-14 with airflow meeting ≥ 1.5 CFM/ft² of CFA via HVI-certified system. Attic ventilation requirements are based on airflow, unless directly vented to the outside. Only required for Addition Type ADUs > 1,000 ft².

IAQ Systems §§150.0(o), 150.1(c)10

Addition of New Dwelling to an Existing Home

Whole-building IAQ System

- Required to be sized per §150.0(o)1C and meet the sone requirements.
- Airflow must be verified by a HERS Rater.

Local Exhaust

- Vented kitchen hoods can be used instead of kitchen local exhaust.
- For kitchen hoods, minimum airflow must be based on cooktop fuel source and minimum sone rating in §150.0(o)1G.
- Bathroom local exhaust requirements apply.

Water-heating Systems §§150.0(n), 150.1(c)8

Hot Water Piping

- Required to meet pipe insulation requirements.

Water Heater Options

One of the following water heaters is required in New Construction:

- A 240-volt heat pump water heater (Additional requirements apply if not using a NEEA Tier 3 unit.)
- A 120-volt heat pump water heater when serving an ADU with ≤ 1 bedrooms
- For a new dwelling unit ≤ 500 ft², an instantaneous electric water heater with point-of-use distribution as specified in RA4.4.5 is allowed
- Electric resistance solar system with solar fraction ≥ 70%

In CZ 3, 4, 13-14, a gas or propane instantaneous water heater with an input ≤ 200,000 Btuh may be used when a heat pump space heater is installed.

Recirculation Pump

- If a recirculation pump is installed, manual-ON control is required.

Electric Readiness §§150.0(n), 150.0(t)-(v)

Each electric-ready item requires breaker space and labeling in the panel.

Water Heating

- Gas or propane water heaters must be installed in or adjacent to a space large enough to accommodate a heat pump water heater (2.5′ x 2.5′ x 7′).
- If the future installation space is within 3 ft of the water heater, it requires a dedicated 125-volt/20-amp outlet with 120/240-volt 3 conductor branch circuit.
- If the future installation space is more than 3 ft from the water heater, it requires a 240-volt/30-amp electrical feed.

Space Heating (Furnace)

- Requires a 240-volt/30-amp electrical feed to the furnace for a future heat pump.

Cooktop

- Requires a 240-volt/50-amp feed for a future cooktop.

Dryers or Gas Hookups

- Requires 240-volt/30-amp feed for future installation of an electric dryer if the unit has a gas line for a dryer.

Plumbing Configuration

- Either a dedicated cold water supply must be installed or the cold water supply must be routed through the designated HPWH location just before reaching the gas or propane water heater.
- The hot water supply pipe coming out of the gas or propane water heater must be routed through the designated HPWH location before serving any fixtures.
- Hot and cold water piping must be exposed and readily accessible at the designated HPWH location for future installation of a HPWH.

Notes

***ADU** = accessory dwelling unit; **CRRC** = Cool Roof Rating Council; **CZ** = Climate Zone; **HERS** = Home Energy Rating System (HERS) Program; **HPWH** = heat pump water heater; **IAQ** = indoor air quality; **NEEA** = Northwest Energy Efficiency Alliance.*

***Table 9.** New Construction ADU Type - Energy Code Mechanical Requirements*

Renewable Energy Systems - New Construction ADU Type

Photovoltaics §150.1(c)14

The required PV kW can be installed anywhere on the property, including being added to the system serving main home.

A CEC-approved community solar program may also be used.

"Green" utility programs are NOT a means to satisfy the PV kW requirements.

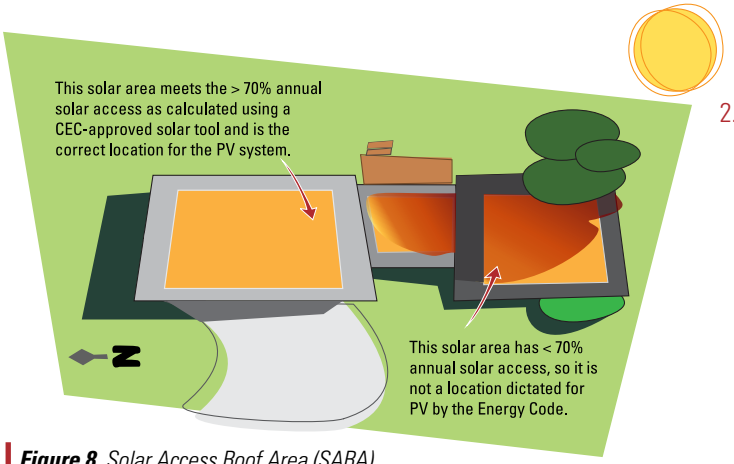


Figure 8. *Solar Access Roof Area (SARA)*

The **maximum PV system size** that can be installed on the building's solar access roof area (SARA) must meet the minimum PV kW requirements. These PV requirements are based on the space-heating load of the home when it meets all of the Prescriptive envelope and mechanical requirements.

1. **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 Title 24, Part 2, §1511.2.
2. **SARA does NOT include:**
   - **Any roof area < 70% annual solar access** using CEC-approved solar assessment tools. See the CEC Solar Assessment Tools web page at bit.ly/CEC-Solar-Assessment-Tools.
   - *Steep-sloped roofs:* Shading from existing permanent natural or manmade obstructions that are external to the dwelling, including but not limited to trees, hills and adjacent structures, are considered.
   - *Low-sloped roofs:* Shading from all obstructions, including those that are external to the dwelling unit, and obstructions that are part of the building design and elevation features are considered.
   - **Occupied roof areas** as specified by California Building Code §503.1.4.
   - **Roof area that is otherwise not available** due to compliance with other building code requirements if confirmed by the CEC.

PV Exceptions

- When the required PV system size is < 1.8 kW_{dc}
- When 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

Solar Readiness §110.10(a)1

Solar readiness is required when PV is not being installed via use of an exception and is associated with a new subdivision of ≥ 10 homes.

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Renewable Energy Systems - New Construction ADU Type

Battery Storage Systems Meeting JA12 Qualifications

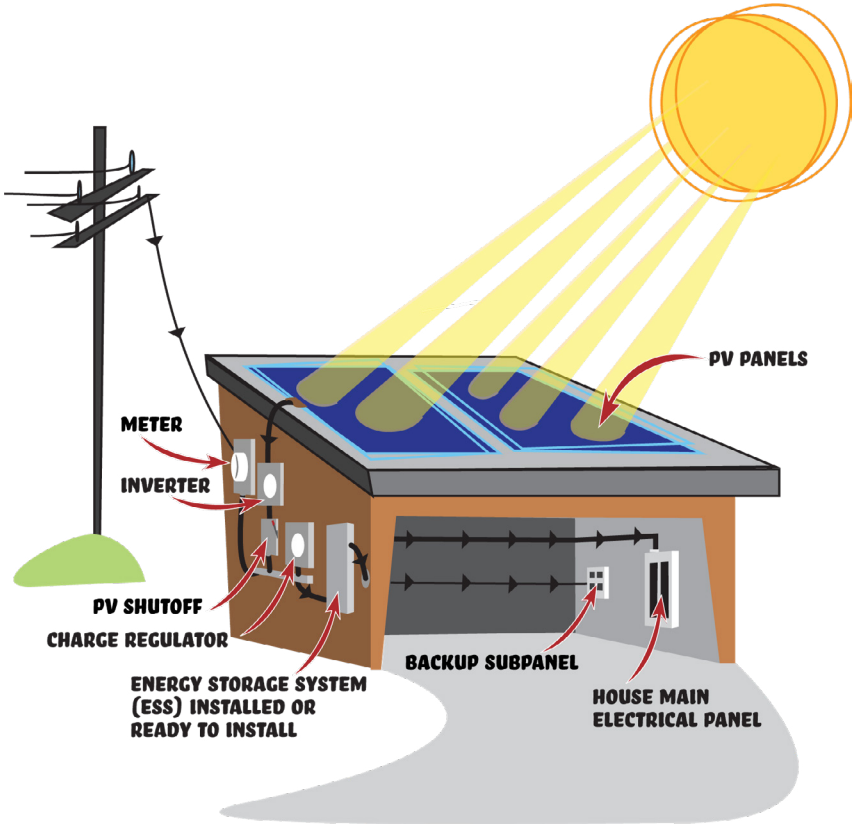

Figure 9. *Battery Storage Systems*

A Performance Approach credit is allowed if the battery system minimum capacity is ≥ 5.0 kWh, and the battery system gives flexibility in meeting building efficiency measures. If PV flexibility is desired, battery storage must be ≥ 7.5 kWh.

If no battery storage is installed, then at least either of the following must be provided:

- Interconnection equipment with a minimum backed up capacity of 60 amps
- A dedicated raceway from the main service to a subpanel that supplies the branch circuits

A minimum of four branch circuits must be identified that feed the following:

- Refrigerator
- One lighting circuit near the primary egress
- A sleeping room receptacle outlet
- One other choice

Energy Storage System Readiness §150.0(s)

(when battery storage systems not installed)

The main panel must be a minimum busbar rating of 225 amps with sufficient space 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.

ESS *= energy storage system;* ***PV*** *= photovoltaic;* ***SARA*** *= solar access roof area.*

Table 10. *New Construction ADU Type - Energy Code Renewable Requirements*

Compliance Forms

Single-family Energy Code Compliance Forms for Accessory Dwelling Units			
Requirement Type	**Certificates of Completion**	**Certificates of Installation**	**Certificates of Verification**
	Provided at Plan Check *Kept Current During Construction*	**Provided On Site During Construction** *Supporting Certificate of Compliance Building Features (or better)*	
Performance Method	CF1R-PRF-01-E	See below	See below
Prescriptive Method			
New Construction ADU	CF1R-NCB-01-E		
Addition ADU - HERS	CF1R-ADD-01-E		
Alteration ADU - HERS	CF1R-ALT-01-E		
Envelope			CF2R-ENV-##-H
Alteration ADU - Non-HERS Related	CF1R-ALT-05-E		
HERS Related	*Included in applicable CF1R listed above*	CF2R-ENV-##-H	
Non-HERS Related		CF2R-ENV-##-E	
Mechanical Systems			CF2R-MCH-##-H
HERS Related		CF2R-MCH-##-H	
Non-HERS Related		CF2R-MCH-##-E	
Plumbing			CF2R-PLB-##-H
Water Heating - HERS Related		CF2R-PLB-##-H	
Water Heating - Non-HERS Related		CF2R-PLB-##-E	
Solar Thermal		CF2R-STH-##-E	
Pool and Spa Heating		CF2R-PLB-03-E	
Lighting		CF2R-LTG-##-E	N/A
Solar PV and Battery Storage Systems		CF2R-PVB-##-E	
Electric Readiness		CF2R-ELC-01-E	

Forms must be registered with a HERS Provider when HERS measures are required. The CF1R-ALT-01-E form may need to be registered via a HERS provider. Other CF1R forms require registration via a HERS provider.

***HERS** = Home Energy Rating System; **PV** = photovoltaic.*

***Table 11.** Single-family Energy Code Compliance Forms for Accessory Dwelling Units*

HERS Providers and Raters

To find a HERS Rater, contact one of the HERS providers shown below. Each provider is approved to perform specific services.

Check the CEC website to see if new providers have been approved bit.ly/CEC-HERS-Providers.

CalCERTS	CHEERS
www.calcerts.com/ Approved for field verification on: ◊ Newly constructed buildings ◊ Additions ◊ Alterations of residential and nonresidential buildings ◊ California whole-house home energy ratings ◊ HERS building performance contractors	**www.cheers.org/** Approved for field verification on: ◊ Newly constructed buildings ◊ Additions ◊ Alterations of residential and nonresidential buildings

For More Information

CALIFORNIA ENERGY COMMISSION

www.energy.ca.gov

Learn more about the California Energy Commission (CEC) and its programs on its website.

Online Resource Center

bit.ly/CEC-ORC

Use these online resources developed for building and enforcement communities to learn more about the Energy Code.

2022 Single-family Residential Compliance Manual

bit.ly/CEC-2022-SF-residential-compliance-manual

Read this comprehensive explanation of the Energy Code requirements for single-family buildings.

Energy Code Hotline

Call: 1-800-772-3300 (Free)

Email: Title24@energy.ca.gov

California Department of Housing and Community Development (HCD)

Download the *Accessory Dwelling Unit Handbook* and other useful information on the HCD website at https://www.hcd.ca.gov/policy-and-research/accessory-dwelling-units

American Association of Retired Persons (AARP)

The publication *ADU Model State Act and Local Ordinance* can be used by state and local legislators to establish policies that encourage the creation of accessory dwelling units and is free to download at https://www.aarp.org/livable-communities/housing/info-2021/adu-model-state-act-and-local-ordinance.html

EnergyCodeAce™

www.energycodeace.com

Stop by this online "one-stop-shop" for no-cost tools, training and resources designed to help you comply with California's Title 24, Part 6 and Title 20.

Tools

www.energycodeace.com/tools

Explore this suite of interactive tools to understand the compliance process, required forms, installation techniques and energy efficiency regulations in California.

Reference Ace

www.energycodeace.com/content/reference-ace-2022-tool

Navigate the Title 24, Part 6 Energy Code using an index, keyword search and hyperlinked text.

Q&Ace

www.energycodeace.com/QAndAce

Search our online knowledge base or submit your question to Energy Code Ace experts.

Training

www.energycodeace.com/training

On-demand, live in-person and online training alternatives are tailored to a variety of industry professionals and address key measures.

Of Special Interest:

- 2022 Title 24, Part 6 Essentials – Residential Standards: What's New
  bit.ly/ECA-training-2022-res-whats-new

Resources

www.energycodeace.com/resources

Downloadable materials provide practical and concise guidance on how and when to comply with California's building and appliance energy efficiency standards.

Of Special Interest:

Check EnergyCodeAce.com for our latest 2022 tools, training and resources!

Create an account on the Energy Code Ace site and select an industry role for your profile in order to receive messages about all our offerings!

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