

Santa Ana Studio ADU (2022) CF1R & MF1R

TITLE 24 COMPLIANCE REQUIREMENTS SUMMARY

Santa Ana - Studio ADU (2022)

Ceiling Insulation = R-38 min. at rafters
 Radiant Barrier = No Roofing - per owner - No Cool Roof Req'd
 Wall Insulation = R-15 at new 2 x 4 walls
 Floor Insulation = N/A. Thermal Mass Areas = Exposed Slab Flooring
 QTI - Yes-Hire HERS rater early before drywall. Alert insulation contractor.
 SOLAR - NO - solar required (1.7) is < 1.8 - solar exemption 2 taken.

Glazing = All new windows & doors are dual glazing. All glass is clear.
 Glazing shall be installed with a NFRC certifying label attached showing U-factor.
 Solar Heat Gain Co-efficient = 0.23 windows, doors.
 U-Factor = 0.30 windows, doors
 Owner to purchase windows & doors w/ specified U-values & SHGC's or better.

Hot Water Heater = 40-gal heat pump REHEM PROP940 T2 RH3750 or eq.
 Uniform Energy Factor is 3.1 min. NEEA Rated.

IAQ FAN = 27 cfm & 0.25 cfm power. Verify w/ Mech. (continuous ventilation per ASHRAE 62.2 is req'd for IAQ.) HERS VERIFIED. Note IAQ fan on plan w/ timer switch w/ manual off & sound rating of 1 sone.

HSPF = 8.2 min. (New mini-split) SEER = 14.0 min. (new) HERS REQUIRED. REFRIGERANT CHARGE. AIRFLOW IN HABITABLE ROOMS (SC3.1.4.1.7). VERIFIED HEAT PUMP RATED HEATING CAPACITY. WALL-MOUNTED THERMOSTAT IN ZONES GREATER THAN 150 S.F. (SC3.4.5) AND DUCTLESS INDOOR UNITS ARE LOCATED ENTIRELY IN CONDITIONED SPACE (SC3.1.4.1.8).

Duct Insulation = none Duct (HERS) 5% Leakage Test - NO

*Heater Sizing
 Total Sensible heating load = 7,103 Btu FUJTS50 RH01282 or eq = 12,800 Btu

*A/C Sizing
 Total Sensible cooling load = 3,735 Btu - 1 ton

WHOLE HOUSE ATTIC COOLING FAN - N/R for compliance

*These load calculations, sizing & equipment are for Title 24 purposes & should be verified HVAC by a Mechanical Engineer/Contractor. Owner may install any Make & Model HVAC equipment that is equal or greater than the min. efficiencies listed above. All equipment is listed "or eq"

ALL LIGHTING TO BE HIGH EFFICACY - SEE MP1R FOR SWITCHING & NOTES. LOCAL EXHAUST FAN RATES BATH = 50 CFM. KITCHEN = 100 CFM. < 3 zones & listed on CMU directory. HERS VERIFIED. (Table 150.0-4 for new venting) SOME BATHING = 1 FOR CONTINUOUS FAN AND 3 FOR INTERMITTENT FAN. ELECTRIC READY REQUIRED FOR NEW STOVE, DRYER & WATER HEATER.

BUILDING ENERGY ANALYSIS REPORT

PROJECT:
 Santa Ana ADU Studio (2022)
 City of Santa Ana
 Santa Ana, CA 92701

Project Designer:
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Job Number:
 1/23/2023

Date:
 1/23/2023

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential Title 24 Building Energy Efficiency Standards. This program developed by EnergyPlus Software - www.energyplus.com.

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD
 Project Name: Santa Ana ADU Studio (2022) Calculation Date/Time: 2023-01-23T05:18:31-08:00
 Calculation Description: Title 24 Analysis Input File Name: SantaAnaADU-Studio (2022).rbd22x CF1R-PRF-01-E (Page 1 of 12)

GENERAL INFORMATION			
01	Project Name	Santa Ana ADU Studio (2022)	
02	Run Title	Title 24 Analysis	
03	Project Location	City of Santa Ana	
04	City	05	Standards Version
06	Zip code	07	Software Version
08	Climate Zone	09	Front Orientation (deg/ Cardinal)
10	Building Type	11	Number of Dwellings Units
12	Project Scope	13	Number of Bedrooms
14	Addition Cond. Floor Area (ft²)	15	Number of Stories
16	Existing Cond. Floor Area (ft²)	17	Fenestration Average U-factor
18	Total Cond. Floor Area (ft²)	19	Glazing Percentage (%)
20	ADU Bedroom Count	n/a	

COMPLIANCE RESULTS	
01	Building Complies with Computer Performance
02	This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider.
03	This building incorporates one or more Special Features shown below

Registration Number: 223-P01000158A-000-000-0000000-0000 Registration Date/Time: 2023-01-23 05:43:01 HERS Provider: CalCERTS, Inc.
 CA Building Energy Efficiency Standards - 2022 Residential Compliance Report Version: 2022.0.000 Report Generated: 2023-01-23 05:18:56
 Schema Version: rev 20220901

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ENERGY DESIGN RATINGS	Energy Design Ratings			Compliance Margins		
	Source Energy (EDR1)	Efficiency ¹ EDR (EDR2Efficiency)	Total ² EDR (EDR2total)	Source Energy (EDR1)	Efficiency ¹ EDR (EDR2Efficiency)	Total ² EDR (EDR2total)
Standard Design	44	40.7	61.7			
Proposed Design						
North Facing	43.1	34.6	58.4	0.9	6.1	3.3
East Facing	42.8	34.2	58.2	1.2	6.5	3.5
South Facing	42.8	35.7	59	1.2	5	2.7
West Facing	43.1	36.4	59.3	0.9	4.3	2.4
RESULTS: PASS						

¹Efficiency EDR includes improvements like a better building envelope and more efficient equipment.
²Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries.
 Building complies when source energy, efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded.

- Standard Design PV Capacity: 0.00 kWdc
- Proposed PV Capacity Sizing: North (0.00 kWdc) East (0.00 kWdc) South (0.00 kWdc) West (0.00 kWdc)

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ENERGY USE SUMMARY							
Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft²-yr)	Standard Design TDV Energy (EDR2) (kTDV/ft²-yr)	Proposed Design Source Energy (EDR1) (kBtu/ft²-yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft²-yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)	
Space Heating	0	0	1.65	12.18	-1.65	-12.18	
Space Cooling	2.17	46.63	0.99	28.21	1.18	18.42	
IAQ Ventilation	0.52	5.47	0.52	5.47	0	0	
Water Heating	3.83	40.87	2.96	33.32	0.87	7.55	
Self Utilization/Flexibility Credit				0		0	
North Facing Efficiency Compliance Total	6.52	92.97	6.12	79.18	0.4	13.79	
Space Heating	0	0	1.67	10.71	-1.67	-10.71	
Space Cooling	2.17	46.63	0.98	28.78	1.19	17.85	
IAQ Ventilation	0.52	5.47	0.52	5.47	0	0	
Water Heating	3.83	40.87	2.95	33.26	0.88	7.61	
Self Utilization/Flexibility Credit				0		0	
East Facing Efficiency Compliance Total	6.52	92.97	5.92	78.22	0.6	14.75	

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ENERGY USE SUMMARY							
Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft²-yr)	Standard Design TDV Energy (EDR2) (kTDV/ft²-yr)	Proposed Design Source Energy (EDR1) (kBtu/ft²-yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft²-yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)	
Space Heating	0	0	1.35	10.01	-1.35	-10.01	
Space Cooling	2.17	46.63	1.07	32.82	1.1	13.81	
IAQ Ventilation	0.52	5.47	0.52	5.47	0	0	
Water Heating	3.83	40.87	2.95	33.23	0.88	7.64	
Self Utilization/Flexibility Credit				0		0	
South Facing Efficiency Compliance Total	6.52	92.97	5.89	81.53	0.63	11.44	
Space Heating	0	0	1.55	11.59	-1.55	-11.59	
Space Cooling	2.17	46.63	1.05	32.85	1.08	13.78	
IAQ Ventilation	0.52	5.47	0.52	5.47	0	0	
Water Heating	3.83	40.87	2.95	33.3	0.88	7.57	
Self Utilization/Flexibility Credit				0		0	
West Facing Efficiency Compliance Total	6.52	92.97	6.11	83.21	0.41	9.76	

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ENERGY USE INTENSITY				
	Standard Design (kBtu/ft²-yr)	Proposed Design (kBtu/ft²-yr)	Compliance Margin (kBtu/ft²-yr)	Margin Percentage
North Facing				
Gross EU ¹	37.26	35.09	2.17	5.82
Net EU ²	37.26	35.09	2.17	5.82
East Facing				
Gross EU ¹	37.26	35.04	2.22	5.96
Net EU ²	37.26	35.04	2.22	5.96
South Facing				
Gross EU ¹	37.26	35.13	2.14	5.66
Net EU ²	37.26	35.13	2.14	5.66
West Facing				
Gross EU ¹	37.26	35.24	2.02	5.42
Net EU ²	37.26	35.24	2.02	5.42

Notes:
 1. Gross EU is Energy Use Total (not including PV) / Total Building Area.
 2. Net EU is Energy Use Total (including PV) / Total Building Area.

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REQUIRED PV SYSTEMS											
01	02	03	04	05	06	07	08	09	10	11	12
DC System Size (kWdc)	Exception	Module Type	Array Type	Power Electronics	CFI	Altimath (deg)	Tilt Input (deg)	Array Angle (deg)	Tilt: (in 12)	Inverter Eff. (%)	Annual Solar Access (%)
0		Standard (14-17%)	Fixed	none	true	n/a	n/a	n/a	n/a	n/a	n/a

REQUIRED SPECIAL FEATURES
 The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.
 • PV exception 2: No PV required when minimum PV size (Section 150.1c)(14) < 1.8 kWdc (0 kW)
 • Exposed slab floor in conditioned zone
 • Variable capacity heat pump compliance option (verification details from VCHP Staff report, Appendix B, and A43)
 • Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

HERS FEATURE SUMMARY
 The following is a summary of the features that must be field-verified by a certified HERS Rater in order to obtain the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Repairs (CF2R) and CE3R are required to be completed in the HERS Registry.

- Quality insulation installation (QI)
- Indoor air quality ventilation
- Kitchen range hood
- Verified Refrigerant Charge
- Airflow in habitable rooms (SC3.1.4.1.3)
- Verified heat pump rated heating capacity
- Wall-mounted thermostat in zones greater than 150 R2 (SC3.4.5)
- Ductless indoor units located entirely in conditioned space (SC3.1.4.1.8)

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ZONE INFORMATION						
01	02	03	04	05	06	07
Zone Name	Zone Type	HVAC System Name	Zone Floor Area (ft²)	Avg. Ceiling Height	Water Heating System 1	Status
ADU - Studio	Conditioned	MiniSplit ADU-Studio1	399	9.5	DHW Sp 1	New

OPAQUE SURFACES							
01	02	03	04	05	06	07	08
Name	Zone	Construction	Altimath	Orientation	Gross Area (ft²)	Window and Door Area (ft²)	Tilt (deg)
Front Wall ADU-Studio	ADU - Studio	R-15 Wall	0	Front	165	42.4	90
Right Wall ADU-Studio	ADU - Studio	R-15 Wall	270	Right	181	7.5	90
Back Wall ADU-Studio	ADU - Studio	R-15 Wall	180	Back	165	6	90
Left Wall ADU-Studio	ADU - Studio	R-15 Wall	90	Left	181	33.4	90
Interior Wall to Mech clo	ADU - Studio	R-15 Wall	n/a	n/a	0	0	n/a

OPAQUE SURFACES - CATHEDRAL CEILING										
01	02	03	04	05	06	07	08	09	10	11
Name	Zone	Construction	Altimath	Orientation	Area (ft²)	Skylight Area (ft²)	Roof Rise (in 12)	Roof Reflectance	Roof Emittance	Cool Roof
Roof (cath) ADU-Studio	ADU - Studio	R-38 Roof No Attic	270	Right	399	0	3	0.1	0.85	No

FENESTRATION / GLAZING													
01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	Type	Surface	Orientation	Altimath	Width (ft)	Height (ft)	Mult.	Area (ft²)	U-factor	U-factor Source	SHGC	SHGC Source	Exterior Shading
Fr Door #1	Window	Front Wall ADU-Studio	Front	0			1	33.4	0.3	NFRC	0.23	NFRC	Bug Screen

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