

Santa Ana 1 Bed ADU (2022) CF1R & MF1R

| BUILDING ENERGY ANALYSIS REPORT | |
|---|--|
| PROJECT: Santa Ana ADU 1 Bed (2022) City of Santa Ana Santa Ana, CA 92701 | |
| Project Designer: Design Path Studio P.O. Box 230165 Encinitas, CA 92023 (760) 484-0253 | |
| Report Prepared by: Diane P. Mendoza D & R Calcs 14107 Ipava Drive Poway, CA 92064 (658) 486-9506 | |
| Job Number: Date: 1/23/2023 | |
| <small>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 2022 Building Energy Efficiency Standards. This program developed by EnergyPlus Software - www.energyplus.com.</small> | |

TITLE 24 COMPLIANCE REQUIREMENTS SUMMARY

Santa Ana - 1 Bed 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
GII - Yes-Hire HERS rater early before drywall. Alert insulation contractor.
SOLAR - NO - solar required (1.72) 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 PROP40 T2 RH3750 or eq. Uniform Energy Factor is 3.1 min. NEEA Rated.IAQ FAN - 30 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 = 7,662 Btu FUJTSU R410A/325EAS or eq - 15,000 Btu
*A/C Sizing
Total Sensible cooling load = 4,665 Btu - 1.25 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 fan venting) SOME BATHING = 1 FOR CONTINUOUS FAN AND 3 FOR INTERMITTENT FAN. ELECTRIC READY REQUIRED FOR NEW STOVE, DRYER & WATER HEATER.

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD
Project Name: Santa Ana ADU 1 Bed (2022) Calculation Date/Time: 2023-01-23T05:13:31-08:00
Calculation Description: Title 24 Analysis Input File Name: SantaAnaADU1Bed (2022).rbd22x

| GENERAL INFORMATION | |
|---------------------|--|
| 01 | Project Name: Santa Ana ADU 1 Bed (2022) |
| 02 | Run Title: Title 24 Analysis |
| 03 | Project Location: City of Santa Ana |
| 04 | City: Santa Ana |
| 05 | Standards Version: 2022 |
| 06 | Zip code: 92701 |
| 07 | Software Version: EnergyPro 9.0 |
| 08 | Climate Zone: 8 |
| 09 | Front Orientation (deg/Cardinal): All orientations |
| 10 | Building Type: Single family |
| 11 | Number of Dwelling Units: 1 |
| 12 | Project Scope: Newly Constructed |
| 13 | Number of Bedrooms: 1 |
| 14 | Addition Cond. Floor Area (ft²): 0 |
| 15 | Number of Stories: 1 |
| 16 | Existing Cond. Floor Area (ft²): n/a |
| 17 | Fenestration Average U-factor: 0.3 |
| 18 | Total Cond. Floor Area (ft²): 499 |
| 19 | Glazing Percentage (%): 21.50% |
| 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-P010009158A-00000000-0000 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 05:13:59
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 | 42.9 | 39.9 | 59.6 | | | |
| Proposed Design | | | | | | |
| North Facing | 42 | 34.2 | 56.5 | 0.9 | 5.7 | 3.1 |
| East Facing | 41.7 | 33.5 | 56.1 | 1.2 | 6.4 | 3.5 |
| South Facing | 41.9 | 35.4 | 57.1 | 1 | 4.5 | 2.5 |
| West Facing | 41.9 | 34.5 | 56.6 | 1 | 5.4 | 3 |
| RESULT: PASS | | | | | | |
| ¹ Efficiency EDR includes improvements like a better building envelope and more efficient equipment. ² Total 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 | | | | | | |
| <ul style="list-style-type: none"> 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) (kWh/ft²-yr) | Proposed Design Source Energy (EDR1) (kBtu/ft²-yr) | Proposed Design TDV Energy (EDR2) (kWh/ft²-yr) | Compliance Margin (EDR1) | Compliance Margin (EDR2) |
| Space Heating | 0.01 | 0.06 | 1.38 | 10.04 | -1.37 | -9.98 |
| Space Cooling | 1.68 | 38.66 | 0.86 | 25.48 | 0.82 | 13.18 |
| IAQ Ventilation | 0.46 | 4.85 | 0.46 | 4.85 | 0 | 0 |
| Water Heating | 3.11 | 33.24 | 2.22 | 25.5 | 0.89 | 7.74 |
| Self Utilization/Flexibility Credit | | | 0 | 0 | | 0 |
| North Facing Efficiency Compliance Total | 5.26 | 76.81 | 4.92 | 65.87 | 0.34 | 10.94 |
| Space Heating | 0.01 | 0.06 | 1.23 | 8.89 | -1.22 | -8.83 |
| Space Cooling | 1.68 | 38.66 | 0.81 | 25.21 | 0.87 | 13.45 |
| IAQ Ventilation | 0.46 | 4.85 | 0.46 | 4.85 | 0 | 0 |
| Water Heating | 3.11 | 33.24 | 2.22 | 25.47 | 0.89 | 7.77 |
| Self Utilization/Flexibility Credit | | | 0 | 0 | | 0 |
| East Facing Efficiency Compliance Total | 5.26 | 76.81 | 4.72 | 64.42 | 0.54 | 12.39 |

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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 EUt ¹ | 30.02 | 28.38 | 1.64 | 5.46 |
| Net EUt ² | 30.02 | 28.38 | 1.64 | 5.46 |
| East Facing | | | | |
| Gross EUt ¹ | 30.02 | 28.21 | 1.81 | 6.03 |
| Net EUt ² | 30.02 | 28.21 | 1.81 | 6.03 |
| South Facing | | | | |
| Gross EUt ¹ | 30.02 | 28.45 | 1.57 | 5.23 |
| Net EUt ² | 30.02 | 28.45 | 1.57 | 5.23 |
| West Facing | | | | |
| Gross EUt ¹ | 30.02 | 28.31 | 1.71 | 5.7 |
| Net EUt ² | 30.02 | 28.31 | 1.71 | 5.7 |

Notes:
1. Gross EUt is Energy Use Total (not including PV) / Total Building Area.
2. Net EUt 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 | Asimuth (deg) | Tilt Input (deg) | Array Angle (deg) | Tilt: (x 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 K&J)
- 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. Required CF2Rs and CF3Rs are required to be completed in the HERS Report.

- Quality insulation installation (GI)
- 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)

| BUILDING - FEATURES INFORMATION | | | | | | |
|---------------------------------|------------------------------|--------------------------|--------------------|-----------------|---------------------------------------|---------------------------------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Project Name | Conditioned Floor Area (ft²) | Number of Dwelling Units | Number of Bedrooms | Number of Zones | Number of Ventilation Cooling Systems | Number of Water Heating Systems |
| Santa Ana ADU 1 Bed (2022) | 499 | 1 | 1 | 1 | 0 | 1 |

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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 - 1 Bed | Conditioned | MiniSplit ADU-1 Bed1 | 499 | 9.5 | DHW Sp 1 | New |

| OPAQUE SURFACES | | | | | | | |
|---------------------------|-------------|--------------|---------|-------------|------------------|----------------------------|------------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 |
| Name | Zone | Construction | Asimuth | Orientation | Gross Area (ft²) | Window and Door Area (ft²) | Tilt (deg) |
| Front Wall ADU-1 Bed | ADU - 1 Bed | R-15 Wall | 0 | Front | 155 | 33.4 | 90 |
| Right Wall ADU-1 Bed | ADU - 1 Bed | R-15 Wall | 270 | Right | 193 | 15 | 90 |
| Back Wall ADU-1 Bed | ADU - 1 Bed | R-15 Wall | 180 | Back | 155 | 15 | 90 |
| Left Wall ADU-1 Bed | ADU - 1 Bed | R-15 Wall | 90 | Left | 241 | 44 | 90 |
| Interior Wall to Mech clo | ADU - 1 Bed | R-15 Wall | n/a | n/a | 0 | 0 | n/a |

| OPAQUE SURFACES - CATHEDRAL CEILINGS | | | | | | | | | | |
|--------------------------------------|-------------|--------------------|---------|-------------|------------|---------------------|----------------------|------------------|----------------|-----------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 |
| Name | Zone | Construction | Asimuth | Orientation | Area (ft²) | Skylight Area (ft²) | Roof Rise (ft in 12) | Roof Reflectance | Roof Emittance | Cool Roof |
| Roof (cath) ADU-1 Bed | ADU - 1 Bed | R-38 Roof No Attic | 270 | Right | 499 | 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 | Asimuth | Width (ft) | Height (ft) | Mult. | Area (ft²) | U-factor | U-factor Source | SHGC | SHGC Source | Exterior Shading |
| Ft Door #1 | Window | Front Wall ADU-1 Bed | Front | 0 | | | 1 | 33.4 | 0.3 | NFRC | 0.23 | NFRC | Bug Screen |

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project
Santa Ana
ADU
address
revisions
description
Energy Calculations
1 Bedroom
date MAY 2023
project no. 2022_SANTA_ANA_ADU
drawn by DESIGN PATH STUDIO
sheet no. T24.1