

Residential Energy Efficiency Plan Submittal Requirements

1. Provide Manual J & S (D if applicable) for proposed heating and cooling.

Heat loss calculations using approved software (Wrightsoft, Adtek, Elite, Carmelsoft, Avenir HeatCAD/LoopCAD) are required. The HVAC contractor shall size heating/cooling equipment and appliances in accordance with ACCA Manual S, based on building loads calculated per ACCA Manual J, 8th Edition. Calculations shall show the size, make, model, and BTU's/SEER Rating for furnaces, air conditioners and boilers. Electric baseboard heater manufacturer's specs must be provided. Duct systems for heating, cooling and ventilation shall be sized in accordance with ACCA Manual D.

The following thermal design parameters shall be used for Larimer County:

Winter Outdoor Design Dry-bulb (4⁰F) Winter Indoor Design Dry-bulb (72⁰F)
 Summer Outdoor Design Dry-bulb (91⁰F) Summer Indoor Design Dry-bulb (75⁰F)
 Summer Design Wet-bulb (62⁰F) 6,368 Degree Days Heating 479 Degree Days Cooling



2. Please indicate which of the following four energy compliance paths you are choosing:

- a. **Prescriptive Package:** see table N1102.1.3 below for insulation and glazing requirements. Decide if you will be installing 2x6 stud walls with R-30 insulation or using footnote (g), and make sure that detail is on your plans. All window NFRC (U-factor/SHGC) labels must be left on windows until the insulation inspection has been approved.
- b. **Total UA Alternative (RESCheck):** Provide REScheck Compliance Certification showing you passed the 2018 or 2021 IECC; an architect or HVAC contractor may be able to assist you. Heating/AC equipment sized per Manual J & S information, shall be provided with REScheck report. Input data must match both reports and building plans. Free software is at energycodes.gov (click on REScheck). The home must also comply with maximum Solar Heat Gain Coefficient requirements of Table N1102.1.2 and maximum fenestration U-factors of Section N1102.5.
- c. **Total Building Performance (Energy Cost):** Approved calculation software tools must be used to show the annual energy consumption of all building elements in the proposed design. A compliance report must be submitted with the permit application, and an as-built report for final inspection. The home must comply with all IRC Table N1105.2 requirements. *Note: a county inspection is required for insulation used for fire- and draft-stopping.*
- d. **Energy Rating Index (ERI):** The rated proposed design and confirmed dwelling shall have an ERI less than 55 compared to the ERI referenced design, using approved software tools in accordance with RESNET/ICC 301. See resnet.us for approved raters. Larimer County allows a \$100 permit fee reduction if an approved rater inspects the home and documents COMPLIANCE WITH IRC requirements. The home must also comply with all IRC Table N1106.2 requirements. *Note: a county inspection is required for insulation used for fire- and draft-stopping.*

PRESCRIPTIVE TABLE N1102.1.3 (R402.1.3) INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT ^a

Fenestration U-Factor ^b	Skylight ^b U-Factor	Glazed Fenestration SHGC ^{b e}	Ceiling R-Value	Wood Frame Wall R-Value ^{f g}	Mass Wall R-Value ^h	Floor R-Value	Basement ^{c f g} Wall R-Value	Slab ^d R-Value & Depth	Crawl Space ^{c f g} Wall R-Value
.32	.55	.40	R-60	30 or 23+3ci or 20+5ci or 13+10ci or 0+20ci	13/17	30	19 or 13+5ci or 0+15ci	10ci, 30" ^e	19 or 13+5ci or 0+15ci

For SI: 1 foot = 304.8 mm.

ci = continuous insulation

- a. R-values are minimums. U-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed R-value of the insulation shall be not less than the R-value specified in the table.
- b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestrations.
- c. "19 or 13+5ci or 0+15ci" means R-19 cavity insulation on the interior side of the wall; or R-13 cavity insulation on the interior of the wall in addition to R-5 continuous insulation on the interior or exterior surface of the wall; or R-15 continuous insulation (ci) on the interior or exterior surface of the wall.
- d. R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab-edge insulation R-value for slabs, as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.
- e. 30" (762 mm) or top of footings or bottom of monolithic slab, whichever is greatest.
- f. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5
- g. The first value is cavity insulation; the second value is continuous insulation as indicated by "ci". Therefore, as an example, "13 + 5ci" means R-13 cavity insulation plus R-5 continuous insulation.
- h. Mass walls shall be in accordance with Section N1102.2.5. The second R-value applies where more than half of the insulation is on the interior of the mass wall.

3. Name of Air Leakage Tester/Testing Company: _____

You must specify the air leakage tester you are hiring that will inspect the air barrier prior to concealment. They are to provide a report on any deficiencies and corrections by the framing or insulation inspection for all new homes and additions 1,000 sqft or larger.

4. Please select **ONE** of the following additional energy efficiency packages (required for all new SFR):

- a. **Enhanced envelope performance option:** The total UA alternative must include a 5% improvement to the envelope performance. If providing a REScheck compliance report per the 2021 IECC with the enhanced envelope performance, the software automatically accounts for the additional 5% improvement.
- b. **More efficient HVAC equipment performance option:** For multiple heating and cooling systems, all systems shall meet or exceed the minimum efficiency requirements in this section and shall be sized to serve 100% of the design load.
 - Greater than or equal to 95 AFUE natural gas furnace and 16 SEER air conditioner.
 - Greater than or equal to 10 HSPF/16 SEER air source heat pump.
 - Greater than or equal to 3.5 COP ground source heat pump.
- c. **Reduced energy use in service water-heating option:**
 - Greater than or equal to 0.82 EF fossil fuel service water-heating system.
 - Greater than or equal to 2.0 EF electric service water-heating system.
 - Greater than or equal to 0.4 solar fraction solar water-heating system.
- d. **More efficient duct thermal distribution system option:**
 - 100% of ducts and air handlers located entirely within the building thermal envelope.
 - 100% of ductless thermal distribution system or hydronic thermal distribution system located completely inside the building thermal envelope.
 - 100% of duct thermal distribution system located in conditioned space as defined by Section N1103.3.2.
- e. **Improved air sealing and efficient ventilation system option:** The measured air leakage rate shall be less than or equal to 3.0 ACH50, with either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed. Minimum HRV and ERV requirements, measured at the lowest tested net supply airflow, shall be greater than or equal to 75 percent Sensible Recovery Efficiency (SRE), less than or equal to 1.1 cubic feet per minute per watt (0.03 m³ /min/watt) and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/Moisture Transfer (LRMT)

Other Noteworthy 2021 Residential Energy Code Requirements

- All permanently installed **lighting fixtures shall contain only high-efficacy sources**, except kitchen appliance fixtures.
- Permanently installed lighting fixtures shall be controlled with a **dimmer, occupant sensor control or another control** installed or built into the fixture, except for bathrooms, hallways, exterior lighting, or safety/security lighting.
- All **heating and cooling equipment** shall be **sized** such that the total sensible capacity of the cooling equipment does not exceed the total sensible load by more than 25% for cooling-only applications, 40% for heating applications
- Manuals J & S are required for **ALL** methods. Manual D is required for **ALL** ducted heating/cooling systems.
- **A signed air leakage testing report** by an approved third party showing a maximum rate of three air changes per hour at 50 Pascals pressure must be provided to the building official. Testing must be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827.
- All ductwork must pass a **duct leakage test** with a report turned in to the building official by final inspection per IRC Section N1103.3.5. and N1103.3.6.