

MARSHALL FIRE RESIDENTIAL REBUILD
DESIGN CRITERIA / PRESCRIPTIVE ENERGY CODE
Based on 2018 Codes or 2021 IECC or 2021 IECC Appendix RC

Qualified Marshall Fire homes can choose between three Energy Path options:

OPTION 1: Residential 2018 IECC Prescriptive Code

OPTION 2: Residential 2021 IECC Energy Code HERS Rating of 50 or Prescriptive Path

OPTION 3: Residential 2021 IECC Appendix RC

Snow Load: 30 lbs/sf non-reducible
Wind speed: 145 mph for 3 second gust (Based on 700 year recurrence, ASCE 7-10)
Wind Exposure: "C" until proven otherwise for greater restrictions
Seismic Zone: B
Frost line depth: 36" below finished grade (LMC 15.05.050)
Weathering: Severe – Climate Zone 5B
Termite: Slight
Decay: Slight
Winter Design Temp: 1 degree
Anticipated Snow: 6"
Ice & Water Shield: Required on ALL Shingled Roofs – Eaves only
Must extend from the lowest edges to a point at least 24" inside the exterior wall line of the building.
Drip Edge: Required on both eaves and rakes of roof.
Air Freezing Index: <1000
Mean Annual Temp: 47 degrees
Elevation: 5,337 feet above sea level
Zero Energy Building: A zero energy building is a building that produces as much energy as it consumes, resulting in net zero energy consumption over the course of a year.

Current codes: 2018 IBC, IRC, IFC, IPC, IFGC, IMC, 2021 IECC, IEBC, IPMC, 1997 Uniform Code for the Abatement of Dangerous Building Code and NEC as adopted by the State of Colorado

REMEMBER:

Sump Pumps: Can NOT drain into sanitary or storm sewer.
Daylight into lawn away from foundation.
Perimeter foundation systems go to sump pit then sump pump and sump pump to lawn.

Drainage from House: Slope at least 6" in the 1st 10 feet.

Retaining Walls: Less than 48" from the bottom of the footing to top the retaining wall with no surcharge does not require a building permit but will require.
Over 48" from the bottom of the footing to top the retaining wall, or ANY wall with surcharge, requires stamped engineered plans.

Backflow Preventer: Required on residential irrigation systems. (See cross connection control manual)

Hot Water Heaters: Require expansion tanks for ALL hot water heaters.
Required to have a drain pan if placed on a wood floor.

Solar: Hi Temp 2% average 34 Degrees C; Extreme Minimum -23 Degrees C

OPTION 1: Residential 2018 IECC Prescriptive Code

- **Residential Prescriptive Insulation:**
 - R-49 Ceilings
 - R-21 Walls
 - R-19 Basement, Crawlspace Walls
 - R-38 Floors over unheated areas
 - R-3 Hot water pipes
 - R-8 Air Ducts
 - R-10 Unheated slabs 4 ft down
 - R-15 Heated slab 4 ft down

- **Windows and Glazing U Factors for additions and remodels:**
 - U- .30 on Glazing Windows/Doors
 - U- .50 on Skylights

- **Mechanical:**
 - Programed Thermostat Required
 - 90% Plus Furnaces, 90% Plus Boilers
 - A/C Units-14 SEER
 - Manual J, D and S will be required

- **Electrical:**
 - Structures shall be built to be Solar Ready
 - Timers on Bathroom Exhaust Residential
 - Recessed luminaires installed in the building thermal envelope shall be sealed to limit air leakage
 - 90% or more of all light fixtures shall contain high-efficiency lamps
 - New residential structures shall be solar ready
 - One EV Capable charging space - Supplied with conduit sized to handle to parking space

- **Air Changes**
 - All new residential shall be tested to verify air leakage rate does not exceed 3 air changes an hour and shall have whole house mechanical ventilation with section M1505.4

OPTION 2: Residential 2021 IECC Energy Code

HERS Rating of 50 or use the Prescriptive Path

- **Residential Prescriptive Insulation:**
 - R-60 Ceilings
 - R-21 Walls
 - R-21 Basement, Crawlspace Walls
 - R-38 Floors over unheated areas
 - R-5 Hot water pipes
 - R-8 Air Ducts
 - R-10 Unheated slabs 4 ft down
 - R-15 Heated slab 4 ft down and R-5 under slab

- **Windows and Glazing U Factors for additions and remodels:**
 - U- .30 on Glazing Windows/Doors
 - U- .50 on Skylights

- **Residential Mechanical for additions and remodels and replacement:**
 - Programed Thermostat Required
 - 96% Plus Furnaces, 90% Plus Boilers, 92% plus on demand water heaters on all new and replaced equipment.
 - Manual J, D and S will be required

- **Electrical:**
 - 2 Electric vehicle charging spaces 1 EV ready, 1 EV capable for new residential buildings and additions greater than 50%.
 - EV Ready Space- Minimum of 40 AMP 240- volt circuit that terminates at receptacle, plug, junction box next to parking space
 - EV Capable Space- Supplied with conduit sized to handle to parking space
 - Existing Residential Homes Comply with Chapter 5 of the 2021 IECC
 - Additions and New Builds: Shall meet the Prescriptive Insulation Standards, Additional EV charging spaces on additions greater than 50%
 - New residential shall be structures shall be solar ready
 - New residential homes shall have a dedicated circuit breaker for a branch circuit for future electric appliance replacement at all gas appliances within 6 feet of appliance.

Table R401.3
Mandatory requirements for residential buildings – 2021 IECC/Appendix RC

Title	IECC Section
Vapor retarder	R402.1.1
Eave baffle	R402.2.3
Access hatches and doors	R402.2.4.1
Maximum fenestration U-factor and SHGC	.30 Doors and windows, .50 Skylights
Mechanical Controls	R403.1
Ducts	R-8 Min
Mechanical system piping insulation	R-5 Min
Heated water circulation and temperature maintenance systems	R403.5.1
Drain Water heat recovery units	R403.5.3
Mechanical ventilation	R403.6 including E403.6.1
Equipment sizing and efficiency rating	96% Furnaces, 90% Boilers, 92% on demand water heaters. R403.7
Systems serving multiple dwelling units	R403.8
Snow melt and ice systems	R403.9
Energy consumption of pools and spas	R403.10
Portable spas	R403.11
Residential pools and permanent residential spas	R403.12
Lighting equipment	R404.1
Interior lighting controls	R404.2

OPTION 3: Residential 2021 IECC – Appendix RC
New Residential Building shall be Zero Energy per
Appendix RC

- **Electrical:**
 - **New Residential and New Accessory Residential Buildings: Shall be Zero Energy and can use high efficient gas appliances, Energy Rating Index of 47 Max not including onsite power production (Appendix RC of 2021 IECC) 2 Electric vehicle charging spaces 1 EV ready, 1 EV capable for new residential buildings and additions greater than 50%.**
 - **EV Ready Space- Minimum of 40 AMP 240- volt circuit that terminates at receptacle, plug, junction box next to parking space**
 - **EV Capable Space- Supplied with conduit sized to handle to parking space**
 - **New construction shall be wired for all electric capabilities. Circuits shall be provided for all appliances such as furnace and range regardless of fuel source.**

- **2021 IECC Appendix RC**
 - **All New homes must have an ERI (Energy Rating Index) of 47 before OPP (Onsite Power Production)**
 - **New Homes will be required to have a Final ERI of 0 after OPP is installed**
 - **New Homes will need to be designed, inspected and signed off that home meets ERI of 0 by a licensed RESNET rating consultant**
 - **To find a RESNET rater and designer <https://www.resnet.us/raters/>**