

**DESIGN CRITERIA / PRESCRIPTIVE ENERGY CODE
Based on 2024 Codes**

Snow Load: ASCE hazard tool at <https://ascehazardtool.org/>
Wind speed: ASCE hazard tool at <https://ascehazardtool.org/>
145 mph for 3 second gust (Based on 700 year recurrence, ASCE 7-22)

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

TABLE R301.2 (1)
CLIMATE AND GEOGRAPHIC DESIGN CRITERIA for Wind Speed and Snow Load use ASCE Hazard Tool. <http://ascehazardtool.org/>

GROUND SNOW LOAD	WIND DESIGN				SEISMIC DESIGN CATEGORY	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP	ICE BARRIER UNDERLAY MENT REQUIRED	FLOOD HAZARDS	AIR FREEZING INDEX	MEAN ANNUAL TEMP
	Speed (mph)	Topographic effects	Special wind region	Windborne debris zone		Weathering	Frost line depth	Termite					
ASCE Hazard	ASCE Hazard	Yes	YES	"C" Unless Proven	B	Severe -5B	36	Slight	1 Degree	Yes	2012	1000-2000	47 Degrees

MANUAL J DESIGN CRITERIA

Elevation	Latitude	Winter heating	Summer Cooling	Altitude correction factor	Indoor design temp.	Design temp. cooling	Heating temperature difference
5385	40 North	0	91	0.84	70	75	69
Cooling temperature difference	Wind velocity heating	Wind velocity cooling	Coincident wet bulb	Daily range	Winter humidity	Summer humidity	
16	15 MPH	7.5 MPH	59	High	50%	30%	

Current codes: 2024 IBC, IRC, IFC, IPC, IFGC, IMC, IECC, IEBC, IPMC, 1997 Uniform Housing Code, 1997 Uniform Code for the Abatement of Dangerous Building Code, Colorado Model Electric Ready and Solar-Ready Code and the Colorado Electric Code.

REMEMBER:

Sump Pumps: Can NOT drain into sanitary 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.

Sprinklers Required: All Structures required to be protected by Fire Suppression Systems

All Electric Ready: All structures shall be Wired to be Electric Ready

EV Charging: EV charging stations shall meet Sec.17.20.170 of the City Municipal Code

Battery Storage: ESS Not allowed in Habitable Spaces

Solar: Hi Temp 2% average 34 Degrees C
Extreme Minimum -23 Degrees C
Face Solar between 110 Degrees and 270 Degrees of true north

Commercial Heated Structures:

- **Electrical**
 - Commercial Structures shall be built to be 100% electric, EV charging stations shall meet Sec.17.20.170 of the City Municipal Code.
 - Structures shall be Solar Ready per Colorado Model Electric and Solar Ready Code
 - Commercial Buildings requires light occupant sensors
 - 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
- **Mechanical all new units:**
 - Commercial: Heating and Cooling systems shall meet the 2024 IECC Requirements

- **Natural Lighting**
 - o **Commercial Buildings need 3% of Roof to be skylights unless solar panels are installed.**
 - o **Commercial wall glazing shall not be less than 8% of the total floor area.**

- Table C401.4 (**Mandatory**)

- Requirements for Commercial Buildings

Title	IECC Section
Air leakage	C402.6
Calculation of heating and cooling loads	C403.1.1
Data centers	C403.1.2
System Design	C403.2
Heating and cooling equipment efficiency	C403.3
Heating and cooling system controls	C403.4, except C403.4.3, C403.4.4, C403.4.5
Economizer fault detection and diagnostics	C403.5.5
Ventilation and exhaust systems	C403.7, except C403.7.4.1
Fan and fan controls	C403.8, except C403.8.6
Large diameter ceiling fans	C403.9
Refrigeration equipment performance	C403.12
Construction of HVAC system elements	C403.13
Mechanical systems located outside of the building thermal envelope	C403.14
Service water heating	C404
Electrical power and lighting systems	C405, except C405.3
Maintenance information and system commissioning	C408

Table C402.1.3 (**Mandatory**)

(Must meet the prescriptive requirements even with using a performance based application)

Opaque Thermal Envelope Insulation Component of an Average Minimum Requirements, *R*-Value Method in following locations:

Roof C402.2.3	
Insulation entirely above roof deck	R-49/ R-49 ci
Metal buildings	R-21 + R-11 LS
Attic and other	R-49
Walls. Above grade C402.2.2	
Mass	R-21/ R-21 ci
Metal buildings	R-21 + <u>R-10ci</u>
Metal framed	R-21+ <u>R-10ci</u>
Wood framed and other	R-27/ R-20 + R-5 ci
Walls, Below grade C402.2.5	
Below-grade wall ^b	R-10 ci
Floors C402.2.3	
Mass	R-21
Joist/framing	R-38
Slab-on-grade floors C402.2.4	
Unheated	R-20 for 24" below
Heated	R-15 for 36" below + R-5 full slab

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m², 1 pound per cubic foot = 16 kg/m³.
NR = No Requirement, LS = Liner System.

a. Where using *R*-value compliance method, a thermal spacer block shall be provided,

b. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.

Table C402.5
Building Thermal Envelope Fenestration Maximum

Vertical Fenestration	
Maximum U-Factor Fixed/Operable	0.34/0.45
Maximum SHGC	0.33
Entrance Doors	0.63
Maximum air leakage rate for curtain walls and storefront glazing	.06 cfm/ft2
Skylights	
Maximum U-Factor	0.50
Maximum SHGC	0.40
Maximum Air leakage rate	.20 cfm/ft2

Residential Structures:

- **Residential Mechanical for additions and remodels and replacement:**
 - Programed Thermostat Required
 - Manual J, D and S will be required on residential additions greater than 500 Sq. Ft.
 - Whole House Ventilation Required
 - Blower Door Test Required
 - Duct Test Required
- **Electrical:**
 - Home shall be Built All Electric Ready per the Colorado Model Electric and Solar Ready Code
 - 2 Electric vehicle charging spaces 1 EV ready, 1 EV capable for new residential buildings and additions greater than 50%. EV charging stations shall meet Sec.17.20.170 of the City Municipal Code
 - 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 Residential Homes shall Comply with 2024 IECC and Prescriptive Min Insulation and Max Fenstration Requirements even with doing an ERI Path:**
 - All New homes must have an ERI (Energy Rating Index) of 50 before OPP (Onsite Power Production)
 - New Homes will need to be designed, inspected and signed off that home meets an ERI of 50 or less by a licensed RESNET rating consultant
 - RESNET Rater must sign off of check list must inspect Manual J, D and S for compliance.
 - RESNET Rater must give final report before Final Building Inspection
 - To find a RESNET rater and designer <https://www.resnet.us/raters/>

Table R401.4
Mandatory requirements for Residential Buildings

Title	IECC Section
Vapor retarder	R402.1.1
Eave baffle	R402.2.4
Access hatches and doors	R402.2.5
Maximum fenestration U-factor and SHGC	R402.5
Mechanical Controls	R403.1
Ducts	R403.3 except R403.3.2, R403.3.3, and R403.6
Mechanical system piping insulation	R403.4
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	R403.7
Systems serving multiple dwelling units	R403.8
Mechanical system located outside thermal envelope	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

Table R406.3
Mandatory Requirements
Minimum Insulation and Maximum Fenestration Requirements by
Component

Roof	R-60
Above grade walls	<u>R-30 or R-20 & R-5 ci</u>
Below grade walls	R-21/ R-19 ci
Floors	R-38
Non heated slab on grade	R-10 for 4ft
Heated slab on grade	R-15 for 4 ft + R-5 under full slab
Fenestration U-Factor	.30
Fenestration SHGC	.33
Skylight U-Factor	.50
Skylight SHGC	.40
<u>Heated Water Pipes</u>	<u>R-3</u>
<u>Heated air Ducts</u>	<u>R-8</u>

ERI-based compliance. Compliance based on the ERI analysis shall have a score of 50 or less without including OPP. ERI based compliance shall meet all of the minimum standards of table R406.3 (Must meet the prescriptive requirements even with using a performance based application)