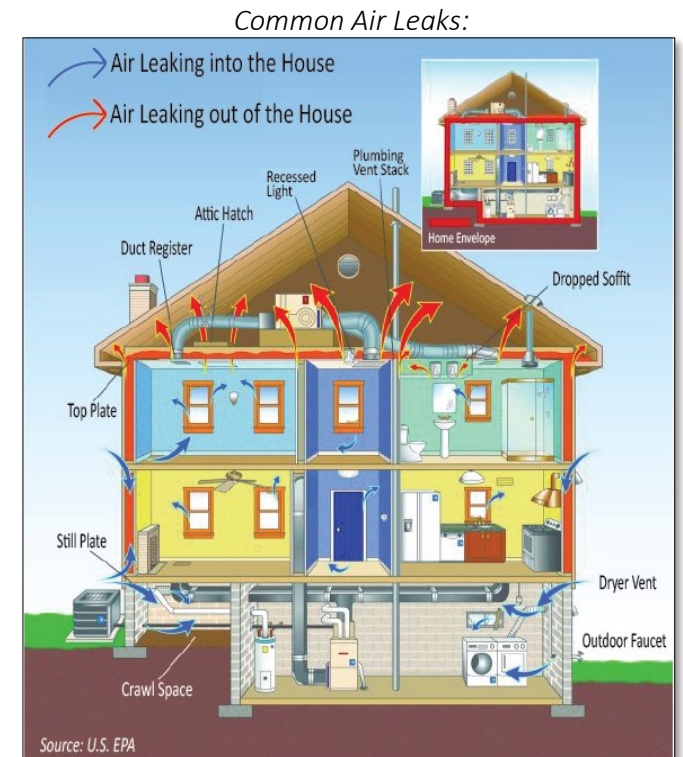


Energy Code Guide For New Home Construction

Use this checklist to help ensure your new home is comfortable, healthy, and energy code compliant.



Updated January 2024

■ Heating and Cooling Systems

A system sized too small could result in an uncomfortable home; if too large, it may cycle on/off more than necessary which may shorten the life of the equipment. Was the system sized in accordance with ACCA Manual S & J or another approved heating and cooling equipment sizing method? These calculations consider house tightness, insulation levels and window placement efficiency.

■ Programmable Thermostat

Programmable thermostats are required on forced air (furnaces) and can provide an energy savings of about 10 percent when used as recommended. Hot water boilers must have an outdoor setback control that decreases the boiler water temperature based on the outside temperature.

■ Heating Ducts

Check that all the seams in the ductwork are sealed with mastic or approved tape. Regular duct tape is not approved. Leaky ducts can be responsible for 10-30 percent of the energy loss in a home. The code requires the entire duct system be tested for tightness if any part of the ductwork is in an unheated/unconditioned part of the house, such as an unheated attic or garage. The test results should be listed on the energy component label. Supply ducts located outside of the conditioned part of the house must be insulated to at least R-8.

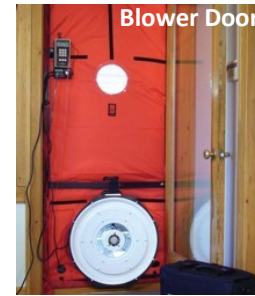


■ Air Sealing and Ventilation

The energy code requires air sealing around windows, doors, electrical boxes on exterior walls and ceilings, and openings where pipes and wires pass through the building shell. Air leakage is often responsible for 10-30 percent of total home energy loss. Check to see if pipes, wires and utility lines, and other openings have been sealed. Most of the air leakage sites will be hidden in the attic, walls, and floor. Because the house is sealed for comfort and efficiency, it is important to ventilate the house in a controlled way. Code-required mechanical ventilation options range from a centrally located efficient (bath) fan to a heat recovery ventilation (HRV) system that bring fresh air into the house while recovering about 70 percent of the heat from the stale air that is being drawn out of the house.

■ Blower Door Test

Blower door testing is required to confirm the air sealing requirements have been met. The test results should be listed on the Energy Code Compliance Label and must be 4 air changes per hour at 50 Pascal pressure (listed as ACH50) or less. A blower door is a large fan assembly, temporarily placed in an exterior doorway, which draws air flow and determine the air leakage rate of the house. Very efficient tight houses may have leakage rates of only 0.6 to 2.5 ACH 50.



■ Infrared Camera Investigation (Optional)



An infrared (IR) camera shows the temperature of the house's surfaces. Improperly insulated areas will appear colder than expected in winter and warmer than expected in summer. Consider having an IR investigation to confirm the house has been properly insulated. An IR investigation conducted with a blow door analysis can detect air leakage.

■ Energy Efficiency Lighting

The code requires all permanent lighting fixtures must be high-efficiency lighting sources.

Contact Us

For more information contact the Montana Energy Office at the Montana Department of Environmental Quality at 406-444-0281 or visit our website at deq.mt.gov/Energy.

Energy Code Guide for New Home Construction

Montana’s energy code provides minimum requirements for the efficient design and construction of new and renovated houses. All new Montana houses, regardless of location, must meet the requirements of the state energy code.

You can use this guide to verify a few of the energy code requirements. While the guide does not include every requirement, it will help you assess a home and make an informed decision about the quality of construction and likelihood the home will be energy efficient. Code compliance can be accomplished by completing basic air sealing requirements and following an energy code path of prescribed insulation levels, and window/door efficiencies or by using REScheck™, a free computer modeling analysis software, is available from the U.S. Department of Energy and may be used to meet compliance. REScheck™ is available to download at energycodes.gov. Energy code path levels are listed on the energy efficiency components label on the next page. If you do not feel comfortable using this guide, or for a more complete investigation, consider having a qualified independent third party complete a code compliance checklist. An example checklist can be found at deq.met.gov/Energy.

Energy Code Compliance Label

Check that a completed energy code compliance label has been placed on or in the electrical breaker panel. The label should list the insulation levels, as well as efficiency ratings of the installed windows, doors, water heating, and heating/cooling equipment. It is also a way for the home builder to comply with Montana law, which requires builders to certify their homes meet the statewide minimum energy code standards.

Ceiling and Attic Insulation

The minimum energy code path requirement for ceilings and attics is R-60 insulation, which is about 17 inches of fiberglass or cellulose insulation. R-49 meets code if that level is achieved over the entire ceiling/attic when an energy truss is used. Check that the attic access hatch/door is insulated and sealed.

Below is a sample energy code compliance label with filled in energy code path levels:

ENERGY CODE COMPLIANCE LABEL		
Address: _____		
Ceiling:	Flat	R - <u>60</u>
	Vaulted	R - <u>49</u>
Walls:	Above grade walls	R - <u>21</u>
	Basement walls	R - <u>19/15</u>
	Crawlspace walls	R - <u>19/15</u>
Floors:	Over unheated spaces	R - <u>30</u>
	Perimeter slab for <u>4</u> feet	R - <u>10</u>
	Under slab for ___ feet ___ ft/ft	R - ___
Exterior doors:		U - <u>.30</u>
Windows:	NFRC unit rating	U - <u>.30</u>
Water heater:	Energy factor (EF) rating	<u>.67</u>
Heating system:	Energy efficiency rating	<u>80%</u>
	(AFUE for gas; HSPF heat pump)	
Cooling system:	EER _____ SEER _____	
Heating ducts:	Systems sealed:	<input checked="" type="checkbox"/> Yes per code
	In non-conditioned areas insulated to	
	Supply R- <u>8</u> Return R- <u>8</u>	
	Leakage test at rough in _____ or final	
	results _____ CFM 25 per 100 sq. ft or N/A _____	
Air Sealing:	Blower door test results	<u>4</u> ACH 50
Whole house mechanical ventilation:		Yes per code
Other (i.e., radon mitigation, solar ready)	_____	
Builder:	Date: _____	
Signature:	_____	
<small>The builder or representative certifies compliance with ARM 24.301.161 and MCA 36-60-502, by completing and signing this label. February 2023</small>		
THIS LABEL MUST BE PERMANENTLY AFFIXED BY HOME BUILDERS TO THE BREAKER PANEL ON ALL NEW RESIDENTIAL BUILDINGS, AS REQUIRED BY SECTION 50-60-803, MONTANA CODE ANNOTATED AND 2021 IECC – SECTION 401.3		

Above-Grade Wall Insulation

The energy code path requires minimum R-21 for above-ground walls. A REScheck™ analysis may allow a lower level. If less than R-21, ask to see a copy of the REScheck™ analysis.

Basement Walls

Check to see that the basement walls are insulated; finishing is not required. The insulation can be placed on the outside, inside, or combination. The energy code path requires a continuous layer of R-15, such as a layer of foam installed on the foundation wall, or R-19 batts if the insulation is placed in a framed wall. The rim/floor joist is located where the floor meets the wall and should be insulated and have an air barrier, usually spray foam or foam boards sealed in-place. If lower R-values are listed, ask to see a copy of the REScheck™ analysis, confirming code compliance.



Insulated framed wall with rim joist foam sealed at rim joist

Crawlspace

Check that the floor above the crawlspace or the foundation walls are insulated. Typically, the walls are insulated, creating a heated crawlspace and the ground is covered with a moisture barrier, usually plastic sheathing sealed around the edges. The insulation should be installed without gaps. The rim/floor joist, located where the floor meets the foundation wall, should be insulated and have an air barrier. The air barrier is usually spray foam or foam boards sealed in-place. If the crawlspace is heated, any crawlspace vents should be sealed shut. A heated crawlspace should have some air flow such as a small exhaust fan drawing air out, or a register in the heating duct supplying air and an opening/transfer grill in the floor connecting the crawlspace to the upper floor.



Crawlspace: Foundation continuous wall insulation with rim joist foam seal at arrow

Windows

Check the energy components label for the U-factor rating for the windows. The lower the U-factor, the better. U-factors generally range from .20 (little heat loss) to .50 (high heat loss). The energy code path requires U-.30 or better. A REScheck™ analysis may allow a higher U-value. Some manufacturers label their products with serial numbers or other data that can be used to track down the efficiency rating. If there is no documentation of the U-factors, try contacting the customer service department of the window manufacturer to confirm the efficiency of the installed products.

 National Fenestration Rating Council® CERTIFIED	World's Best Window Co. Millennium 2000+ Vinyl-Clad Wood Frame Double Glazing • Argon Fill • Low E Product Type: Vertical Slider	
	ENERGY PERFORMANCE RATINGS	
U-Factor (U.S./I-P)	Solar Heat Gain Coefficient	
0.30	0.30	
ADDITIONAL PERFORMANCE RATINGS		
Visible Transmittance	Air Leakage (U.S./I-P)	
0.51	0.2	
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>		