

Energy Code Guide for New Home Construction

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

Common Air Leaks:

-  Air leaking into the house
-  Air leaking out of the house



Updated March 2018



Windows Continued

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.

Heating and Cooling Systems

Was the system sized in accordance with a code-accepted method? These calculations take into consideration house tightness, insulation levels, and window placement and efficiency. 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.

Programmable Thermostat

If the home has a furnace, it should have a programmable thermostat which can provide an energy savings of about 10 percent when used as recommended. It is recommended that you automatically turn the temperature down 10 degrees when the home is unoccupied or during the night.

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% 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 and return ducts to at least R-6.

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 to 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.

Air Sealing and Ventilation Continued

Code-required mechanical ventilation options range from a centrally located efficient (bath) fan to a heat recovery ventilation system (HRV) 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 out of the house. Instruments measure the amount of 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 blower door analysis can detect air leakage.

Energy Efficiency Lighting

The code requires at least 75 percent of the permanent lighting fixtures have high efficiency light bulbs, such as compact fluorescent (CFL), high efficiency halogens, light emitting diodes (LEDs), etc.

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.



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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™. REScheck™, a free computer modeling analysis software, is available from the U.S. Department of Energy and may be enlisted 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 don't feel comfortable using this guide, and for a more complete investigation, consider having a qualified independent third party complete a code compliance checklist. An example checklist can be found at deg.mt.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 energy code path requirement for ceilings and attics is R-49 insulation, which is about 15 inches of fiberglass or cellulose insulation. R-38 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.

Above-Grade Wall Insulation

The energy code path requires 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.

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

ENERGY CODE COMPLIANCE LABEL		
Address: _____		
Ceiling:	Flat _____	R- 49 _____
	Vaulted _____	R- 38 _____
Walls:	Above grade walls _____	R- 21 _____
	Basement walls _____	R- 19/15 _____
	Crawlspace walls _____	R- 19/15 _____
Floors:	Over unheated spaces _____	R- 30 _____
	Perimeter slab for <u>4</u> feet _____	R- 10 _____
	Under slab for _____ feet full _____	R- _____
Exterior doors:		R- 3 _____
Windows:	NFRC unit rating _____	U- .32 _____
Water heater:	Energy factor (EF) rating _____	.58 _____
Heating system:	Energy efficiency rating _____	78% _____
	(AFUE for gas; HSPF heat pump)	
Cooling system:	EER _____	SEER _____
Heating ducts:	Systems sealed: <u>X</u> Yes per code	
	In non-conditioned areas insulated to	
	Supply R- <u>8</u> Return R- <u>6</u>	
	Leakage test at rough-in _____ or finished _____	
	Leakage to outside _____ or total leakage	
	results _____ CFM 25 per 100 sq. ft.	
	or N/A _____	
Air Sealing:	Blower door test results <u>4</u> ACH 50	
	Visual inspection: _____ Yes per code	
Whole house mechanical ventilation:	_____ Yes per code	
Other (i.e., radon mitigation)	_____	
Builder:	_____	Date: _____
Signature:	_____	
<i>The builder or representative certifies compliance with ARM 24.301.162 and MCA50-60-802, by completing and signing this label.</i>		
<i>November 2014</i>		
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 2012 IECC – SECTION 401.3		

Basement Walls

Check to see if 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 if the insulation is placed in a framed wall.

Basement Walls Continued

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 arrow

Crawlspace

In a heated crawlspace any crawlspace vents open to the outside should be sealed shut. 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, better. U-factors generally range from (little heat loss) to .50 (high heat loss). energy code path requires U-.32 or better. A REScheck™ analysis may allow a higher U-value.

ENERGY PERFORMANCE RATINGS	
U-factor (U-F)	Solar Heat Gain Coefficient
0.30	0.30
ADDITIONAL PERFORMANCE RATINGS	
Window Transmittance	Air Leakage (A-L-F)
0.51	0.2

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