PLANS SUBMITTED FOR THE APPROVAL PROCESS MUST CONTAIN SUFFICIENT DETAIL AS TO ALLOW CONSTRUCTION OF THE STRUCTURE USING ONLY THE SUBMITTED DOCUMENTS AND BE SUFFICIENT TO DETERMINE COMPLIANCE WITH ALL BUILDING AND CITY CODES

Site Plan (1 copies required)

Small scale, 8 x 10 inch paper
Residence Address / Legal Desription
All Streets Bordering Property Labeled
Property Lines and Dimensions from Side, Front and Rear Yards
  In most cases, setbacks are measured to foundation wall
  A few areas and zero setbacks require measures to the eave line
All Site Improvements Including
  Existing Construction
  New Construction
  Patios and Decks
  Driveways (list dimensions)
  Indicate Any Trees on City Blvd Possibly Impacted By Site Plan

Locate your property pins

Floor Plan (1/4" scale)

Provide a Complete Architectural Floor Plan for Each Level
Show All Interior Partitions and Dimension
Label Proposed Use of All Rooms or Areas
Location of All Windows and Doors
  Include Dimensions and Types of Windows Used
Indicate Window Well if Basement Egress
Indicate Mechanical Equipment Location (Furnace, Water Heater)
Attic Access - Location and Size
Crawl Space Access - Location and Size
Smoke Detector Locations
Safety Glazing
Clothes Dryer Vent, Bathroom Exhaust Fans - Location/Termination

Exterior Elevations

Illustrate All Sides of the Building per Scale
Finish Grade
Roof Slope
Finish Height (Natural Grade to Peak)

Stair Section (1/4" scale)

Provide a Stair Section
Show Rise and Run Dimensions
Headroom Height
Handrail and Guardrail Locations and Height

Foundation Plan (1/4" scale)

Show Type of Foundation to be Used and Dimensions
Indicate Basement and/or Crawl Space Areas
Indicate Mechanical Equipment Location
Show Crawl Space Vent Locations

Wall Section (1/4" scale)

Complete Foundation Detail
  Wall Section to Show Details from the Footing to the Ridge Line
Size of Footing and Foundation Wall
Anchor Bolts Size and Location
Exterior Wall Framing to Include
  Stud Size and Spacing
  Header Type and Size for Exterior Openings
  Truss Blocking
Insulation Values
  Exterior Walls
  Foundation
  Crawl Space
  Roof/Ceiling

Framing Details (1/4" scale)

Floor Framing
  One Complete Structural Plan per Floor Identifying
    Framing Material
    Type of Material
    Spacing
    Support Headers and Sizes
    Support Post
    Bearing Walls
    Required Shear Panels
    Include Seismic Connections

Roof Framing
  A Complete Structural Plan Identifying
    Framing Material
    Trusses - Engineering Must be Provided
    Rafters - Type of Material, Size and Spacing
    Bearing Walls
    Attic Ventilation
    Include Seismic Connections

INDICATE PROPER SNOW LOAD / SEISMIC ZONE D1 AND 90 MPH WIND

ONE Complete Set of Plans Required for Residential Projects

Complete Sets of Plans, STAMPED by Architect / Engineer
Commercial and Multi-Family Projects of Four or More Units

Additional Materials May be Requested

ALL ABOVE ITEMS MUST BE INCLUDED WITH THE APPLICATION
INCOMPLETE APPLICATIONS WILL NOT BE ACCEPTED

CITY OF COLUMBIA FALLS, MONTANA
APPLICATION FOR PERMIT FOR THE ERECTION AND ALTERATION OF BUILDINGS
Phone: (406) 892-4391 FAX: (406) 892-4413

Permit #_____

Application is hereby made to the Building Inspector of Columbia Falls for construction of:

_____

_____

Subject to all ordinances including those covering the zoning and the erection of buildings in the City of Columbia Falls and its extraterritorial zone.

STREET NUMBER: _____ LOT _____ BLOCK_____ SUBDIVISION _____

LEGAL DESCRIPTION _____ ZONE _____

SET BACK REQUIREMENTS: FRONT _____ REAR_____ SIDE_____

BUILDING SIZE SQ. FOOT	FINISHED SQ. FOOT
UNFINISHED SQ. FOOT	GARAGE SQ. FOOT
CARPORT SQ. FOOT	COVERED PORCHES SQ. FOOT
LOT SIZE SQ. FOOT	% OF LOT COVERAGE
DECKS SQ. FOOT	PROJECT VALUATION

BUILDER'S NAME _____ ADDRESS_____

BUILDER'S PHONE _____CITY BUSINESS LICENSE #_____

OWNER'S NAME _____ ADDRESS_____

OWNER'S PHONE _____

Type of Building _____ Occupancy Group _____ Purpose of building _____

BUILDING PERMIT FEE $_____

PLAN REVIEW FEE $_____

FIRE PREVENTION PROGRAM FEE $ _____

TOTAL FEE $ _____

The granting of a permit or approval of plans, specifications and computations shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of the Uniform Building, Mechanical, or Plumbing Codes; the National Electrical Code; the City of Columbia Falls. The Applicant and Owner have responsibility for compliance with all applicable laws, regulations, codes and ordinances.

Separate permits are required for electrical, plumbing, and mechanical (heating, ventilating or air conditioning). This permit becomes null and void if work or construction is not commenced within 180 days or if construction or work is suspended or abandoned for a period of 180 days at any time after work has commenced.

APPLICANTS SIGNATURE _____

BUILDING INSPECTORS SIGNATURE _____

QUESTIONS CONTACT BARB 892-4388

staalandb@cityofcolumbiafalls.com

REQUIRED INSPECTIONS

(Must Have a minimum 24 Hours Notice)
(During peak building season – 48 Hours Notice)

- ☐ **Sono-Tubes/Pier Pads/Columns**
- ☐ **Footings**
- ☐ **Walls** Foundation/Basement
- ☐ **Foundation Water Proofing**
- ☐ **Concrete Slab**
  - ☐ **Underslab Plumbing**
  - ☐ **Underslab Heating**
- ☐ **Rough Framing**
  - ☐ **Rough Electrical**
  - ☐ **Rough Mechanical**
  - ☐ **Rough Plumbing**
- ☐ **Shear Wall Nailing**
- ☐ **Insulation**
- ☐ **Drywall Nailing**
- ☐ **Final Mechanical** **APPLIANCES TAGGED**
- ☐ **Other:**_____
- ☐ **Other:**_____
- ☐ **Other:**_____
- ☐ **Final Building (For Certificate of Occupancy)**
  - ☐ **Final Electrical**
  - ☐ **Final Mechanical**
  - ☐ **Final Plumbing**

CUSTOMER CONSTRUCTION CHECKLIST

Applicant _____

Mailing Address _____

Phone _____ Date _____

Property/Legal Description _____

_____

Street Number _____

Tax Assessor# _____

Type of Project being considered: _____

Zoning Classification _____

Depending on your project, city regulations may require one or more of the following:

☐ Building Permit (Need one set of plans with Building Permit application)

☐ Plumbing Permit

☐ Mechanical Permit

☐ Electrical Permit

☐ Excavation Permit

☐ Right of Way Permit

☐ Sign Permit

☐ Water Hookup Permit/Plant Investment Fee

☐ Sewer Hookup Permit/Plant Investment Fee

☐ Demolition Permit

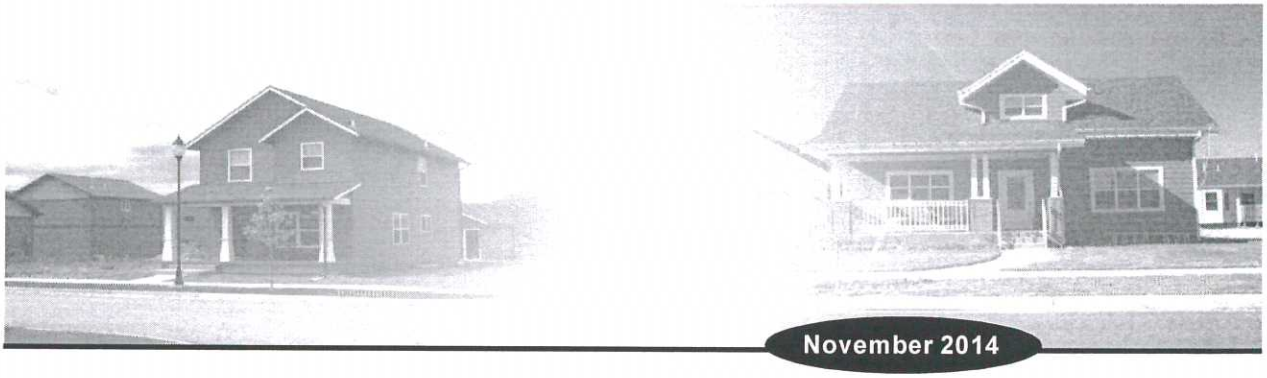
☐ City Address Assigned (by City Clerk)

☐ City Business License (Required by Contractors)

☐ Certificate of Occupancy

☐ Final Inspection

***Contact the city for any additional information you may need.**



November 2014

RESIDENTIAL BUILDINGS ENERGY CODE SUMMARY

Overview

Montana homebuyers appreciate the comfort and warmth of well-designed, energy-efficient houses. All new houses in Montana must meet the minimum requirements of the 2012 International Energy Conservation Code (2012 IECC) with Montana amendments. This publication is a summary of the 2012 IECC residential provisions.

The new statewide energy code took effect on November 7, 2014. Certified jurisdictions may take up to 90 days from their notification date to adopt the code.

Cities, towns, and counties who choose to adopt the building code are required to enforce the state energy code in their jurisdictions. A listing of certified jurisdictions that have adopted building codes is available at **www.buildingcodes.mt.gov.** Outside of these building code jurisdictions, builders are required to meet the requirements of the energy code and to show energy code compliance through a self-certification process. This means that the builder is required to provide a written statement to the homeowner that the house meets the state energy code requirements. The home builder may provide this certification by signing and dating the Energy Code Compliance label as shown on page 14 of this document.

Significant changes with the new Montana energy code explained in more detail in this brochure:

- More efficient windows and skylights.
- Additional air sealing, air barrier, and insulation requirements.
- At least 75 percent of the permanent light fixtures must have high efficiency bulbs, such as CFLS and LEDs.
- Test requirement for heating system ductwork located outside of the conditioned (heated) part of a house is more stringent.
- Whole-house mechanical ventilation required for all new houses.

The statewide energy code also gives house buyers an additional tool to use in making their purchase decision–the "Energy Code Compliance Label." This label is required in all new residential construction and is a way for the builder to certify that the house meets the minimum code levels for insulation, window, and heating system efficien-

continued on page 2

This booklet is an energy code summary with a listing of Montana amendments. A copy of the 2012 IECC can be ordered from the International Code Council at **www.iccsafe.org** or call 800-786-4452.

Montana Department of Environmental Quality

For more information contact:
Paul Tschida • Phone (406) 444-6464 • E-mail: ptschida@mt.gov
http://www.deq.mt.gov/energy/default.mcpx

Overview – *continued*

cies and other energy features required in new residential construction. A sample is shown in Figure 6 (page 14). The label also ensures that the information about these features is not lost over time. The label should be permanently affixed to the house's electrical breaker box, so subsequent owners will have the same information available to them.

Not only do home builders and home buyers benefit from this code, but Montana wins too. Energy-efficient homes consume less energy than homes not built to these standards. This means less energy has to be produced to heat and cool these homes which helps conserve our fossil fuel resources and protects Montana's environment.

What Buildings Are Covered Under The Statewide Energy Code?

The energy code applies to all new residential buildings, additions, repairs and renovations in Montana (with exceptions noted below) regardless of fuel type (gas, electricity or other). Unaltered portions of existing buildings do not need to comply with this code. Residential buildings (R-2, R-3, and R-4) with more than three floors above ground must comply with the commercial energy code portions of the 2012 IECC.

The following buildings are exempt from this code:

- Buildings that are neither heated nor cooled or that have a peak design rate of energy use less than 3.4 Btu/h per square foot for space conditioning.
- Buildings that are classified or determined to be eligible for listing in the National Register of Historic Places.

Ways to Show Energy Code Compliance

There are two primary ways to demonstrate that thermal envelope of one- and two-family dwellings meet the requirements of the Montana Energy Code (2012 International Energy Conservation Code with Montana amendments).

1. Follow the **prescriptive path** listed in Table 1.

2. Use REScheck™ a computer analysis (a free download at **www.energycodes.gov**), to show compliance, or other approved method.

   REScheck requires inputs of the areas and insulation efficiency levels for ceilings, walls, and windows.

TABLE 1. Insulation and Window Requirements by Component

Component	Insulation or Efficiency Level
Ceiling	R-49/38 [A]
Exterior Wall	R-21 or R13+R5 CI [B]
Mass Wall	R15/20 [C]
Floor	R-30 [D]
Basement Wall	R-19/15 CI [E]
Slab Perimeter	R-10, [F] from top edge for 4 ft. R-15 for in-floor heated slab.
Crawlspace Wall	R-19/15 CI [G]
Window/Door U Factor	U -.32 [H]
Skylight	U-.55

Footnotes to Table 1 (contain some Montana Amendments)

The R-value requirement listings are for insulation material only, not for structural components such as drywall or siding. All materials, systems, and equipment must be installed in accordance with the manufacturer's installation instructions.

A) R-38 is acceptable if the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. See Figure 4 on page 10.

Where there is not enough space to achieve Table 1 ceiling insulation levels, R-30 is allowed in up to 250 sq. ft. or 10 percent of the space, whichever is less.

Insulation markers with at least one-inch sized numbers are required at least every 300 sq. ft. of attic space and must face the access opening.

Attic access hatches and doors must be weather-stripped or sealed and baffled to prevent loose insulation from spilling into the living space and insulated to its surrounding area's requirement.

B) The second number is a listing for continuous Insulation (CI), which is insulation that runs continuously over structural members and is free of thermal bridging. Foam sheathing over exterior wall framing is an example of continuous insulation.

Table R402.2-6
Requirement for Steel-Frame Wall (R-Value)

Steel-Framed Wall 16" O.C. –	R-13 + 9.5	or	R-15 + 9.1	or	R-19 + 8.4	or	R-21 + 8.1
Steel-Framed Wall 24" O.C. –	R-13 + 8.3	or	R-15 + 7.7	or	R-19 + 6.9	or	R-21 + 6.5

Cavity insulation R-value is listed frst, followed by continuous insulation R-value.

Structural Insulated Panels (SIP) with at least 5.5 inches of foam, and insulated concrete foam systems (ICF) with at least 2 inches of foam on each side, usually surpass the R-21 wall requirements because of their lack of thermal bridging. A REScheck analysis can be used to show compliance.

C) Mass walls are considered to be above grade walls of concrete, concrete block, insulated concrete form (ICF), brick, (other than brick veneer), earth and solid timber/logs. R-20 applies when more than half the insulation is on the interior of the mass wall. Log walls use mass wall requirements. Usually 14-inch and larger log walls will meet the R-15 requirement or REScheck can be used to show compliance.

D) Floor insulation must be in contact with the underside of the floor sheathing.

E) Basement walls, whether or not the space is finished, require R-19 cavity or R-15 continuous insulation level.

F) R-15 is required for heated slab-on-grade floors. Heated slab includes floors with heating elements, hydronic tubing and ductwork within and under the slab. Slab-on-grade floors with a floor surface less than 12 inches below grade require R-10 insulation, adding R-5 for heated slabs. Slab-on-grade insulation should extend downward from the top of the slab on the outside or inside of the foundation wall. The insulation should extend 4 feet by any combination of vertical and horizontal placement that extends out from the slab or under the slab (see the Insulated Slab Options, Figure 1). Insulation extending away from the building must be protected by pavement or at least 10 inches of soil. The top edge of the insulation installed between the exterior wall and the edge of the interior slab may be cut at a 45 degree angle. Exposed insulation shall have a weather-resistant protective covering extending at least 6 inches below grade level.

G) Unvented crawlspace walls require a minimum of R-19 cavity or R-15 continuous insulation. Insulation must cover the entire foundation wall.

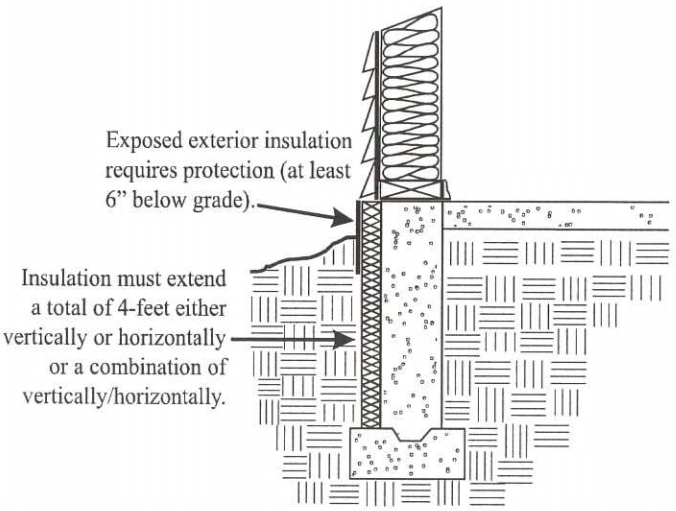
H) Because the U-factor is the inverse of the R-value, a lower U-factor indicates a window that has better thermal capabilities than a window with a higher U-value. Example: a U-.32 rated window is more efficient than a U-.33 rated window. Up to 15 sq. ft. of glazing is exempt for the U-factor value requirement. Skylights must have a U-factor of at least .55.

Insulated Slab Options

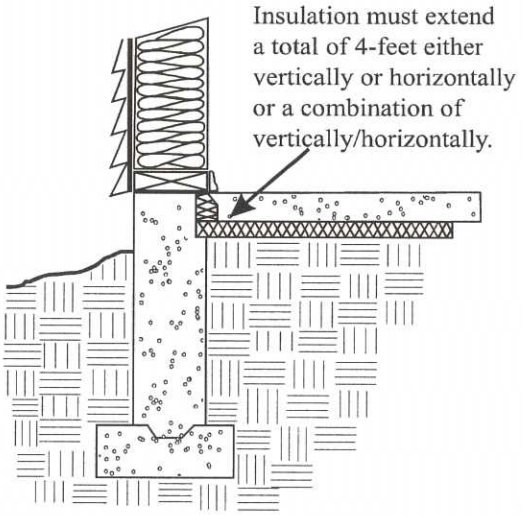
Slab perimeter insulation of at least R-10
(R-15 for in-floor heat) from top edge for at least 4 feet.

FIGURE 1

Option 1

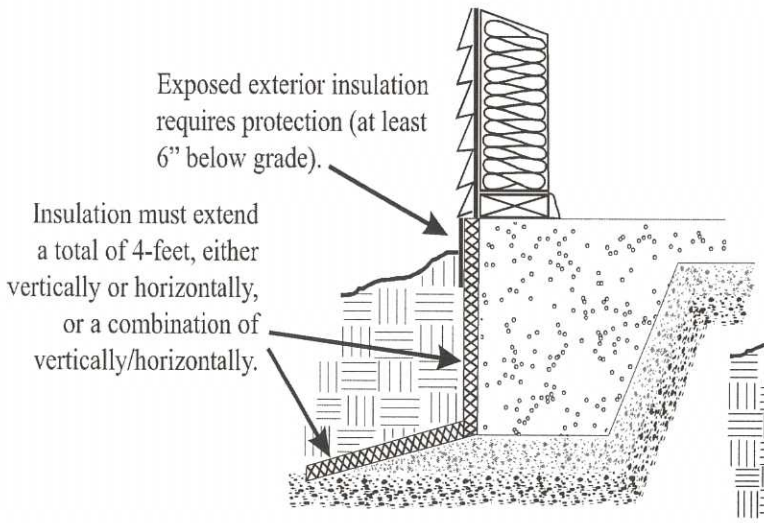


Option 2

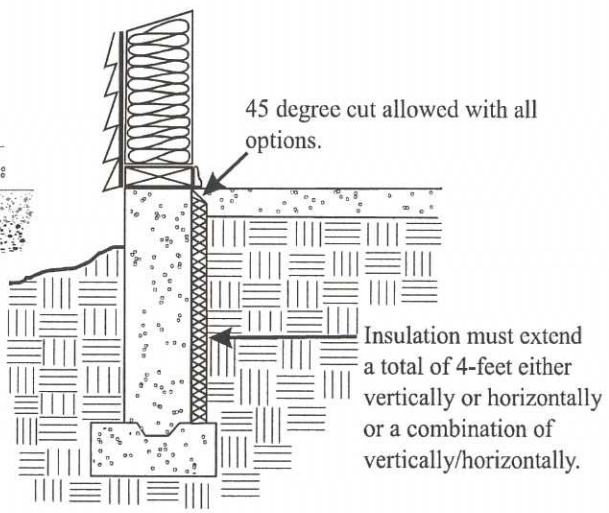


Option 3

2012 IRC Section 403.3 allows frost protected shallow foundation footing depth of 2 feet.



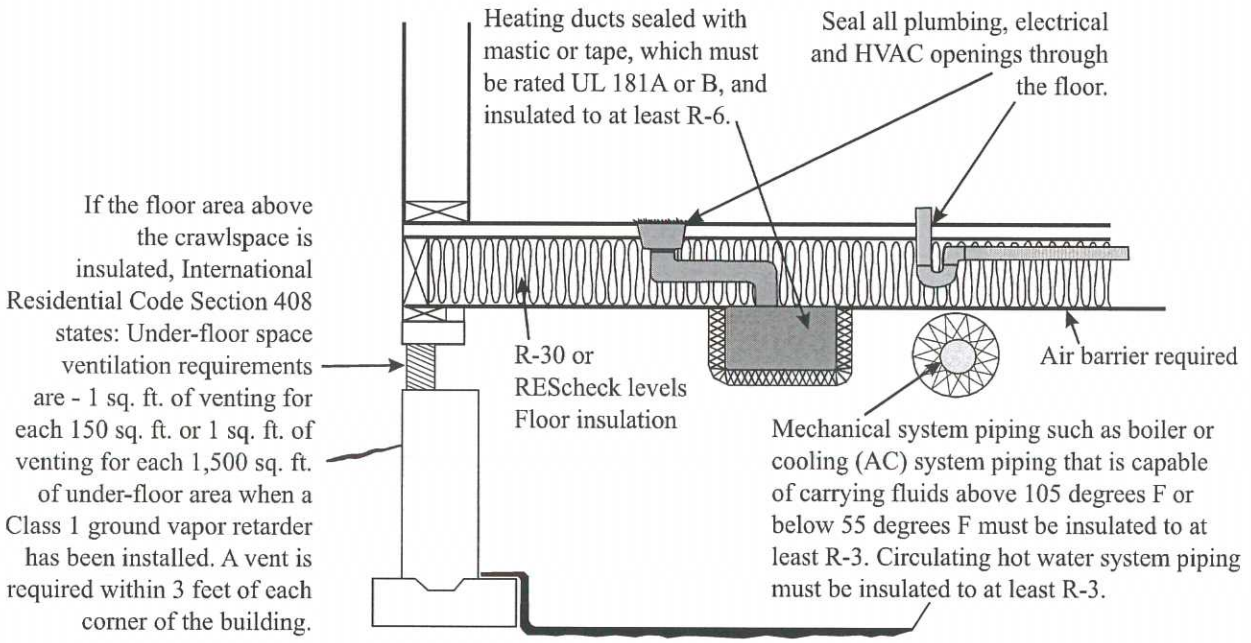
Option 4



Vented Non-heated Crawlspace with Floor Insulation

An option for insulating a crawlspace is to insulate the floor and install code-required venting. This option treats the crawlspace as an unconditioned space. Insulation levels are listed in Table 1 under the floor requirements or follow REScheck results for the building. Venting, air sealing, heating system sealing, duct and pipe insulation requirements are listed on Figure 2.

FIGURE 2



Unvented Heated Crawlspace with Insulated Foundation Walls

As an alternative to insulating floors over a crawlspace, crawlspace walls may be insulated when the crawlspace is not vented to the outside. Temporary crawlspace vent openings are allowed during construction. These vent openings must be closed, sealed, and insulated to the same R-value of the surrounding crawlspace wall when construction is complete and prior to final inspection. Crawlspace wall insulation must be permanently attached to the wall and cover the entire height of the crawlspace wall. Exposed earth in the unvented crawlspace must be covered with a continuous class 1 vapor retarder, such as 6 mil polyethylene. All joints of the ground cover must be overlapped at least 6 inches and be sealed or taped. The edges of the ground cover must extend at least 6 inches up the foundation wall and be attached to and sealed to the foundation wall. (See Figure 3, page 6)

Unvented Heated Crawlspace require air flow with an exhaust or supply air option.

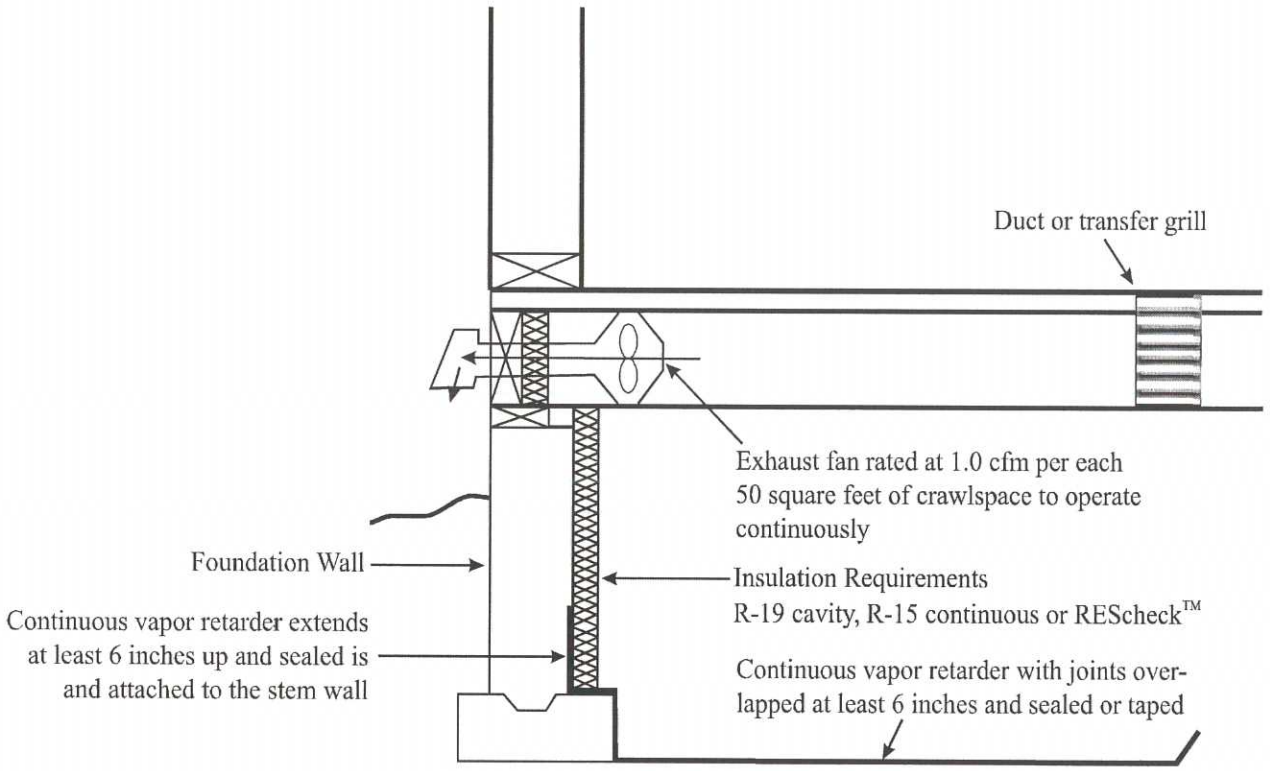
Exhaust Air Option

This code option requires continuously exhausted air from the crawlspace at a rate of 1 cubic foot per minute (cfm) for each 50 square feet of crawlspace. The ground in the crawlspace must be covered with a Class 1 vapor retarder, such as 6 mil polyethylene. Section 408.3 of the IRC requires an air pathway to the common area (such as a duct or transfer grille).

Crawlspace Exhaust Air Option

FIGURE 3

A sealed vapor retarder is part of a radon mitigation system. See Figure 5 (page 13) -- **(Radon Mitigation Systems are not Required by Code).**



Section 408.3 of the IRC requires the exposed earth to be covered with a continuous vapor retarder. Joints of the vapor retarder must be overlapped by 6 inches and must be sealed or taped. The edges of the vapor retarder must extend at least 6 inches up the stem wall and be attached and sealed to the stem wall.

Supply Air Option

This code option is accomplished by supplying a small amount of airflow into the crawlspace; 1 cfm of airflow for each 50 square feet of crawlspace. Listed below are three ways used for supplying air into crawlspaces.

1) Heat recovery ventilator providing supply and return air
2) Heating/air conditioning system providing supply air
3) Supplemental fan providing supply air

During the season when the heating/air conditioning system would not be operating, a recommendation is to have the air handler or supplemental fan cycled on for 5 minutes each hour.

The IRC requires an air pathway from the crawlspace to the common area (such as a duct or transfer grille). See (Figure 3, page 6)

Air Sealing Requirements

Section R402.4.1

Uncontrolled air leakage in the building envelope can significantly increase heating bills, allow warm moist interior air to enter building cavities, with potential for moisture damage, and cause uncomfortable drafts. Therefore, the energy code requires an **air barrier** for control of air leakage. An air barrier is a material or assembly of materials that reduces air flow **through or into** the building envelope. The new Montana energy code requires compliance with the Air Barrier and Insulation Installation requirements (visual checklist) and will require that the house tightness be (blower door) tested.

Blower Door Test not required until after November 7, 2015

2012 IECC Section R402.4.1.2 (Montana Amended)

A blower door test measurement of building air tightness showing four air changes per hour or less when tested at 50 Pascal – (4 ACH50). A blower door test is performed using a large fan assembly placed in an exterior door opening. The fan draws air out of the building while measuring the air flow required to create a pressure difference of 50 Pascals with reference to outside. Where required by the code official, testing shall be conducted by an approved party.

Air Barrier and Insulation Installation Requirements

The energy code includes a table R402.4.1 that lists the air barrier and insulation installation requirements for sixteen building envelope components. Some of the requirements of that table are listed below.

Insulation placed in the thermal envelope of the building; – walls, ceilings, dropped ceilings/soffit, rim joists, fireplace walls, shower/tub – must be in substantial contact and continuous alignment with the building envelope air barrier. (See Figure 4, page 10)

Some of the air leakage (visual checklist) areas that must be sealed with an air barrier material, durable caulk, or foam sealant are:

1. Openings between the building structure and exterior windows and door frames;
2. Openings around electrical wire, boxes, recessed light fixtures, and plumbing piping through the attic, exterior walls and other unheated spaces;
3. Dropped ceilings or chases adjacent to the thermal boundary;
4. Behind tub and showers on exterior walls;

Air Sealing Requirements - *continued*

5. Common walls between dwelling units;
6. Attic access openings, drop-down stairs and kneewall doors;
7. Rim/band joist junctions;
8. Top plate at exterior walls;
9. Electrical/phone boxes on exterior wall or air sealed boxes are installed;
10. HVAC register boots.
11. Recessed lighting – Recessed lights installed in the thermal envelope shall be air tight, IC rated and sealed to the drywall.
12. Fireplace – An air barrier shall be installed on fireplace walls and fireplaces shall have gasketed doors.

Some of these locations are shown on Figure 4. (Note: *Fiberglass and cellulose are not an acceptable air barrier material. Generally, the facing materials used on fiberglass batt insulation cannot be adequately sealed to be considered an air barrier.*)

Insulation Installation Requirements
Batt insulation must be cut to fit around wiring, piping and fill narrow cavities and must be in contact with the air barrier. Wall corners and headers located in the thermal boundary must be insulated.

Insulation markers must be placed facing the attic access showing the thickness of insulation. The markers must be placed at least one every 300 square feet throughout the attic.

Eave baffles are required in vented attics insulated with air permeable insulation (fiberglass and cellulose). The baffles (any solid material) must extend from the soffit and eave vents, over the top of the insulation and maintain an opening at least the size of the vent.

Mechanical Ventilation Requirements
Section R403.5

Kitchen and Bathroom Exhaust Fan Requirements
Kitchen fans must provide at least 100 cfm (cubic feet per minute) intermittent or 25 cfm of continuous air flow.

Bathroom-toilet room fans must provide at least 50 cfm of intermittent or 20 cfm of continuous air flow.

Bathroom and toilet room fans must be vented/exhausted to the outdoors; these fans cannot have discharge into the attic, crawlspace, or any area inside the building.

Whole House Mechanical Ventilation Requirements
The energy code requires a whole-house mechanical ventilation system that at least meets the specifications listed in International Residential Code (IRC) or International Mechanical Code (IMC). Those requirements can be accomplished by installing a fan in a bathroom, utility room, hallway, etc., sized according to the square-foot size of the house and number of bedrooms as specified on the following IRC Table M1507.3.3(1).

IRC Table M1507.3.3(1)
Continuous Whole-House Mechanical Ventilation System Airflow Rate Requirements in cubic feet per minute (cfm)

Dwelling Unit Floor Area (square feet)	Number of Bedrooms				
	0 or 1	2 or 3	4 or 5	6 or 7	More
<1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
>7,500	105	120	135	150	165

If non-continuous ventilation is provided, then the capacity of the fans must be increased as specified by Table M1507.3 below.

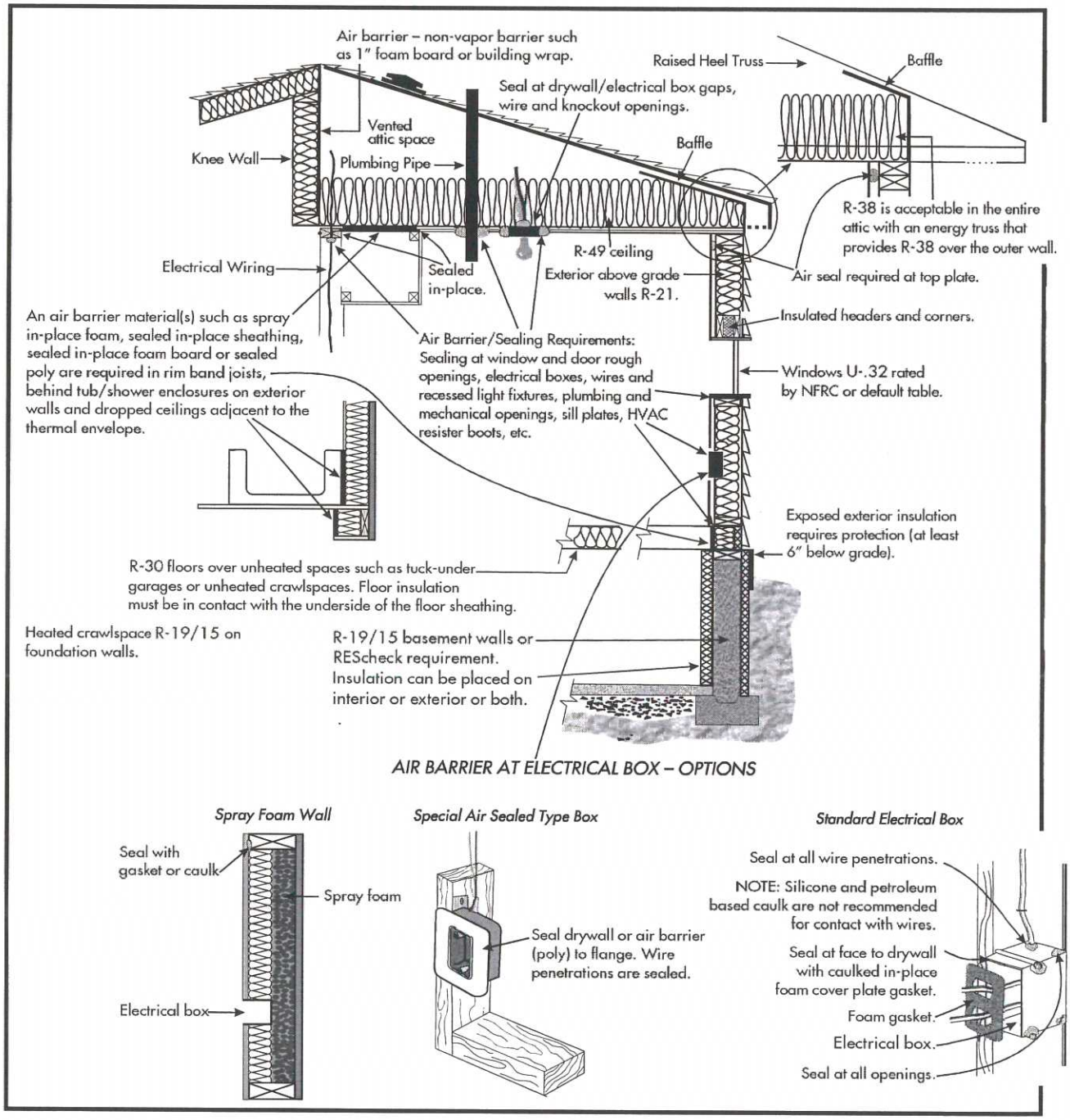
Table 7.4 M1507.3.3(2)
Intermittent Whole-House Mechanical Ventilation Rate Factors

Run-Time Percentage in Each 4-Hour Segment	25%	33%	50%	66%	75%	100%
Factor	4.0	3.0	2.0	1.5	1.3	1.0

For example, a 1,600 square foot, 3-bedroom house requires a continuously operating 60 cubic feet per minute (cfm) fan. If the fan runs half of the time the fan should be sized at 120 cfm.

The whole-house mechanical ventilation fan must meet minimum efficiency requirements. Bathroom and utility room fans between 10 and 90 cubic feet per minute (cfm) must deliver at least 1.4 cfm per watt. Fans larger than 90 cfm, range hoods, and in-line fans, must deliver at least 2.8 cfm per watt.

FIGURE 4. Air Sealing and Prescriptive Path Insulation Requirements



Recessed Light Requirements

Section R402.4.5

Recessed lights that are installed in the building thermal envelope (typically a ceiling with unheated space above) must be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed lights must be IC rated and labeled as meeting ASTM E 283. All recessed lights shall be sealed with a gasket or caulk between the

housing and interior ceiling or wall covering.

Heating Systems Section R403

Programmable Thermostats – Section R403.1.1
Programmable thermostats are required on forced air (furnaces). The thermostat must be able to set back or temporarily operate the system to maintain temperatures down to 55 degrees or up to 85 degrees. It must be initially programmed with a heating temperature no higher than 70 degrees and a cooling temperature no lower than 78 degrees.

Duct Insulation – Section R403.2.1
Supply ducts in unconditioned attics must be insulated to at least R-8. All other ducts, both supply and return, located outside the thermal boundary must be insulated to at least R-6.

Heating system ductwork and air handler (cabinet) that are located outside of the conditioned boundary, such as in the attic or garage, must be tested for tightness.

Duct Sealing and Testing – Section R403.2.2
All ducts, both supply and return, air handlers, filter boxes, and building cavities used as ducts, shall be sealed. Building cavities cannot be used for supply ducts. Duct tightness must be tested either at rough-in or after construction is complete. Duct leakage testing is not required if all ducts and the air handler are located within the thermal envelope.

> **Post Construction**. If tested after completion (post-construction), a total leakage equal to or less than 4 cfm per 100 sq.ft. of conditioned floor area when tested at a pressure differential of 25 Pascal across the entire system, including the manufacturer's air handler enclosure, or the leakage to the outdoors must be equal to or less than 4 cfm per 100 sq.ft. of conditioned floor area.
>
> **Rough-in**. If tested before completion (rough-in), the total leakage must be equal to or less than 4 cubic feet per minute (cfm) per 100 sq. ft. of the conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pascal), across the roughed-in system, including the manufacturer's air handler enclosure. If the air handler is not installed at the time of the test, total leakage must be equal to or less than 3 cfm per 100 sq.ft. of conditioned floor area.

Mechanical System Pipe Insulation – Section R403.3
Mechanical system piping such as boiler or cooling (AC) system piping that is capable of carrying fluids above 105 degrees F or below 55 degrees F must be insulated to at least R-3.

Circulating hot water system piping must be insulated to at least R-3. These systems must also include an automatic or readily accessible manual switch that can turn off the hot water circulating pump when the system is not operating.

Hot Water Pipe Insulation – Section R403.4.2 (Montana Amended)

R-3 insulation is required for the following:

- Piping larger than ¾ inch diameter.
- Piping serving more than one dwelling unit.
- Piping located outside conditioned space.
- Piping from the water heater to a distribution manifold.
- Piping located under a floor slab. (not part of in-floor heating system).
- Buried piping.
- Supply and return piping in recirculating systems other than demand recirculation systems.

Proper Sizing of Heating and Cooling Equipment – Section R403.6
Heating and cooling equipment sizing shall be based on building loads calculated in accordance with ACCA Manual S & J or other approved heating and cooling calculation method. In the past many heating and cooling systems were oversized, resulting in increased installation and operating costs.

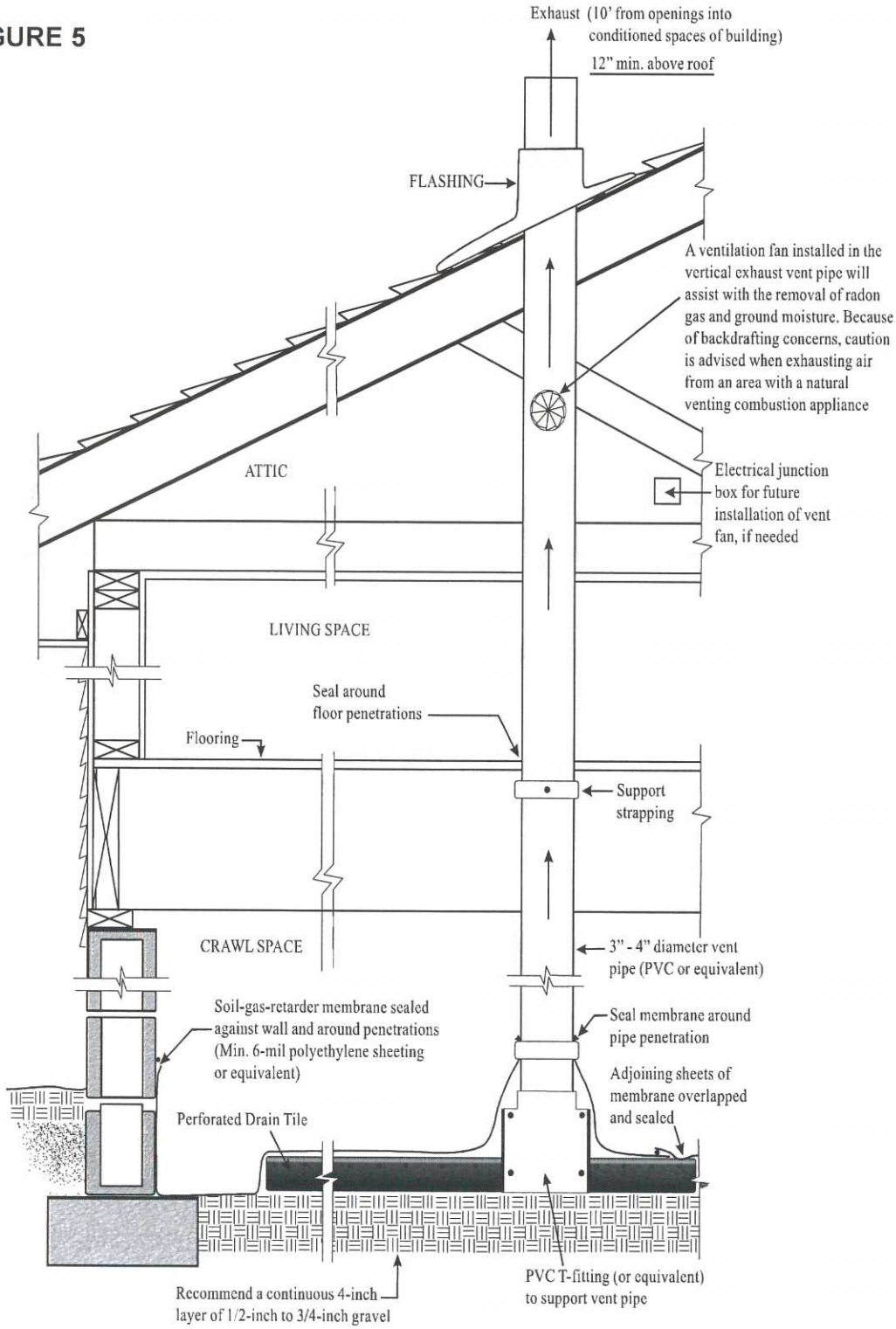
Lighting Requirement – Section R404
At least 75 percent of the permanently installed lighting fixtures must have high-efficiency lamps or light bulbs, (need not be fixtures) which include compact fluorescent (CFL), T-8 or smaller linear fluorescent, or LED or lamps with a minimum efficacy of 60 lumens per watt if over 40 watts, 50 lumens per watt if over 15 watts to 40 watts, and 40 lumens per watt if 15 watts or less. Low voltage lighting is exempt.

Radon Mitigation
Because of the potential for high indoor levels of radon, the Montana Department of Environmental Quality recommends new houses have basic radon mitigation systems installed during construction. Contact the Montana Radon hotline for more information at 1-800- 546-0483.

Radon Mitigation System in Crawlspace

(Radon Systems are not Required by Code)

FIGURE 5



Energy Efficiency Components Label

Labels are available at no cost from many sources. Several utility companies are distributing labels as a public service. Local Montana Homebuilder Association offices in Billings, Bozeman, Great Falls, Helena, Kalispell, and Missoula distribute labels to their members.

Labels are also available from:

Montana Department of Environmental Quality • Energy and Pollution Prevention Bureau
1520 East Sixth Avenue, P. O. Box 200901 • Helena, Montana 59620-0901

or by calling the Montana Department of Environmental Quality at (406) 444-6697.
Also, camera-ready copies are available from our DEQ website:

FIGURE 6.

Energy Code Compliance Certificate with Prescriptive Path Listings

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 4 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: X Yes per code	
	In non-conditioned areas insulated to	
	Supply R- 8 Return R- 6	
	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 4 ACH 50	
	Visual inspection: ____ Yes per code	

Whole house mechanical ventilation: ____ Yes per code

Other (i.e., radon mitigation)_____

_____

Builder:_____ Date:_____

Signature:_____

The builder or representative certifies compliance with ARM 24.301.162 and MCA50-60-802, by completing and signing this label.

November 2014

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

Montana Energy Conservation Tax Credit

Homebuyers are eligible for a state tax credit of up to $500 / $1000 per couple when they purchase or build an "above energy code" home or improve the efficiency of their existing home. **Certified ENERGY STAR or Montana Green Building Program (above Bronze level) homes with an ENERGY STAR heating system receive a $500 Montana tax credit. Only one of these credits can be used.** For new houses, the credit is 25 percent of certain high efficiency heating, cooling, water heating, ventilation equipment, windows, doors, and the "extra" cost of the building components, such as insulation levels, that are more energy efficient than the Montana energy code requirements. Go to www.energizemontana.com for additional information.

Refrigerators, clothes washers, and dryers do not qualify for the credit. Taxpayers should use tax form ENRG-C to claim the energy conservation tax credit.

Alternative Energy Systems Tax Credits

Homebuyers are eligible for the following Alternative Energy Systems Tax Credit: geothermal $1,500; wind and solar $500/$1000 per couple; and eligible wood and pellet stoves $500/$1000 per couple.

Taxpayers should use tax form ENRG-B to claim the alternative energy tax credit and form ENRG-A for the geothermal tax credit.

Tax credit forms are available online at: **www.discoveringmontana.com/revenue/**

Definitions of Some Energy Efficient Terms

A good comparison shopper needs to understand certain units of measurement, such as MPG (miles per gallon) when shopping for a new car. Shopping for energy efficiency also involves knowing a few units of measurement. Each Energy Efficiency Components Label may contain five or more different units of measurement. The following definitions will help you crack the code of energy efficiency.

R-VALUE – The units used to measure the insulating value of an object. The higher the R-value, the more insulating value an object has. For example, a high density batt of fiberglass insulation for a 2" x 6" wall has an R-value of 21.

U-FACTOR – Another unit of insulation measurement, U-values, measure heat loss through windows. The U-value of a window is the reciprocal of its R-Value (U = 1/R). For instance, a window with a U-value of 0.33 is equivalent to an R-value of 3 (0.33 = 1/3). Because the U-value is the inverse of the R-value, a lower U-value indicates a window that has better insulating capabilities than a window with a higher U-value.

NFRC UNIT RATING – The National Fenestration Rating Council (NFRC) determines the U-value for most windows. This rating is placed on a label attached to all new NFRC rated windows. If the NFRC rating is available, the home builder should use this number when filling in the U-value on the Energy Efficiency Components Label.

EF – Used to determine the energy efficiency of hot water tanks, EF is the abbreviation for "Energy Factor." This unit is a ratio of the heat energy contained in the water in a hot water tank over a certain period of time divided by the energy that the hot water heater consumes over the same time period. The most efficient electric water heaters have an EF rating of 0.93 to 0.96, while the most efficient gas-fired water heaters have energy factors ranging from 0.8 to 0.9. To be eligible for the Montana Energy Conservation tax credit, a gas water heater must have an EF of at least .82 or thermal efficiency of at least 90. Electric heat pump water heaters must have an EF of at least 2.

Definitions of Some Energy Efficient Terms - *continued from page 15*

AFUE – An abbreviation for Annual Fuel Utilization Efficiency, AFUE is a measure of the effectiveness of gas and oil space heating systems. All furnaces and boilers in the United States are required to have an AFUE rating of at least 78 percent. The most efficient gas furnaces have an AFUE of 92 percent to over 96 percent, while the most efficient gas hot-water boilers have AFUE ratings of around 84 percent to 95 percent. Energy-efficient oil furnaces have similar AFUE ratings, in the mid-80s to 90 percent. The most efficient oil-fired hot water boilers have efficiencies that are slightly lower, with AFUE ratings up to around 90 percent. To be eligible for the Montana Energy Conservation tax credit, a gas furnace must have an AFUE of at least 95 percent.

HSPF – Heating Season Performance Factor is the measurement unit for determining the efficiency of heat pumps. It is calculated by dividing the estimated seasonal heating output (in Btu) by the seasonal power consumption (in watts). To be eligible for the Montana Energy Conservation tax credit, an air scource heat pump split system must have an HSPF of at least 8.5

SEER – Seasonal Energy Efficiency Ratio. The total cooling output of an air conditioner during its normal annual usage period for cooling, in Btu/hours, divided by the total electric energy input during the same period in watt-hours. To be eligible for the Montana Energy Conservation tax credit, a central air conditioning split system must have a SEER of at least 16.

EER – Energy Efficiency Ratio. Energy Efficiency Ratio is the ratio of the cooling capacity (in British thermal units [Btu] per hour) to the power input (in watts). The higher the EER rating, the more efficient the air conditioner. To be eligible for the Montana Energy Conservation tax credit, a central air conditioning split system must have an EER of at least 13.

Following are some websites with additional energy conservation information:

■ Building Science Corporation	Westford, MA	**www.buildingscience.com**
■ Efficient Windows Collaborative	Washington, DC	**www.efficientwindows.org**
■ Energy and Environmental Building Association	Bloomington, MN	**www.eeba.org**
■ EPA Home Performance with Energy Star	Washington, DC	**www.energystar.gov**
■ Lawrence Berkeley Laboratory/, Energy Performance of Buildings Groups	Berkeley, CA	**www.lbl.gov**
■ National Center for Appropriate Technology	Butte, MT	**www.ncat.org**
■ Partnership for Advancing Housing Technology (PATH)	Washington, DC	**www.pathnet.org**
■ U.S. Department of Energy	Washington, DC	**www.eere.energy.gov**
■ Northwest Energy Star Homes		**www.northwestenergystar.com**
■ National Fenestration Rating Council		**www.nfrc.org**
■ Montana Green Power		**www.montanagreenpower.com**

Look for the ENERGY STAR certification on windows, heating, air conditioning systems, and appliances.

200 copies of this public document were published at an estimated cost of $.28 per copy, for a total of $56.00, which includes $56.00 for printing and $0.00 for distribution.

printed on recycled paper

RES*check* Software Version 4.4.1
Inspection Checklist

Ceilings:

☐ Ceiling 1: Flat Ceiling or Scissor Truss, R-49.0 cavity insulation
Comments: _____

Above-Grade Walls:

☐ Wall 1: Wood Frame, 16" o.c., R-21.0 cavity insulation
Comments: _____

Basement Walls:

☐ Basement Wall 1: Solid Concrete or Masonry, 8.0' ht / 7.0' bg / 8.0' insul, R-11.0 continuous insulation
Comments: _____

Windows:

☐ Window 1: Vinyl Frame:Double Pane with Low-E, U-factor: 0.330
For windows without labeled U-factors, describe features:
#Panes ____ Frame Type _____ Thermal Break? ____ Yes ____ No
Comments: _____

Doors:

☐ Door 1: Solid, U-factor: 0.200
Comments: _____

Air Leakage:

☐ Joints (including rim joist junctions), attic access openings, penetrations, and all other such openings in the building envelope that are sources of air leakage are sealed with caulk, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material.

☐ Air barrier and sealing exists on common walls between dwelling units, on exterior walls behind tubs/showers, and in openings between window/door jambs and framing.

☐ Recessed lights in the building thermal envelope are 1) type IC rated and ASTM E283 labeled and 2) sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

☐ Access doors separating conditioned from unconditioned space are weather-stripped and insulated (without insulation compression or damage) to at least the level of insulation on the surrounding surfaces. Where loose fill insulation exists, a baffle or retainer is installed to maintain insulation application.

☐ Wood-burning fireplaces have gasketed doors and outdoor combustion air.

Air Sealing and Insulation:

☐ Building envelope air tightness and insulation installation complies by either 1) a post rough-in blower door test result of less than 7 ACH at 33.5 psf OR 2) the following items have been satisfied:

(a) Air barriers and thermal barrier: Installed on outside of air-permeable insulation and breaks or joints in the air barrier are filled or repaired.

(b) Ceiling/attic: Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed.

(c) Above-grade walls: Insulation is installed in substantial contact and continuous alignment with the building envelope air barrier.

(d) Floors: Air barrier is installed at any exposed edge of insulation.

(e) Plumbing and wiring: Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.

(f) Corners, headers, narrow framing cavities, and rim joists are insulated.

(g) Shower/tub on exterior wall: Insulation exists between showers/tubs and exterior wall.

Sunrooms:

☐ Sunrooms that are thermally isolated from the building envelope have a maximum fenestration U-factor of 0.50 and the maximum skylight U-factor of 0.75. New windows and doors separating the sunroom from conditioned space meet the building thermal envelope requirements.

Materials Identification and Installation:

☐ Materials and equipment are installed in accordance with the manufacturer's installation instructions.

☐ Insulation is installed in substantial contact with the surface being insulated and in a manner that achieves the rated R-value.

☐ Materials and equipment are identified so that compliance can be determined.

☐ Manufacturer manuals for all installed heating and cooling equipment and service water heating equipment have been provided.

☐ Insulation R-values and glazing U-factors are clearly marked on the building plans or specifications.

Duct Insulation:

☐ Supply ducts in attics are insulated to a minimum of R-8. All other ducts in unconditioned spaces or outside the building envelope are insulated to at least R-6.

Duct Construction and Testing:

☐ Building framing cavities are not used as supply ducts.

☐ All joints and seams of air ducts, air handlers, filter boxes, and building cavities used as return ducts are substantially airtight by means of tapes, mastics, liquid sealants, gasketing or other approved closure systems. Tapes, mastics, and fasteners are rated UL 181A or UL 181B and are labeled according to the duct construction. Metal duct connections with equipment and/or fittings are mechanically fastened. Crimp joints for round metal ducts have a contact lap of at least 1 1/2 inches and are fastened with a minimum of three equally spaced sheet-metal screws.
Exceptions:

Joint and seams covered with spray polyurethane foam.

Where a partially inaccessible duct connection exists, mechanical fasteners can be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.

Continuously welded and locking-type longitudinal joints and seams on ducts operating at less than 2 in. w.g. (500 Pa).

☐ Duct tightness test has been performed and meets one of the following test criteria:

(1) Postconstruction leakage to outdoors test: Less than or equal to 96.0 cfm (8 cfm per 100 ft2 of conditioned floor area).

(2) Postconstruction total leakage test (including air handler enclosure): Less than or equal to 144.0 cfm (12 cfm per 100 ft2 of conditioned floor area) pressure differential of 0.1 inches w.g.

(3) Rough-in total leakage test with air handler installed: Less than or equal to 72.0 cfm (6 cfm per 100 ft2 of conditioned floor area) when tested at a pressure differential of 0.1 inches w.g.

(4) Rough-in total leakage test without air handler installed: Less than or equal to 48.0 cfm (4 cfm per 100 ft2 of conditioned floor area).

Heating and Cooling Equipment Sizing:

☐ Additional requirements for equipment sizing are included by an inspection for compliance with the International Residential Code.

☐ For systems serving multiple dwelling units documentation has been submitted demonstrating compliance with 2009 IECC Commercial Building Mechanical and/or Service Water Heating (Sections 503 and 504).

Circulating Service Hot Water Systems:

☐ Circulating service hot water pipes are insulated to R-2.

☐ Circulating service hot water systems include an automatic or accessible manual switch to turn off the circulating pump when the system is not in use.

Heating and Cooling Piping Insulation:

☐ HVAC piping conveying fluids above 105 degrees F or chilled fluids below 55 degrees F are insulated to R-3.

Swimming Pools:

☐ Heated swimming pools have an on/off heater switch.

☐ Pool heaters operating on natural gas or LPG have an electronic pilot light.

☐ Timer switches on pool heaters and pumps are present.
Exceptions:

Where public health standards require continuous pump operation.

Where pumps operate within solar- and/or waste-heat-recovery systems.

☐ Heated swimming pools have a cover on or at the water surface. For pools heated over 90 degrees F (32 degrees C) the cover has a minimum insulation value of R-12.
Exceptions:

Covers are not required when 60% of the heating energy is from site-recovered energy or solar energy source.

Lighting Requirements:

☐ A minimum of 50 percent of the lamps in permanently installed lighting fixtures can be categorized as one of the following:

(a) Compact fluorescent

(b) T-8 or smaller diameter linear fluorescent

(c) 40 lumens per watt for lamp wattage <= 15

(d) 50 lumens per watt for lamp wattage > 15 and <= 40

(e) 60 lumens per watt for lamp wattage > 40

Other Requirements:

☐ Snow- and ice-melting systems with energy supplied from the service to a building shall include automatic controls capable of shutting off the system when a) the pavement temperature is above 50 degrees F, b) no precipitation is falling, and c) the outdoor temperature is above 40 degrees F (a manual shutoff control is also permitted to satisfy requirement 'c').

Certificate:

☐ A permanent certificate is provided on or in the electrical distribution panel listing the predominant insulation R-values; window U-factors; type and efficiency of space-conditioning and water heating equipment. The certificate does not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels.

NOTES TO FIELD: (Building Department Use Only)