

**F**or many Montanans a winter does not pass without excessive moisture build-up in the home. The moisture that forms on the inside of your windows is called condensation. In some cases condensation can be short-term—during a cold spell or localized to humid areas of the home such as the kitchen, bathroom or laundry area. In other cases excessive moisture can condense on walls, the ceiling and other cold surfaces causing paint to peel, wood to rot and mildew to grow.

### Condensation Control

To limit condensation and its damaging effects you must control three elements: indoor humidity, surface temperatures and moisture migration into walls, attics and crawl-spaces.

#### 1. Indoor Humidity Control.

During the heating season, the indoor humidity level should be kept around 30 to 45 percent. High humidity is often the result of too much moisture generated indoors; however, exterior sources can also contribute to high indoor humidity.

It is possible for an average family of four to add over six gallons of moisture to the air each day. Some of these activities include:

- To reduce indoor humidity, follow these simple tips.
- While cooking, bathing and laundering, use an exhaust vent. Make sure the exhaust is vented to the outside and not into the attic or crawl-space.
- Never run your clothes dryer with the exhaust vented to the inside. Also you might want to avoid hanging wet clothes inside your home during cold weather.
- Cover pots and pans while boiling foods.
- If you have a crawl space keep the moisture in the ground by covering it with 6 mil plastic sheeting.

#### 2. Surface Temperature Control.

In order for moisture vapor to condense, it must come in contact with a cold surface like a poorly insulated or uninsulated wall or single-paned window. Warm air holds more moisture than cold air and warm air will naturally move toward a cold surface. If warm moist air comes into contact with a cold surface it will condense forming water, frost or ice on the surface.

**IT'S NOT WISE, LITTLE BUDDY, TO VENT YOUR DRYER INSIDE. IT ADDS TOO MUCH MOISTURE AND MESSY LINT!**



**Total Moisture 55.9 lbs/day or 6.7 gallons/day**

To reduce surface condensation here are some simple solutions:

- **Have your walls, ceiling and floor checked for insulation.** This can be done by calling your HRDC, an insulation contractor or your utility. If insulation levels are low or the insulation isn't filling all the nooks and crannies, cold surfaces will result. Insulation resistance "R" values should be at least:
- **Add storm windows.** If your windows are single-paned, condensation is probably a common problem. Installing a plastic or glass storm window over the window increases the surface temperature which reduces the condensation. The storm window must be installed with at least a 1/2 inch space between the two windows and sealed on the edges. While it may not be cost-effective, adding a storm window to a double-paned window will allow for a higher relative humidity in the home without condensation taking place.
- **Allow air to circulate around the room—especially across cold surfaces.** Do not cover furnace supply or return registers. Use a ceiling fan to move air. During the day leave drapes open to allow air to circulate freely over the windows. During the night close drapes to prevent warm moist air from reaching the cold window surface.

#### 3. Moisture Migration Control.

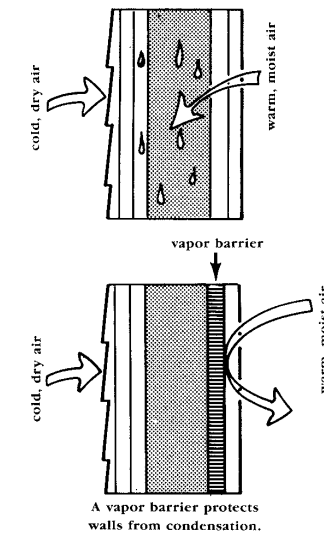
Even with properly installed insulation, moisture can migrate into cold walls, attic spaces and crawlspaces to form condensation. Although condensation taking place in these areas is less obvious, it is where moisture can do the most harm—rot the framing, degrade insulation and corrode fasteners. Moisture can sneak into these cold areas through cracks or diffuse through building materials.



**YES SIR, THIS PLASTIC WILL HELP KEEP THE MOISTURE OUT OF THE CRAWL-SPACE!**

To control condensation in walls, attics and crawl-spaces two remedies are common: (a) block moisture from entering using vapor barriers and sealants, and (b) ventilate to remove moisture.

Vapor barriers have been used with insulation in colder climates for many years. A vapor barrier is a low-permeable material that slows the movement of



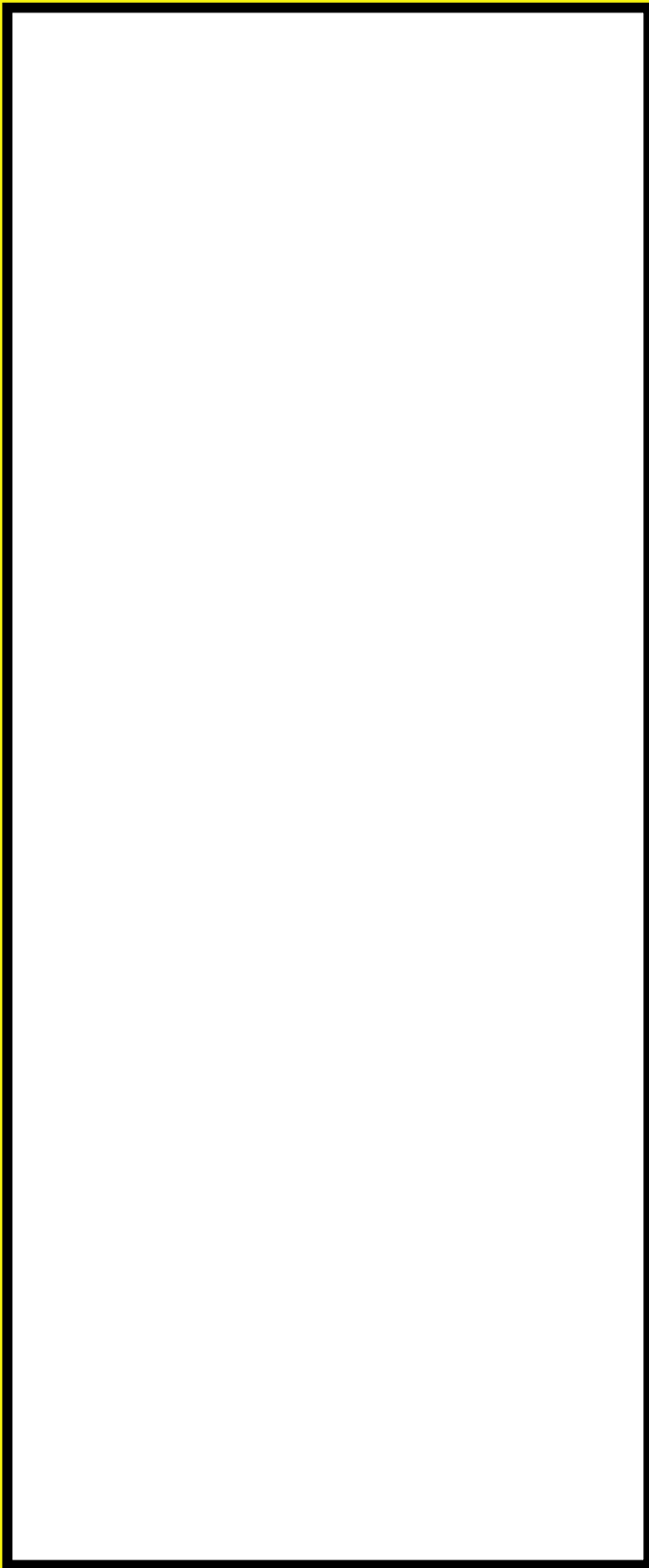
**Figure 1**  
**Vapor Barrier**

moisture. Vapor barriers should always be placed near the warm side of a wall, floor and ceiling. Materials near the cold side should let moisture escape from the wall or ceiling to the outside. A vapor barrier placed on both the warm and cold side may trap moisture causing problems.

Several materials are effective vapor barriers including polyethylene plastic and aluminum foil. Since it is difficult to add a vapor barrier to existing homes, oil-based paints, foil and vinyl wall-coverings,

and specially formulated low-permeability paints can be used to retard moisture vapor.

Keep in mind that where a hole or a crack exists, warm air and moisture can sneak through. All openings should be sealed with a long-lasting caulk or gasket material.



**ONTROLLING**

