

Condensation

Questions and Answers for Homeowners

The facts about window condensation and what you, the homeowner, can do about it.

The winter season causes more and more of today's homeowners to become increasingly interested in the causes of window condensation and the bothersome often costly effects it has on their homes.

If you experience the problems of window condensation on MELOCHE windows or other comparable thermally improved products, it's probably due to the fact that your home is constructed better than homes your parents lived in years ago. Many condensation problems are caused directly by progress and improvement in building construction. Advanced window and door designs make new homes tighter and less susceptible to drafts. Today homes are built with superior vapor barriers and insulation that tend to keep the majority of moisture inside the house, instead of allowing it to filter to the outside as it did in older homes. Another contributor to the problem is the great number of modern time and labor saving appliances available today that can add to your condensation problems.

The booklet will help to explain the problems and causes of condensation in today's homes and will give you suggestions as to how you can eliminate these problems as much as possible.

What causes condensation?

The source of condensation is humidity or invisible water vapor, which is present in all but the driest air. When this water vapor comes in contact with a surface that is below what is called the "dew point temperature" the vapor becomes liquid and is called condensation. This process of changing water vapor to liquid occurs on bathroom mirrors and walls after someone takes a hot shower. It also can occur on windows during the winter if the inside air contains enough vapor.

This condensation can occur at any normal temperature, provided the moisture concentration (relative humidity) is high enough.

Water on windows is condensation – and can be a problem, and the solution usually doesn't come from the windows.

Why does frost or condensation form on the window?

The water vapor in the air tries to flow towards drier air and mix with it. This process is termed "vapor pressure". It is not an instantaneous movement, but a definite movement from an area of high vapor pressure to where the air is drier.

In the winter, vapor pressure is very strong in the house because the cold outside air holds very little moisture: This vapor pressure can force moisture easily through most of the materials we use to build our homes: wood, drywall, even cement and brick are susceptible.

Moisture in the bath, kitchen, and laundry areas is absorbed into the warm inside air and then rushes to mix with the drier outside air. The most obvious indication of this is condensation or frost on your windows. The moisture comes in contact with a surface of the window but cannot get through the glass frame. It, therefore, condenses to form either frost or water, depending on the temperature of the surface.

What is humidity in general?

When air will no longer hold more moisture, it is said to be saturated. Relative humidity is a percentage of moisture in the air in relation to complete saturation.

EXAMPLE: 100% relative humidity would be rain. 50 % relative humidity indoors in the winter time would be excessively high and dangerous. 10% inside relative humidity would be comparatively dry air.

Warm air can hold more water vapor than cold. Even though the inside and outside humidity could be the same in the winter months, the inside air would be holding far more water vapor since it is warmer.

Condensation can even occur in warm weather. Several examples are as follows:

1. Condensation forms on a glass of ice water since the surface of the glass is down to the dew point temperature of the inside air.
2. Dew (condensation) forming on grass during the cold nights in the summer months.

What are the harmful effects of excess moisture or condensation?

If you have condensation on your MELOCHE windows or any comparable thermally improved windows, you have a good reason for worry, and good reason to act.

The problem is not the windows themselves, but what excess moisture may be doing elsewhere in your home.

1. Paint peeling or blistering may result from condensation moisture within the house. Characteristically, the blisters will contain water and the room penetrates the wall until it reaches the underside of the exterior paint. The building materials through which the water vapor has passes are porous; paint is not. As a result, moisture gathers underneath the paint, forms blisters and eventually the paint peels away from the wood.
2. Damp spots on ceilings or warm-side surfaces of exterior walls.
3. Moisture on basement walls and floors.
4. Ice and frost on the underside of roof sheathing boards.
5. Fungus moulds and mildew growth.
6. Delamination of plywood materials.

What causes excess moisture or high relative humidity, which can cause condensation?

With energy conservation the main concern today, modern homes are being built with the increased insulation in walls and ceilings, use of vapor barriers over insulation: better performing windows and doors so there is less air infiltration and air exchange between the inside and out. This, combined with the following sources of moisture, adds to the problem of excess condensation.

1. Uncontrolled furnace humidifiers.
2. Damp basement walls and floors.
3. Excessive boiling when cooking.
4. Laundry hung up to dry.
5. Bathing- taking showers.
6. Large number of plants watered daily.
7. Un-vented appliances such as automatic clothes dryers and all gas appliances (water vapor is one of the products of gas combustion).
8. Crawl spaces without adequate vapor barriers.
9. Cracks or voids in exterior caulking can allow cold, outside air to cool inside surfaces of windows and doors and cause condensation.
10. Lack of insulation between the window frames and the rough openings, allow cold drafts to short circuit the window or doors thermal barrier.

Mopping the floor of a 150-sq. ft. kitchen can release 1 1/2 pints of water. A shower or bath, about 1/2 pint washing diner dishes, about 1/2 pint. A family of four gives off about 1/2 pint of water per hour just by breathing. It takes only four to six pints of water to raise the relative humidity in a 1000 square foot area from 15% to 60%

Housing generally has been growing smaller, and this means that an even greater concentration of water vapors is trapped by modern tight construction. It means more moisture contained in less space.

What are new homes more prone to condensation?

During the first year after construction, it is likely that a house will have more condensation present because of the massive amount of moisture in the building materials used. It will be a drying out period when wood, plaster, basement floors, walls and paint finishes must dry. When the heating season starts, this moisture will gradually flow out into the air in the home.

The modern insulation and construction that keep cold air outside, also keeps moisture in. vapor-seal insulation is designed specifically to stop the escape of water vapor and protect the insulation and your walls from the ravages of water, but at the same time, it adds to the problem of condensation.

We are using superior insulation and vapor barrier techniques; along with superior windows and doors that minimize air infiltration and air exchange between the inside and outside, which all adds to excessive moisture.

THIS IS ONE REASON WHY FURNACE HUMIDIFIERS SHOULD NOT BE USED AT ALL DURING THE FIRST HEATING SEASON. IN SOME INSTANCES, DECHMIDIFIERS SHOULD BE USED TO RELIEVE THE HOUSE OF EXCESS MOISTURE CONTENT.

What can two identical homes, side by side, react differently in regard to condensation?

Condensation problems can be puzzling, and can differ from house to house and family to family. Identical, side by side homes could offer different degrees of problems, or one could be trouble free and the other troubled.

Normal living processes generate water vapor. Cooking, bathing and laundry all contribute to water vapor contents in the house. A family of four is said to generate 4 gallons of water into the air in the course of a day.

A new baby in the house causing additional laundering could bring a problem that did not exist in the previous year. Or the same thing could occur when another person of any age joins a household.

Each individual family has its own set of living habits, which contribute to different degrees of water vapor in the air.

Why is condensation more noticeable during the first part of the heating season and directly after winter thaws or winter rains?

During the summer, your home has absorbed a great deal of moisture. Condensation will be more noticeable the first several cold spells directly into the heating season. This is because the house is still moist and it will take several weeks of continuous heating to be dried out. Condensation will usually dissipate as the heating season progresses.

A home picks up considerable amounts of moisture during winter thaws and rains. If a cold spell sets in immediately after a thaw or heavy rain, the relative humidity in a home will be at an extreme high, which can cause frost or condensation, until the humidity level is reduced by moisture transmission to the cold outdoors. This is one reason why frost or condensation can be more noticeable after a rain followed by cold weather.

Why can frost and condensation be more of a problem after the installation of MELOCHE INC. replacement windows than before?

Before replacement windows are installed, most homes have fairly loose windows that have excessive drafts around them, which automatically reduce the humidity levels within the home. Actually, in many older homes, it is impossible to obtain high humidity levels due to the moisture lost around loose windows.

After the installation of new MELOCHE Windows and Doors, drafts are reduced to a minimum and the house is made far tighter than it ever has been in the past. The interior moisture cannot easily escape to the exterior, thus causing higher humidity levels, which could not be obtained before.

What can be done to control condensation and high relative humidity?

Any of the steps below can alleviate a condensation problem:

1. Re-caulk any broken exterior caulking around windows and doors.
2. Shut off furnace humidifier and any other humidifying device in your home.
3. Use kitchen exhaust fans while cooking, or at least close the kitchen door to rest of house and open a window slightly for ventilation. During and after taking a shower or bath, the bathroom should be ventilated with the use of ventilating fans or by opening windows slightly.
4. Windows in laundry rooms should be open for ventilation when laundering.
5. Large numbers of plants should be concentrated in a sunroom or other seldom-used room during critical cold weather.
6. Basement floor and walls should be treated with efficient waterproofing.
7. Opening windows slightly throughout the house for a short period of time each day will allow for humid air to escape and for drier air to enter. The heat loss will be minimal.
8. Never hang up clothes to dry indoors in a house with extreme humidity.
9. Open fireplace damper to allow moist air to escape.
10. Provide vents to outside on all major gas appliances. Also, vent all clothes dryers.
11. In crawl spaces, provide proper vapor barriers and wall insulation to prevent moisture from escaping from walls in your home.
12. Run a dehumidifier if necessary.

If troublesome condensation persists, see your heating contractor about an outside air intake for your furnace, about ventilating gas burning heaters and appliances, or about installation of ventilating fans. Certainly they will be less expensive than a big paint job caused by excessive water vapor, not to mention the deterioration of the insulation in the walls.

How can comfortable humidity levels be maintained without damaging a house?

The table shown below is a result of long and careful experiments at the University of Minnesota Engineering Laboratories. It shows the maximum safe humidities for your home, not just for the windows, but also for your paint, insulation and structural members.

MAXIMUM RECOMMENDED HUMIDITY LEVELS
(CHART HERE)

NOTE: relative humidities higher than 40% are undesirable in winter weather.

If you test humidity in your home, be sure to use accurate instruments. Remember, too, that these relative humidity's are for 70 degrees F. for higher inside temperatures, lower relative humidity's are required.

If condensation does occur on MELOCHE Windows or Doors, and they are installed according to the manufacturer's recommendations, it is an indication that the humidity levels are higher than what is recommended.

If the procedures indicated on the previous pages do not bring about acceptable humidity levels, the builder or heating contractor should be contacted. It may be necessary to provide a dehumidifier to remove excess moisture.

Is higher humidity necessary and can it even waste energy?

Some humidity is necessary for comfort and it may help health; in older homes it was a struggle to keep enough moisture inside the house, but with our modern, tight well-insulated homes the situation is completely reversed. The problem is how to get rid of excess moisture. Yet, many new homeowners go right on pouring additional moisture into their homes. The danger signs of condensation on windows certainly don't discourage them. Sometimes they aren't even discouraged by exterior paint jobs costing many hundreds of dollars.

“. . . In the more tightly built modern houses, the moisture given off by showers, laundry equipment, cooking and by other occupants themselves put more humidity in the air than is needed, and there is little likelihood that the humidity levels would ever become so low as to be harmful or irritating.”

“High humidity, however, can greatly contribute to the deterioration of a house and to the discomfort of its occupants.”

In fact, the recommended humidity levels are higher than could ever be obtained in older housing built before the days of modern insulation, vapor barriers, superior windows and doors that are completely weather-stripped.

Have you ever had a feeling of dampness in the house, due to excessive moisture? Usually when the house feels damp, does this excessive moisture cause you to turn up the heat to take the dampness out of the house? What you are actually doing is raising the temperature beyond the normal comfort range to eliminate the dampness. This is one wasteful effect of excess moisture.

What other factors can contribute to frost or condensation on windows?

If the heat within a room is not allowed to warm the windows or doors, it can become colder and is prone to the formation of condensation or frost. On cold winter nights when drapes and shades are pulled, windows and doors are not allowed to absorb the heat from the room. That is why it is important to position heating registers directly beneath doors or windows in question.

Improper installation is another factor in condensation forming on the windows of your home.

Insulating should be stuffed around small spaces between the rough opening framing of the door and window during construction. This will prevent a cold draft from entering and short-circuiting the window or doors thermal barrier. It is extremely important that the exterior perimeter of the doors and windows be caulked, also to eliminate any drafts from short-circuiting the thermal barrier, which could cause frost or condensation in the interior.

Minimize exterior frame exposure to the elements. This is especially important with frame and aluminum siding window installations. Protect sides of window with brick-mold or J-Channel.

A final word

We hope this booklet on condensation has been useful to you both in understanding the problem and in correcting it.

However if you still have unanswered questions, or a particularly tough condensation problem, please feel free to contact MELOCHE Windows & Doors.

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