



When warm air comes in contact with a cooler surface, condensation forms. The same way as a can of your favorite beverage “sweats” on a hot summer’s day.

When Hot Summer Nights Fall Cold...

Condensation.

The moisture that suddenly forms in the autumn season on the interior or exterior of window and patio door glass. Blocking your view, dripping on the floor, or sometimes even freezing on the glass. It can be an annoying problem.

And while it may seem natural to blame your new windows or patio doors, interior condensation is actually an indication of excess humidity in your home.

Exterior condensation, on the other hand, is a form of dew, and the glass simply provides a surface on which the moisture can condense.

The important thing to realize is that condensation is not generated by your new windows or patio doors; it comes from water vapor in the air. When warm, moist air comes into contact with cooler surfaces, the excess moisture in the air condenses. That’s because the cooled air next to the cooler surface can’t hold as much moisture as the warmer surrounding air.

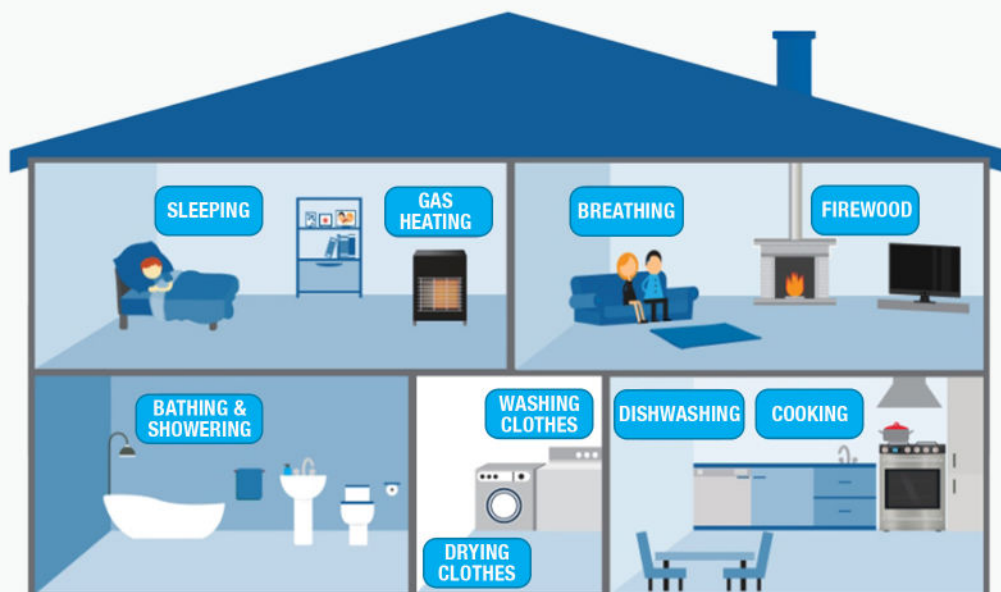
This phenomenon of window condensation typically occurs during the fall and winter seasons, particularly in climates where the average January temperature is 35 degrees or colder.

Where does indoor moisture come from?

There are many things that generate indoor moisture. The normal perspiration and breathing of a family of four adds about half a pint of water to the air every hour. Cooking three meals a day adds four or five pints of water to the air. Each shower contributes another half-pint.

In fact, just the daily living activities of a family of four can add more than 18 gallons of water a week to the air in their home. And the more water vapor in the air, the higher the relative indoor humidity. Other contributors include house plants, and the burning of fossil fuels and natural gas.

The structure of your home is also a source of humidity. During the summer months, the walls, framing, and even the furniture will absorb moisture, and then when the heating season begins in fall, that moisture is released into the home, adding to the humidity.



The daily living activities of a family of four can add more than 18 gallons of humidity per week.

SmartShield: Interior Thermal Coat

Some of the **SmartShield High Efficiency Glass Systems** from Joyce have a ceramic-based interior coating that reflects thermal heat back into the home rather than letting it absorb into the glass pane, keeping the glass surface cooler than typical uncoated glass. While this interior coating dramatically improves the overall efficiency of the window by keeping more heat inside the home, the cooler glass surface can have a slightly lower threshold to condensation than just standard glass.

However, any windows overall ability to resist condensation is driven by the indoor/outdoor temperatures and the relative humidity inside the home, and if the issue of condensation persists, then it is recommended steps be taken to reduce the amount of interior humidity.

Steps to Prevent Condensation

Following the installation of your new Joyce windows, you will notice a dramatic decrease in unwanted air infiltration, which results in less exchange of warm and cold air during the winter months. To help prevent condensation from forming on your new Joyce windows, it is suggested that steps be taken to reduce the overall humidity in your home. Here are a few ways to do that:

- Vent all gas appliances, clothes dryers, and exhaust fans to the outside. Your attic and crawl space should also be ventilated. Covering any exposed soil in the crawl space with a good vapor barrier will also minimize any humidity from the ground.
- When you cook, make sure to run the exhaust fans in the kitchen. When you bathe or shower, run the fans in the bathroom until your mirror is clear. Be careful not to overheat exhaust fans by running them too long.
- Open your drapes or shades during the the day so warm air can reach your windows.
- Use ceiling fans to promote air movement.
- Avoid storing firewood inside.
- Reduce the usage of a humidifier, and if necessary, install a dehumidifier.



J11
J21
J31



J221
J321

The SmartShield High Efficiency Glass Systems listed above include an interior ceramic thermal coating that reflects interior heat back into the home, keeping the air warmer, but the glass surface cooler.

Maximum Recommended Humidity Levels

| OUTSIDE AIR TEMPERATURE | INSIDE RELATIVE HUMIDITY |
|-------------------------|--------------------------|
| -20° F or Below | Not over 15% |
| -20° F to -10° F | Not over 20% |
| -10° F to 0° F | Not over 25% |
| 0° F to 10° F | Not over 30% |
| 10° F to 20° F | Not over 35% |
| 20° F to 40° F | Not over 40% |

The recommendations above are based upon engineering studies at 70° F conducted at the University of Minnesota Laboratories.