Interior Condensation

SURFACE CONDENSATION

Each person has his or her own preference regarding the humidity level in his or her home. If the occupants insist on a high level of humidity within the house, surface condensation must be expected when outside temperatures are low. Some indications of surface condensation are:

- Frost on door handles and hinges, or door frozen shut
- Water or ice on windows
- Damp spots on walls and ceiling
- Damp spots on closet walls
- Moisture on light fixtures
- Moisture on water closets
- Moisture on cold water pipes, walls and floors.

Some humidity is necessary for comfort and health. In many homes, it is a struggle to keep enough moisture inside the home to maintain an acceptable humidity level for the occupants. Frequently, humidifiers are installed to add moisture to the air, but their use must be controlled or surface condensation problems may result. Unfortunately, a dry house may indicate a high leakage rate (depending on the amount of moisture added by the homeowner), which can contribute to concealed condensation.

In some newer homes, however, air leakage is controlled so well that removing moisture from the house becomes a problem. This problem is made worse by the use of humidifiers, resulting in condensation on windows, mold growth, or damp spots on ceilings and room-side surfaces of exterior walls.

Because windows do not provide much resistance to heat loss, they are often the coldest component of a building enclosure, and can be an indicator of humidity problems. Because condensation occurs on inside window surfaces whenever the surface temperature falls below the dew point temperature of the room air, window condensation may signal a need to reduce the humidity level in your home.

Condensation Chart, *Dual Clear VS Low-E Argon*

Maximum Humidity before Condensation Occurs

Outside Temperature	Dual Clear	Low-E Argon
0°C	50%	63%
-10°C	38%	50%
-20°C	26%	40%
-30°C	18%	30%
-40°C	12%	23%

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WHAT CAN EFFECT THE PERFORMANCE OF WINDOWS

(The following may cause condensation to form on a window at lower levels than given in TABLE 1)

Air Circulation - a window may be in an area in which there is poor circulation of warm air. This means that the temperature of the inside glass surface is colder than in other parts of the home and this may cause condensation to form at humidity levels which are practical for the rest of the home.

Drapes - the figures in TABLE 1 are based on natural circulation of warm air on the inside surface of the window. By drawing heavy drapes or venetian blinds over a window or patio door the possibility of condensation can be increased because the flow of warm air is restricted.

Varying Humidity Levels - remember that the humidity in some rooms, kitchens and bathrooms in particular, can be higher than in other areas of the home, thus encouraging condensation to form on the windows in these rooms.

Orientation - if windows are exposed to prevailing winds, then they will be slightly colder than the other windows in the home and may cause condensation to form at humidity levels which are practical for the rest of the home.

Exposure - some windows in the home may be protected by other buildings, trees, etc., which form a windbreak while others are totally exposed to the wind and, therefore, colder.

TABLE I
(Inside Relative Humidity of 21° C with Double Glazing)

Outside Air Temperature *including wind chill*	Indoor Relative Humidity
-28°C (-18°F) or below	not over 15%
-28°C (-18°F) to -23°C (-9°F)	not over 20%
-22.°C (-8°F) to -17°C (-2°F)	not over 25%
-16°C (-1°F) to -12°C (10°F)	not over 30%
-11°C (11°F) to -6°C (21°F)	not over 35%
-5°C (22°F) to 4°C (40°F)	not over 40%

Wind Chill Temperature - this is the method used to relate wind and temperature. Usually traditional temperature readings do not include a wind chill factor. For example, with an indoor temperature of 20oC and an outside air temperature of -12oC, Table 1 recommends a relative humidity of 30 percent. However, with an outside air temperature of -12oC and a 20 kilometer per hour wind, the outdoor wind chill temperature is -26oC and so the level of relative humidity should be reduced to 20 percent.

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FACTS & TIPS FOR CONTROLLING HUMIDITY

• A new home will typically expel 500 to 600 gallons of water in the first year and a half, so it is difficult to reduce condensation during this time.
• It is normal to have about 1″ of moisture on a sealed unit.
• Sliders will typically have more condensation on the fixed portion due to the glass being positioned further to the exterior then the interior.
• Ventilation is the most effective means to remove moisture from your home. By exchanging some of the drier outdoor winter air for warm humid interior air, the moisture level inside the house will be reduced.
• Open a door or window for short periods to allow moisture to escape.
• Gas appliances produce moisture from combustion. Cooking adds even more moisture — be sure to run your kitchen fan while cooking. Vent the kitchen fan directly to the outside to achieve the desired effect.
• Showers are a high source of moisture. Keep bathroom doors shut and run the exhaust fan to eliminate moisture. Ensure you leave your fan on for a minimum of 15 minutes after you shower to allow the humid air to be removed to the outside.
• Clothes dryers should be vented to the outside. Hanging up wet clothes to dry inside your home can add significant moisture to your home.
• Shut off the furnace humidifier and any other humidifying device in the home, particularly in winter months.
• If you have a fireplace, open the damper occasionally to allow moisture to escape.
• Free air circulation is important. Do not cover hot or cold air registers with furniture or appliances. Leave bedroom and bathroom doors open.
• Keep the temperature of all rooms at a minimum of 10oC (50°F), even if unoccupied. Condensation will occur in an unheated room.
• Condensation will typically be greater on the second floor due to the fact warm air rises, and the upper floors are exposed to greater winds cooling the glass.
• Wipe up any tracked-in snow before it melts and evaporates.
• Floors wet from mopping can add large amounts of moisture. Run exhaust fans (bathroom and kitchens) while floors are wet. Avoid washing floors on extremely cold days.
• Most builders install a fresh air intake into the cold air return duct of the heating system. Make sure that the intake damper is open and that there are no obstructions to prevent airflow. If you do not have a fresh air intake, have one installed.
• Drapes and blinds should be left open during the daytime. At night, raise blinds at least 4″up (preferably 6-8″) off the frame to allow air to flow against the glass.
• Certain fabric blinds that are designed to fit from jamb to jamb must be left partially open to ventilate the window cavity. Failure to do this can cause extreme temperatures between the blinds and the glass. Glass breakage or warping of PVC can occur, which can void warranties.
• Remove casement screens to increase air flow.

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Exterior Condensation

With high performance glazing it is possible, under certain conditions, to have condensation on the outside of the glazing. The glazing radiates to the sky and on a clear night that can reduce the temperature of the outside surface to below the dew point. Condensation will form similarly to the condensation on a car windshield and, once the sun comes up, the condensation will disappear.

The phenomenon is only possible when the glazing unit high performance and little heat is being transmitted to the outer surface. It is not likely to occur on a cloudy night.

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