

Outdoor Condensation

Condensation on the outdoor surface of an insulating glass unit is not an indication that the insulating glass unit is defective. Under the right set of atmospheric conditions, it is possible to get condensation on the exterior glass surface of an IG unit. Specifically, these conditions are as follows:

- Glass temperature below dew point temperature
- Clear night sky
- Still air
- High relative humidity
- Well-insulating glazings

Exposed to these conditions, the outdoor surface of the glass can radiate heat away to the night sky such that the glass temperature falls below the dew point of the ambient air. When this occurs, moisture from the air condenses on the glass surface. Only when the glass temperature rises above the dew point will the condensation evaporate back into the air. Dew formation on grass, car hoods and roofs, building roofs and walls is common and accepted as a fact of nature.

The presence of moisture indicates that a specific set of atmospheric conditions exists and that the insulating glass unit is indeed doing its job – that of insulating the building from the environment. In this case, that insulation capability is what retards the flow of building heat through the glass and prevents warming of the outdoor glass surface above the dew point.

If outdoor condensation occurs on an insulating glass unit, there is little or nothing that can be done to prevent its recurrence.

- Draperies can be opened to allow as much heat transfer through the glass as possible.
- Trees or buildings can block the radiation view to the sky reducing the chance for outdoor condensation.
- Shrubbery immediately adjacent to the glass can increase the local humidity increasing the chance for outdoor condensation.

The outdoor surface of the insulating glass unit will warm and the condensation will evaporate when the wind picks up or sunlight is absorbed on the glass surface.

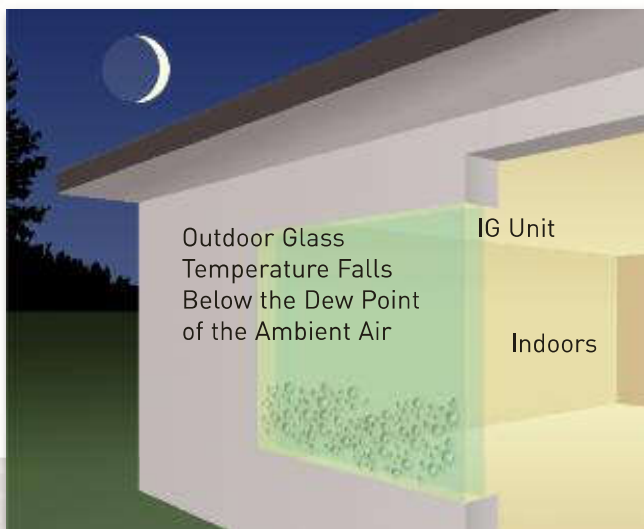


Figure 21-1

If condensation on the exterior of the window is a concern, the use of Cardinal's LoE-x89™ coating should be considered. The LoE-x89 coating is an Indium Tin Oxide based coating sputtered onto the outdoor surface of an insulating glass (IG) unit designed specifically for the reduction of outdoor condensation. This coating reduces the heat loss from the outboard keeping it warmer and reducing the chance of the glass temperature falling below the outside dew point. This decreases the hours and days with condensation. In addition, this coating has a titanium dioxide coating that becomes hydrophilic when exposed to UV radiation so if condensation forms, the water will sheet allowing better visibility through the water layer.



Indoor Condensation

Maintaining a Desirable Humidity Level

People are most comfortable when relative humidity ranges between 20 and 60%. In the home, an average relative humidity of 35 to 40% is appropriate when the outside temperature is 20° F (-7° C) or above. However, during cold weather, higher humidity ranges may cause indoor condensation on windows.

This table (Figure 21-2) shows recommended indoor humidity levels in relation to outdoor temperatures.

Outdoor Temperature °F	Recommended Relative Humidity
20° and Above	35% to 40%
+10°	30%
0°	25%
-10°	20%
-20°	15%

Figure 21-2

The chart in Figure 21-3 shows the relationship of condensation to indoor glass and room relative humidity. If glass conditions are above the red line in the chart, expect to see condensation. If they are below the line, you won't see condensation.

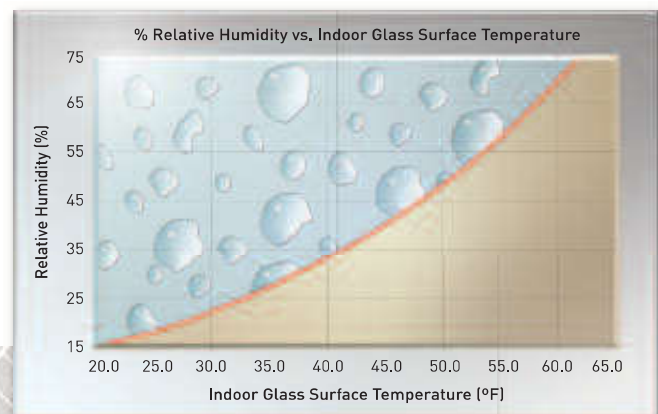


Figure 21-3

1) Indoor Air Temperature = 70° F (21° C)