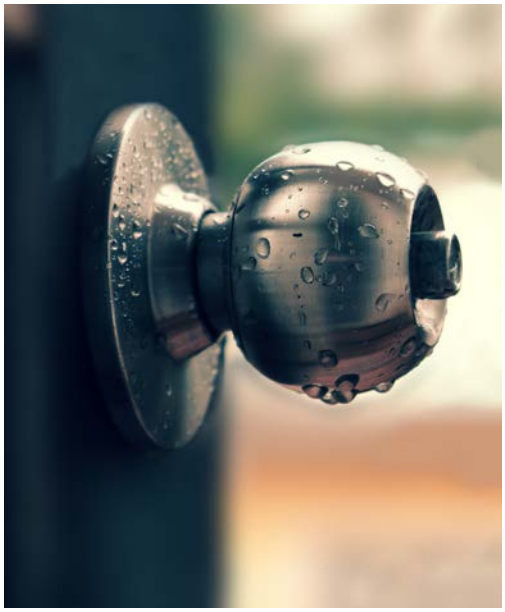
ProVia®
THE PROFESSIONAL WAY

CONDENSATION, HUMIDITY AND DEW POINT TEMPERATURE

WHAT IS CONDENSATION?

Condensation generally occurs inside the home when it is extremely cold outside and the humidity level inside the home is at a higher level than recommended. When it gets extremely cold outside, the humidity level inside needs to be reduced accordingly to avoid condensation.

Condensation typically occurs on cooler surfaces inside the home, such as astragals, hinges, hardware and glass. These surfaces are cooler because they are closer to the outside than a wall or table, and excess moisture condensates on these surfaces. The moisture in the air is defined as humidity.



WHERE IS THE WATER COMING FROM?

An important fact to remember is the surface where condensation has formed is not obtaining water from outside the home, nor is it making its own moisture, rather it comes from the environment inside the home. The higher the humidity percentage inside the home, the quicker a cooler surface will begin to condensate.

Air temperature, combined with humidity level, defines a temperature at which condensation will form. This is called the **Dew Point Temperature**. If condensation is forming, then the humidity percentage must be reduced so the resulting **Dew Point Temperature** is below the temperature of the cooler surfaces.

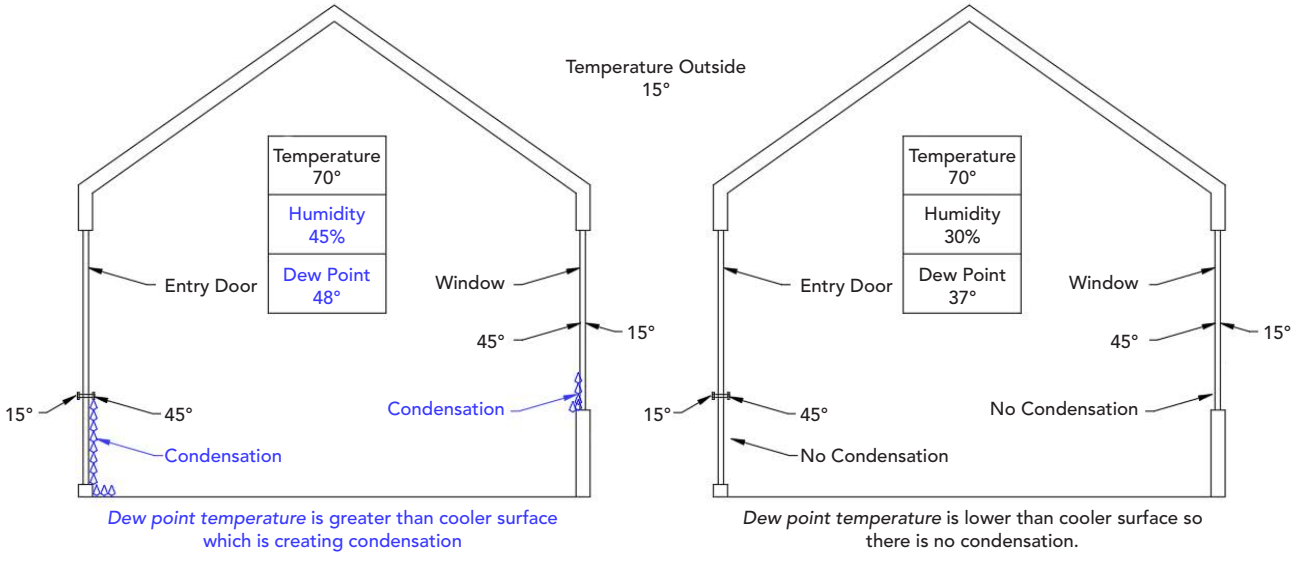
UNDERSTANDING DEW POINT TEMPERATURE IMPACT

For instance, if the air inside is **70° F** with **45% humidity,** then any surfaces cooler than **48° F** (calculated) will condensate. If it's **15° F outside**, then inside surfaces such as hinges or hardware, would be approximately 30 degrees warmer, or about **45° F**. In this example, the 45° part temperature is below the **48° F** temperature where condensation will happen, and condensation will form. **If the humidity percentage is lowered to 30%, then the part temperature would need to be around 37° F (calculated dew point temperature) to condensate**.

Think about a glass of ice water with condensation on the outside.

Why is there moisture on the outside of the cold glass, yet the glass is not leaking?

This is because the air next to the cold glass has cooled to the **Dew Point Temperature** and the air cannot hold any more moisture which will cause condensation to form on the outside surface of the glass.



Dew point temperature is greater than cooler surface which is creating condensation

Dew point temperature is lower than cooler surface so there is no condensation.

**All degrees are in Fahrenheit*

WHAT CAUSES MOISTURE IN THE HOME?

Moisture in the home can be caused by people taking showers, cooking food, doing laundry, or when a large group of people are in a room together. With closed curtains where air movement is restricted, the air closest to the window remains cool and can also condensate. Elevated moisture levels can also lead to mold and rot in unseen areas of the home.

Reducing the humidity percentage inside the home when it's cold outside usually solves the problem. A higher humidity may not cause an issue when outside air temperatures are 30° and higher, but when the outside temperatures drop below freezing to near zero while maintaining the same inside level of humidity, condensation will be an issue. Differences in inside and outside air temperatures, combined with different humidity levels inside will determine when condensation occurs. If moisture is collecting on the inside glass, hinges, etc, identify and reduce the cause of the excess moisture in the air.

An example of elevated humidity is a fogged mirror in a bathroom after someone takes a shower. The air is in an enclosed space and is saturated with moisture from the shower and then lays on adjacent surfaces that are cooler. Once the door is opened, the excess moisture will mix with dryer air outside and the condensation will go away.

This *Humidity Selector Chart* shows required humidity levels to eliminate condensation. **These are only estimates and factors such as airflow, insulation value, etc. can change the point at which condensation begins to form.**

	Inside Temperature (F)				
Outside Temperature (F)		60°	65°	70°	75°
	0°	20%	17%	14%	12%
	5°	25%	21%	18%	15%
	10°	32%	27%	22%	19%
	15°	39%	33%	28%	23%
	20°	48%	40%	34%	28%
	25°	58%	48%	41%	34%
	30°	70%	58%	49%	41%
	35°	84%	70%	59%	50%

WHAT CAUSES EXTERIOR CONDENSATION?

- Exterior condensation occurs when the dew point temperature is approaching the outside air temperature.
- Water vapor forms droplets on grass, cars, roofs/siding, and window glass.
- The air is saturated and cannot hold any more moisture.

WHY DIDN'T THIS HAPPEN ON MY OLD WINDOWS?

Older less energy-efficient windows allowed warmth from inside the home to reach the outside glass pane, which warmed the exterior glass and then dissipated the moisture on it. This is a side effect with older windows that you didn't know you had.

Newer, more energy-efficient windows will not allow as much warmth from the inside to reach the outside glass pane, therefore the pane will be cooler, and it cannot dissipate the exterior condensation.

The new window insulated glass unit is acting like an insulated wall where the warmth stays to the inside, which is what you want in the new windows.

Moisture also forms on other exterior surfaces, such as siding, and the new energy efficient insulated glass unit is acting in the same manner.

Moisture on the outside pane of glass is normal and the new windows are functioning correctly. The condensation will dissipate when the outside air temperature rises.

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