NATIONAL GLASS
DISTRIBUTION

CONDENSATION
ON GLAZED PRODUCTS

What is condensation?

Condensation is the process where water vapor becomes liquid. It is the reverse of evaporation, where liquid water becomes a vapor. Condensation happens in one of two ways: Either the air is cooled to its dew point or it becomes so saturated with water vapor that it cannot hold any more water. Dew point is the temperature at which condensation happens. (Dew is simply condensed water in the atmosphere.) Air temperatures can reach or fall below the dew point naturally, as they often do at night. That's why lawns, cars, and house windows are often coated with water droplets in the morning.

Generally, condensation appears on surface as a light coating of water droplets, frost or ice in severe cases, where the surface temperature is less than its dew point temperature. Condensation will form when moist warm air comes into contact with a cold surface. For example, glass with a surface temperature of 12 degrees Celsius and the dew point temperature of that glass type is 15 degrees Celsius, condensation will form on the glass surface. The dew point temperature is directly related to the amount of moisture in the air, i.e relative humidity, as well as the ambient temperature in the room. As the humidity in a room increases, so will the dew point, which means the window surface is more likely to exhibit condensation in high humidity areas.

Where the relative humidity levels are close to 100%, i.e certain times in bathrooms or kitchens, it would be very difficult to prevent condensation forming on glass or any other surface. In very low relative humidity areas, the risk of condensation occurring is virtually non-existent.

Reducing the frequency of condensation

To reduce the risk of condensation, the window temperature must be higher than the dew point and can be achieved by reducing heat transfer through the glass, thus reducing the u-value of the fenestration. Products with a high u-Value, will have a greater risk of condensation. Both the frame and glass will need to be thermally efficient.

Glass:

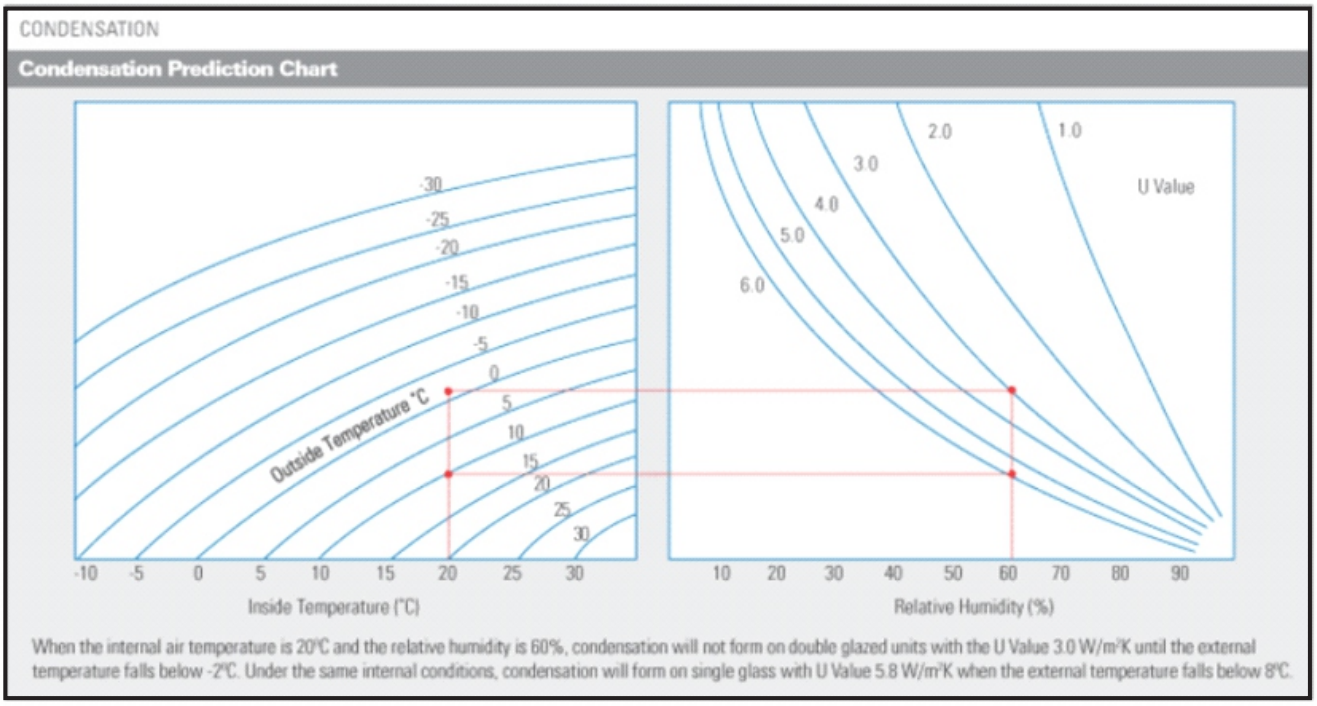
Switching the glass make-up from single glazed to a low E or double-glazed product, will greatly reduce the risk of condensation forming on the glass. Argon gas filled units might be required in extreme climatic conditions.

Frame:

Changing from highly conductive materials to thermally broken aluminium, uPVC or timber frames will also reduce the risk of condensation forming on the glass edges or framework.

Condensation Prediction Chart

The condensation predication chart below will give a general guideline of when condensation could occur.



To do a risk assessment we need to know at least 3 of the 4 values listed below to determine the unknown value

- Inside Temperature (ambient air temp inside the room)
- Outside Temperature
- Relative humidity of the air inside a room (for air-conditioned rooms, assume a max of 50%)
- U-Value of complete fenestration of both frame and glass (for frameless enclosure – only use glass value)

Example 1:

Inside Temperature: 20oC
Outside Temperature: Unknown
Relative Humidity: 60%
U-value: 3.0 W/m2K

Example 2:

Inside Temperature: 20oC
Outside Temperature: Unknown
Relative Humidity: 60%
U-value: 5.8 W/m2K

In **example 1**, when the internal air temperature and the relative humidity is 60%, condensation will not form on product with a U-value of 3.0 W/m2K until the external temperature falls below -2oC. In **example 2**, condensation will form at around 80C where the U-value of the fenestration is 5.8 W/m2K

For risk assessments on Eagle Aluminium Products, please use our Eagle Aluminium Simulated U-values which are available for download from our technical documents on our customer portal or WIKI. For any other Aluminium manufacturer's products, please use SANS 10400 XA or SANS 204 table 6 values.

Where the client is only worried about the glass, i.e Frameless or wine cellars as an example, please use the centre of glass values which are available in our glass brochure.