

Condensation and Low Emissivity Glass

Condensation will form on any surface as soon as the surface temperature falls below the dew point of the air. External condensation will only occur on cloud free nights, when there is little or no wind, and usually when a 'warm front' follows a cold dry spell.

As gardeners know, the air temperature in their garden can vary on any day or night from one part of the garden to another. A hedge, a shrub, an open flowerbed or a projecting wall or garage can all affect the air temperature in their close proximity.

It is a combination of weather conditions and local microclimate, which can contribute to the formation of external condensation. On occasions and as a result of the local conditions it is possible to see clear and condensed windows in the same home.

However, as would be expected, the formation of external condensation on glazing is also affected by the thermal insulation performance of the glass.

The thermal insulation provided by single glazing is very poor and heat from the home passes through the glass and escapes to the outside world.

As a result of this the external surface of a single glazed window is warmer than the dew point of the outside air and this prohibits the formation of condensation on the glass.

With ordinary double-glazing the level of insulation is improved. However, sufficient heat still escapes through the glass to warm the external pane and prohibit the formation of condensation.

Low emissivity glass works differently to ordinary glass. The low emissivity coating reflects heat back into the room, and as a result, the amount of heat passing through the glazing is greatly reduced.

The external pane of a double-glazing unit containing low emissivity glass is only slightly warmed up by escaping heat and therefore presents a colder surface to the outside environment. Triple glazing provides a further improvement in thermal insulation, resulting in an outer pane that is almost not affected at all by heat passing through the glazing; the outer surface is colder than that of a double glazing unit.

When the glass surface temperature is lower than the dew point of air and conditions are comparable to those mentioned earlier, condensation could form on the external glass surface. Where triple glazing is installed the condensation may occur more often and take slightly longer to clear.

Unfortunately, it is not possible to quantify the number of occasions when external condensation will occur, because nobody can predict the coincidence of still air and clear night skies. However, it will be a relatively rare and transient occurrence.

The occurrence of condensation may be disconcerting to the home owner; however it is temporary and proves the increased efficiency of the glass in keeping heat inside the home, and will have the benefit of reducing heating bills.

The rate of formation and appearance of the condensation can vary across the surface if there are materials present on the glass surface. This variation may be random, but may also show up as distinctive patterns. The most common contamination is from finger marks or dirt, but any contamination that creates a water-repellent surface layer, such as grease, glazing compound, suction cups used in handling, protective transport pads, excessive cleaning creams, packaging materials etc., some of which can form chemical links with the glass surface and make them difficult to remove, may produce these effects.

The surface contamination that causes these effects results from a very thin layer of material, usually transparent, which in normal dry conditions may not be detectable when viewed normally. The glass may appear to be scrupulously clean, but will show marks when condensation is present.

These variations in appearance under condensation conditions do not indicate any fault in the glass. The surface contamination has no effect on any mechanical or physical property of the glass, other than its appearance under these abnormal conditions.

The appearance of glass and insulating glazing units should only be assessed under normal viewing conditions as specified by a recognised viewing standard.