

# Preventing condensation

## Condensation and how to prevent it

Condensation, the formation of water on cold surfaces, is not unusual on panes of glass - but highly undesirable, especially in living spaces. It is therefore advisable to avoid condensation, which can be achieved using various factors. Knowing how condensate is formed and how it can be prevented through proper ventilation and heating is extremely important when opting for large-format window fronts with narrow profiles.

### How is condensate formed?

Every room contains a certain amount of invisible water vapour. This depends on the respective air temperature. The warmer the air, the more water vapour it holds:

1 m <sup>3</sup> air at	30°C	contains	30 g water vapour
1 m <sup>3</sup> air at	20°C	contains	17 g water vapour
1 m <sup>3</sup> air at	5°C	contains	5 g water vapour

Air cools as it comes into contact with the surfaces of cold objects, so that it can no longer hold as much water vapour. The result is condensate (or dew) on the coldest parts of the surface.

## Types of condensate

Condensate can appear on three different areas of a double-glazed window and does not always have the same effect.

### Condensate inside the room

This mainly forms in the winter months when the inward-facing side of the window reaches a low temperature and air humidity is relatively high. This occurs in unheated or less frequented rooms, such as bedrooms. At night, the room cools down, the air becomes saturated with water vapour from people's breath, and condensate forms on the windowpane.

### Condensation between the panes

This form of condensate can always be traced back to a damaged edge seal. It can be eliminated by repairing the window.

### Condensate outside the room

Condensate on the outside of the double glazing primarily occurs on highly insulating windowpanes in the early morning hours during the autumn. The glass reflects most of the room heat, so that the outer pane barely warms up at all. Depending on the weather, the surface temperature of the outer pane can fall below the dew point of the surrounding air.



## Why condensation should be avoided

Condensate often forms on cold windows during the winter, but can also form while cooking or showering. In small quantities, this condensate is not a problem - but if moisture occurs on a regular or ongoing basis, it can cause mould. What's more, it is likely to result in damage to the components of the window or on the surrounding facade.

Due to their structure, window systems with extremely large glass surfaces - which offer panels with extremely narrow profiles and minimal sight lines - often have different insulation values than windows with a solid frame construction. Cooling of the surfaces on the inner side of the window is a physical limitation of such systems and can lead to condensation, especially during cooler times of the year.

## Thorough ventilation

To prevent condensation on glass panes and window frames, the humid indoor air must be adequately and regularly exchanged. Ventilating in short bursts by opening a window (intermittent ventilation) can provide relief, provided the seasonal climate and any environmental influences are taken into account in the duration and intensity of the ventilation.

It is therefore worth adjusting your ventilation habits in high-moisture areas, such as the bathroom, bedroom or kitchen, as needed.

Cross ventilation is highly advisable in these areas, to ensure high air circulation. Modern, well-insulated buildings often use a ventilation system to automatically ensure a consistent, controlled exchange of air.

Certain rooms with special requirements, such as pool areas or saunas, often have a consistently high humidity, depending on the climate. In this case, frequent ventilation cannot fully prevent condensation.





## Proper heating

Adjusted heating habits are yet another factor that can help prevent condensation. Especially in the winter, living spaces must be adequately heated, as they are affected by freezing temperatures and regular ventilation. When doing so, it is not only the heating temperature that plays a role, but the position of the heat source within the room.

With large window surfaces or glass fronts, the heated air must reach as far as the window/door element. Underfloor heating or floor convectors are especially well-suited for this purpose. It is important to take into account whether underfloor heating alone can generate the necessary air circulation to achieve the desired surface temperature on the glass and window profiles.

In certain cases, a combination of underfloor heating and radiators or underfloor convectors may be advisable in front of the facade element. The required heat output must be determined individually by a specialist company according to the structural requirements, and implemented accordingly.

## Unobstructed heated air

Unobstructed heat transfer is essential to ensuring the effective use of heated air.

Internal shades, curtains, drapes, blinds and shutters, as well as glass balustrades or furniture, can impair the necessary circulation of warm air. It is therefore preferable to implement external systems for the provision of sun protection and privacy.

Coordinated components create a pleasant climate in the room

Coordinated heat insulation, heating and air circulation, combined with appropriate ventilation habits are indispensable to achieving and maintaining a pleasant and healthy climate in the room. A consistent room temperature helps to avoid condensation, while saving on heating costs.



