

U-value

The heat transfer coefficient or U-value of an insulating glass unit is used as a measure of thermal performance. It is a number value that indicates the rate of heat transfer from inside to the outside.

The U-values of IGUs are affected by outdoor temperatures and the slope of the roof. Therefore, any measurements for comparison should be made in identical conditions. EN 673 specifies that U-value calculations be performed in conditions where the temperature in the space between the panes is 10 degrees and the temperature difference between the surfaces of the panes is 15 degrees. U-values are dependent on the temperature difference. As the temperature difference increases, the U-value of a double-pane IGU with spectrally selective glazing degrades more than that of a triple-pane unit.

The lower the U-value, the lower the heating costs. However, lower U-values of glazed units do not just save you money on heating – they also create a more comfortable indoor climate.

When indoor air comes into contact with cool glass surfaces, the air cools and becomes denser. Cool air is heavier than warm air and sinks downward. Movements of such air masses that are faster than 0.15 m/s create an unpleasant feeling of draft. Thus, a low U-value can help reduce air mass movements and increase comfort near windows.

In order to prevent the feeling of draft near windows at an indoor temperature of 22 °C, the temperature of the inner pane should be 14 degrees.

A surface temperature of 14 degrees for the inner pane can be achieved:

with single glazing when the outdoor temperature is +10 °C;
with double glazing with clear float glass when the outdoor

temperature is +2 °C;

with triple glazing when the outdoor temperature is -5 °C;

with double glazing with spectrally selective glass when the outdoor temperature is -15 °C;

with triple glazing with spectrally selective glass when the outdoor temperature is -26 °C.

Hence, the surface temperature of the inner pane depends on both the indoor and outdoor temperature, which is to some extent also affected by the wind speed.

A one-degree change in the indoor temperature results in a 5% difference in the annual heat consumption of a residence.