

Construction physics

The thermal requirements for buildings are largely determined by the characteristics of the components from which they are built. The combination of the patented air-lux profile technology with multi-glazing and the patented pneumatic air-lux sealing system ensures highly effective thermal insulation and optimum warmth yield. The air-lux system already fulfils the energy standards of tomorrow and is ideally suited to sustainable and modern construction.

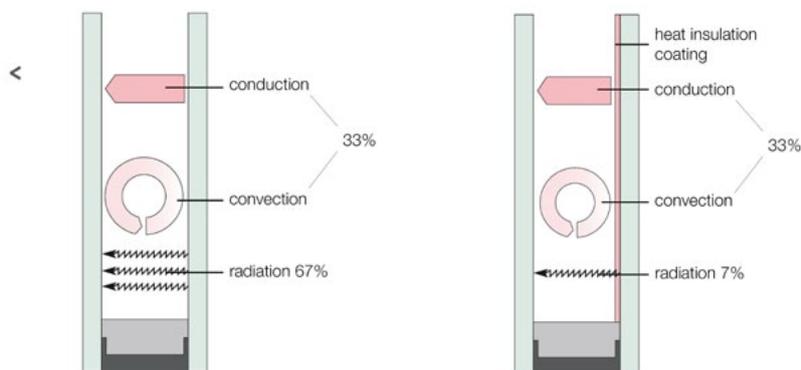


Minergie standard or higher guaranteed with air-lux

The Minergie standard or higher is the state-of-the-art at air-lux – large-surface sliding windows by air-lux are highly efficient thermal insulating components perfectly suited both to environmental and economic purposes.

Thermal insulation

U parameter, heat permeability



*Energy transport insulating glass;
without thermal coating*

*Energy transport insulating glass;
with thermal coating*

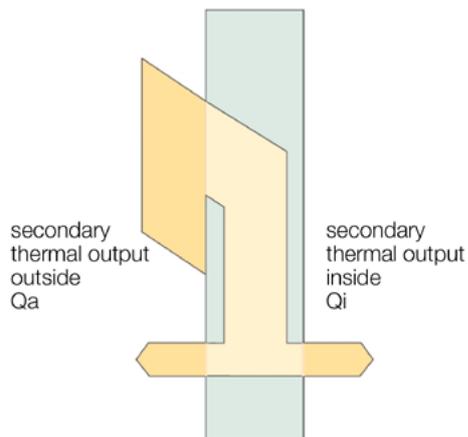
The U parameter (heat permeability coefficient W/m^2K) is the unit of measurement for determining heat loss. It expresses the amount of energy that transfers through a $1m^2$ area of a component per time unit if the air temperatures on either side differ. The lower the U parameter, the higher the thermal insulating effect. The U parameter is therefore a means of measuring the thermal insulating capability of an enclosing construction.

The energy from the air in the room is transmitted to the inner pane. This causes the room-side pane of the insulating glass to heat up. The energy exchange occurs primarily as a result of long-wave infrared radiation. To this is added the heat conductivity and minimal convection in the space between the panes, which transports the energy from the inner to the outer pane. These three mechanisms cause the outer pane to heat up, which then transmits the heat to the outside air through conductivity, radiation and convection.

Properties of insulating glass with functional layers:

- Lower energy costs through high thermal insulation (U parameter)
- Maximum light transmission for brightly lit rooms and a pleasant ambience
- Optimal utilisation of solar energy through various sunlight protection coatings (g parameter)
- Depending on the climate control concept for a building, different U and g parameters can be combined
- Heat and sunlight protection coatings can be combined with safety and noise insulating functions
- Ideal for passive and low-energy houses

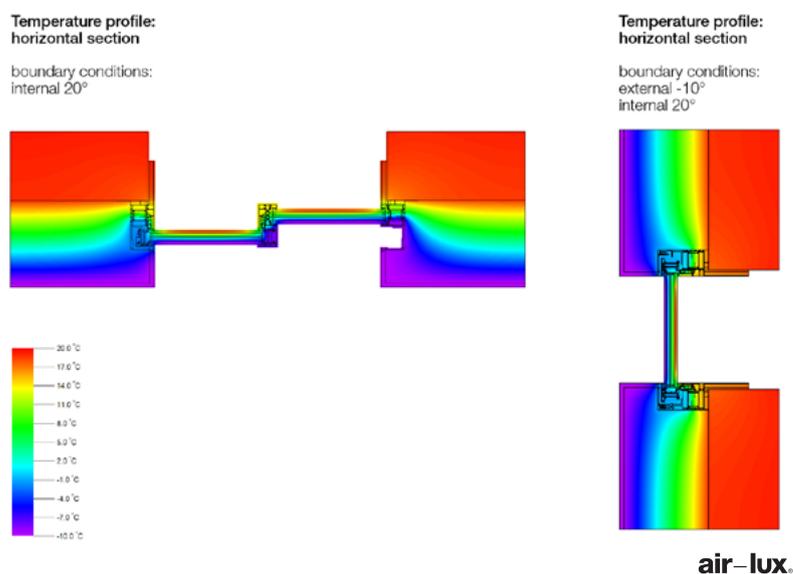
g parameter, heat exploitation



Overall heat permeability

The overall heat permeability (g parameter in %) specifies how much energy from the sunlight reaches the room space through the glazing. The parameter is composed of two parts: the direct radiation transmission and the secondary heat release. The secondary heat release occurs because the glass heats up due to the solar radiation and discharges heat in both directions. The higher the g parameter, the more solar radiation is transmitted to the interior room space through the glazing.

Thermal separation with the air-lux window system



Isotherms (interior temperature 20°C, exterior temperature -10°C)

When planning large windows and façade constructions, the key to achieving the desired insulating effect is to avoid heat bridges. An ideal design avoids follow-on effects such as condensation, mould, reduced thermal insulation or long-term damage to the structure itself. With the air-lux system, thermal separation is ensured through the sophisticated system technology. The technology consists of a multi-shell frame profile with interior and exterior aluminium profiles as well as a centre profile made of a special plastic as an insulator. The exterior sliding casement profile is comprised of multiple single profiles made of aluminium and high-grade plastics, which are partially connected by traction. If insulating windows with low U parameters are combined with a highly efficient thermal insulating frame edging and the patented air-lux pneumatic sealing system, very low U parameters surpassing the Minergie standard can be achieved.

Resistance to wind pressure (EN 12210) class C4 / B4

With static and dynamic wind pressure, the deforming effects of wind forces on the window elements are tested. A permanent deformation would create massive functional disadvantages. air-lux achieves very high values in these tests, and air-lux sliding casement windows are designed for the most demanding conditions. This demonstrates once again how important the proper profile structure dimensions are – air-lux is committed to an uncompromising balance between aesthetics and functionality.

Air permeability (EN 12207) class 4

For a window system, air permeability is a key factor measured in terms of suction and blowing effects. Demonstrable losses in the impermeability are associated with compromised comfort and energy losses. Thanks to its patented pneumatic seal principle, air-lux is 100% impermeable and achieves the highest class (4).

Driving rain impermeability (EN12208) class E1500

This parameter describes impermeability to rain that is blown out of its vertical trajectory by strong wind. The result is that the rain drops fall not only on the ground, but can also hit vertical surfaces. Driving rain impermeability is the capacity of the window façade system to resist water leakage when in a closed and locked position under a certain amount of pressure. air-lux is the only sliding window system to achieve top values and the class E1500 for sliding windows up to 18m². This capability is particularly relevant for properties in locations that are unusually exposed to the weather or unique geographical conditions (coastal and mountain regions, or tall buildings).

Noise insulation (EN 14351-1)

The basis for noise insulation is noise reflection, i.e. deflecting the airborne sound energy (e.g. exterior noise). In window construction, noise protection can be defined in a targeted fashion using special insulating glasses (thicker glass, asymmetrical structure or the use of laminated glass). But although the surface area of the windows on the exterior of a building can be very high, the noise insulation effect is not determined by the insulating glass alone. The frame, fittings and the seal between the frame and the casement, as well as the connection to the structure, must be designed with this purpose in mind. air-lux also impresses in this field: For the finished façade construction (frame and glass), noise insulation values up to 43dB can be achieved.

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