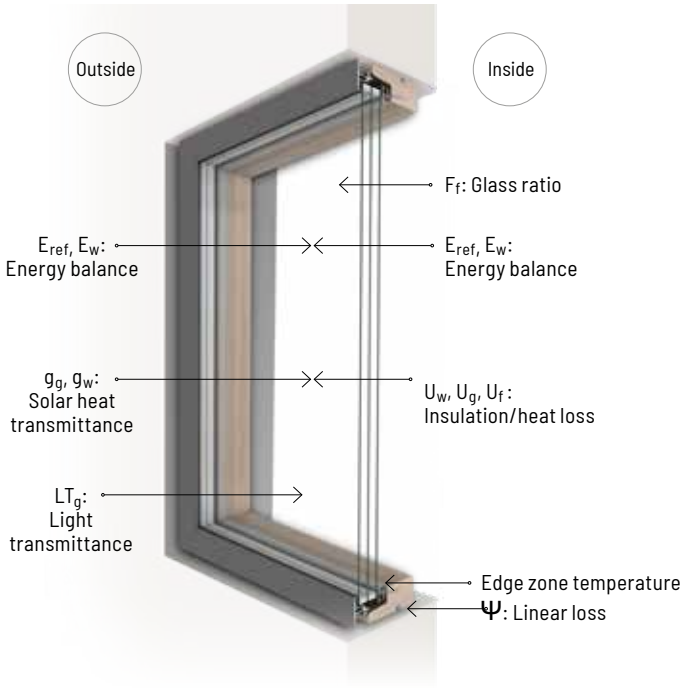
More daylight less heat

We can advise on the ideal strategy to avoid overheating, regardless of fenestration.

Daylight is essential to life – not just to architecture – and plays a fundamental role in our health and wellbeing.

Using glass to control solar gain
The impact of daylight and solar gain can be mitigated by strategic window specification. The number, size and distribution of windows across a building can also be used to control the impact of daylight - to increase light levels for example, or to reduce unwanted heat.

Overleaf we show the impact of different glass types on the energy performance of a project.



A number of values are used to measure the energy performance of a window, as shown here. Arrows indicate whether energy is escaping or entering a building through the window.

Understanding window performance

Glass ratio: The percentage of clear glass in a window unit (F_f). Only glass which allows light transmittance is included in the glass ratio.

Energy balance: The difference between energy gain and loss in a specific window (E_w) compared to a reference window (E_{ref}). Given in kWh/m²/year. A positive energy balance means that more energy is gained than lost through the window.

U-value: A measure of the insulation performance of the whole window (U_w), comprising the glass (U_g) and the window frame (U_f). The U-value is given as W/m²K - the lower the value, the better the insulation.

g-value: The percentage of solar heat transmitted through the window (g_w) or the glass (g_g) and into a building. The higher the g-value, the greater the level of solar gain.

LT-value: The percentage of daylight penetrating a window (LT_g) which affects internal light levels and the need for artificial light.

Edge zone temperature: The surface temperature at the edge of the glass pane, where it meets the frame.

Linear loss Ψ: Energy lost once installed – this can be minimised by ensuring a robust interface detail.

VELFAC®

How glass works

Properties of glazing solutions

Glass is a complex substance with almost limitless variations – but what type of glass can meet all the requirements of an ideal indoor climate? Modern architectural glass comes with a wide range of functions and coatings in order to ensure the ideal flow of energy and light into a room.

Finding the perfect balance
There is no such thing as the perfect pane of glass – instead, glass properties must be carefully balanced so they meet the needs of a specific window and its location.

Our quick performance guide (right) demonstrates the benefits, and compromises, of different glass specifications – for example:

Example 1
To optimise the inflow of daylight specify glass with high light transmittance (LT_g) - but this will also increase solar heat transmittance (g_g).

Example 2
To balance the impact of large windows on thermal indoor climate specify glass with a low solar heat transmittance (g_g) - but this will also reduce daylight transmittance (LT_g) and insulation efficiency (U_g).

Making the right choice
Glass specification also depends on other factors affecting indoor climate, such as acoustic control. Ask our experts for advice on how to tailor glass specification precisely to your project.

› Example 1: Focus on inflow of daylight

Hight light transmittance (LT_g)

	LT_g	g_g	U_g
EClaz/EClaz	0.77	0.60	0.52
Energy Xtra/Energy Xtra	0.74	0.61	0.56
Standard glazing	0.74	0.53	0.53
Standard 1,0 glazing	0.66	0.45	0.50
North glazing (1,0/1,0)	0.57	0.35	0.47

· LT_g-value: The lighter the colour, the higher the light transmittance (0.74 = 74 %)
· g_g-value: The lighter the colour, the higher the solar heat transmittance (0.53 = 53%)
· U_g-value: The lighter the colour, the better the insulating qualities (W/m^2K)

› Example 2: Focus on preventing overheating

Low solar heat transmittance (g_g) balanced against high light transmittance (LT_g)

		g_g	LT_g	U_g
Solar protection glazing	SKN154, solrude	0.26	0.47	0.52
	CL Extreme 61/29, solrude	0.27	0.55	0.52
	CL Extreme 70/33, Sun	0.30	0.63	0.49
	SKN165, Sun	0.32	0.56	0.50
	SKN176, Sun	0.35	0.64	0.50
	North glazing (1,0/1,0)	0.35	0.57	0.47
	Standard 1,0 glazing	0.45	0.66	0.50
	Standard glazing	0.53	0.74	0.53
	EClaz/EClaz	0.60	0.77	0.52
	Energy Xtra/Energy Xtra	0.61	0.74	0.56

· g_g-value: The darker the colour, the lower the solar heat transmittance (0.53 = 53%)
· LT_g-value: The lighter the colour, the higher the light transmittance (0.74 = 74%)
· U_g-value: The lighter the colour, the better the insulating qualities (W/m^2K)

All values are based on 48mm triple glazing. The overall energy performance of the window depends on the external fenestration (appearance and size) and the glass specified. Once the glass is included in the window construction, a complete value for the entire window will be provided in our quotation and order confirmation.