UNIGLAS®

IT'S CLEAR

UNIGLAS® | TOP Pure

Energy-Saving Glass

www.uniglas.net

Perfect home climate and natural light

UNIGLAS® | **TOP Pure**
Energy-Saving Glass

Maximum transparency

Light and heat – two properties synonymous with cosiness and comfort. Particularly on days with fewer hours of sunlight, the demands made on glass as a transparent material are highest. The aim is to get the best possible home comfort with maximum energy efficiency.

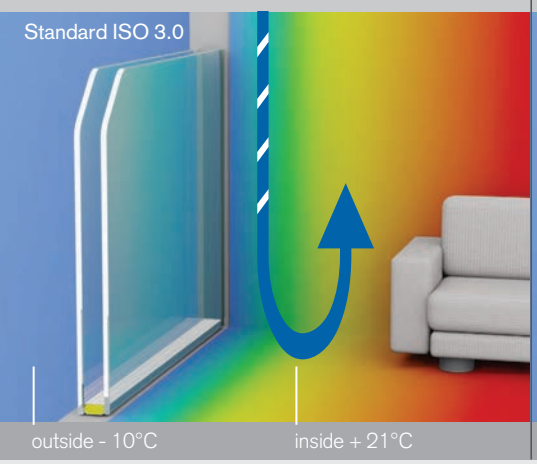
Rising energy costs and increased environmental awareness call for efficient measures to save energy both in the home and at the workplace. UNIGLAS® offers with its UNIGLAS® | TOP product series an outstanding alternative to standard insulation glass units. That's effective environmental protection with a bright future!

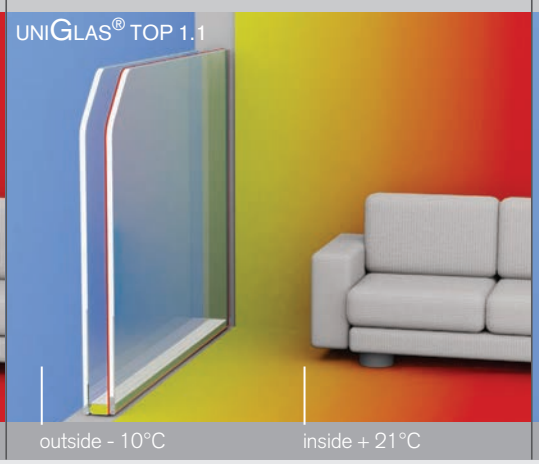
- Excellent thermal insulation
- Outstanding light transmission
- Forward-looking climate protection

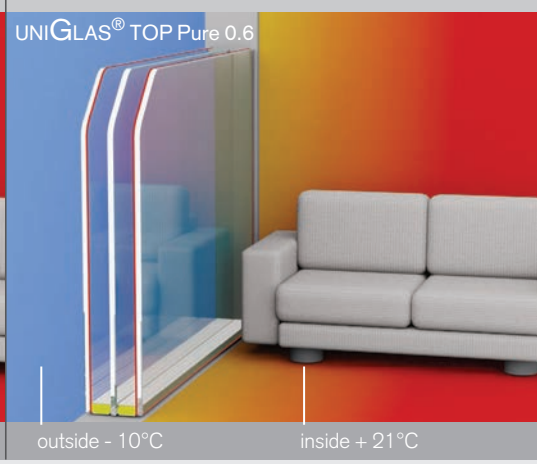
With the new UNIGLAS® | TOP Pure Energy-Saving Glass, UNIGLAS® offers an efficient solution for standard structures to minimize the energy loss.

Maximum light incidence, neutral colour rendering together with heat insulation. With UNIGLAS® | TOP Pure Energy-Saving Glass, high light transmission is assured on gloomier days too. As a double or triple insulating glass, UNIGLAS® | TOP Pure combines high light transmittance, an extremely neutral colour rendering and energy efficiency all at once.

In addition, thermally optimized UNIGLAS® edge connection systems ensure markedly higher temperatures at the glass edge and hence a better room climate.



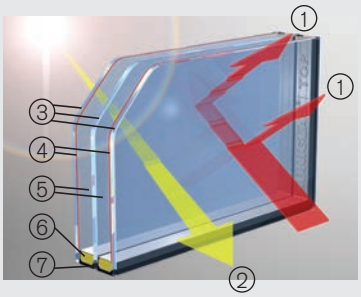




Structure and effect

UNIGLAS® | **TOP Pure**
Energy-Saving Glass

1. Reflexion of heat radiation
2. Total energy transmittance
3. Float glass panes
4. Precious metal coating (positions 2 and 5)
5. Cavity between panes with inert gas filling
6. Spacer with desiccant
7. Two-stage gastight edge connection



Function and Effect

UNIGLAS® | TOP Pure Energy-Saving Glass offers not only a high light transmittance with outstanding colour neutrality, but also an excellent total energy transmittance (g-value). This is assured by the innovative coating technology and by the cavities between the panes of double and triple glazing, which are filled with inert gas and hermetically sealed. The precious metal coating allows the visible light into the room almost unhindered. Infra-red (thermal) radiation by contrast is almost completely reflected.

During their life cycle, the products save considerably more energy than is expended on manufacture, transport, installation and recycling. That gives UNIGLAS® | TOP Pure Energy-Saving Glass a positive sustainability balance.

With UNIGLAS® | TOP Pure Energy-Saving Glass the feeling of comfort also increases in the room, especially near the windows. That's because a higher surface temperature is achieved at the inner window pane when compared with conventional glazing of the aucient type. As a result, the perception of cold air and draughts near windows is considerably reduced.

As triple insulating glass, the new UNIGLAS® | TOP Pure Energy-Saving Glass achieves a very low U-value of 0.6 W/m²K. With a g-value of 53 per-cent, this glass ensures at the same time solar energy gains. The transmission of visible light is, at 74 percent, extremely high.

Table: Comparative values for the component values determining the heat loss

	U	g	S factor			$U_{g,eq}$		
	[W/m²K]	[%]	S	N	O/W	S	N	O/W
Standard insulating glass	3,0	80	2,4	0,95	1,65	1,1	2,2	1,7
UNIGLAS® I TOP Pure 1.1	1,1	64				-0,4	0,5	±0
UNIGLAS® I TOP One 1.0	1,0	53				-0,3	0,5	0,1
UNIGLAS® I TOP Pure 0.6	0,6	53				-0,7	0,1	-0,3
UNIGLAS® I TOP Solar 0.7	0,7	61				-0,8	0,1	-0,3
UNIGLAS® I TOP Pure 0.5	0,5	53				-0,8	±0	-0,4
Outer wall excellent insulation	0,2					0,2	0,2	0,2

Key:
U: Heat transfer coefficient of the component
$U_{g/eq}$: Balance - heat transfer coefficient of the component (equivalent U-value)
g: Total energy transmittance of the component
S: Solar input factor depending on the direction

Example: In a detached house built in 1991, the uncoated double insulating glass (U_g = 3.0 Wm²K) is to be replaced by UNIGLAS® I TOP Pure 0.6 .

Building standard: Low-temperature boiler, regulated pump e_p = 1.74
Window surface proportions for building types constructed 1984-94 according to IWU (Institut für Wohn- und Umwelt GmbH)
South: 12.73 sq.m East/West: 14.84 sq.m North: 2.10 sq.m Total: 29.67 sq.m

Heating degree-day indices according to DIN V 4108-6:2003-06 Tab. A.2.

To achieve approximately the same insulating effect per sq.m of wall surface, the outer wall would have to be additionally lined with about 3 cm of full heat insulation compound.

Hamburg: 3.806 l
Saving per year: 417 l of heating oil ≅ approx. 480 m³ of natural gas
in 30 years: 12,510 l (46,968 kg CO_2)

Freiburg: 3,178 l
Saving per year: 341 l of heating oil ≅ approx. 392 m³ of natural gas
in 30 years: 10,222 (38,398 kg CO_2)

Comparative values for heat loss

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Thermally optimized edge connection systems

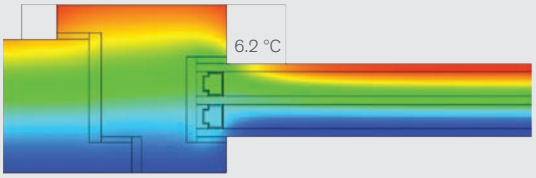
The use of the thermally optimized UNIGLAS® Thermo-Spacers leads to an additional energy saving and to a reduction in condensate formation at the window, and so plays a big part in increasing the living quality.

The thermally improved edge connection reduces heat losses at the transitional area from the glass to the window frame. As a result, condensate only forms in the edge area at considerably lower outside temperatures or with considerably higher room humidity. The risk of mould is greatly reduced as a result.

Advantages:

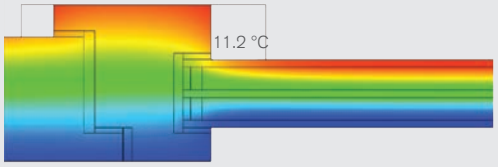
- thanks to a higher surface temperature in the edge area of the inside pane (warm edge), valuable heat remains in the room
- minimization of the risk of damaging dew water on the pane surface and of mould which could be harmful to health
- more favourable isotherm curve in the window and in the facade, due to thermal separation in the edge connection of the glazing
- About 10 percent better values for heat transfer coefficient of the window (U_w value)
- lower heating energy losses
- thermally optimized sash bar systems available as complete solutions for any window

Calculated heat transfer coefficient
U_w = 1.1 W/(m²K)



Frame:	Wood 1.4	U_f:	1.40 W/(m²K)
Spacer:	Aluminium (EN ISO 10077-2)	ψ:	0.086 W/(mK)
Glass:	UNIGLAS® I TOP Pure 0.6	U_g:	0.60 W/(m²K)
Window width	1.23 m	Glass thickness inside	4 mm
Window height	1.48 m	Glass thickness outside	4 mm
Frame width	0.12 m	PSI correction	+ 0.000 W/(mK)
		ψ:	0.086 W/(mK)
Window type:	Single-wing window		
Sash bars:	None		

Calculated heat transfer coefficient
U_w = 1.0 W/(m²K)



Frame:	Wood 1.4	U_f:	1.40 W/(m²K)
Spacer:	UNIGLAS® I thermo plastic system	ψ:	0.037 W/(mK)
Glass:	UNIGLAS® I TOP Pure 0.6	U_g:	0.60 W/(m²K)
Window width	1.23 m	Glass thickness inside	4 mm
Window height	1.48 m	Glass thickness outside	4 mm
Frame width	0.12 m	PSI correction	+ 0.000 W/(mK)
		ψ:	0.037 W/(mK)
Window type:	Single-wing window		
Sash bars:	None		

The results presented here are the outcome of calculations on the basis of specifications made with reference to currently valid standards. With these calculations, the actual conditions at the building can be presented only in approximate form. The results are therefore intended only as a guideline and for comparison of different products. No legal claims can therefore be derived from these calculations.

Comparison of window heat transfer coefficients (EN ISO 10077-1)

Spacers in an overview

For manufacturing spacers, there are various materials with which an improved thermal separation of the individual panes can be achieved in the insulating glass edge connection, such as:

- Thermo Spacer UNIGLAS® TS Thermo Spacer

The classic for „warm edges“. The highly thermally conductive material, aluminium, of the hollow section is replaced here by special steel or plastic. Special steel has a considerably lower thermal conductivity and is produced in substantially lower wall thicknesses thanks to its higher strength values.

- Flexible system UNIGLAS® STAR FLS Flexibler Abstandhalter

This flexible spacer system consists of breathable structural foam with integrated desiccant and contains a multi-layer vapour barrier.

- Thermoplastic system UNIGLAS® STAR TPS Thermoplastischer Abstandhalter

Here the conventional profile is replaced by a hot-extruded, special plastic compound with integrated desiccant which is inserted between the panes during production.

Thanks to the use of thermally optimized UNIGLAS® spacers, the U-value of your window is improved and dew water formation is reduced.

Sinking energy costs with UNIGLAS® | TOP Pure

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Modern building

The heating energy required in older buildings is 3 to 4 times higher than in new buildings. This means that future energy consumption is a crucial aspect during renovation work. Furthermore, various funding programs like KfW's CO_2 building refurbishment program* keep costs low in addition to saving on energy costs.

Windows with triple insulation glass were used in the past above all in low-energy and passive-energy houses. Thanks to their outstanding energy and light values, windows with triple glazing are now standard for new buildings too. For example, a window glazed with UNIGLAS® | TOP Pure 0.6 has energy characteristics which are at least as good as well-insulated brickwork.

The g-value ensures outstanding solar heat gains particularly when the winter sun is low in the sky. Overall, the solar gains on the southern, eastern and western faces are even more than the loss of heat via the glazing. Even on the northern face, a balanced U-value of only 0.1 W/m^2K is achieved.

To do that, of course, the whole system must be just right: thermally optimized edge connection systems, frame structures and fittings matched to the function and to the material, and carefully designed and constructed connection details, particularly in roller shutter boxes, are all part of that. This allows rising energy costs to be handled with more peace of mind.

*only in Germany (www.kfw.de)

The heat transfer coefficient U [W/m²K] indicates the heat energy per unit of time that passes through 1 m² of a component for each K of temperature difference. The lower the U-value, the higher the thermal insulation.

The total energy transmittance (g-value) is a quantity that can only be usefully obtained when glass is the building material. It indicates the percentage of the solar radiation acting on the glazing that passes through the glass into the interior, including the secondary heat radiation which the glazing emits to the interior as a result of absorbed solar energy.

With the equivalent heat transfer coefficient ($U_{g,eq}$) UNIGLAS® indicates the heat quantity gained or lost through the glass on a yearly average, $U_{g,eq} = U_g - S \times g$ (S factor = direction).

The light transmittance (τ_v) is the percentage of visible light (wavelength from 380 to 780 nm) passing through a glass, relative to the brightness sensitivity of the human eye.

The light reflectance (ϱ_v) by contrast indicates what proportion (in percent) of the visible light is reflected from the glass surfaces.

The ψ value (Psi value) describes a thermal bridge as a length-related or linear heat transfer coefficient. In the window, the heat transfer at the glass edge is understood mainly from the interaction of window frame, insulating glazing and spacer. The ψ value [W/m²K] indicates the heat energy per unit of time that passes through 1 m of a component connection for each K of temperature difference.

Frequently asked questions

Why can my new energy-saving glass mist up from the outside?

During nights with high humidity, condensate will form on the outsides of components more frequently the better its thermal insulation. Due to the excellent U_g value of modern thermal insulating glass, its heat transmittance is very low. This means that heat stays inside the room, and hardly any of it passes to the outside. Due to the radiation of heat into the coldes night sky, the surface temperature of the outer pane can cool down in clear, cold and windless nights to less than the temperature of the outside air. With correspondingly high relative humidity, the dew point on the glass pane is not reached, and so condensate forms on the pane surface. This condensate disappears as soon as the glass surface gets warmer again, for example due to sunlight.

Do I have to remember anything for ventilation?

If you fit new windows, you also improve the airtightness of the building shell. However, the moisture that builds up in any room no longer escapes to the outside through the old and less-tight windows. For the building owner, that means regular airing periods are needed after renovation.

What am I contributing to environmental protection by installing UNIGLAS® | TOP windows?

In Germany, hundreds of millions of litres of heating oil or cubic meters of natural gas are wasted every year. For the environment, that means extremely high emissions of carbon dioxide, which heat up the earth‘s atmosphere and impact our climate. By fitting UNIGLAS® | TOP Pure windows, heating costs are reduced, helping to protect our environment.

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Our proximity: your advantage

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