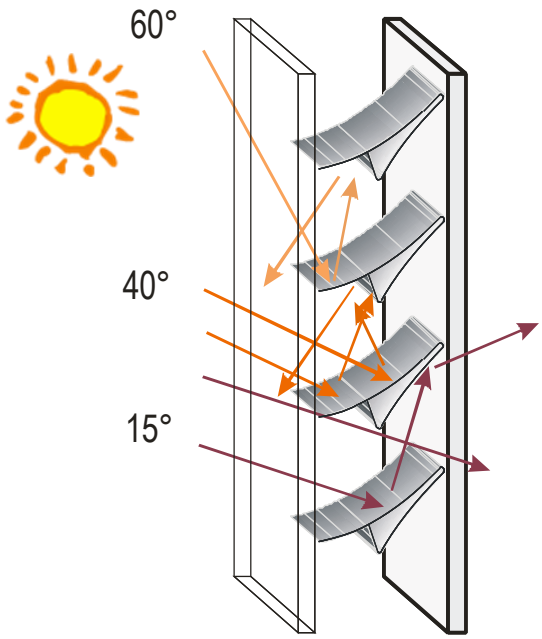
INFOTEXT

.LIGHT LOVES GLASS

OKA*SOLAR* W

Glazing with Integral Sun Control Louvres

OKA*SOLAR* W is an insulating glass with fixed louvres in the cavity between the glass panes. OKA*SOLAR* W enables both the use of daylight as well as an effective solar protection, and has been optimised for use in the façade. For roof glazing, we recommend our product OKA*SOLAR* S.



With its three-dimensionally shaped, highly reflective profile, OKA*SOLAR* W offers:

- Efficient directionally selective solar control
- Directionally selective light transmission
- Partial through-vision
- Can be easily recycled
- Visibility for birds

Physical properties

Thermal insulation

OKA*SOLAR* W is available as a 2-pane make-up with a space between the panes of 22 mm, and also as a 3-pane make-up with an additional space between the panes.
Depending on the gas filling and coating, the 2-pane make-up achieves U_g values ≥ 1.0 W/(m²K). As a 3-pane make-up, U_g values ≥ 0.6 W/(m²K) are possible.

Sound insulation

The integrated louvres have no significant effect on the sound insulation. The achievable values depend on the glass assembly.

Spectral properties

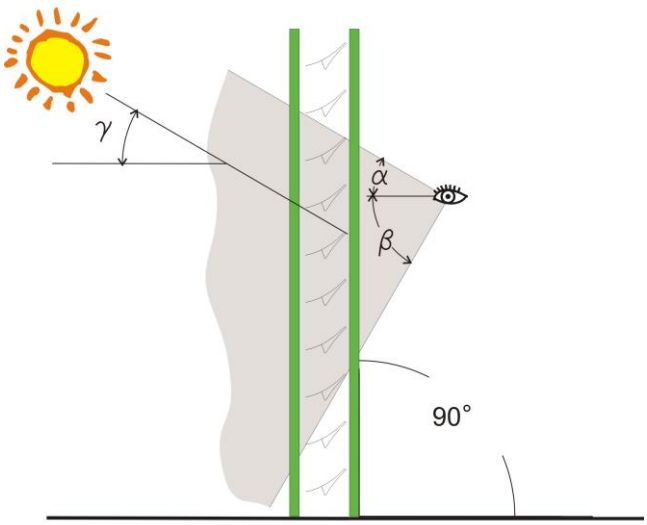
The function of OKA*SOLAR* W depends on the current radiation conditions. Partial through-vision is always given, despite the solar protection which differs depending on the season and time of day.

Integrated in a vertical façade, OKA*SOLAR* W functions as follows:

1. direct irradiation from high and medium solar altitude
   - thermal solar protection with total solar energy transmittance values of as low as ≥ 11%, in particular secondary heat transfer without solar radiation transmission
   - glare protection

2. direct irradiation from low solar altitude
   - partial transmission of the direct sunlight
   - solar yields on south-facing façades
   - partial light deflection upwards in the direction of the ceiling

3.diffused irradiation (overcast sky)
   - preferred light transmission flat in every part of the room



Technical values of standard types

The types W 50/17, W 55/17 and W 60/17 have been optimised for vertical façades. Other geometries can be developed as an option.

The following information applies to 2-pane make-up consisting of one 6 mm thick external pane with a functional coating at face #2 and an inner pane of 6 mm.

Table 1: Geometry of the different OKA*SOLAR* W types

Type OKA*SOLAR*	Angle of louvre [°]	Distance of louvre [mm]	Horizontal through-vision %	Through-vision to above α [°]	Through-vision to lower β [°]	Lock out angle γ [°]
W 50/17	50	17	38	25	64	25
W 55/17	55	17	41	28	62	28
W 60/17	60	17	45	30	60	30

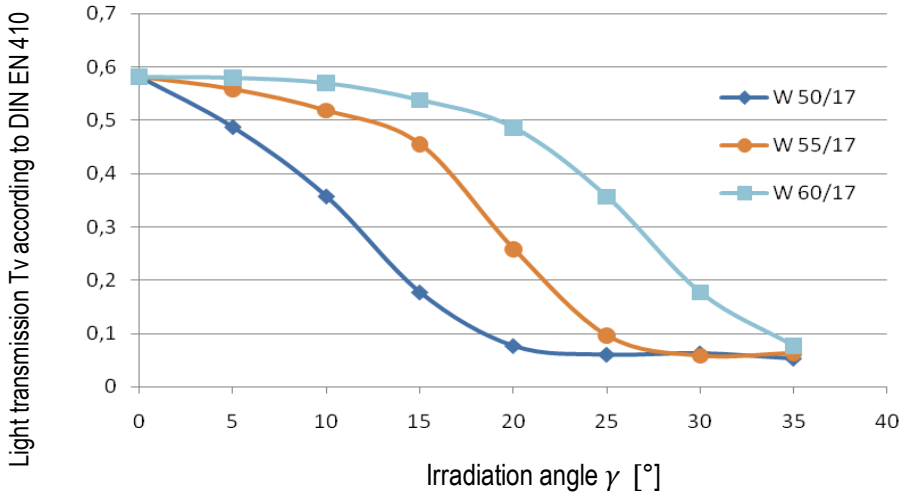


Figure 1: Angle-selection light transmission T_v of the different OKA*SOLAR* W types in the 2-pane structure with thermal protection coating

Table 2: Technical values for the 2-pane make-up with low-e coating as well as solar control coating 70/35 T

Type	Functional coating	T_v % min. 1)	T_v % max. 2)	TSET % min. 1)	TSET % max. 2)	U_g value [W/(m²K)] / U_g [Btu/(hr ft² °F)] cavity 22 mm		
						Krypton	Argon	Air
OKA*SOLAR* W	low-e	5	59	18	49	**1.1** / 0.19	**1.5** / 0.26	**1.9** / 0.33
OKA*SOLAR* W	solar	4	51	12	33	**1.0** / 0.18	**1.4** / 0.25	**1.8** / 0.32

The following information applies to 3-pane make-up consisting of a 6 mm external pane with a functional coating at face #2, a 6 mm middle pane and a 6 mm inner pane with a thermal protection coating at face #5.

Table 3: Technical values for the 3-pane make-up with low-e coating as well as solar control coating 70/35 T

Type	Functional coating	T_v % min. 1)	T_v % max. 2)	TSET % min. 1)	TSET % max. 2)	U_g value [W/(m²K)] / U_g [Btu/(hr ft² °F)] cavity 22 mm/10 mm		
						Krypton	Argon	Air
OKA*SOLAR* W	low-e	4	53	16	43	**0.6** / 0.11	**0.8** / 0.14	**1.1** / 0.19
OKA*SOLAR* W	solar	4	46	11	31	**0.6** / 0.11	**0.8** / 0.14	**1.1** / 0.19

1) for angle of incidence γ = 60°

2) for angle of incidence γ = 0° (vertical to the glass surface)

Legend and related values:

	unit	standard	technical term
U_g	W/(m²K)	DIN EN 673 DIN EN 674	Thermal transmittance
TSET	%	DIN EN 410	Total solar energy transmittance or solar heat gain coefficient
T_v	%	DIN EN 410	Light transmission (direct/hemispheric resp. diffuse/ hemispheric)
R_w	dB	DIN EN 20140	Sound reduction coefficient
F_C	%	DIN 4108	Reduction factor of a solar control system, F_C=TSET/$TSET_{reference}$
SC	%	GANA Manual	Shading coefficient, SC=TSET/0.86

The above data are approximate data. They are based on measurements of approved test institutes and calculations derived from these measurements. Values determined on a project-specific basis may vary from the above values. The values continue to vary if other coatings are used.

Direct transmission relates to direct incidence of light, generally vertical (model situation for direct sunlight). Diffuse transmission applies to homogeneous, diffuse incidence of light from the outer hemisphere (model situation for an overcast sky). All values were measured hemispherically.

A low-e coating or a combined solar and low-e coating at face #2 changes the colour appearance when viewed from outside.

The specified values may change as a result of technical developments. No guarantee is therefore given for their correctness.

Make-up

The special feature of OKA*SOLAR* W is that the louvres for solar protection and use of daylight are integrated in the cavity between the glass and therefore pose no special requirements concerning the installation, maintenance and cleaning. In fact, the OKA*SOLAR* element can be treated like conventional insulating glass. The glass thickness and type are based on the structural needs and constructional requirements.

Standard make-up:

2-pane make-up

External pane made of thermally treated glass, low-e/solar protection coating face #2
Cavity: 22 mm with integrated louvres and gas filling
Inner pane made of thermally treated glass

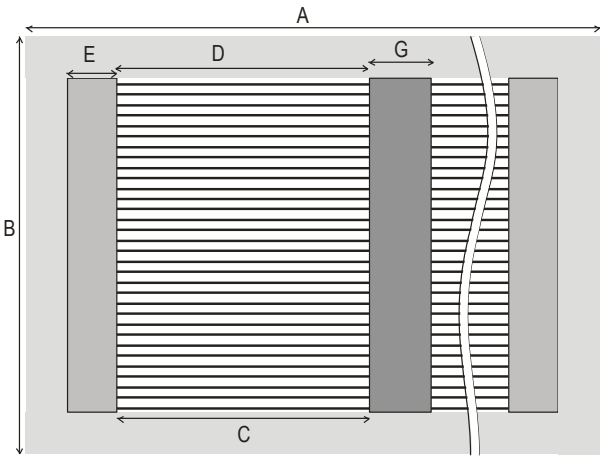
3-pane make-up

External pane made of thermally treated glass, low-e/solar protection coating face #2
Cavity 1: 22 mm with integrated louvres and gas filling
Middle pane made of thermally treated glass
Cavity 2: 8 to 12 mm with gas filling
Inner pane made of thermally treated glass, low-e coating face #5

Dimensions

The table and drawing below show maximum dimensions and visible widths.

glass dimension parallel to louvre direction	A	max. 3000 mm
glass dimension perpendicular to louvre direction	B	max. 4000 mm
louvre length	C	max. 1000 mm
unsupported span of louvres	D	max. 1000 mm
visible width edge profile	E	12.0 mm
visible width of joint profile	G	23 mm



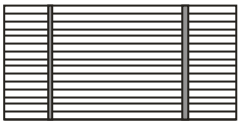
The maximum area is 7 m^2. Special shapes are possible. The feasibility and divisions must be discussed with OKALUX beforehand. It may be necessary to use an increased secondary sealant in the case of smaller dimensions and/or greater thickness of glass. The required edge seal width must be discussed with OKALUX beforehand. In the case of over sized units, joints could occur at the edge and the joint profiles. OKALUX will specify the location of the joints.

For tolerance reason and due to different thermal expansions, the insert may exhibit a visible light gap between the insert and the spacer bar. For this reason, the overall sealant (spacer bar + secondary seal) plus additional 5 mm have to be covered by a profile or by an appropriate edge screen printing.

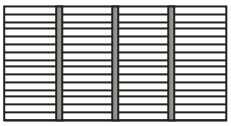
In the case of a polysulphide as secondary seal, it may be necessary to use a exceed cover in order to provide sufficient UV protection. In the case of a frameless glazing system, it is generally recommended that the edge areas are covered using a UV-impenetrable edge enamelling. Depending on loading, the required sealant width can be considerably greater than that of “conventional” insulating glazing.

Depending on the insulating glass formats, junction profiles may be required to support the louvres. If we do not receive any specifications, we will provide a symmetrical division of the louvres for each individual insulating glass unit. Please consult us in good time if a different division is required.

Edge and joint profiles have a matt, eloxal finish colourless C-0 (EV1). Profiles can be powder-coated in RAL colours upon request.



Example1 1:
symmetrical division with 2 joint profiles



Example 2:
symmetrical division with 3 joint profiles

Planning instructions

On the basis of the planning data, in particular

- geographical latitude of the project
- possible façade inclination
- façade orientation
- room utilisation

we develop a project-specific OKA*SOLAR* assessment. The shading times of the respective OKA*SOLAR* type are evident in the OKA*SOLAR* assessment.

OKA*SOLAR* does not totally block out the sun which can at times shine through the louvres and be partially redirected to the inside. A part of the retro-reflected light is reflected once more by the outer glass surfaces to the inside. These circumstances may make it advisable to put in additional internal glare protection to satisfy especially demanding applications (e.g. computer workstations).

The louvres have a highly reflective coating, which contributes to an effective redirection of solar radiation. For this reason, certain lighting conditions and viewing angles may already make slight deviations in the positions of some of the louvres visible. These deviations are unavoidable and do not affect the function of the insulating glass.

If the OKA*SOLAR* insulating glazing is being installed at temperatures <0°C in an unheated building (winter construction site), we must be notified of this in writing beforehand.

Installation instructions

OKA*SOLAR* insulating glass is glazed as per normal insulating glass. During transportation, the insert may slide to the side, creating a greater visible slit between the spacer and the insert or the support profiles could become inclined. We must be notified in writing beforehand of any special loads which may occur during transportation (vibrations/shaking).
For instructions and recommendations for the installation of our insulating glazing, please refer to our information and instructions for customers contained in "Delivery of OKA*LUX* Glass Products" and "General Information on Glazing".

OKA*SOLAR* Design

We recommend the use of the OKA*SOLAR* type that best complies with the requirements to be met and the installation situation (orientation, inclination) specified in the cover note.

Type designation

The type designation ends in a Roman numeral (I, II, III or IV). This indicates the direction in which the louvres of OKA*SOLAR* are "opened". In façades, the louvres usually run horizontally (Type I, providing shade against the high sun).
When used in roof glazing constructions, the louvres should if possible be turned so that they are "opened" towards the north, in order to provide shade against the sun from the south.

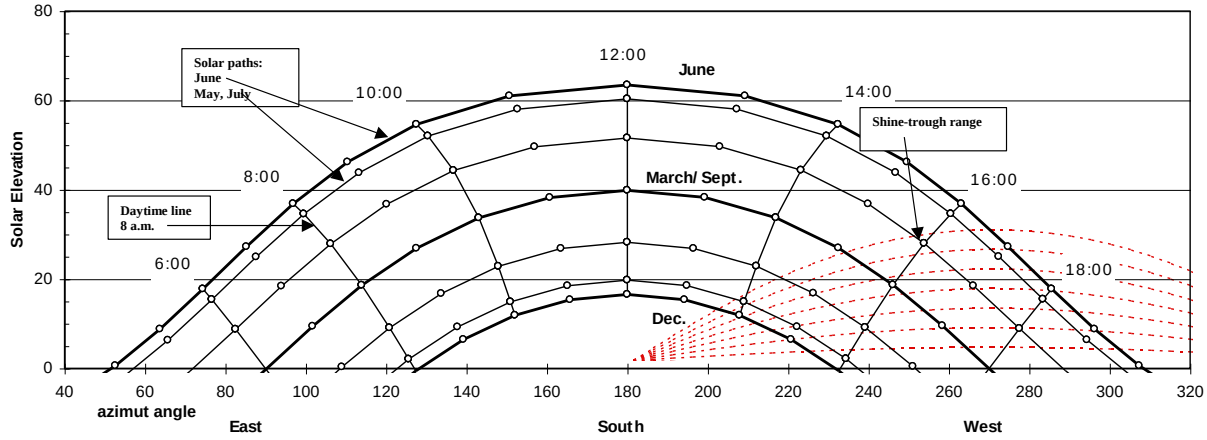
Solar diagram

The OKA*SOLAR* design contains a solar diagram for each glazing orientation that occurs. This indicates how long the sun can shine directly through the selected glazing, for each time of year or time of day. With OKA*SOLAR*, the sun shines only partially through between the louvres.

Example of a solar diagram

Installation

Project:	**Example**	**Glazing**		
Location:	Marktheidenfeld	Product:	**OKASOLAR W 60/17 I**	Typnr: 3
Coordinate:	50 ° 0 ' north. Latitude	Turn	0 °	
Orientation:	270 ° W			
Inclination:	90 ° (vertical = 90°)			



Terms

Coordinates: Geographical latitude of the installation site, the path of the sun is dependent on the geographical latitude
Orientation: Direction the glazing is facing, 0° = North, 90° = East, etc.
Inclination: Inclination of the glazing with respect to the horizontal, horizontal = 0°, vertical = 90°
Product: OKA*SOLAR* type for which the diagram was drawn up. If clear glass without louvres is examined for purposes of comparison, "Clear glass" appears here.
Rotation: see type designation

Paths of the sun

The solid black lines show the paths of the sun for various days in the year. The height of the sun is entered depending on the azimuth angle (90° = East, 180° = South). The lines for the time of day are entered at right angles to these.
Example: At 4 p.m. (solar time) in June, the sun is at an azimuth of approx. 260° (that is, almost exactly in the West), and at about 37° above the horizon.

Shine-through range

In the places where the paths of the sun overlap with the see-through range, the sun shines through the glazing (with OKA*SOLAR* partially through the louvres).
Example: In December the sun shines through some of the glazing from approx. 2 p.m. until sunset, but in June not until approx. 5 p.m.

Solar time, deviations from local time

Solar time is specified in the solar diagrams, that is, at 12 noon the sun is at its highest point and is exactly due South. This time differs from local time. There are three reasons for this discrepancy:

- Time zone: since the sun cannot be at its highest point in all places within a time zone at 12 noon, solar time differs from local time by a few minutes. For example, the sun reaches its highest point in Berlin approx. 19 minutes earlier than in Frankfurt.
- Periodic fluctuations in the earth's orbit and in the earth's rotation cause an additional deviation of up to 16 minutes.

For this reason, actual local time fluctuates within a range of approx. 30 minutes, depending on the time of year. At 12 o'clock solar time, for example, local time in Berlin fluctuates between 11:50 and 12:20, and in Madrid between 12:59 and 13:29.

- Summer time: In summer time, one more hour must be added to solar time.

Other printed matter

If you do not have the following printer matter, please request it directly from OKALUX or download it from the Internet at www.okalux.com:

General terms and conditions of business
Product-specific information texts

As well as these, there are the following customer notes:

Customer notes on offers
Customer notes on delivery
Customer notes alarm glass
Customer notes screen printing
Customer notes Structural Glazing / Edge deletion
Customer notes on heat-soak test
Customer notes on glazing
Customer notes SIGNAPUR®
Customer notes OKA*WOOD* tolerances
Cleaning instructions for OKA*LUX* gen.
Cleaning instructions OKA*COLOR*
Guideline for visual quality