

KAPILUX Capillary System

KAPILUX is an insulating glass with an integrated capillary slab KAPIPANE. The type designation "-T" refers to a capillary slab made of transparent material, "-W" refers to white-tinted material (other colours on request). Type "WS" is a white-tinted material with an inclined capillary axis. The capillaries do not only reduce heat losses resulting, with their forward-directed light diffusion, they also improve the in-depth illumination of the room. This effect is particularly valuable on overcast days and in rooms with side illumination.

KAPILUX offers

- optimum, uniform light transmittance into the room, irrespective of irradiation conditions
- light transmission and total solar energy transmittance as required
- very good colour rendering index
- very good heat insulation
- sound insulation as required
- UV protection as required
- Attractive appearance in daylight and in artificial light
- Partial troughvision, effect of depth
- visibility for birds



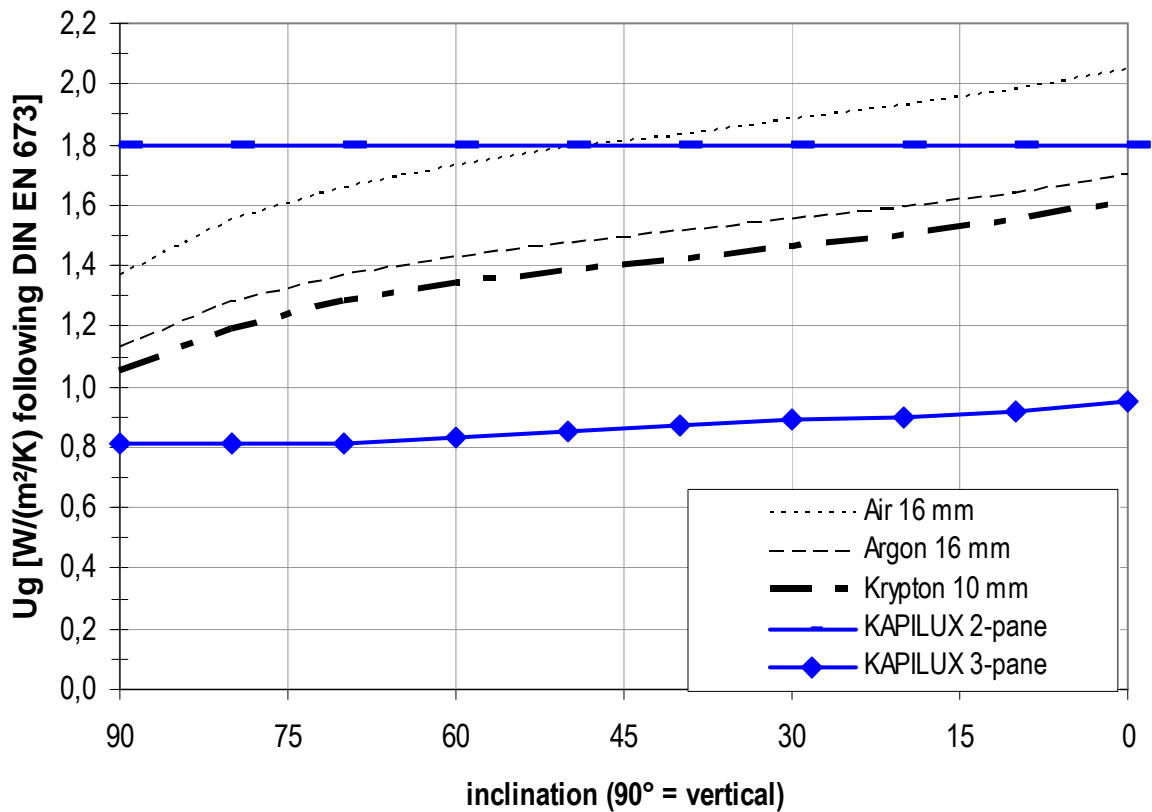
Physical properties

Thermal insulation

The KAPIPANE insert reduce the heat transfer in the cavity between panes in terms of convection and heat radiation. The thicker the KAPIPANE insert, therefore, the better the U_g value. With the triple pane make it is possible to achieve U_g values $\geq 0.8 \text{ W}/(\text{m}^2\text{K})$.

The U_g value of insulating glass in accordance with DIN EN 673 or DIN EN 674 always relates to vertical installation. If the insulating glass is at an angle, e.g. as in roof glazing, the U_g value increases, because the rising convection level in the cavity. Duplex insulating glass with a standard value of $U_g = 1.1 \text{ W}/(\text{m}^2\text{K})$ has an actual value of approx. $1.7 \text{ W}/(\text{m}^2\text{K})$ if used for horizontal roof glazing.

The capillary slab in the cavity between panes prevents convection, which means that the U_g value of OKALUX+ is nearly constant whatever the installation position.



Sound insulation

Capillary slabs decouple the panes of the insulating glazing and provide improved sound insulation.

Spectral properties

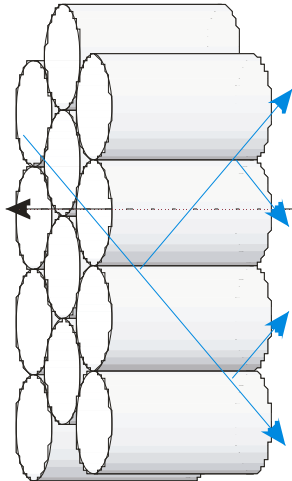
Energy transmission, light transmission and light diffusion can be adapted to the façade orientation and the use of the room behind the façade. Especially with KAPILUX W the g-Value decreases in case of higher inclination angles. Stricter glare protection requirements can also be taken into consideration by using white-tinted capillary material (type -W).

Along the capillary axis, partial through vision is possible with characteristic visual effects, especially if viewing from a considerable distance away.

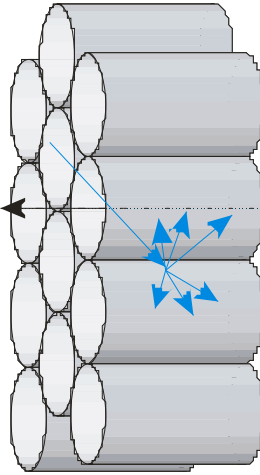
The capillary axis of the standard product KAPILUX W is perpendicular to the glass.

In certain cases it makes sense to have the capillary axis at an angle to the glass. This can prevent radiation coming in at a right angle from entering the room through the capillaries. KAPILUX WS is the appropriate product for such cases.

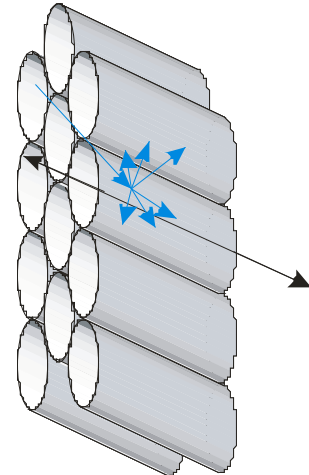
KAPILUX T



KAPILUX W



KAPILUX WS



UV protection

Very low UV transmission possible on request.

Technical values of standard types

The following details apply to a two-pane glass make up with a 6 mm outer pane and a 4 mm inner pane.

Table 1. Spectral properties 2-pane make-up

KAPILUX Type T	Tv direct %	Tv diffuse %	TSET direct %	Ug-value [W/(m ² K)] / Ug [Btu/(hr ft ² °F)]
68/64	68	51	64	1.8 / 0.32

KAPILUX Type W	Tv direct %	Tv diffuse %	TSET direct %	Ug-value [W/(m ² K)] / Ug [Btu/(hr ft ² °F)]
38/37	38	22	37	1.8 / 0.32

The following details apply to a two-pane glass make up with a 6 mm outer pane, with a functional coating on face #2, a 4 mm middle pane and a 4 mm inner pane.

Table 2. Spectral properties 3-pane make-up

KAPILUX Type T	T _v direct %	T _v diffuse %	TSET direct %	U _g -value [W/(m ² K)] / U _g [Btu/(hr ft ² °F)] cavity 8 mm		
				Krypton	Argon	Air
62/47	62	41	47	0.8 / 0.14	1.0 / 0.18	1.2 / 0.21
54/30	54	36	30	0.8 / 0.14	1.0 / 0.18	1.1 / 0.19
46/26	46	31	26	0.8 / 0.14	1.0 / 0.18	1.2 / 0.21

KAPILUX Type W	T _v direct %	T _v diffuse %	TSET direct %	U _g -value [W/(m ² K)] / U _g [Btu/(hr ft ² °F)] cavity 8 mm		
				Krypton	Argon	Air
35/29	35	18	29	0.8 / 0.14	1.0 / 0.18	1.2 / 0.21
31/19	31	16	19	0.8 / 0.14	1.0 / 0.18	1.1 / 0.19
26/17	26	13	17	0.8 / 0.14	1.0 / 0.18	1.2 / 0.21

Legend and related values:

	unit	standard	technical term
U _g	W/(m ² K)	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. Lower g values can be achieved by combining selective solar protection coatings.

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 sun-control and low-e coating at position 2 changes the colour appearance when viewed from outside.

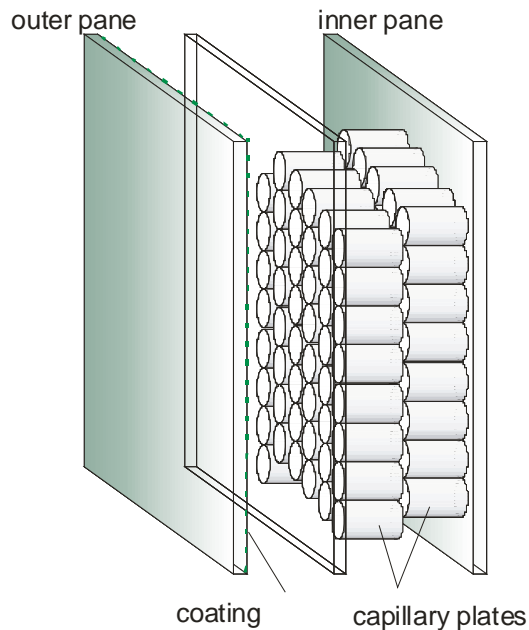
The specified values may change as a result of technical developments. No guarantee is therefore given for their correctness.

Make-up

With its diameter of about 2.5 to 3 mm, the KAPIPANE inserted in the cavity of KAPILUX is what makes this product so special. The glass type and thickness vary according to static requirements and design requirements.

Standard make-up:

- Outer pane coated on #2
cavity 1: 8 mm, with air or gas filling
- Middle pane
cavity 2: with 2 offset KAPIPANE slabs of 10 mm thickness each
- Inner pane



The 2-pane make-up consists of one 20 mm cavity with two 10 mm capillary slabs and covering pane, in general without coating.

Maximum angle of inclination of the capillary axis by KAPILUX WS to the glass normal is 40°.

Variations in the density and the diameters of the KAPIPANE may be visible, as can joints which are necessary for production reasons. These "variations" in appearance give the product a lively appearance. Under certain light conditions it may also be possible that fine lines, also the result of the production process, can be seen within the KAPIPANE. The physical characteristics of KAPILUX are not adversely affected by the above.

Variations in the density of the OKAPANE and the diameters of the capillaries may be visible, as can joints which are necessary for production reasons.

Dimensions

	KAPILUX T/W	KAPILUX WS
max. width without joint	1.4 m	1.4 m
max. width with joint*	2.4 m	2.4 m
max. height without joint	4.0 m	2.2 m
max. height with joint*	6.0 m	4.4 m

*max. 1 joint pro unit

For tolerance reasons and due to differing temperature expansion, the insert may exhibit an expansion gap of up to 2.0 mm on each side. This can lead to a visible gap between the insert and the spacer bar. For this reason, the edge cover must amount to at least the required overall seal width plus 5 mm or be covered using an edge screen print (spacer bar + secondary bar).

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 screen print. Depending on loading, the required sealant width can be considerably greater than that of "conventional" insulating glazing.

Planning instructions

The capillary slab in product type KAPILUX T diffuses the incident light. In doing so, direct sunlight expands to become a ring of light. This ring can be distracting in the case of demanding visual tasks. This is why it is preferable to use the KAPILUX W type for more sophisticated requirements.

Builder-owners and architects must be able to technically assess the effect of glazing in daylight terms. Okalux offers such calculations as a voluntary extra service without obligation. The daylight-relevant properties of the room to be examined must be known; in particular, these are:

- room geometry, window dimensions
- approximate degree of reflection of the surfaces forming the room boundaries

The so-called daylight coefficient (D) in accordance with DIN 5034, Part 3, is relevant for the evaluation of the ambient daylight. This gives the ratio between the horizontal luminous intensity indoors and out of doors, under a completely overcast sky. This value can be calculated for different glazing variants using the existing simulation tools. The customer can thus assess the light-directing effects of special products, in comparison with normal glazing as well. In addition to the assessment in accordance with DIN, virtual images can visualise the light distribution in the rooms.

Installation instructions

KAPILUX light diffusing insulating glass is used for glazing like normal insulating glass.

For instructions and recommendations for the installation of our insulating glazing, please refer to our information and instructions for customers contained in "Delivery of OKALUX Glass Products" and "General Information on Glazing".

Other printed matter

If you do not have the following printed 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 OKAWOOD tolerances

Cleaning instructions for OKALUX gen.

Cleaning instructions OKACOLOR

Guideline for visual quality