OKALUX Light Diffusing Insulating Glass

The challenge for OKALUX Light Diffusing Insulating Glass: to make daylight useful. With the use of a translucent light diffusing capillary slab both sides covered with additional glass fibre tissues in the cavity, OKALUX achieves

- 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
- good heat insulation
- UV protection as required
- sound insulation as required
- vision protection and glare protection
- attractive appearance in daylight and in artificial light
- bird friendly glazing

Physical properties

Thermal insulation
The capillaries reduce the heat transfer in the cavity between panes in terms of convection and heat radiation. The thicker the OKAPANE insert, therefore, the better the $U_g$ value. For OKAPANE thicknesses of 24 mm and over, we recommend the use of our OKALUX EVO product, which enables $U_g$ values of $\geq 1.3 \text{ W/(m}^2\text{K)}$ to be achieved. With the triple pane make (OKALUX K product variant) it is possible to achieve $U_g$ values of $\geq 0.8 \text{ W/(m}^2\text{K)}$.

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. Insulating glass with a standard value of $U_g = 1.1 \text{ W/(m}^2\text{K)}$ has an actual value of approx. 1.7 W/(m²K) 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 constant whatever the installation position. For roof glazing, OKALUX glass with a 24 mm capillary slab achieves the same $U_g$ value as insulating glass with a $U_g$ of 1.1 W/(m²K).
**Sound insulation**
Capillary slabs decouple the panes of the insulating glazing and provide improved sound insulation.

**Spectral properties**
The special light diffusing properties of the OKAPANE insert provide an optimised, uniform distribution of light in the room, regardless of irradiation conditions. The special geometry of the “OKAPANE” capillary material results in improved heat insulation with an increased thickness, but without any notable reduction in light transmission.

The g value and the light transmission are dependent on the make-up of the light diffusing inserts. Other g values and light transmission values can be provided on request with the use of special make-ups.

**UV protection**
Very low UV transmission possible on request.

**Technical values of standard types**
The following details apply to glass make-ups with a 6 mm outer pane and a 8 mm laminated safety glass as inner glass pane (0.76 PVB foil).
Table 1. Spectral properties

<table>
<thead>
<tr>
<th>OKALUX Type</th>
<th>$T_v$ direct</th>
<th>$T_v$ diffuse</th>
<th>TSET direct</th>
<th>TSET diffuse</th>
<th>SC %</th>
</tr>
</thead>
<tbody>
<tr>
<td>45/46</td>
<td>45</td>
<td>34</td>
<td>46</td>
<td>35</td>
<td>53</td>
</tr>
<tr>
<td>37/39</td>
<td>37</td>
<td>29</td>
<td>39</td>
<td>31</td>
<td>46</td>
</tr>
<tr>
<td>32/35</td>
<td>32</td>
<td>25</td>
<td>35</td>
<td>27</td>
<td>41</td>
</tr>
<tr>
<td>28/31</td>
<td>28</td>
<td>21</td>
<td>31</td>
<td>25</td>
<td>36</td>
</tr>
<tr>
<td>24/28</td>
<td>24</td>
<td>19</td>
<td>28</td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td>21/25</td>
<td>21</td>
<td>17</td>
<td>25</td>
<td>21</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 2. $U_g$ value and $R_w$ value

<table>
<thead>
<tr>
<th>Capillary slab [mm]</th>
<th>8</th>
<th>12</th>
<th>16</th>
<th>20</th>
<th>24</th>
<th>32</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U_g$ [W/(m²K)]</td>
<td>2.7</td>
<td>2.5</td>
<td>2.2</td>
<td>1.9</td>
<td>1.7</td>
<td>1.5</td>
<td>1.3</td>
</tr>
<tr>
<td>$U_g$ [Btu/(hr ft² °F)]</td>
<td>0.48</td>
<td>0.44</td>
<td>0.39</td>
<td>0.34</td>
<td>0.30</td>
<td>0.26</td>
<td>0.23</td>
</tr>
<tr>
<td>$R_w$ [dB]</td>
<td>38</td>
<td>40</td>
<td>41</td>
<td>42</td>
<td>43</td>
<td>44</td>
<td>45</td>
</tr>
</tbody>
</table>

Legend and related values:

- **$U_g$** [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, $F_C = \frac{TSET}{TSET_{reference}}$
- **SC** % GANA Manual
- Shading coefficient, $SC = \frac{TSET}{0.86}$

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.

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).

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
What makes OKALUX light diffusing insulating glass so special is the capillary slab inserted in the cavity between the panes. The glass type and thickness vary according to static requirements and design requirements.

Standard make-up:
- Outer pane
  - additional glass fibre tissues
  - Capillary slab 8 - 24 mm
  - additional glass fibre tissues
- Inner pane

Variations in the density of the capillary slab and the diameters of the capillaries may be visible, as can joints which are necessary for production reasons. Under certain light conditions it may also be possible that fine lines, also the result of the production process, can be seen within the capillary slab. The physical characteristics of OKALUX are not adversely affected by the above.

Special make-up > 24 mm capillary slab size on application

Dimensions

<table>
<thead>
<tr>
<th>larger glass dimension</th>
<th>up to 4500 mm</th>
<th>no restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>smaller glass dimension</td>
<td>smaller than 1500 mm</td>
<td>no restrictions</td>
</tr>
<tr>
<td></td>
<td>1500 mm to 2000 mm</td>
<td>light transmission not more than 32 %</td>
</tr>
<tr>
<td></td>
<td>Larger than 2000 mm</td>
<td>subdivision by joint with aluminium profile</td>
</tr>
</tbody>
</table>

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 an 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
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**

OKALUX 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 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 installation of OKAFLEX
- Customer notes installation of OKAPANE
- Customer notes OKAWOOD tolerances
- Customer notes OKACELL product specification
- Cleaning instructions for OKALUX gen.
- Cleaning instructions OKACOLOR
- Guideline for visual quality