Phoenicia Acoustic is a laminated glass capable of filtering noises. The combination of Phoenicia Acoustic glass with multiple glazing options will attenuate the sounds passing through. It is made of glass layers bonded by a designated acoustic interlayer of PVB (Polyvinyl butyral – a layer of plastic polymer).

The composition of Phoenicia Acoustic glass breaks the frequency of the sound waves passing through it in an optimal way; and it generates an acoustic attenuation that is significantly better than common glazing solutions, such as monolithic glass (one sheet of glass), isolation glass, and even laminated glass with regular PVB consisting of multiple layers.

Phoenicia Acoustic Glass is especially suitable for uses such as:
- Glazing windows adjacent to noisy centers such as schools and playgrounds.
- Glazing at airports, trains, and buses.
- Homes near main traffic intersections.
- Conference rooms, for filtering internal and external noise.
- Rooms in shared workspaces.
- Acoustic isolation for screen walls.
Noise passes through sound waves and its intensity is measured by decibels (Db). In order to better understand the various noise intensities, a number of common noises are measured using a scale in which the noise levels are displayed in Db.

On this scale, the level of noise in a residence is approximately 60 Db, the noise level on a main road is about 85 Db and the noise level of a plane taking off is about 145 Db. It is important to remember that noise above 85 Db is defined as harmful and may cause harm to health and symptoms such as stress, insomnia and lack of concentration.

**Db Scale:**

![Db Scale Image]

**The calculation of the acoustic reduction is as follows:**

The intensity of the acoustic filtering (reduction) should be subtracted from the amount of noise that you want to reduce. The result is the volume of noise you hear behind the glass. The volume of acoustic attenuation is displayed as Rw(C;Ctr):

- **Rw (Reduction weighted)** - Indicates the measured average of acoustic reduction.
- **C** - Represents the **acoustic reduction in high sound frequencies** (high-pitched noise like a scream, a horn, a bird chirping, etc.).
- **Ctr** - Indicates **acoustic reduction in low sound frequencies**, with emphasis on traffic noise (low noise created by cars, bass sounds, etc.).

**Case Study:**

**Phoenicia Acoustic** glass 33.2 (2 glass layers with a thickness of 3 mm each and a layer of PVB with a thickness of 0.76 mm) with acoustic reduction performance of -36(-1;-3)

Average acoustic reduction: Rw = 36 Db
Reduction in high sound frequencies: C = 35 Db
Reduction in low sound frequencies: Ctr = 33 Db

The calculation of the intensity of noise you will hear behind the glass when a building is located near a main road:

The given noise intensity of a main road: 85 Db
The composition of glazing – Acoustic laminated 33.2, 36 Db (-1;-3)

Calculation of acoustic attenuation: Db 49 = 85-36

The result shows that the noise level behind the glass will be lower than the noise in a library (60 Db).
An example of common glazing solutions and their acoustic attenuation:

<table>
<thead>
<tr>
<th>COMMON GLAZING SOLUTIONS AND THEIR ACOUSTIC ATTENUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Glass</strong></td>
</tr>
<tr>
<td>Monolithic Glass 6 mm</td>
</tr>
<tr>
<td>Isolation Unit 4-12-4 (Air Space)</td>
</tr>
<tr>
<td>Laminated 55.2 Regular PVB</td>
</tr>
<tr>
<td>Phoenicia Acoustic 55.2</td>
</tr>
<tr>
<td>Isolation Unit with Phoenicia Acoustic 6-12-55.2 (Air Space)</td>
</tr>
</tbody>
</table>

- Data from the acoustic data collection of the PVB manufacturer – Saflex

The table shows that the best acoustical reduction will be obtained by glazing with Phoenicia Acoustic glass.

The following is an explanation of the auditory change in Db levels:

- With a reduction of 1 Db, there some relief from the noise intensity will be felt.
- With a reduction of 3 Db, there will be a reduction of about 50% in the noise intensity.
- With a reduction of 10 Db, there will be a significant reduction of about 75% in noise intensity.

**Technical performance of acoustic glass 44.2**

(two glass sheets 4 mm thickness each, acoustic PVB 0.76 mm)

- \( R_w \) (Db) - The degree of reduction in noise level passes through the glass, measured in decibels.
- \( V_L \) - Visible light from the Sun
- \( V_Lr \) - (Visible light reflection) - The percentage of light reflected outside.
- \( I_R \) - Infra red solar heat, part of the visible light
- \( I_r \) - (Solar energy reflection) - The percentage transition of solar energy reflection.
- \( U \) - Ultraviolet radiation, part of the visible light
- \( L_T \) - (Visible light transmission) - The percentage of visible light transition.
- \( E_A \) - Energy absorption
- \( E_T \) - (Solar energy transmission) - The percentage of solar energy transition.
- \( U_V \) - (Heat transfer coefficient) W/(m²/K) - The degree of heat transfer through the material and its effect on temperature transfer.
- \( G_V \) - (Total Solar energy transmission) - Coefficient of heat transfer of the total percentage of solar energy transfer.

**Notes:**
- All data are nominal values, subject to the tolerance of the product and without obligation.
- The calculated values are for guidance only and do not offer any guarantee regarding the production of the final product.
- Since a glass window consists of several parts, there is no guarantee that the final product will display these values.
- According to EN 14449:2005 / EN 12543:2011 laminated safety glass, which is intended for use in buildings, doors, balustrades, furniture, fittings or other uses, wherever required by law or regulations or wherever is desired.
- Low final values indicate higher insulation of the glass.
PHOENICIA ACOUSTIC glass has been tested according to strict international regulatory requirements such as ISO 140-3 for acoustics in buildings, and ASTM E90 to test the passage of sound waves in buildings. It is calculated according to a variety of requirements for levels of internal / external noise isolation in a building – ASTM E1332, an acoustic rating for sound isolation in a building – ISO 717.

To ensure that the Phoenicia glass application complies with all applicable laws, regulations, standards, codes of practice and other requirements, it is recommended that the Phoenicia glass processor consult with a qualified Phoenicia consultant regarding the instructions for processing, such as how to successfully store, handle, process and install Phoenicia glass. Instructions can be obtained directly from Phoenicia.

Clarification: The information presented in this publication is a general description of the product and Phoenicia will not be responsible for any inaccuracies or omissions in this publication and any implications of adherence thereto. This liability is imposed on those who use the information.