

What should you consider when selecting sound-absorbing furniture?

When walls vanish and an office opens up, you develop a need for places that can be described as rooms within rooms. Such places can be created using removable screens and furniture that absorbs sound, thereby allowing you to have a more private conversation or a place to contemplate things in peace. Our acoustic environment plays a major role in our lives. It affects our working efficiency and ultimately also our health.

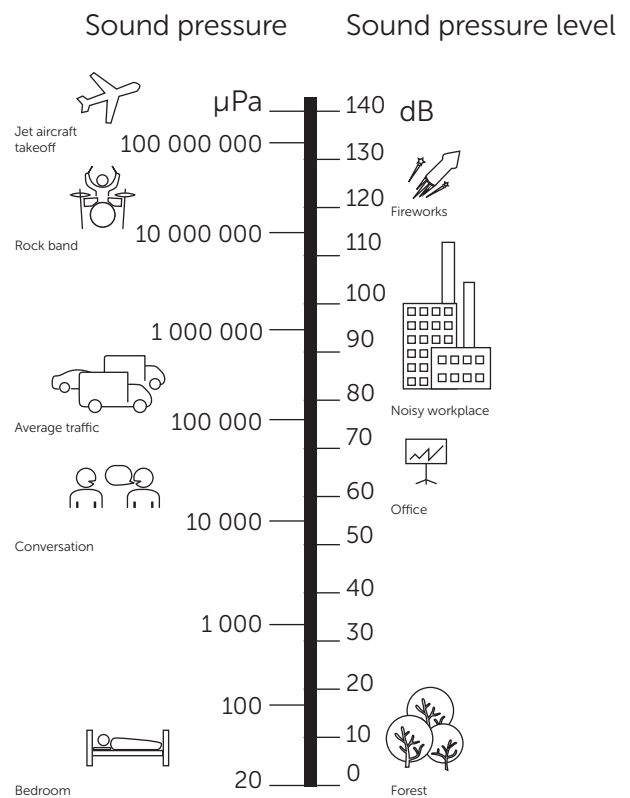
Sound perception

Public space and open offices often have problems with resonance, meaning that sounds reverberate for too long. Creating a more pleasant environment requires us to dampen all kinds of different sounds, such as fans, people's footsteps, conversations and phone calls.

People's perception of sound depends on a variety of factors, including level and frequency, but also the type of the sound: whether it is constant or fragmented, noise or music.

The ear is highly sensitive and sound waves don't have to be particularly strong to be heard. People hear sounds from 0 dB to 120 dB (the pain threshold) at the frequency range of 20-20000 Hz. Sounds that are at a lower frequency than the limit of human hearing are called infrasound, while sounds exceeding that limit are called ultrasound. For voice and speech recognition, the most important frequency range is 300-3000 Hz.

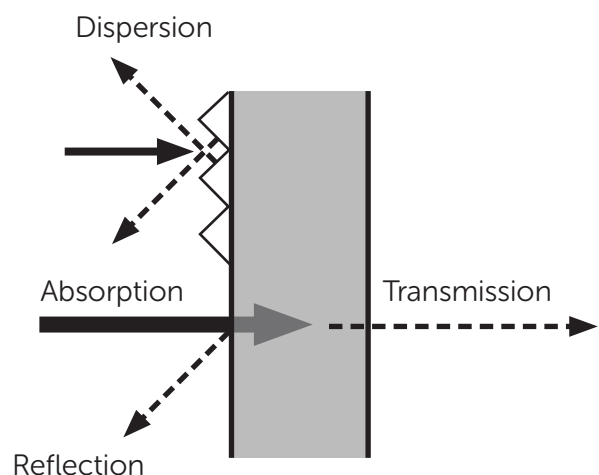
People perceive sound differently. Something barely audible to one person may disturb another. Even one person can perceive the same sound differently depending on the situation. A 10 dB increase in the level of sound is considered to double the loudness of the sound. A change of 1-2 dB is considered to be the smallest alteration that humans can perceive.



Acoustic absorption

Sound waves cannot move freely in a closed room and bounce off the structure of the room. Some of the sound is absorbed by surfaces, while some reflects from them. Monitoring sound absorption and achieving the recommended reverberation duration is one of the principal tasks in the acoustic design of rooms.

Acoustic absorption means that sound does not reflect off a material after reaching it. That is also the principle of designing furniture with acoustic properties: furniture has to absorb the sound that would otherwise reflect back and contribute to unwelcome noise. Materials with good sound absorption are porous and breathable. Synthetic felt and a range of foams are among the materials with such properties, which we also use in Softrend products. The models in the August and Sigmund ranges also use felt fabrics for upholstery to ensure better sound absorption. The calculated sound absorption for the models in the August range is between 0.2-5.1 sabins*, depending on the sound absorption coefficient of the particular material.



The decibel is used in acoustics to express the level of sound pressure (symbol L) relative to 0 dB. The agreed sound pressure for this 0-level is 20 micropascals (μPa), which corresponds to the threshold of human hearing.

Sound pressure or acoustic pressure is a change in the ambient atmospheric pressure in the form of a wave. As it moves through the air, sound creates areas of high and low airtightness. As sound moves through the air its pressure also alters somewhat. Small changes in air pressure caused by sound moving through the air are referred to as sound pressure. The unit used to describe acoustic pressure is the pascal (Pa). The human ear reacts to sound pressure, which is what causes us to hear sounds.

The threshold of hearing is the minimum sound level or pressure that human beings can perceive as audible sound. The threshold of hearing at 1000 Hz is deemed to be equal to 10-12 W/m^2 (2·10⁻⁵ Pa). This sound pressure value is used as a base or comparison level (0 dB) on a scale of the relative sound pressure level (usually a logarithmic scale in decibels) when describing findings in hearing studies.

The acoustic absorption of materials is characterised by the **acoustic absorption coefficient**, which does not have a unit and can vary from 0 (fully reflective) to 1 (fully absorbent). The acoustic absorption of furniture can be described by its equivalent absorption area, which is equal to the absorption coefficient multiplied by the surface area of the material (m^2sabin). This size is used when calculating the reverberation duration of a space.

Recommendations for pleasant working environments

Office space

To achieve a good acoustic environment in offices, we recommend that the space be designed to ensure a reverberation duration of around 0.6 seconds at 250-4000 Hz. It is important to consider the number of employees, the noise created by office equipment and the need to have private conversations and phone calls. Sound-absorbent surfaces should be in close proximity to office equipment. The more people there are in the space, the greater the need for surfaces with acoustic absorption properties.

Suitable products: Sigmund, August, August Wall, Frankie

Meeting rooms

Solutions for meeting rooms should take into account the size of the rooms. For smaller meeting rooms, the reverberation duration at 250-4000 Hz should be 0.6 seconds, but it is better to aim for 0.8 seconds in more spacious rooms. Voices should be clear and understandable in all parts of the room, meaning that surfaces with semi-reflective properties can help achieve a good acoustic environment in larger rooms.

Suitable products: August Wall or Sigmund sound-absorbing panels

Open-plan offices

The optimal reverberation duration that you should aim for when designing the space should be 0.5 seconds at 250-4000 Hz. It is advisable to use sound-absorbing screens to separate workplaces and avoid noise-reflective surfaces.

Suitable products: Sigmund, August, August Wall, Frankie

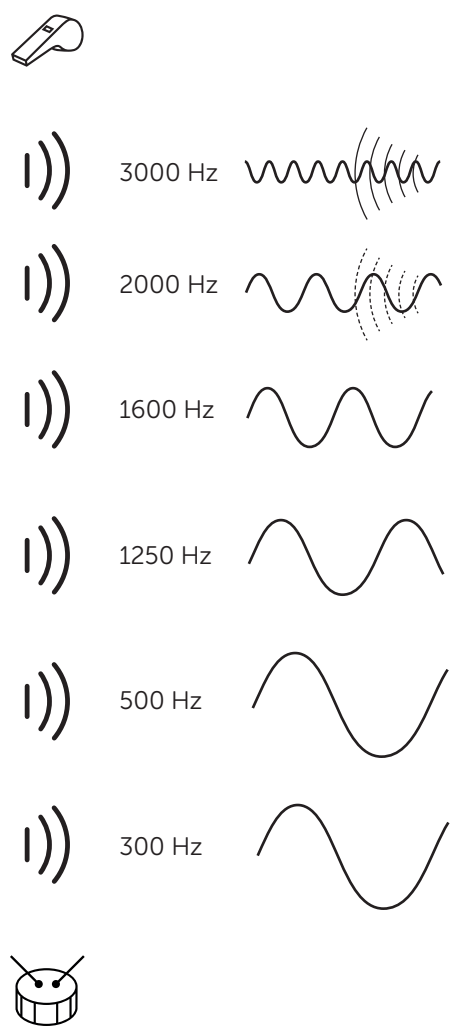
Other public space

Similar principles to those of open-plan offices apply in restaurants, hospitals, museums, hotel lounges, shopping centres and other public areas. Such places are bustling with people, and there are all kinds of sounds coming in at different frequencies, which often leads to a lot of reverberation.

Sound-absorbing furniture and panels should be positioned as close as possible to the sound source and should also be present in places where the sound energy is initially reflected back by desks and paths of movement. Soft surfaces close to the workplace absorb most of the sound, significantly improving the acoustic environment.



For voice and speech recognition, the most important frequency range is 300-3000 Hz.

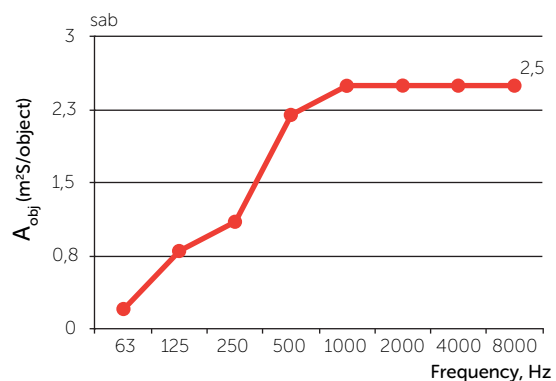


Calculated sound absorption values



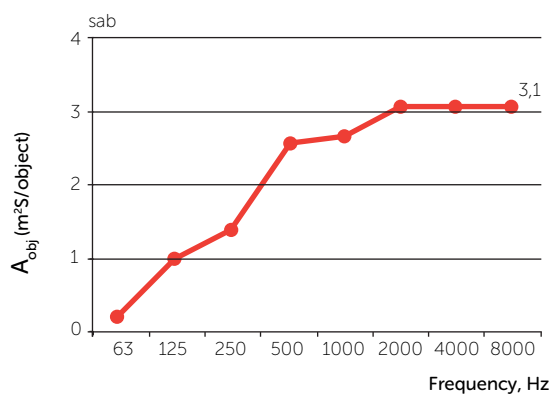
2-S/ H1

Equivalent absorption area per object (m^2Sab / object)



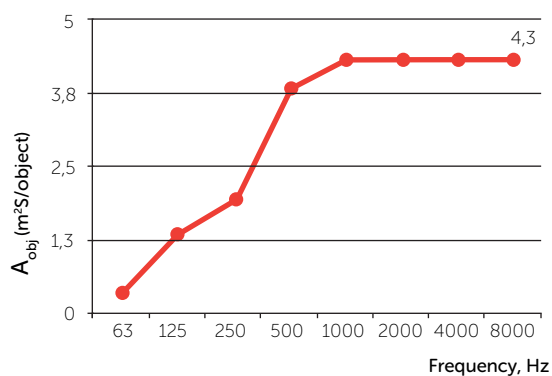
2-S/ H2

Equivalent absorption area per object (m^2Sab / object)

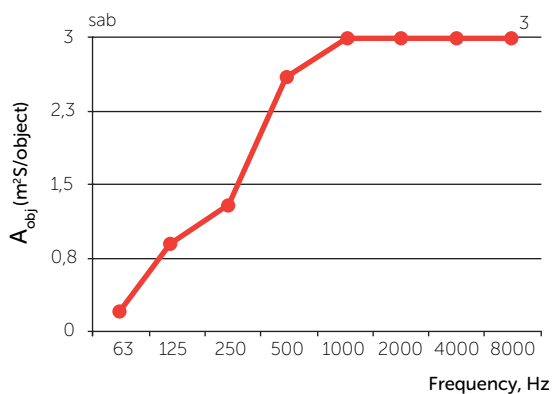


2-S/ H3

Equivalent absorption area per object (m^2Sab / object)

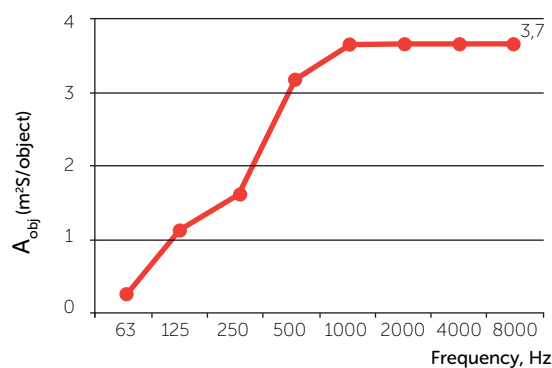


Equivalent absorption area per object (m²Sab / object)



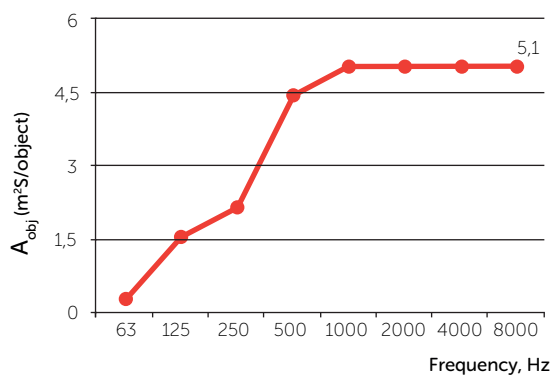
2,5-S/ H1

Equivalent absorption area per object (m²Sab / object)



2,5-S/ H2

Equivalent absorption area per object (m²Sab / object)



2,5-S/ H3

Calculated acoustic absorption values of August product range developed in cooperation with experts from Akukon

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