Sound absorbents

In a room without sound-absorbing materials the reverberation time will be long. The room feels acoustically hard, as the sound remains for a long time. Too long a reverberation time will reduce the speech comprehension and will increase the sound level and the duration of noisy/irrelevant sounds. Such a sound environment may be suitable in certain cases, for example choir singing where a long reverberation carries the tones.

In many other cases we aim at a more subdued sound environment, where the sound fades faster. When a sound hits the surface of a material, part of it will be absorbed and part of it will be reflected. The properties of the material decide the absorption capacity. Sound absorbents of various kinds are abundantly requested in for instance landscaped offices and canteens. Also conference rooms, reception desks, and entrance halls require sound absorbents to get an acceptable sound environment.

Textiles as absorbents

Textiles absorb sounds best in high frequency ranges, less in the middle frequencies and little in low frequencies. This function may be explained by the fact that textiles are normally thin with proportionately little material, and, therefore, the transformation of energy from sound to heat (absorption) will be limited to the frequency ranges, where the wave length is short and the fibres of the material are physical obstacles with regard to stiffness, mass and permeability.

By increasing the absorption in for example a landscaped office you could reduce undesired sounds like telephone conversations at other desks, fan sounds from a computer etc. Textiles subdue such sounds owing to their good sound absorbing capacity.

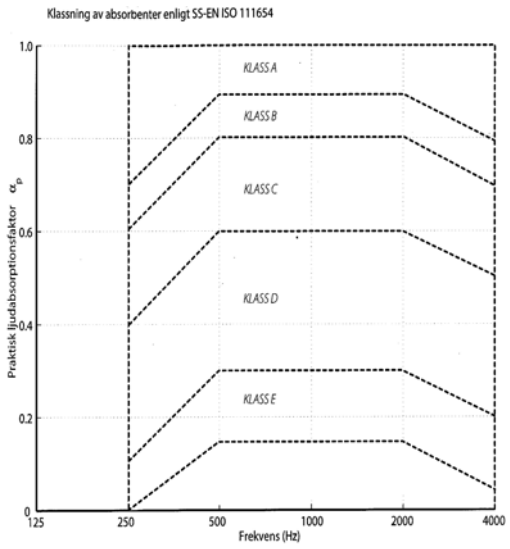
In comparison with other sound absorbents on the market, textiles have several advantages, as they also function as decoration. Furthermore, textiles are easier to install and cheaper, compared to for instance building a wall with a subduing top layer.

Method of measurement and results

The absorption measurements were performed in a lingering note room, which meets the requirements of SS-EN ISO 354:2003 and has a room volume of 200 m³. The distance from the rail to the wall behind was 0,1 m. Approximately 10 m² of the wall surface was covered. The sample surface was 3 x 3,4 m and the textile was flat. When measuring the reverberation, broadband noise was used. The measurements were performed in accordance with SS-EN ISO 354:2003.

As there are few measurements of sound absorption for textiles, standard values are used for the calculations of the reverberation. By means of the measurement results these products can then be used for calculations of room acoustics.

The results are shown in different sound absorption classes from A to E, where class A absorbs sounds best. The use of the classification system may however be misleading, as a low classification makes one think of a bad product. As a matter of fact, working with room acoustics is about combining sound absorbents with different properties and spreading them in the best way over the surfaces of the room. Several factors decide which type of absorbent is most suitable. In some cases the sound absorbing properties (with a good absorption in higher frequencies) is a requested quality. On surfaces like windows there are only a few alternatives for sound absorption. A textile for daylight control is therefore a suitable choice as a sound absorbent.



Classification of absorbents, where class A is the highest class, which corresponds to for example 100 mm mineral-wool in an under-roof.

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