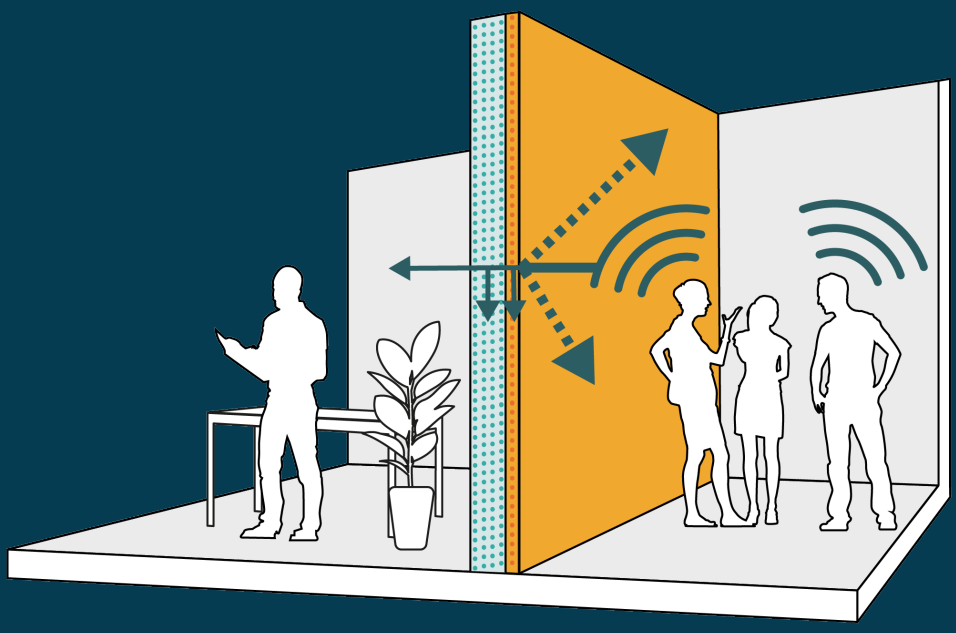
texdecor

Acoustic and decoratives solutions

WALLCOVERING AT THE SERVICE OF ACOUSTIC COMFORT



Disturbance due to noise

How to treat with sound reverberation

A cost-effective solution

1. Disturbance due to noise

a. What exactly is noise ?

Noise is a group of sound waves that can be heard by the human ear. Air molecules carry the vibrations created by noise.
In a room, when the source of noise stops, we can notice that the noise is reflected around the walls for a certain lapse of time. This residual noise is called reverberation.

b. What is reverberation of sound ?

Reverberation is a phenomenon that results from sound waves being reflected off the various surfaces in a room where noise is produced (mainly the floor, walls and ceiling).

The reverberation time depends on the level of comfort and acoustic properties of a room.
If the reverberation time is too short, the room sounds dry and dead (a room that is 'too absorbent'), whereas if the reverberation time is too long, the sounds all blend into each other, which makes conversation difficult if not impossible to follow and gives an unpleasant impression of permanent cacophony.

c. The two most disturbing consequences of reverberation

• The increase in the overall level of noise : when several people speak at the same time reverberation amplifies the noise level (restaurants, meeting rooms, reception halls, common areas in hotels or office buildings...).

• Understanding or perception of the source of sound is diminished : meaning that a voice is not heard clearly or is unintelligible (conference halls, school buildings, music rooms or cinemas).

d. Where are the main areas concerned by noise disturbance ?

Problems relating to sound reverberation are encountered to a certain extent in all public buildings :
- Common passageways: corridors, entrance halls, stairwells
- Meeting, seminar or conference rooms
- School refectories, company canteens
- Entertainments rooms, reception halls or multi-purpose halls
- Music rooms or cinemas

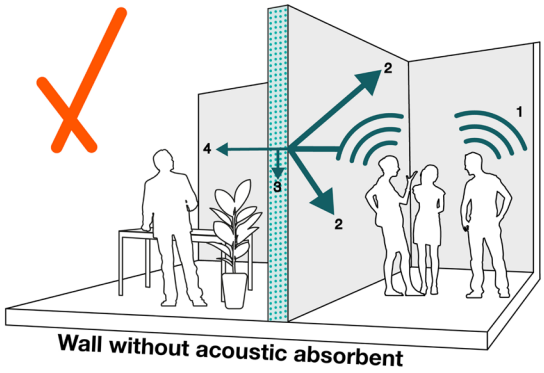
The same also applies to private living areas where specific sound properties are required :
- Home cinema, music rooms, children's play areas, reception rooms

The benefits : an acoustic treatment for every use

- Improve the clarity of a sound (music room) or the intelligibility of a voice (conference room)
- Promote concentration (open space office) or communication (restaurant)
- Create a confidential space (meeting room)

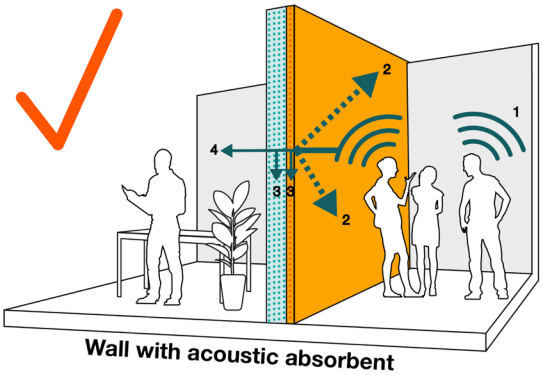
2. The solution to high sound reverberation Acoustic wallcoverings

a. General theory of sound reverberation



Wall without acoustic absorbent

1 **Sound energy**
2 **Sound energy reflected in the same room**
3 **Sound energy dispersed or spread to other walls**
4 **Sound energy spread to adjoining room**



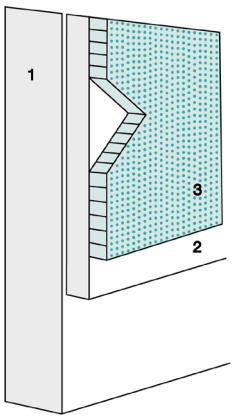
Wall with acoustic absorbent

1 **Sound energy**
2 **Reduced sound energy**
3 **Identical sound energy dispersed**
4 **Identical sound energy dispersed**

The effect of reverberation is even greater when the room is big and the walls are hard and smooth (glass, tiles, concrete ...).

In order to reduce the amount of sound reverberation in a room, the frequencies that make up the noise must be reduced by the absorbent materials.
Acoustic absorption is therefore ensured by thick and porous components of the wallcovering: Fleece or foam as shown in the diagram below.

Technical diagram of an acoustic wallcovering



***1* Wall**
***2* Non-woven fleece or foam**
***3* PVC foam or micro-perforated textile surface**

b. Evaluating absorption

The absorption capacity of the wallcovering is measured by an absorption coefficient : Sabine alpha (or Alpha S). This is the ratio of sound energy absorbed over energy emitted. For example, if, for a given frequency, the wallcovering absorbs 60% of the energy emitted, we can say that alpha S=0.6

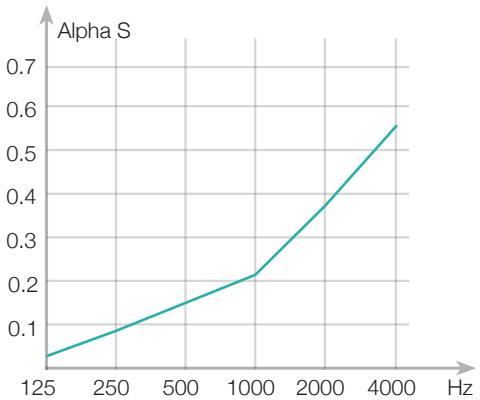
The general performance level of the wallcovering is expressed as a value Alpha W, which is the weighted absorption index (measured over a range of representative frequencies). For example, a value Alpha W of 0.3 shows that the wallcovering absorbs on average 30% of the sound energy.

Evaluating sound absorption is carried out in compliance with International standards NF EN ISO 354 and 11654.

The absorption properties of the wallcovering differ according to sound frequencies. It is therefore necessary to define the absorption coefficients –alpha S– for various frequencies that are characteristic of sources of noise. The range of frequencies tested (125 to 4 000 Hz) is set forth in the standard ISO 354.

Example of values obtained by the Vinacoustic wallcovering Alpha W=0.25
The Vinacoustic collection absorbs up to 38% of the average sound energy emitted by a human voice of 2000 Hz.

Absorption curve



Frequency in Hertz	Reverberation time (in seconds)		Alpha-S Coefficient
	Empty room	Room with Vinacoustic	
125	3.96	3.87	0.02
250	5.18	4.40	0.09
500	6.09	4.36	0.17
1000	5.80	3.78	0.24
2000	5.03	2.88	0.38
4000	3.83	2.10	0.56

IAC Sim engineering test report No. 138G04-12

2 IN 1 : A DECORATIVE SOLUTION WITH ACOUSTIC PROPERTIES = A COST-EFFECTIVE SOLUTION

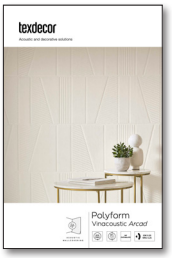
2 complementary ranges for use in all situations... providing the right atmosphere for all settings

- **Vinacoustic : αw 0.25**

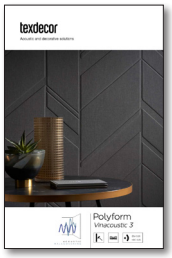
PVC finish : extremely shock-resistant and washable, these wallcoverings are perfect for use in intensive situations.

Vinacoustic Stone

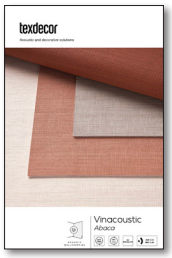
Polyform Vinacoustic Eole



Polyform Vinacoustic Arcad

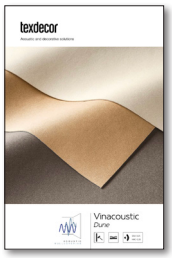


Polyform Vinacoustic Gallery



Vinacoustic Abaca

Vinacoustic Melia



Vinacoustic Dune

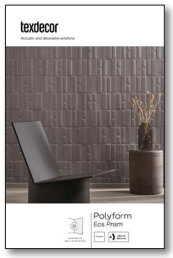
Vinacoustic Tivoli

Vinacoustic Linen

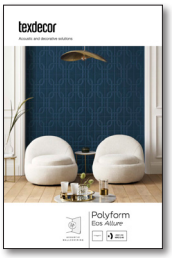
- **Eos : αw 0.30**

Textile finish : to create an elegant and warm atmosphere.

Eos Naturals



Polyform Eos Prism



Polyform Eos Allure

Polyform Eos Vertigo

Eos Color 2

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