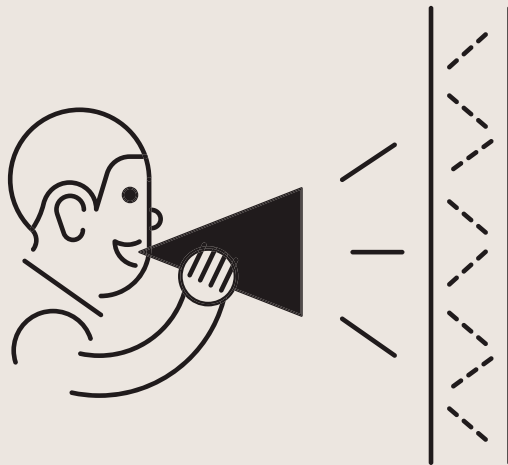
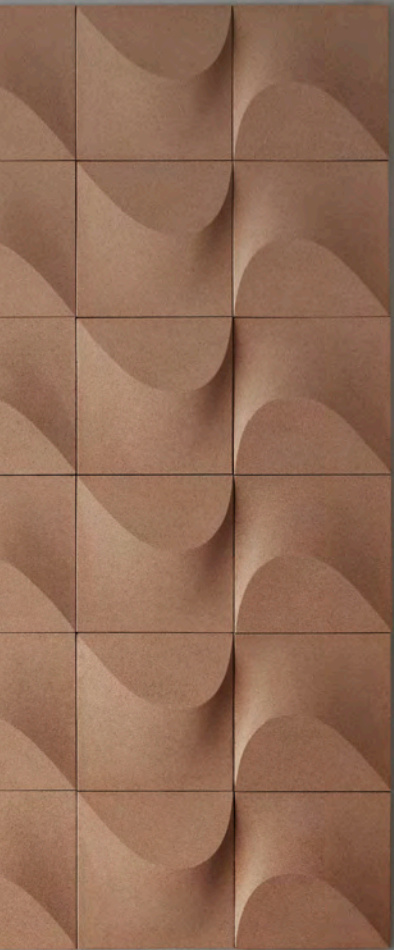


abstracta

The guide to a better soundscape



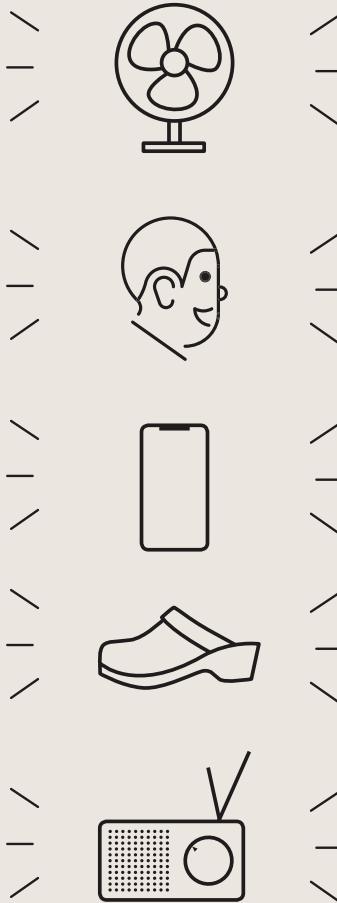




1.

What is a soundscape?

Simply put, the word soundscape refers to how we experience a given environment with our hearing. In recent years, the awareness of how everyday sounds affect us has grown steadily. This has been accompanied by an increasing interest in how design can be used to reduce noise and create better soundscapes. At Abstracta, we're very pleased about this because we know how important soundscapes are – both to our well-being and to how well we perform at work. We're also pleased to be at the forefront of innovation in this area.



We believe the future lies in perceiving an interior space holistically, as both a visual environment and a soundscape. Soon, designing furniture and interiors not only for our eyes but for our ears will be the standard.





2.

The soundscape affects our well-being



Every day, we are surrounded by sounds that may negatively affect our well-being and cognitive abilities: chattering colleagues, email pings, phone rings, fans, and echoing footsteps. Too much noise makes us stressed out and fatigued. Studies show that noisy soundscapes decrease our cognitive performance by as much as 14 % – compared with how well we perform in harmonious environments.

Often, the major cause of a bad acoustic environment is that the reverberation time – the time it takes for a sound to fade away – is too long in relation to the size of the room. This is a common problem in environments such as open space offices, schools, restaurants, and meeting halls.

The source of the problem is that many spaces are dominated by hard surfaces, such as glass, stone, concrete, and MDF board – all materials that reflect sound waves, thereby causing them to remain and reverberate longer. There is, however, several ways to radically improve the soundscape in such environments, and thus to enhance well-being and performance.







3.

What is acoustics?

**Acoustics is the science of audible sound.
The word acoustics derives from the
Greek "to make oneself heard"**

Definition of sound

Sound is pressure waves in the air. The sounds have different characteristics because of differences in wavelength. They are defined as either short, middle, or long. The frequency of the wavelength is measured in Hertz (Hz). Low frequency waves have dark tones and high frequency waves high tones.



Low frequency

Long sound waves, dark tones such as vowels or ventilation-fans.

50 – 250 Hz



Mid range frequency

Mid length sound waves, mid tones such as normal speech.

250 – 2500 Hz



High frequency

Short sound waves, light tones such as consonants and ringtones.

2500 – 12000 Hz

Sound loudness is measured in decibels (dB)

When talking about good or bad acoustic in a room you can talk about two things – the noise level and the echo effect. The noise level or sound loudness is measured in decibels, (dB).

A normal conversation is about 60 dB, a heavy vehicle is about 90 dB, and a commercial jet plane is about 125 dB.

140 dB



Pain Threshold

125 dB



Commercial jet

90 dB



Heavy vehicle

65 dB



Office

35 dB



Library

15 dB



Deciduous forest

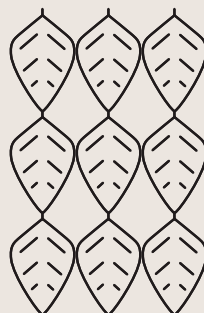
Acoustic products efficiency in decreasing the sound loudness

The dB scale is logarithmic which means that a doubling of the sound intensity will result in an increase of 3 dB. A decrease to half of the sound intensity will result in a 3 dB reduction.

Reducing the sound loudness is one obvious way to create a better soundscape. To decrease the reverberation time is another.

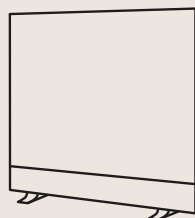
Hanging absorbers

2–5 dB, Airleaf



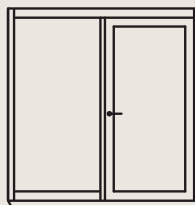
Floor screens

13–15 dB, Chubby



Silent rooms

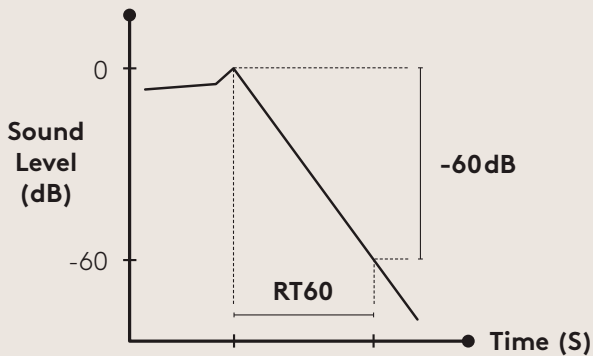
30–36 dB, Plenty Pod



Reverberation time

The next step in the process of achieving a pleasant soundscape is to reduce the echo effect in a room, also known as the reverberation time.

Smooth bare walls, floors, ceilings or other similar surfaces reflect the sound waves, and the sound bounces right back, causing a diffuse echo that is unpleasant.



How to measure the reverberation time

The reverberation time (RT60) is the time interval within which the sound level in a room has faded away by 60 dB. Typical reverberation times: a normal room: 0.5 s, concert hall: 0.8–1.5 s, church: 1–2.5 s.

It is determined by how much sound is absorbed into the room's acoustic surfaces and furniture relative to the room volume. The mathematical description is called Sabine's formula.

$$T_{RT60} = \frac{V \times 0.161}{A}$$

T_{RT60} = Time, V = room volume, A = equivalent absorption area

What reverberation times are we aiming for?

Maximum reverberation time requirements for different types of rooms*

Class rooms, lecture rooms, study rooms	0,6 s
Conference rooms	0,6 s
Educational landscapes	0,4 s
Music rooms, drama rooms	0,8 s
Gym, swimming pools	1,5 s
Craft rooms, technology rooms, utility rooms	0,5 s
Dining rooms, restaurants, cafeterias larger than 100 m²	0,6 s
Living rooms, staff rooms, offices, expeditions, libraries	0,6 s
Corridors, entrances, copy rooms	0,8 s

*Swedish Standard · SS 25268

Acoustics - Sound classification of spaces in buildings - Institutional premises, rooms for education, preschools and leisure-time centres, rooms for office work and hotels.





4.

How to create better soundscapes

The three primary methods of reducing the actual noise level and reverberation time in a room are acoustic absorption, diffusion and attenuation. Many of our products feature combinations of these methods, such as absorption together with diffusion, or absorption twinned with attenuation.



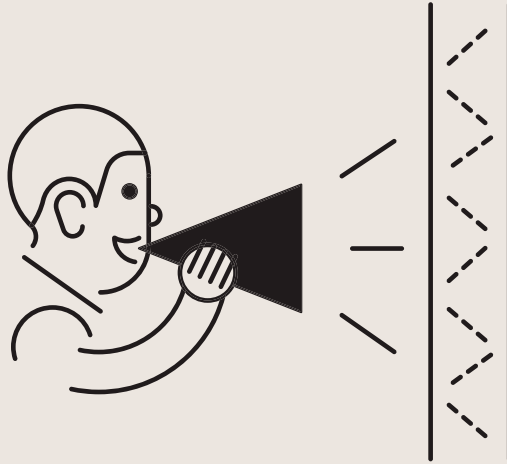
Absorption



Diffusion

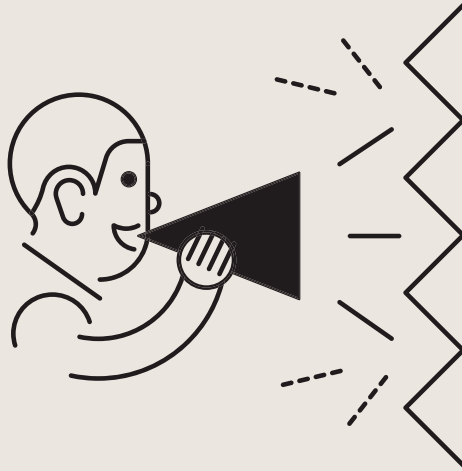


Attenuation



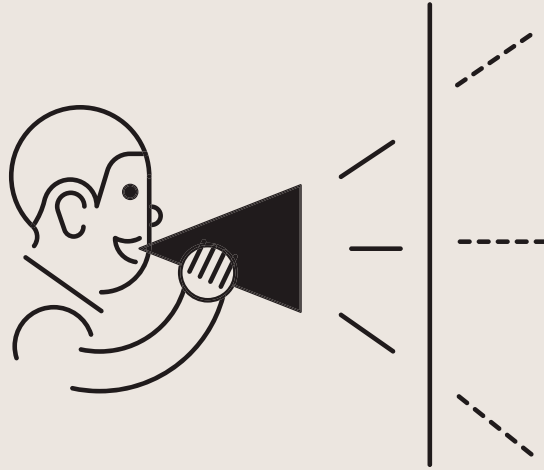
Absorption

In this case, sound waves are absorbed by the surface, rather than bouncing off it, and are converted into heat energy. Generally speaking, porous or soft surface materials such as textiles contribute to sound absorption. Hard surfaces like glass or concrete reflect sound and thus create echoes. By using our absorption solutions, such as cloth-upholstered screens or wall panels that feature a sound-absorbent core, it is easy to balance the presence of hard materials, shorten reverberation times, and thereby create a more harmonious soundscape.



Diffusion

In addition to the combination of materials that go into a piece of furniture, the structure or texture of its surfaces, and its shape affect ambient sound, as well. A hard surface that is also entirely flat will reflect sound directly, but one that is pleated or waved will weaken sound waves by dispersing them in various reflective directions. The effect is called diffusion. Using this method, sound waves are fragmented rather than broken down. By combining the method of diffusion with that of absorption, it is possible to create a harmonious soundscape.



Attenuation

This method, also known as dampening, involves dividing a soundscape into discrete acoustic zones using different types of barriers that prevent sound from travelling unobstructed between, for example, two workstations. The most radical way of working with acoustic attenuation in an office space is to install silent rooms – such as Plenty Pod, which completely prevents sound from entering or exiting. Another way is to use screens. They can lower noise levels by up to 15 dB. Normally, office noise levels are around 65 dB, so a reduction of 15 dB is very considerable. By comparison, a conventional wall attenuates noise by about 35 dB.





5.

**Acoustics
assortment
range**

Floor screens

Table screens

Hanging & ceiling absorbers

Wall absorbers

Quiet rooms

Acoustic furniture & lightings

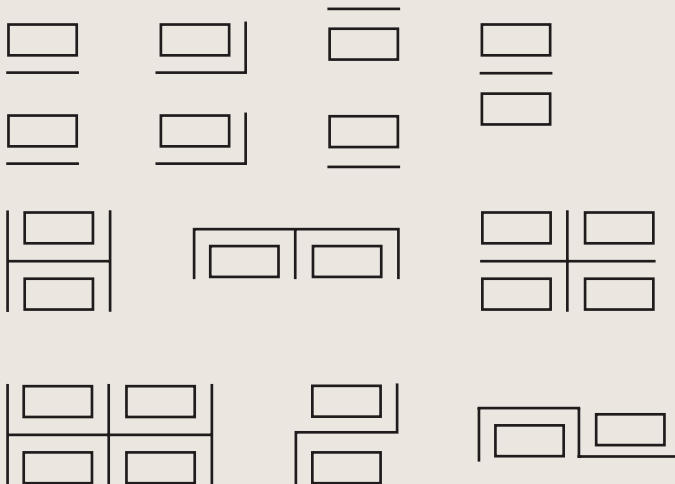


Floor screens

Classic floor screens creates spatiality and solves acoustical problems. Our floor screens can be assembled into systems for an easy way to create better soundscapes at work. Screens are the perfect product for open office landscapes.

Table screens

Table screens work in the same way as floor screens. They are mounted to desks instead of the floor. Table screens are smaller than floor screens, and therefore not as efficient as floor screens.



Possible combinations for floor- and table screens.

Hanging & ceiling absorbers

In situations in which traditional screens are not the optional solution, hanging or ceiling absorbers work excellent.

Wall absorbers

Wall mounted absorbent are often a suitable option for environments in which traditional screens does not work. They can either be displayed almost as works of art, or they can be adopted to fit discretely into the background.

Quiet rooms

When you need a quiet room for an undisturbed meeting, working or an important phone call Plenty Pod is the solution. Plenty Pod is a series of mobile, quiet rooms. They are especially suited for noisy areas such as open-plan offices and public spaces.

Acoustic furniture & lightings

Furniture in combination with an acoustic funtion is a very efficient way to improve a space. Hard table tops reflect and amplify ambient noise. That is something Abstracta is challenging with our acoustic tabletop material Strata. We have also a range of acoustics lamps to accompany the rest of our acoustic products.





6.

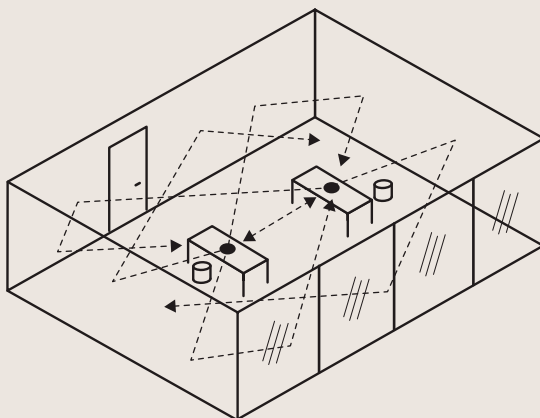
Room environments

Different environments require different types of acoustic products.

On the following pages we give you examples how to reduce the reverberation times and create better soundscapes.

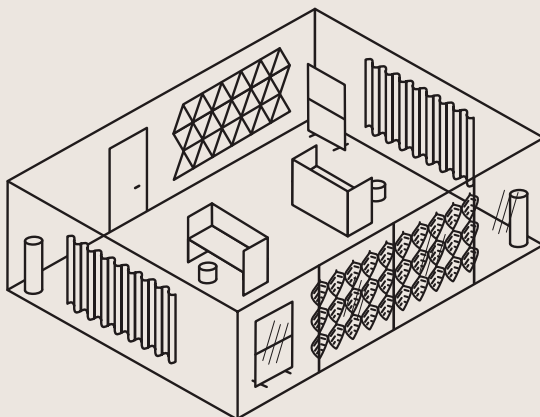
A room with no acoustic treatment

The soundwaves can move freely and bounce through all the walls in the room. The reverberant time is therefore very long.



A room with good acoustic solutions

Wall absorbers, acoustic table screens and hanging absorbers take control of the reverberant time in the room and make the environment a pleasant place where there is much easier to be productive and focused.

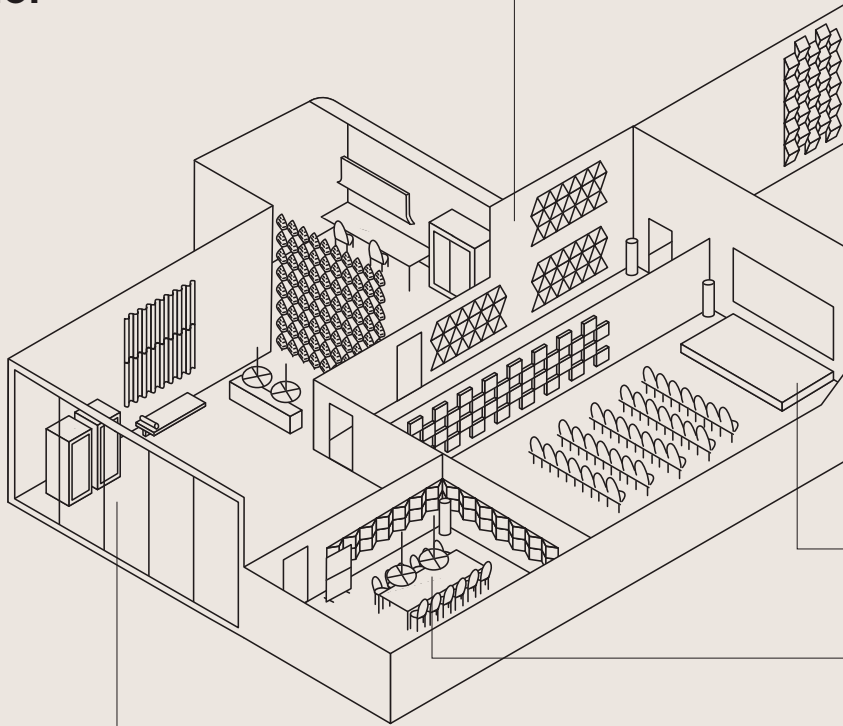


Different environments require dif

Activity based area / Agility

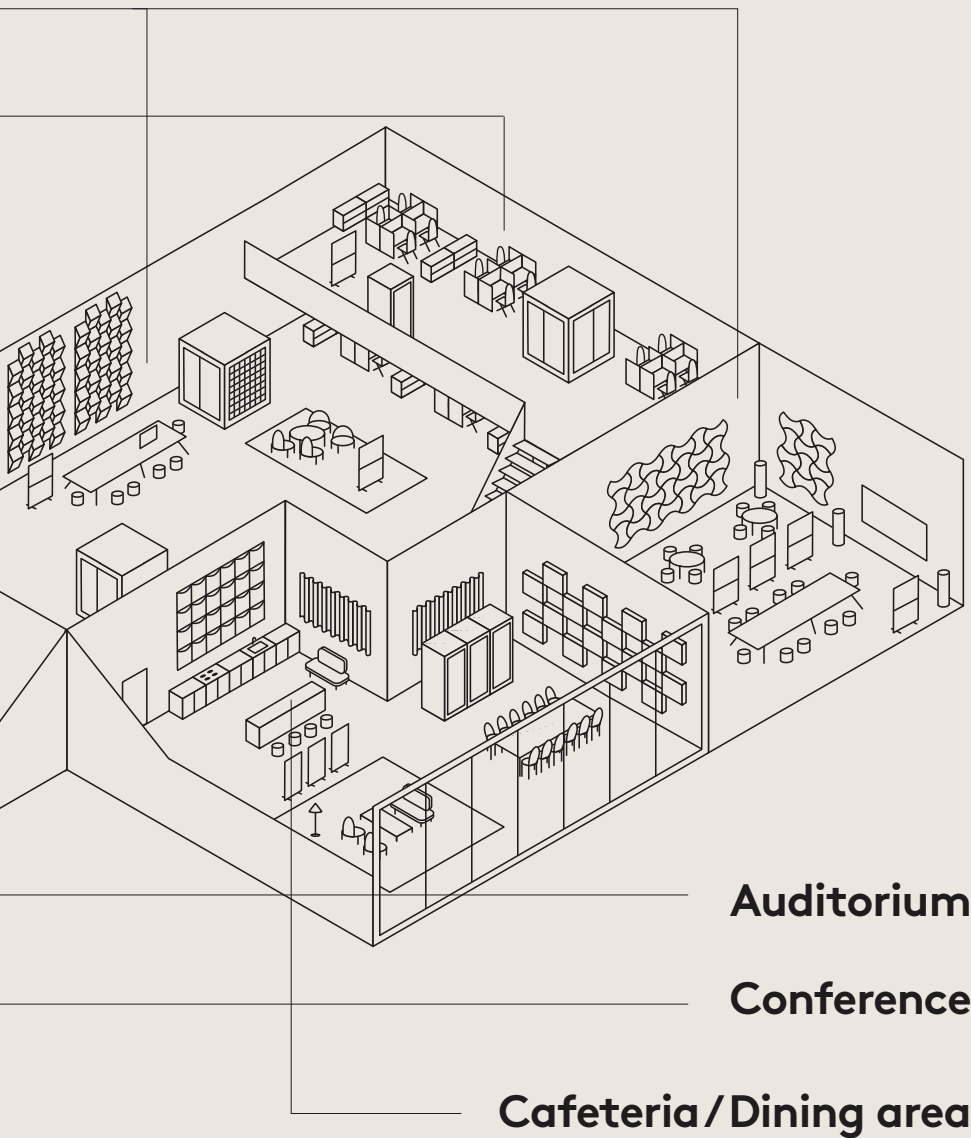
Work spaces

Corridor



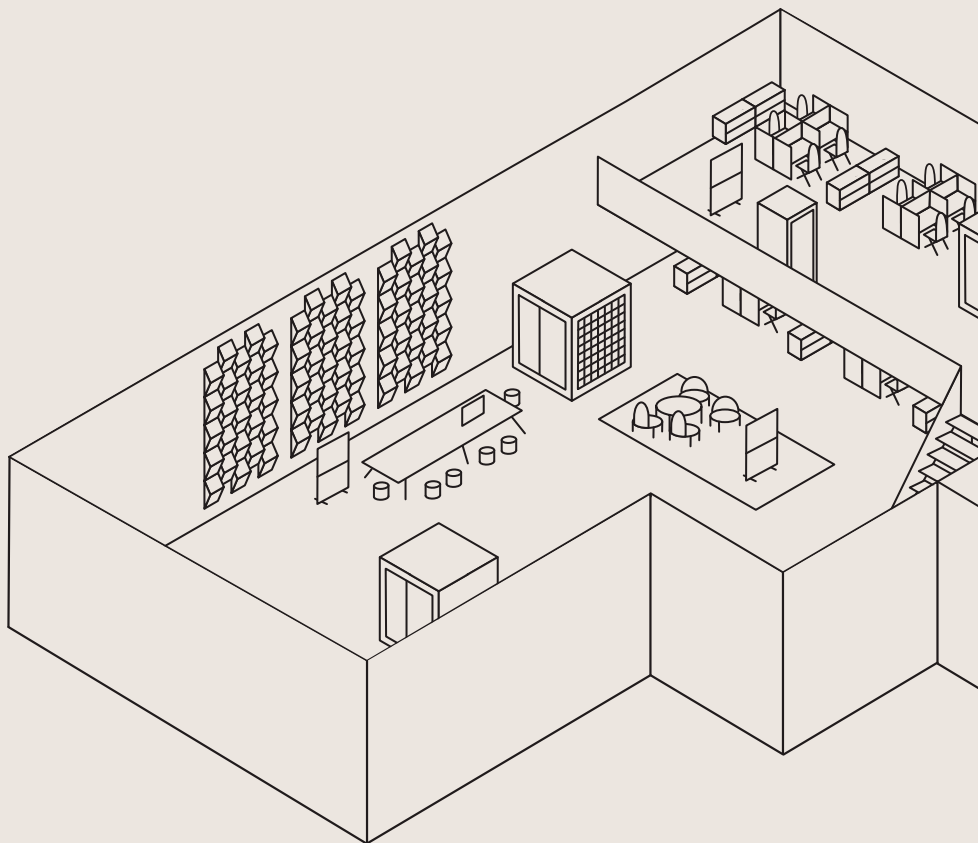
Lobby / Entrance

ifferent types of acoustic products.



Activity based area/Agility

Trying to concentrate in a noisy environment can be very stressful, and the major reason why open plan offices need to take extra care of the acoustic situation. Stop the sound at the source by using different type of acoustic products, such as screens and wall absorbers. A mobile quiet room works well in an open office. The quiet room modules are perfect for meetings and for tasks that demands concentration and focus. Other acoustic solutions for activity based areas are acoustic tables, acoustic seatings and acoustic lamps.



Work spaces

To create a better acoustic environment within a more traditional work space, consider the use of different acoustic solutions to create a highly functional space that both dampens and diffuses the noise. Another smart solution is a multi purpose product such as a writing board and floor screen combined.

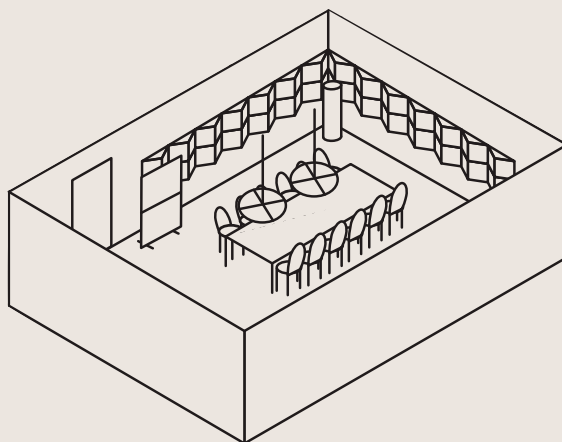
To create an even more effective acoustic environment, don't forget to use the ceiling as an absorbing surface. See the simple yet ingenious design of Abstractas ceiling panel Sky that works effective in ceilings metal constructions and is easy to rearrange without any tools, just with the use of magnets.

Example of product types: acoustic wall panels, acoustic pods, table screens, floor screens, acoustic table tops, Acoustic stools, ceiling and hanging absorbers.



Conference

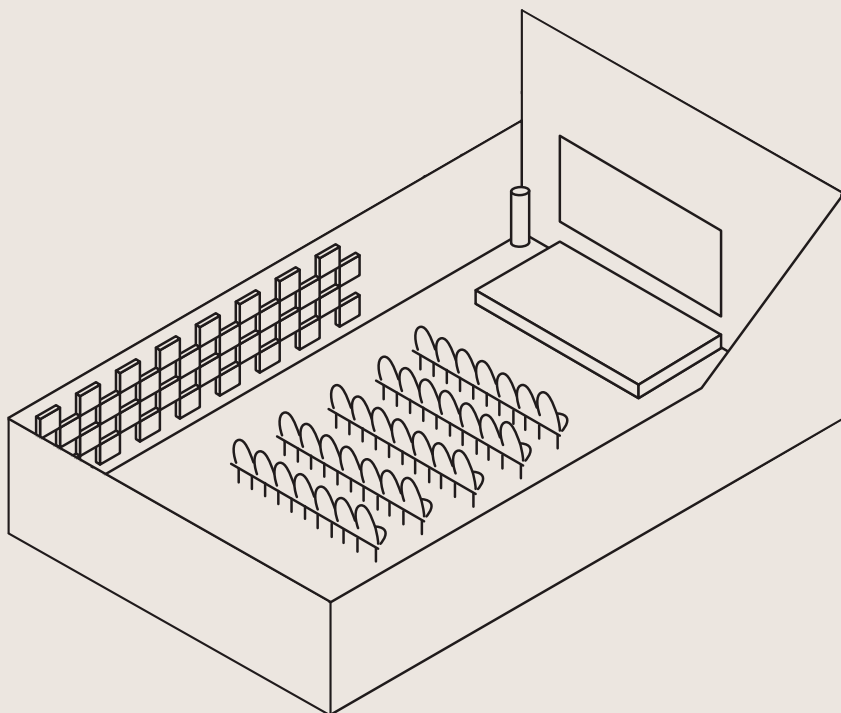
A typical conference room is almost unbareble without acoustic products. A very efficient way to use acoustic wall panels is by placing them pependicular to one another as the sound will then absorb faster and better than with parallell placing. Acoustic table tops and acoustic lamps are really helpful in this type of setup as a large table affects the acoustic environment very much. It is also wise to use a floor screen with white board for extra efficiency. If there are fans or other disturbing base sounds in the room, a good idea is to place base pillars in the corners of the room.

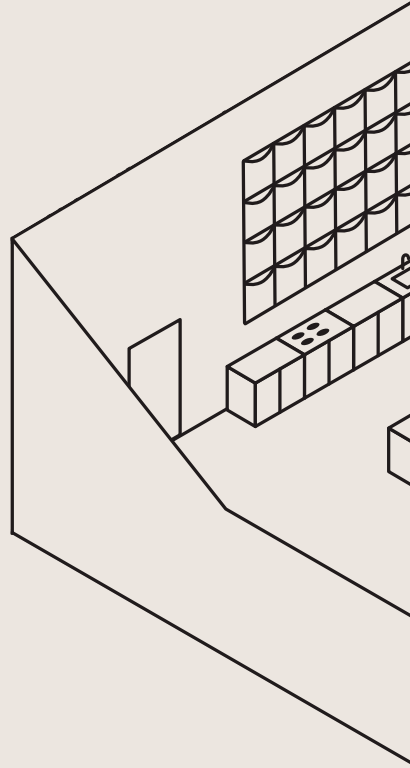


Auditorium

In an auditorium or a room used as an auditorium at times, an effective acoustic wall panel is almost a necessity to decrease the echo effect in a big room. This should be used on the sides and on the back wall if possible. To minimize reverberation time even more, an acoustic ceiling product or an acoustic lamp is money well spent. Acoustic base pillars in the corners are very effective for dampening the low frequency base sounds that can be very disturbing.

Example of product types: Acoustic wall panels, acoustic lamps, acoustic pillars and acoustic ceilings.

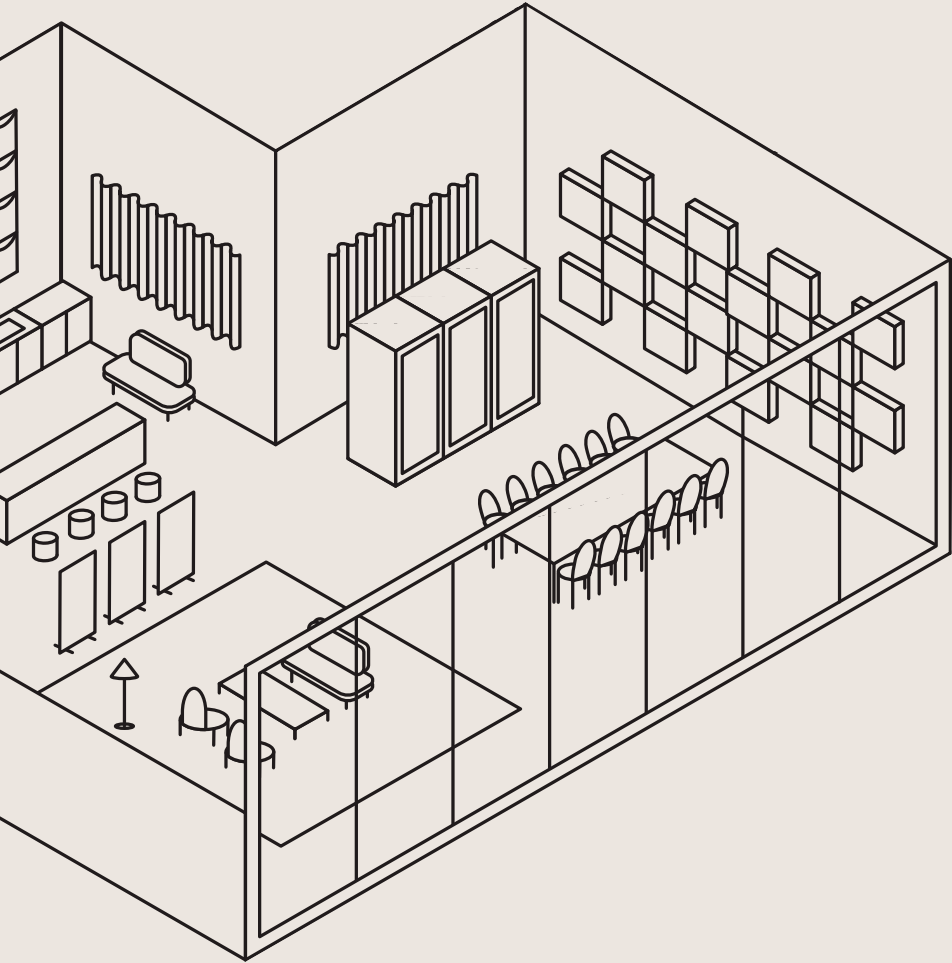




Cafeteria/Dining area

Noise in dining areas or restaurants can be very demanding when it comes to the acoustics. Modern interior are often large open spaces combined with hard surfaces such as big glass windows, floor etc. Many restaurant customers take the acoustic experience in consideration when rewieving a dine out. Here you need to take the whole environment in consideration when designing the space. Effective acostic wall panels on one or two walls at least and an acoustic ceiling is a good start. Wall dividers and smart acoustic furniture such as acoustic lamps, acoustic table tops and upholstered chairs and stools will all contribute to a more pleasant over all experience.

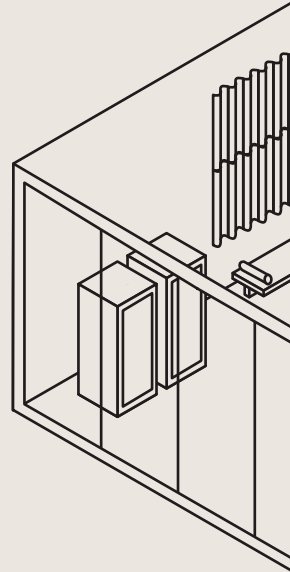
Example of product types: acoustic wall panels, acoustic furniture, floor screens, acoustic table tops, hanging absorbers and acoustic lamps.



Lobby/Entrance area

Spaces such as waiting rooms, reception halls, and lobbies at hospitals or hotels, have changed radically in the digital era. Today, they are used for all kinds of activities. Here you can work with elegant and efficient wall panels combined with acoustic ceiling products and acoustic lamps. With Plenty Pod, people can make phone calls and have one-to-one conversations in privacy, without bothering others.

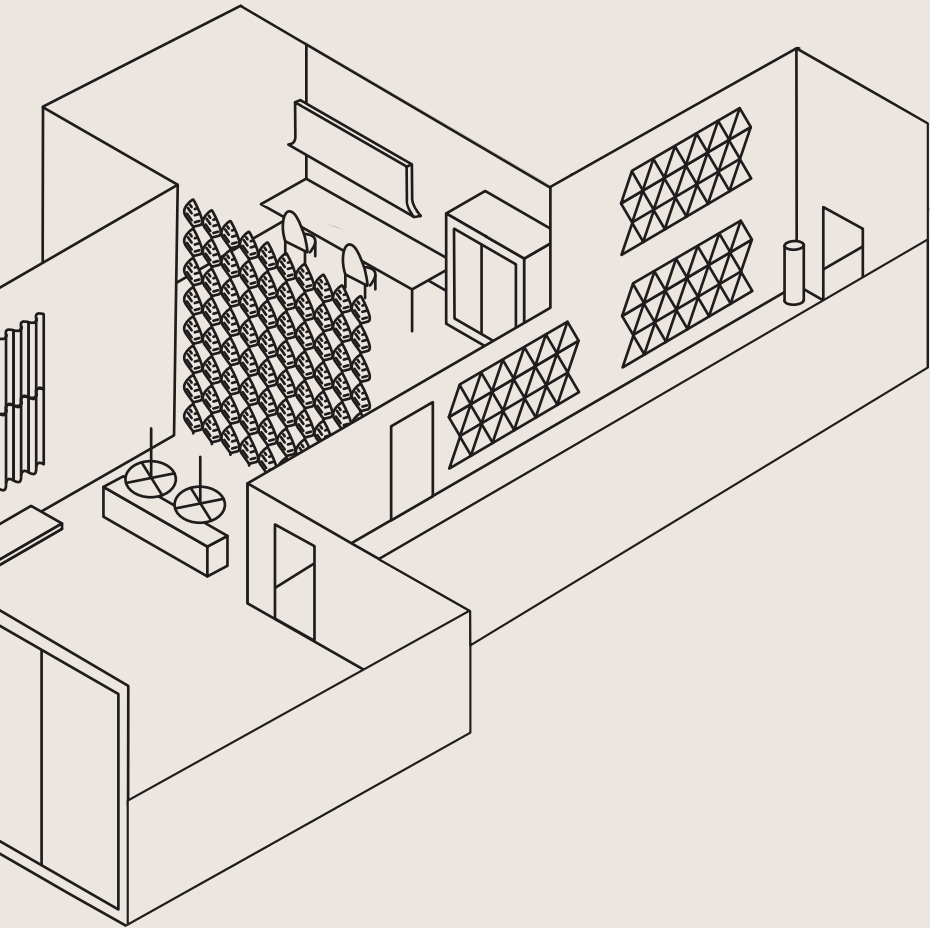
Example of product types: quiet rooms, acoustic wall panels, acoustic floor screens, hanging- and ceiling absorbers.



Corridor

The space that are often used as a passage can often be forgotten when it comes to the acoustics. Here you should always consider a really effective wall absorber for both absorption and diffusion. A soft flooring or a runner will also help to stop the sound. Partitions such as a floor screen helps to stop the sound from travelling. Acoustic lamps och acoustic ceiling combined with acoustic pillar helps to absorb sound and take down the base frequencies in this type of room.

Example of product types: Acoustic wall panels, Acoustic lamps, Acoustic ceilings and acoustic base pillars.







7.

Acoustic products

**Following pages show Abstractas
acoustic products overview.**

Table screens



Domo Table
Design: Stefan Borselius

Measurements WxHxD (mm)
800/1000/1200/1400/1600/
1800/2000x650x40

Material
Sound-absorbing filling in a solid wood frame upholstered with fabric. Aluminium fittings.

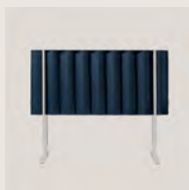


Absorption



Attenuation

acoustic facts



Scala Table
Design: Anya Sebton

Measurements WxH (mm)
758/1207/1358/1509/1810x605

Material
Moulded felt with a sound-absorbing core held by a white- or black lacquered steel tube stand.



Absorption



Attenuation

acoustic facts



Softline Table
Design: Abstracta

Measurements WxHxD (mm)
Softline table (over table): 600/800/1000/
1200/1400/1600/1800/2000x450/590x30
Softline modesty panel: 600/800/1000/
1200/1400/1600/1800/2000x650x30
Softline mobile table screen: 600/800/
1000/1200/1400/1600x450x30

Material
Upholstered wood frame with a sound-absorbing filling. Grey-, black- or white lacquered metal fittings.



Absorption



Attenuation

acoustic facts

MÖBELFAKTA



Soneo Table
Design: Abstracta

Measurements WxHxD (mm)
800/1000/1200/1400/1600/
1800/2000x600/650x30/50

Material
Upholstered wood frame with a sound-absorbing filling. Metal table fittings.



Absorption



Attenuation

acoustic facts

MÖBELFAKTA



Stitch Table
Design: Stefan Borselius

Measurements WxHxD (mm)
860/1460/1660/1860x650x85

Material
Upholstered wood frame with a sound-absorbing filling. Covering made of fabric and a fibre filling. Metal table fittings.



Absorption



Attenuation

acoustic facts

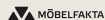




Floor screens



Alumi Combi
Design: Nina Jobs



Measurements WxHxD (mm)

Alumi combi screen
796x1905x63
1206x1905x63
1463x1905x63

Alumi combi light screen

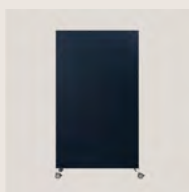
1190x2006x63
1190x1806x63
806x2006x63
806x1806x63



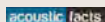
Absorption



Attenuation



Alumi Floor
Design: Nina Jobs



Measurements WxHxD (mm)

806x1306/1506/1806/2006x63
1206x1306/1506/1806/2006x63
1406x1306/1506/1806/2006x63

Material

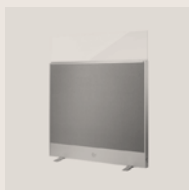
Aluminium frame filled with a sound-absorbing core. Upholstered with compressed felt or fabric. Aluminium legs with or without lockable wheels.



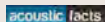
Absorption



Attenuation



Chubby Floor
Design: Abstracta



Measurements WxHxD (mm)

Without glass top:
1200/1400/1600/1800/2000/2200/
2400x1430x88
With glass top:
1200/1400/1600/1800/2000/2200/
2400x1830x88

Material

Aluminium frame filled with a sound-absorbing core. Upholstered with fabric. Aluminium legs. With or without glass top.



Absorption



Attenuation



dB
Design: Thomas
Bernstrand



Measurements WxHxD (mm)

800x1565x165 (dB floor screen)
800x1815x165 (dB screen with whiteboard)
800x1565x165 (dB screen with corkboard)

Material

Screens with metal base. Whiteboard with magnetic e3 enamel, cork board or upholstered with fabric.



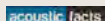
Absorption



Attenuation



Domo Floor
Design: Stefan Borselius



Measurements WxHxD (mm)

864/1064/1264/1464/1664x1400x40
864/1064/1264/1464x1600x40

Material

Sound-absorbing filling in a solid wood frame upholstered with fabric. Aluminium legs.



Absorption




Attenuation

Floor screens



My Hive
Design: Poul Christensen

 MÖBELFAKTA

Measurements WxHxD (mm)

Workstation/Sofa
My Hive 120: 2010x1350x805
My Hive 90: 1610x1350x810

Material

Upholstered frame with a sound-absorbing filling. Fixed or height-adjustable desk is made of white laminate. Concealed cables/mechanism.



Absorption



Attenuation



Scala Floor
Design: Anya Sebton



Measurements WxHxD (mm)

603x1650
905x1650
1207x1650

Material

Moulded felt with a sound-absorbing core held by a white- or black lacquered steel tube stand.



Absorption



Attenuation



Softline Floor
Design: Abstracta



 MÖBELFAKTA

Measurements WxHxD (mm)

800x1360/1500/1700x30/50
1000x1360/1500/1700x30/50
1200x1360/1500/1700x30/50

Material

Upholstered wood frame with a sound-absorbing filling. Grey-, black- or white lacquered metal feet with or without wheels.



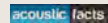
Absorption



Attenuation



Soneo Floor
Design: Abstracta



 MÖBELFAKTA

Measurements WxHxD (mm)

800x1360/1500/1700x50
1000x1360/1500/1700x50
1200x1360/1500/1700x50
800/1000/1200x1500x30

Material

Upholstered wood frame with a sound-absorbing filling. Grey-, black- or white lacquered metal feet with or without wheels.



Absorption



Attenuation



Stitch Floor
Design: Stefan Borselius



Measurements WxHxD (mm)

810x1540x85
1060x1540x85
1310x1540x85

Material

Upholstered wood frame with a sound-absorbing filling. Covering made of fabric and a fibre filling. Legs have a steel structure and ash shell.

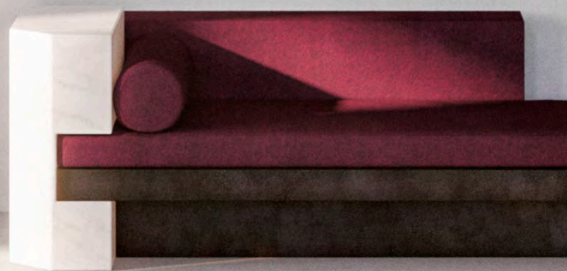
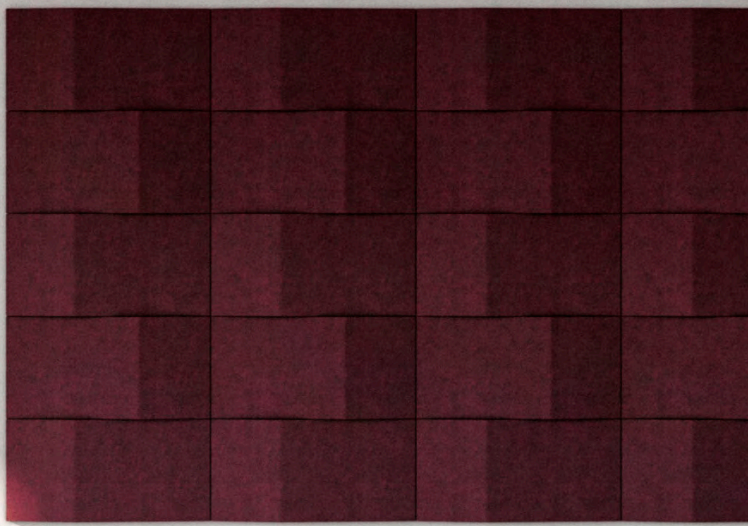


Absorption



Attenuation



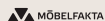


Wall absorbers



Bits Wall
Design: Anya Sebton

acoustic facts

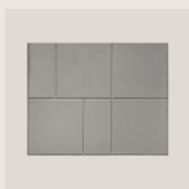


Measurements WxHxD (mm)
575x510x100

Material
Sound-absorbing polyester fibre upholstered with fabric. Concealed metal brackets.

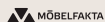


Absorption



Domo Wall
Design: Stefan Borselius

acoustic facts



Measurements WxHxD (mm)
600x600x34
600x1200x34
1200x1200x34

Material
Sound-absorbing filling mounted on a solid wooden frame upholstered with fabric. Concealed metal brackets.

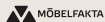


Absorption



Scala Wall
Design: Anya Sebton

acoustic facts

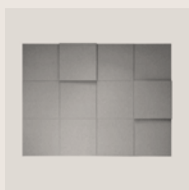


Measurements WxH (mm)
1207x1600 1600x603
1600x1207 603x800
603x2300 800x603
2300x630 1207x800
603x1600 800x1207
1207x2300

Material
Sound-absorbing filling upholstered with fabric. Concealed metal brackets.

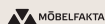


Absorption



Soneo Wall
Design: Abstracta

acoustic facts

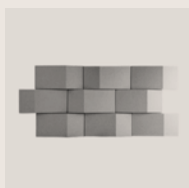


Measurements WxHxD (mm)
500x500x30/50/100
600x600x50/100
800x800x50/100
1000x1000x30/50/100
500x1000x30/50/100

Material
Sound-absorbing filling mounted on a solid wooden frame upholstered with fabric. Concealed metal brackets.

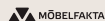


Absorption



Triline Wall
Design: Anya Sebton

acoustic facts



Measurements WxHxD (mm)
800x400x95

Material
Sound-absorbing filling mounted on a solid wooden frame upholstered with fabric. Concealed metal brackets.



Absorption

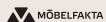
Wall absorbers



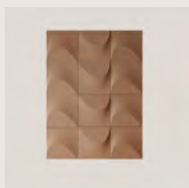
Sky Wall
Design: Stefan Borselius

Measurements WxHxD (mm)
846x591x120

Material
Felt-laminated moulded fibre felt.
Ceiling- or wall hung with magnets.



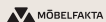
Absorption



Sahara
Design: Gabriel Tan

Measurements WxHxD (mm)
450x450x50

Material
Natural Cork



Diffusion



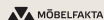


Hanging & ceiling absorbers



Airbloom
Design: Stefan Borselius

acoustic facts



Measurements WxH (mm)
477x512

Material
Felt-laminated moulded fibre felt.
Assembled together with small plastic clips. Ceiling- or wall hung with an aluminium rail.



Absorption



Attenuation



Aircone
Design: Stefan Borselius

acoustic facts



Measurements WxH (mm)
465x405 (Aircone)
405x240 (Aircone End, left or right version)

Material
Felt-laminated moulded fibre felt.
Assembled together with small plastic clips. Ceiling- or wall hung with an aluminium rail.



Absorption

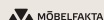


Attenuation



Airflake
Design: Stefan Borselius

acoustic facts



Measurements WxH (mm)
360x400 (Airflake blade open, blade closed, line open, line closed)

600x700 (Airflake XL, blade open)

Material
Felt-laminated moulded fibre felt.
Assembled together with small plastic clips. Ceiling- or wall hung with an aluminium rail.



Absorption

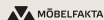


Attenuation



Airleaf
Design: Stefan Borselius

acoustic facts



Measurements WxH (mm)
290x467

Material
Felt-laminated moulded fibre felt.
Assembled together with small plastic clips. Ceiling- or wall hung with an aluminium rail.



Absorption



Attenuation



Combo Cross
Design: Pia Wallén

acoustic facts

Measurements WxHxD (mm)
600x2100x10 (Large cross, Small cross, Perforated Cross, Slits Cross, Solid)

1200x2100x10 (Large cross, Small cross, Perforated Cross, Slits Cross, Solid)

Material
Sound-absorbing filling upholstered with fabric. Suspended from ceiling by discreet wires.



Absorption



Attenuation

Hanging & ceiling absorbers



Combo Deluxe
Design: Pia Wallén

Measurements WxHxD (mm)
600x2000x10, 1000x2000x10

Material
Felt from recycled PET. Soundfelt REC BM from recycled PET and textile waste. Ecolin from renewable raw and biodegradable material. The jewelry, made from painted metal sheets.

acoustic facts



Absorption



Attenuation



Scala Ceiling
Design: Anya Sebton

Measurements WxH (mm)
1600x1207

Material
Sound-absorbing core upholstered with fabrics. Secured to the ceiling via a discrete wire.



Absorption



Attenuation



Scala Hanging
Design: Anya Sebton

Measurements WxH (mm)
1207x1600
603x1600
1207x800

Material
Sound-absorbing core upholstered with fabrics. Secured to the ceiling via a discrete wire.



Absorption



Attenuation



Sky Ceiling
Design: Stefan Borselius

Measurements WxH (mm)
846x591x120

Material
Felt-laminated moulded fibre felt. Ceiling- or wall hung with magnets.



Absorption



Attenuation

MÖBELFAKTA





Acoustic furniture & lightings



Domo Wall Booth
Design: Stefan Borselius

Measurements WxHxD (mm)
1155x790x665

Material
Walls/Ceiling is made of upholstered wooden frame with sound-absorbing filling. Concealed metal brackets. Shelf in white-painted MDF. With or without integrated lighting.



Absorption



Attenuation



Jetty
Design: Staffan Holm

Measurements LxWxH (mm)
2400x1200x740/900
2400x1400x740/900

4800x1200x740/900
4800x1400x740/900

Material
Legs are made of anodised aluminium. Strata sound-absorbing table top.



Absorption



Lily
Design: Runa Klock & Hallgeir Homstvedt


Measurements WxH (mm)
1200x61

Material
Moulded felt fabric with sound-absorbing filling. The base comes in two varieties White base or BioPhon base. Suspended from the ceiling with a metal wire. Lily is available with or without the actual lamp.



Absorption



 MÖBELFAKTA

Quiet rooms



Plenty Pod
Design: Abstracta

Measurements WxHxD (mm)
Small: 1200x2200/2315x1200
Medium: 1200x2200/2315x2200
Large: 2215x2200/2315x2200

Material
Frame made of aluminium in several lacquered colours. Interior walls with a sound-absorbing core upholstered with felt boards. Ventilation, led-lights and electric socket. With or without interior floor.



Absorption



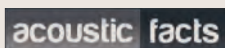
Attenuation

Acousticfacts.com

All of Abstracta's products are listed at acousticfacts.com

Acousticfacts.com is an initiative to raise the quality with which interior design companies account for acoustic properties on their products, so that a correct and factual comparison between two different products can be done directly. This is a guarantee for you as a customer that all technical data are correct and they fulfil international, European and Swedish standards. If you want to know more about the acoustic data of our products, please visit www.acousticfacts.com

We collaborate with SP regarding tests on stability, durability, emissions, fire safety and sound.







We create better soundscapes.