Enhance the workplace

with Activity Based Acoustic Design

Ecophon®
SAINT-GOBAIN
A SOUND EFFECT ON PEOPLE

Bring the outdoors in

to enhance wellbeing and performance

Over hundreds of thousands of years, our ears have evolved for us to hear perfectly outdoors, in nature. But today most of us spend up to 90 per cent of our time indoors. For more than 50 years Ecophon has been on a mission to spread awareness of the importance of creating indoor environments that resemble what we experience in nature.

So, what do you need to consider when designing an office? Well, the first thing is that people will most likely perform a vast variety of activities in that office. There will at any given time be people talking on the phone, working in teams, having meetings, doing tasks in front of the computer that demand concentration or having brainstorming sessions. All these activities require their own acoustic solution. We call this Activity Based Acoustic Design. Our solutions support the activity taking place and thus enhance people's job satisfaction, job performance and overall wellbeing.

Taking care of the environment

Everything Ecophon does is about people, so naturally we strive to limit our environmental impact. Our systems are 100 per cent recyclable, and we use glass wool that is made of more than 70 per cent recycled glass and a plant-based binder. Our absorbers are very lightweight which means lower emissions from transportation. We use renewable energy in our facilities and never put any harmful additives into our water-based paints. We turn our production waste into pellets that are used for drainage.

When it comes to the indoor environment you can rest assured that our systems are completely safe. We are certified by the leading indoor climate labels and our systems are recommended by the Swedish Asthma and Allergy Association.

Ecophon – a sound effect on people.

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Activity Based Acoustic Design

makes companies more successful

Are you in an open-plan office right now? Please take a look around. Listen. Do you hear people talking on the phone? Do you hear conversations that are not relevant to you? Do you hear ventilation fans? Do you feel that these things disturb you, break your concentration and make you feel more stressed? If so, you are not alone. The undisputed number one cause of dissatisfaction in offices is sounds that you don't want to hear.[1] *Or in one word – noise.*

Instead of everybody having their own designated desk, the trend today is to design offices where you perform different activities in different areas of the office. This means you have to move as your tasks change between work that demands concentration, talking on the phone, meetings, video conferencing, teamwork, brainstorming or multitasking desk work.

However, it is not enough just to place people in different sections of an office. If you don't attend to acoustics, speech will spread throughout the office, sound will bounce off walls, ceilings and floors and create echoes, people will raise their voices to be heard and the overall sound level will escalate. Basically, you will have a poor working environment.

1 Activity

What will people be doing in the space? Be on the phone, do team work, focus in front of the computer or something else? How much time is spent communicating?

Supporting the activity

In order to create office spaces where people can perform a certain activity, and feel good doing it, Ecophon has developed Activity Based Acoustic Design. This is a method for designing indoor environments to support the level of communication and concentration that is taking place. In practice, this means defining spaces from three perspectives – activity, people and space – and finding the common ground where all perspectives benefit. The solutions are then achieved using a combination of high-quality acoustic elements.

2 People

Who are the people that will perform the activity? Are they many or few, old or young? Do they have any special needs?

3 Space

Is the space big or small? Where is it situated in the office, what spaces are next to it and what activities are performed there? Does the building have bare concrete walls, ceilings and floors? Are there fans, projectors or other sound sources in the space?

Office facts

- Noise exposure is significantly correlated to sickness absence: the more complex the task the more significant the correlation becomes[2]
- The top 25% performers are more protected from disruptions, have interruption consciousness at their workplace and have fewer phone interruptions[3]
- 60% of our time is spent on quiet concentration[4]
- It takes on average 25 minutes for a worker to return to the original task after an interruption, and another eight minutes pass until the worker has reached the same level of concentration[5]
- The cost of the people in an office is 82% of the total cost of an office over ten years of work. This is 16 times more than the cost of the physical workplace[4]

A good acoustical environment can

- Reduce adrenaline levels by 30%[6]
- Improve task motivation by 66%[6]
- Increase performance during tasks that require concentration by up to 50%[7]
- Improve mental arithmetic performance by 20%[8]

[1] KL Jensen, E Arens, L Zagreus, Proceedings: Indoor Air 2005, "Acoustical quality in office workstations, as assessed by occupants surveys".

[2] Fried et al "The joint effects of noise, job complexity and gender on employee sickness absence", Journal of Occupational and Organizational Psychology, 2002, 75, 131-144.

[3] DeMarco, Lister, "Programmer performance and the effects of the workplace", 1985, ICSE '85 Proceedings of the 8th international conference on Software engineering.

[4] Brill, Weidemann, BOSTI, "Disproving Widespread Myths about workplace design", BOSTI associates, 2001

[5] Mark, Gonzalez, "No Task Left Behind? Examining the Nature of Fragmented Work", University of California – Irvine, 2005

[6] Evans, Johnson, Cornell university, "Stress and open office noise", Journal of Applied Psychology, 2000, vol. 85, no. 5, 779-783

[7] Weinstein, University of California, Berkeley, 1974, "Effect of noise on intellectual performance", Journal of Applied Psychology 1974, vol. 59, no 5, 548-554

[8] Banbury, Berry, "The disruption office-related tasks by speech and office noise", British Journal of Psychology, 1998, 89, 499-517

Top:

Areco Sweden AB, Sweden

Photographer: Teddy Strandqvist/Studio-e.se

Right:

Cegedim Nordics, Sweden

Photographer: Teddy Strandqvist/Studio-e.se

Informal meetings

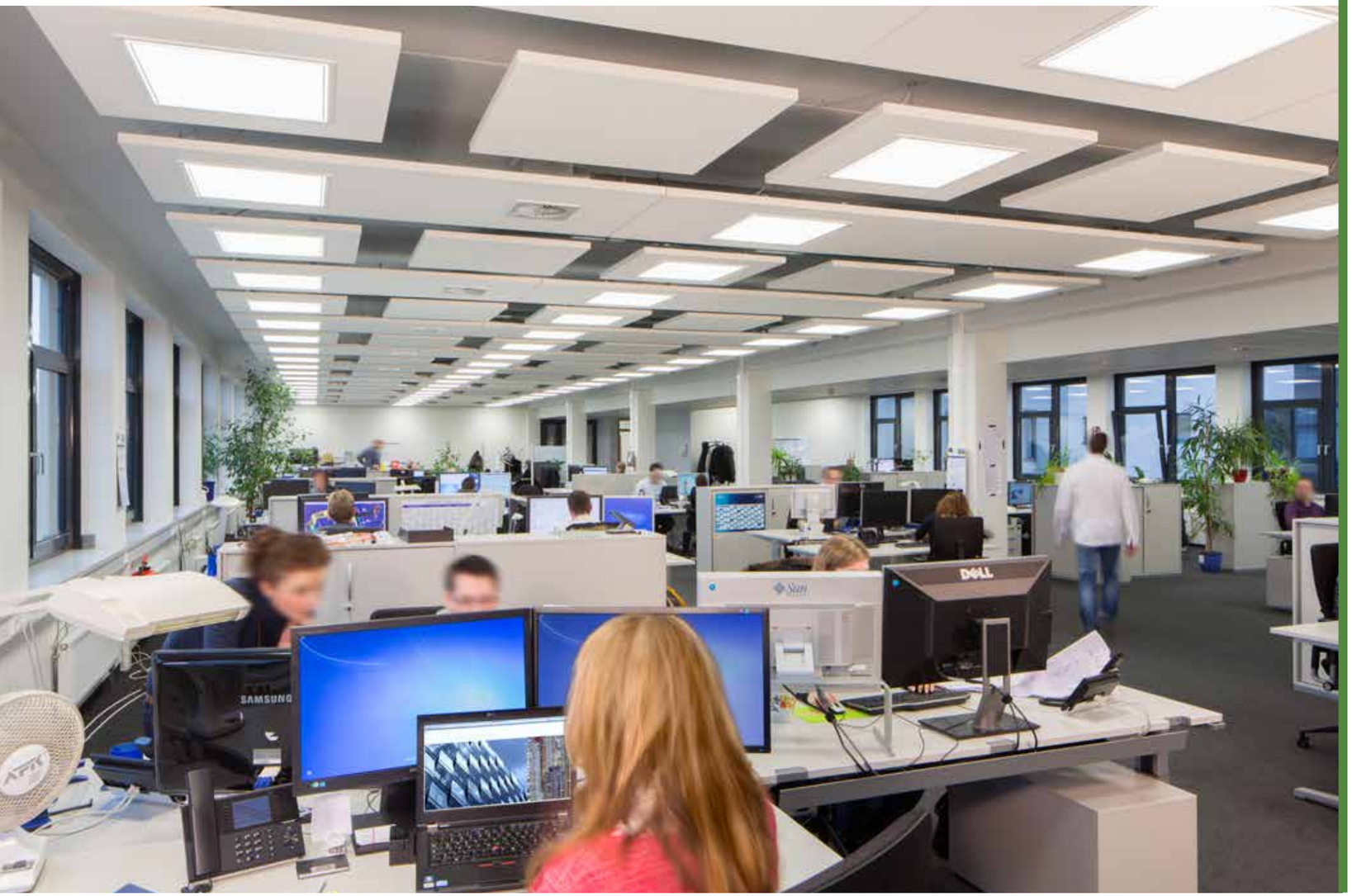
Wherever people meet, there will be informal meetings. In a typical office this is very common in canteens and breakout spaces. These spaces are often large and can have high soffits. There are often lots of people, noise from tableware and cutlery, and sounds from people talking or walking by.

Challenge: *most important is to keep the overall sound level from escalating, otherwise people will have to raise their voices significantly, just to be heard. Increased sound levels can also result in sound spreading to areas where people are working at their desks.*

Solution: *best possible coverage of sound-absorbing elements on ceiling and walls. If adjacent to workspaces, sound-absorbing screens are recommended as dividers and to prevent sound propagation. It is also recommended to think about the location of the informal meeting spaces so they are not too close to activities that demand concentration.*

Acoustic considerations:

Sound level and sound propagation



Top:

Sumitomo Electric GmbH, Germany

Photographer: Hans Georg Esch

Right:

Google Dublin EMEA HQ, Ireland

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Multitasking

Most people perform a lot of different tasks every day, sitting at their desks in a large open space, surrounded by co-workers. They will have the occasional phone conversation, concentrate on important tasks, answer e-mails and prepare presentations. But they will also walk around, have quick meetings and discuss daily business across desks.

Challenge: *to keep speech and other sounds from spreading and to minimise the disturbance of co-workers.*

Solution: *a sound-absorbing ceiling with good absorption qualities at speech frequencies and sound-absorbing screens dividing people into groups.*

Acoustic considerations:

Sound propagation and disturbance between workspaces

Top:

Joulz, Netherlands

Photographer: Menno Emmink

Right:

Joulz, Netherlands

Photographer: Menno Emmink

Teamwork

Office workers are often involved in projects and team assignments. To succeed, the team needs to transfer knowledge within the group and have meetings, discussions and work sessions. Preferably, this is done in a space separate from others, but it often takes place in a semi-open space or among others in a completely open space.

Challenge: *in a project room it is important to hinder wall-to-wall echoes and support communication (speech clarity). The room should also be properly sound-insulated to keep sound from entering or leaving the space.*

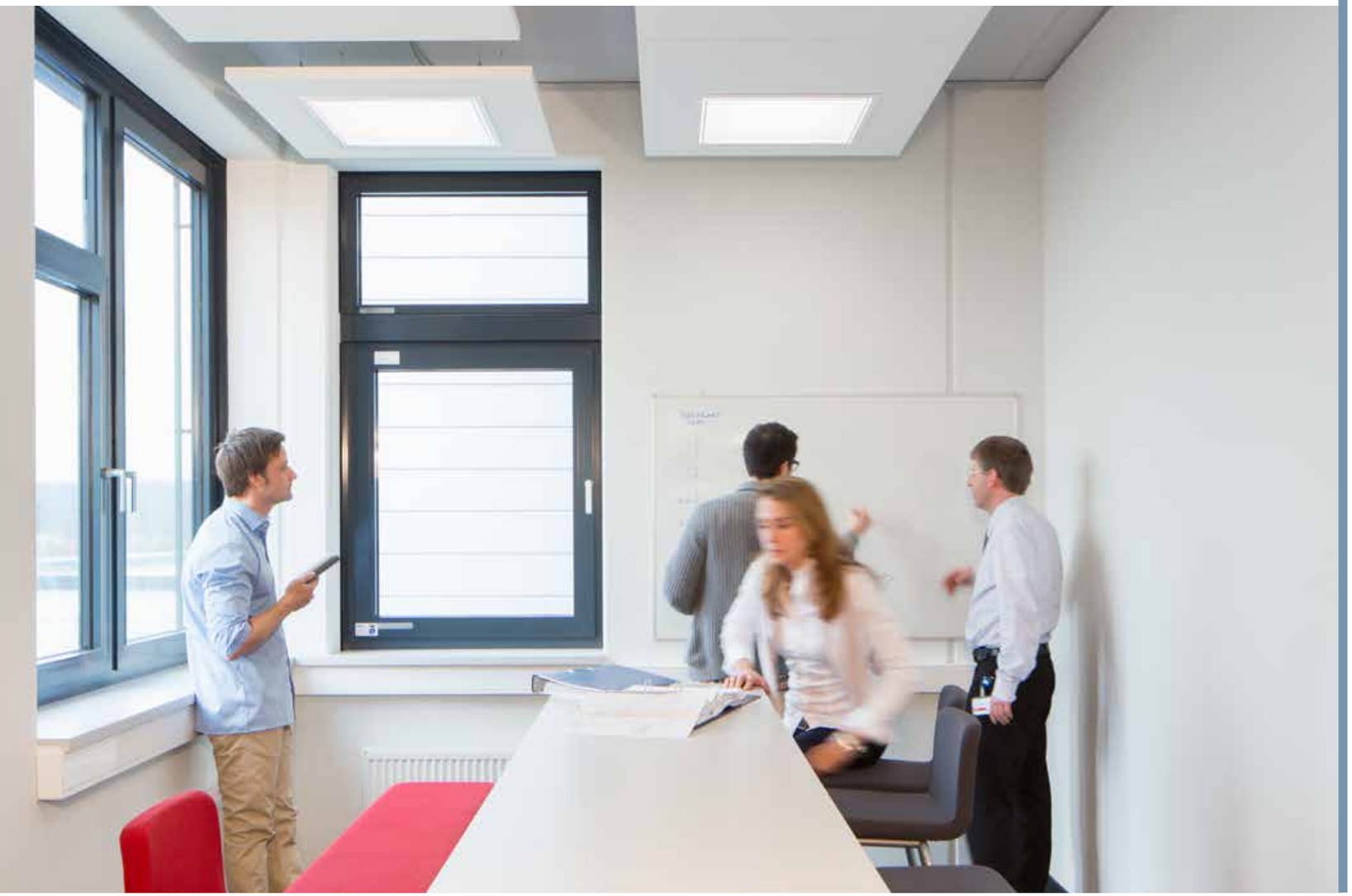
In a semi-open or open space you need to keep sound from spreading, prevent sound levels from escalating and avoid the need for people to raise their voices. The team should have local speech clarity so they can talk normally.

Solution: *a project room needs sound insulation, a sound-absorbing ceiling with good absorption qualities at low frequencies, and wall absorbers.*

In a semi-open or open space you need a sound-absorbing ceiling with good absorption qualities at speech frequencies, and if people in adjacent areas can be disturbed, sound-absorbing screens.

Acoustic considerations:

Speech clarity, sound propagation and sound level



Top:

Sumitomo Electric GmbH, Germany

Photographer: Hans Georg Esch

Right:

Areco Sweden AB, Sweden

Photographer: Teddy Strandqvist/Studio-e.se

Brainstorming

When you release your creativity in a brainstorming session it is a lively activity, often with people walking around and two or more people speaking at the same time. The dynamic activity is usually done in a closed space with a flexible interior, sort of a "cool meeting room".

Challenge: *to avoid echoes, support communication (speech clarity) and prevent sound from entering and leaving the space.*

Solution: *sound insulation, a sound-absorbing ceiling or free-hanging units, and wall absorbers covering at least one wall, but preferably two adjacent walls.*

Acoustic considerations:

Speech clarity, echoes and sound insulation

Top:

KIA, Netherlands

Photographer: Michael Oosten Fotografie

Right:

Saint-Gobain Ecophon AB, Sweden

Photographer: Rickard JohnssonT/Studio-e.se

Phone intensive

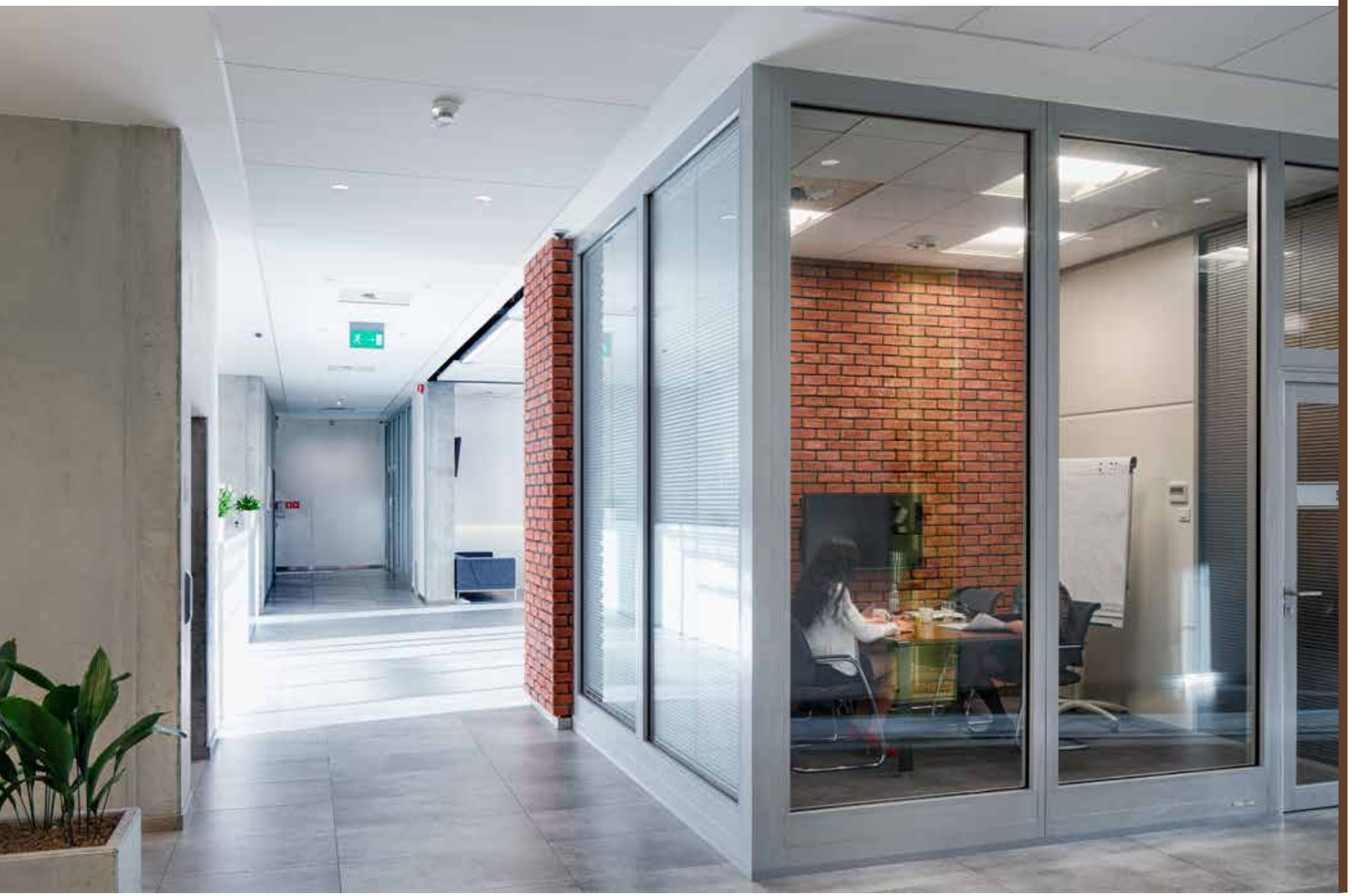
Telephone conversations are an important and fast way to do business or answer questions. But if you have a phone-intensive support team or sales team, you will have a lot of people in the same area who are on the phone at the same time. This means a lot of speech flowing in all directions, resulting in escalating sound levels and impaired speech clarity over the phone.

Challenge: *to prevent sound levels from escalating, to enhance speech clarity over the phone by preventing high background noise, to reduce disturbance between co-workers and to ensure that sound doesn't spread to other areas.*

Solution: *a sound-absorbing ceiling with the best absorption qualities at all frequencies, sound-absorbing screens dividing people into groups and wall absorbers on every possible wall space.*

Acoustic considerations:

Sound level, disturbance between workspaces, speech clarity over the phone and sound propagation



Top:

Raben, Poland

Photographer: Bartosz Makowski

Right:

Nordstrand Frisenstam Rung, Sweden

Photographer: Bert Leandersson

Focus work

From time to time everybody needs to focus without being disturbed. Since fewer and fewer people have access to their very own cellular office it is therefore crucial to have so-called concentration spaces. Among other things these are used for concentrating on very important tasks, long telephone conversations, video conferences and meetings.

Challenge: *to hinder wall-to-wall echoes, to enhance speech clarity and to keep sound from entering and leaving the space.*

Solution: *for both cellular offices and concentration spaces you need sound insulation, a sound-absorbing ceiling and wall absorbers on at least one wall.*

Acoustic considerations:

Wall-to-wall echoes, sound insulation and speech clarity

Top:

Cegedim Nordics, Sweden

Photographer: Teddy Strandqvist/Studio-e.se

Right:

Toyota Material Handling, Netherlands

Photographer: Menno Emmink

Formal meetings

To have constructive meetings it is important that we hear each other clearly; everybody should be able to easily follow and participate in the conversations, presentations and discussions. However, it is also important to prevent the sounds of the meeting from spreading to others in the office.

A meeting room is almost always furnished with lots of equipment, such as humming projectors and speakers for telephone and video conferences. At the same time there are often two glass walls and a third that has the obligatory whiteboard. Speech will bounce off all these hard surfaces, creating echoes that obscure speech.

Challenge: *to keep sound from entering and leaving the space, to ensure speech clarity by preventing wall-to-wall echoes and low-frequency disturbance.*

Solution: *superior sound insulation, a sound-absorbing ceiling with good absorption qualities at low frequencies and wall absorbers covering at least one wall, but preferably two adjacent walls.*

Acoustic considerations:

Sound insulation, speech clarity and low frequencies (especially if video conferencing equipment is installed)

Top:

Toyota Material Handling, Netherlands

Photographer: Menno Emmink

Right:

Raben, Poland

Photographer: Bartosz Makowski

Welcoming

When clients and guests enter your reception area they should immediately feel welcomed. They should easily be able to talk to the people behind the desk and relax while they wait for someone to come and meet them.

A welcoming space often has large windows, a lot of other hard surfaces and a high soffit. At any given time there will be people walking by and conversations by phone and in person at the counter.

Challenge: *to absorb sound and hinder echoes, improve speech clarity and keep conversations at the reception desk from spreading throughout the space.*

Solution: *a sound-absorbing ceiling with good absorption qualities, lowered sound-absorbing free-hanging units directly above the reception desk, and wall absorbers on the wall behind the desk.*

Acoustic considerations:

Echoes and speech clarity over the reception desk and phone

On the road to

acoustic comfort

When you have defined your space according to activity, people and the space itself, the next step is finding the acoustic solution to achieve the desired acoustic comfort. Depending on what will happen in your space, your solution should have different acoustic qualities. When you know these qualities it is much easier for you to find the acoustic systems you need.

Sound propagation

Sound spreading through a space. Without preventing sound propagation, sound will spread throughout the space leading to increased sound levels and constant disturbance. To prevent this you need at least a ceiling with absorption class A. In most cases you also have to supplement the ceiling with sound-absorbing screens and wall absorbers.

Since speech is the most common sound in offices it is very important that the sound absorbers perform well at frequencies where speech is predominant. To ensure this, your class A ceiling should have a high Articulation Class value.

Sound propagation without sound-absorbing elements.		Ceiling with Articulation Class value 150.	
Sound propagation with Absorption Class A ceiling installed.		Ceiling with Articulation Class value 180.	
Sound propagation with Absorption Class A ceiling, Akusto Wall and Akusto Screen.		Ceiling with Articulation Class value 200.	

Distance of comfort

The distance speech travels before it is perceived to be halved (58 dB to 48 dB). The shorter the distance – the better. A combination of acoustic ceilings with high Articulation Class values, acoustic wall panels and acoustic screens help you improve the distance of comfort. In the illustations above, the green sound waves appear at the distance where the sound has been reduced to 48 dB.

General sound strength

The combination of all sounds present in a space. A high sound level leads to people having to raise their voices to be heard above all the surrounding noise – the so-called Café Effect. To absorb as much sound as possible, you need to make sure that all sound absorbers are of the highest quality.

Reverberation

Sound that bounce back to you. In smaller spaces and larger spaces with a lot of hard surfaces, it is easy for sound and speech to bounce off walls and surfaces and create echoes. These echoes will make it hard to hear what you want to hear. To prevent reverberation you need the right amount of absorption in the ceiling and on the walls, in correlation to the size of the space

Speech clarity

Being able to be heard and understood without having to raise your voice. Late reflections (echoes) and background noise from installations, such as office equipment and video projectors/beamers, reduce speech clarity and hinder communication. A combination of acoustic ceilings and acoustic wall absorbers help you create a space where speech clarity is high.

All these acoustic parameters are based on ISO 3382-1, ISO 3382-2 and ISO 3382-3.

Measurements of acoustic qualities

Wall-to-wall ceilings

When you have a wall-to-wall ceiling you use the practical absorption of the ceiling, at different frequencies. The measurement is then, for the ease of communication, turned into a classification of absorption class; A, B, C etc. Absorption class A has the highest absorption.

Sound absorbers smaller than 10 m²

If you use free-hanging units or screens with a sound absorption area of less than 10 m^2, it is not recommended to measure the absorption in the same way as a full coverage ceiling. Instead, you measure the cluster's equivalent absorption area (A_{eq}) in square metres.

For instance, if you have a cluster of sound absorbers that covers 5 m^2 and the measurement renders an Aeq of 7.5 m^2 at a certain frequency, this means that every installed square metre has an equivalent absorption area of 1.5 m^2 (7.5/5) at that frequency.

These measurements and classifications are done according to ISO 354 and ISO 11654.

Ecophon Focus™

Entering a universe of design and flexibility

Focus is our most comprehensive system family and offers excellent acoustics with a wide range of design opportunities through different edge designs, forms, levels and installation options. This makes Focus systems a valuable partner to achieve the atmosphere you strive for in your design. Focus is also easily and seamlessly integrated with Ecophon Lighting.

- Endless options
- Possibility of level changes
- Design and precision

Ecophon Master™

Taking care of demanding conditions

The Master family is unrivalled when it comes to sound absorption and speech clarity. It is simply the best. So when you have a tough sound environment, such as a space where phones are used frequently, we highly recommend you turn to Master to find your solution.

- Performance
- Superior acoustics
- Robust

Ecophon Solo™

Experiencing freedom of expression

The ever-trendy Solo comes in several shapes and sizes. If you desire, you can also create your very own shape. With Solo you have total freedom of design and the opportunity to create your own striking new expressions while keeping up to date with sustainable architectural developments.

- Unique perspective
- Any shape
- Creative possibilities

Photographer: Peter Wuerrmli Photography

Ecophon Combison™

Sound insulation and absorption in one

Modern office buildings are constantly changing and therefore strive for full flexibility. Combison ceilings make it possible to easily build partitioned walls where rooms are needed. By choosing the right walls and Combison solutions you can achieve the privacy needed.

- Sound insulation
- Solutions for flexible offices
- Enables privacy

Ecophon Akusto™

Exploring the variety of the vertical

As a complement to acoustic ceilings, Akusto enhances the acoustic solution and allows you to create the best possible acoustic comfort. At the same time it provides opportunities to follow current trends in design, with an array of colours, textured finishes and stylish profiles.

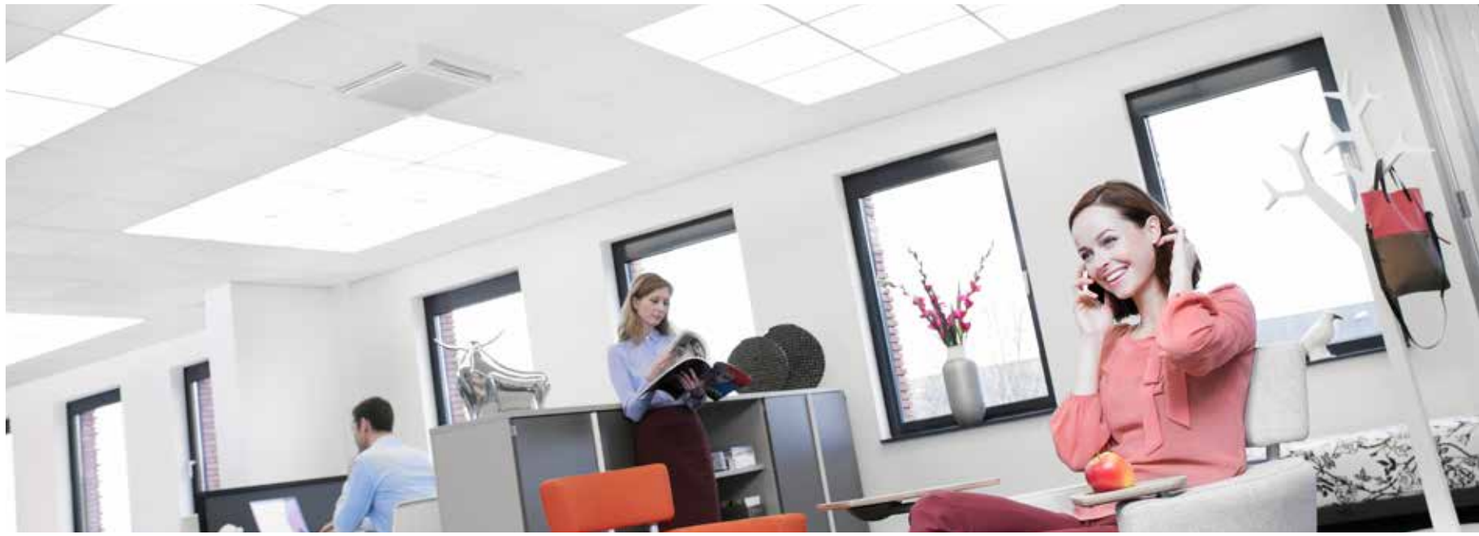
- Diversity
- Acoustically engineered
- Vertical acoustics

Soundlight Comfort

Where sound meets light, comfort is built

The Soundlight Comfort systems improve wellbeing and performance in the office space by integrating comfortable LED lighting with superior sound absorption in integrated light and acoustic ceiling systems. When both light and sound behave in a more natural way for us, we experience a unique level of comfort – a synergy we call Soundlight Comfort.

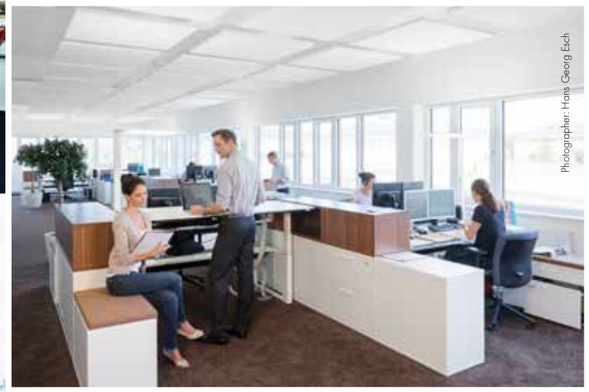
- Superior acoustics
- Integration
- LED Technology



For the eye, the ear and the mind


Photographer: Teddy Mattsson/Studioe.se


Photographer: Peter Wuermli Photography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Photographer: Eso Karki


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A SOUND EFFECT ON PEOPLE

Ecophon dates back to 1958, when the first sound absorbers from glass wool were produced in Sweden to improve the acoustic working environment. Today the company is a global supplier of acoustic systems that contribute to good room acoustics and a healthy indoor environment with the focus on offices, education, health care and industrial manufacturing premises. Ecophon is part of the Saint-Gobain Group and has sales units and distributors in many countries.

Ecophon efforts are guided by a vision of earning global leadership in room acoustic comfort through sound-absorbing systems, enhancing end-user performance and wellbeing. Ecophon maintains an ongoing dialogue with government agencies, working environment organisations and research institutes, and is involved in formulating national standards in the field of room acoustics where Ecophon contributes to a better working environment wherever people work and communicate.

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