

Ecophon

# Healthcare

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by 67%**

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# Noise affects quality of care

Over hundreds of thousands of years, our ears have evolved to provide perfect hearing outdoors, in nature. But today most of us spend up to 90% of our time indoors, in environments not suitable for the human ear. This has long-term effects for both patients and staff in healthcare facilities.

Hospitals are often places where ceilings, walls and floors have hard and reflective surfaces. When it comes to sound, this means there is nothing to absorb it. It will bounce around and spread everywhere it can, raising noise levels and making it hard to relax and to have normal conversations.

It is known that high sound levels in hospitals and healthcare facilities impair sleep, increase stress and raise heart rates<sup>1</sup>. Or, in other words, noise is a serious health issue.

## A good sound environment is possible

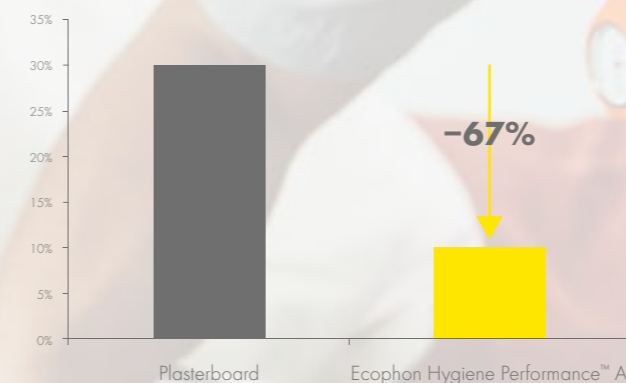
It doesn't have to be this way. There are solutions – acoustic solutions for ceilings and walls that comply with the hygiene demands in every kind of hospital environment, from intensive care units and operation rooms to patient rooms and airtight laboratories.

This means patients and staff no longer need to cope with poor environments. Instead, we can safely bring the outdoor sound environment indoors, to increase wellbeing, performance, rest and recovery.

<sup>1</sup> Weise, "Investigation of patient perception of hospital noise and sound level measurements: before, during and after renovations of a hospital wing", Architectural engineering – Dissertations and Student Research, 2010, Paper 4, p7

## Acoustics reduced medication intake by 67%

### Patients needing extra intravenous beta-blockers, percent



At the intensive coronary heart unit at Huddinge University Hospital, Sweden, researchers investigated how good and bad sound environments affected patients. One of the most striking discoveries was in regards to medication intake. Nearly all the patients were prescribed peroral beta-blockers (normal heart medicine), with extra intravenous treatment given mostly when patients indicated that they were in pain. When an Ecophon Hygiene™ sound-absorbing ceiling was installed, the need for the extra medication dropped by 67%.

Reference: Hagerman et al: "Influence of intensive coronary care acoustics on the quality of care and physiological state of patients", International Journal of Cardiology, Volume 98, Issue 2, February 2005

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# When the highest level of care is critical

In specialist care areas, doctors and nurses have to communicate continuously in order to ensure that everybody is informed about what is happening and what is to come. It is crucial that decisions can be made quickly and that everybody is clearly informed about them. In a study in the state of Pennsylvania, USA, it was discovered that 70% of critical medical errors in emergency departments can be traced back to "communication shortcomings" such as multitasking and interruptions.<sup>1</sup>

Patients in specialist care areas are often both mentally and physically stressed due to worry and their illness. Their bodies need surroundings that are as calm as possible.

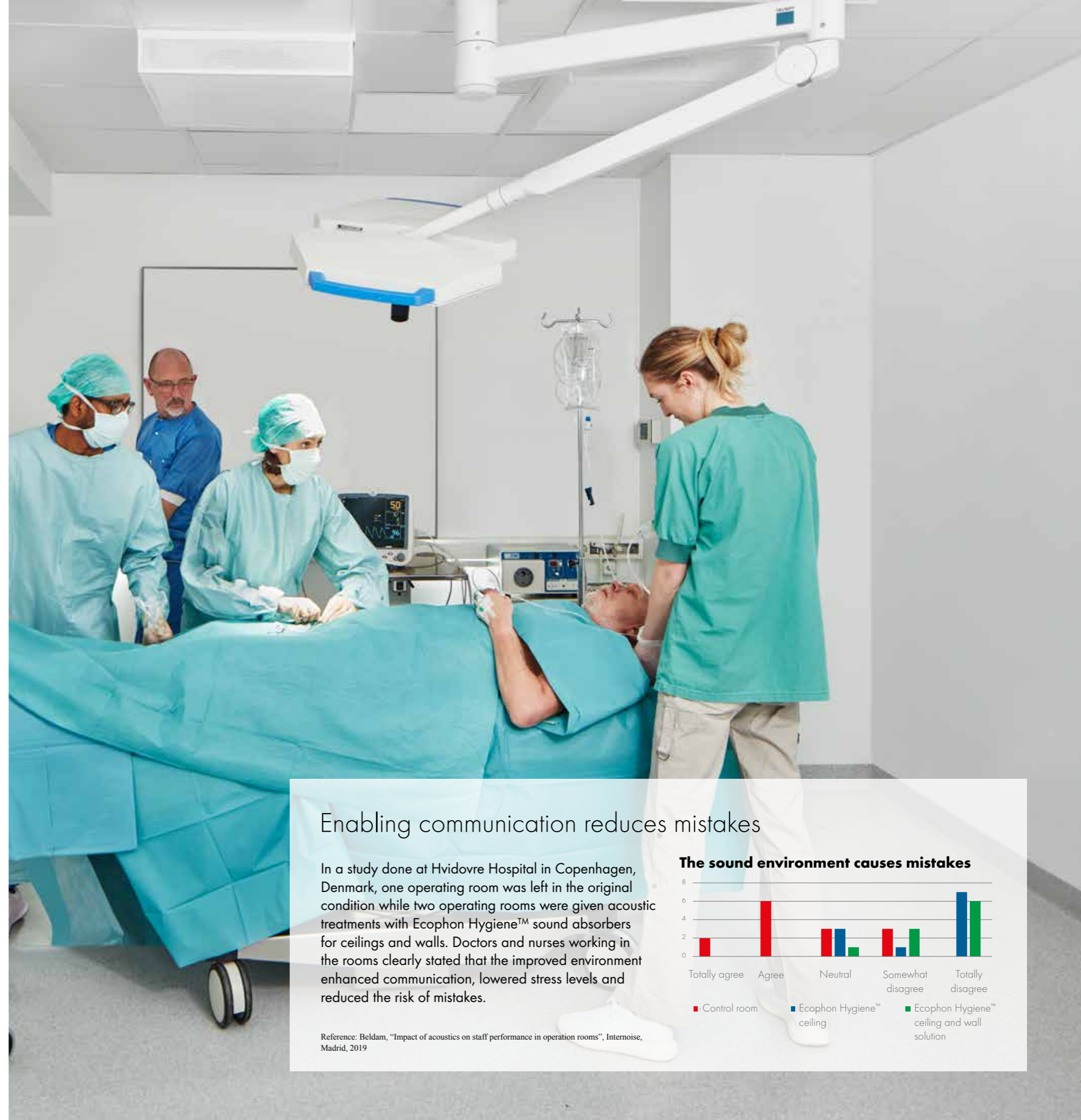
The care takes place in spaces where background noise from technical equipment can be constant and loud. Doctors and nurses have to raise their voices to be heard above the noise. In turn, this increases noise levels even further. All in all, this creates a stressful and demanding environment for both patients and staff.

## Helping people save lives

When you introduce an acoustic solution in the ceiling of a space like this, it will absorb much of the noise and thus reduce the overall sound level dramatically. If wall absorbers are added, they will increase speech clarity by eliminating unwanted sound reflections back and forth.

For the people in the room, the change will be very noticeable. Stress levels will drop, staff will be able to communicate clearly without raising their voices and patients will have a much better chance of remaining calm.

<sup>1</sup> Joint Commission. Sentinel Event Data, Root Causes by Event Type, 2010

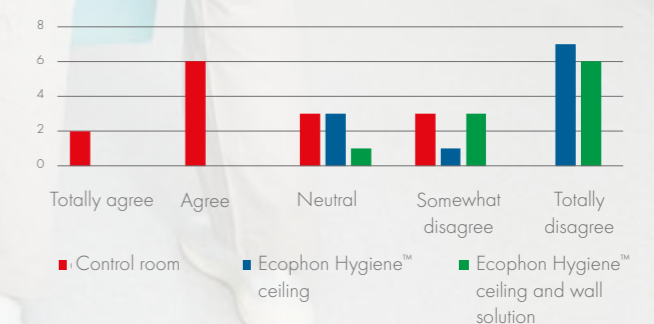


## Enabling communication reduces mistakes

In a study done at Hvidovre Hospital in Copenhagen, Denmark, one operating room was left in the original condition while two operating rooms were given acoustic treatments with Ecophon Hygiene™ sound absorbers for ceilings and walls. Doctors and nurses working in the rooms clearly stated that the improved environment enhanced communication, lowered stress levels and reduced the risk of mistakes.

Reference: Beldam, "Impact of acoustics on staff performance in operation rooms", Intenoise, Madrid, 2019

### The sound environment causes mistakes





## Taking care of the most vulnerable

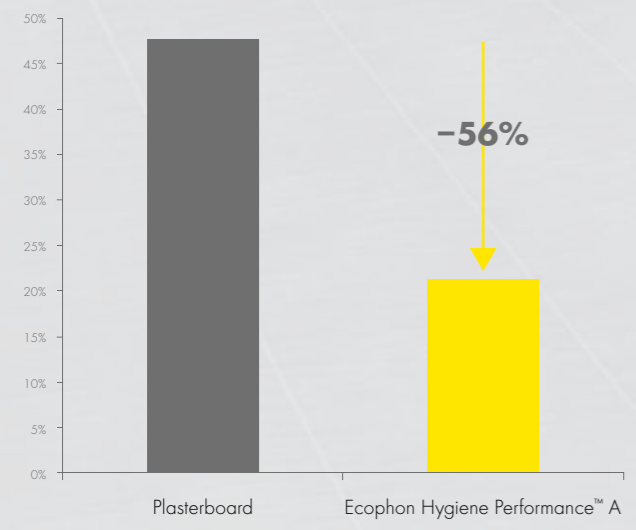
*Rest and sleep are important aspects of our health and everyday life, but never as important as when we are ill or have undergone surgery and need to heal. When patients suffer from sleep disturbances they will often experience changes in alertness, healing time and length of stay.<sup>1</sup>*

There are many things that can disturb a patient's ability for rest and recovery in patient rooms. For instance, alarms, communication between staff or between staff and other patients, noise from other patients or technical equipment, or family and friends visiting other patients. If the sound environment is poor, sound will easily spread within rooms and between rooms.

Adding sound-absorbing solutions to the ceilings and walls will solve the problems. It will stop sound closer to the source. This lowers sound levels and makes confidential conversations possible even in shared patient rooms. Most important, it improves patients' ability to sleep soundly.

<sup>1</sup> Hsu, Ryherd, Ackerman, Persson Wayne, "Noise pollution in hospitals: Impacts on patients", J. Clin. Out. Mgmt. 2012, vol 19, no 7, p301-309

Good acoustics reduce hospital readmissions by 56%



In a study of patients suffering from chest pain, the researchers had one patient room with a traditional ceiling and one patient room with an Ecophon Hygiene sound-absorbing ceiling. One of the most remarkable results was that fewer patients who recovered in the good sound environment needed to be readmitted to hospital after one month and after three months. The difference after three months was 56%.

Reference: Hagerman et al: "Influence of intensive coronary care acoustics on the quality of care and physiological state of patients", International Journal of Cardiology, Volume 98, Issue 2, February 2005

# Reaching near and far

*Corridors are busy and vibrant areas in healthcare settings. They are everywhere, like a spider's web that connects all the different areas. They are also a natural part of every unit and ward. Patients, visitors and staff use them to move from one place to another. They are also used for moving beds, medical equipment and other supplies. In a UK study it was found that 83% of all communication within an emergency department was done by speaking to each other, in contrast to communicating via telephone or digital channels.<sup>1</sup> A lot of that important communication occurs in corridors.*

Due to their elongated shape, corridors are like reverberant tubes in which sound, if allowed to, can travel very long distances. The sound will create a background noise level that makes conversations more difficult, causing people to raise their voices. The things people say may carry for long distances, making it harder to keep conversations confidential.

The noise will also disturb patients and staff in every room it passes through the corridor. Moreover, the noise generated in a room can easily spread through the corridor to adjoining rooms.

## **Keeping it in the corridor**

To solve the noise issues in corridors, it is important to use both the ceiling and walls. A sound-absorbing ceiling reduces noise levels significantly, while absorbers on the walls stop sound propagation.

All the rooms along a corridor also need to be considered. If less noise seep out of rooms the environment is improved even further. Making it possible for everybody to keep conversations quiet and private, as well as having the ability to move from one place to another in peace.

<sup>1</sup> Woloshynowych, Davis et al., "Communication patterns in a UK emergency department", *Ann. Emerg. Med.*, Oct 2007, 50(4), p407-413





## Everybody benefits from a noise-free environment

*Up to 40% of hospital premises can consist of office environments. These offices may be used for administration, hospital management or nurses and doctors in wards. A wide range of activities are included in office work. At any given time, people may be talking on the phone, working in teams, holding meetings or performing tasks at the computer that require concentration.*

Today's office spaces often have an open-plan design with many desks. There will be areas among the desks for holding brief meetings, as well as adjoining closed meeting rooms. If the office is covered with hard surfaces, conversations on the phone or between colleagues will spread unhindered throughout the office. This will disturb everybody, impairing focus and productivity. The undisputed number one cause of dissatisfaction in offices are sounds that you don't want to hear.<sup>1</sup>

### **Taking care of business**

One common solution to noise problems in offices is to seat people with similar tasks together. Although this is a good first step, it is not enough. If, for instance, you have a phone-intensive group, their voices will still spread. They will also disturb each other's conversations.

The goal of the solution is to stop sound close to the source, before it spreads. When this is achieved, and people are no longer disturbed by high-level background noise, they will naturally lower their voices, reducing sound levels even further. To make this happen, all areas of the office may need to be treated separately, based on the activities performed there. The part of the office where people speak on the phone a lot needs more acoustic treatment than the part where everyone works quietly at their computer. A closed meeting room needs a sound-absorbing solution that stops sound from leaving the room, while also making the meeting room appropriate for the tasks performed in it.

When the right consideration is taken to the activities, the people and the space, the chosen acoustic solutions will help enhance job satisfaction, job performance and overall wellbeing.

<sup>1</sup> KL Jensen, E Arens, L Zagreus, Proceedings: Indoor Air 2005, "Acoustical quality in office workstations, as assessed by occupant's surveys".

## Good acoustics reduce stress by 11%

The Stress Research Institute in Stockholm, Sweden, conducted a study in a real-life office environment to examine how sound affects people in open-plan offices. During the study the sound environment was changed from poor to good and back to poor again. The study showed that a good sound environment, with Ecophon Gedina™ and Ecophon Akusto™ sound-absorbing solutions, reduced cognitive stress by 11% and perceived disturbance by 16%.

Reference: Seddigh A et al., "The effect of noise absorption variation in open-plan offices: A field study with a cross-over design", Journal of Environmental Psychology, Volume 44, 2015, p. 34-44

# Healthy environments are equally important everywhere

Care doesn't just take place in hospitals. Outpatient clinics and health clinics offer a wide range of treatment services, diagnostic tests and surgical procedures. Patients are just as stressed when they enter one of these facilities as when they go into hospital. Doctors and nurses have the same need for an environment where they can communicate clearly and in private. If the acoustics are left unattended, noise easily spreads from room to room.

Dental care facilities are another type of care facility to consider. Here, the high-pitched noise from electrical equipment poses a further problem. Without anything to absorb this noise, the environment can be very unpleasant, both for patients and dentists.

People who enter a mental care facility may be there for a wide variety of reasons. Since it is known that noise can reduce helpful behaviours, increase aggression and reduce the processing of social cues<sup>1</sup>, it is crucial that the environment be adapted to diminish the risk of this happening.

## Noise sensitivity increases with age

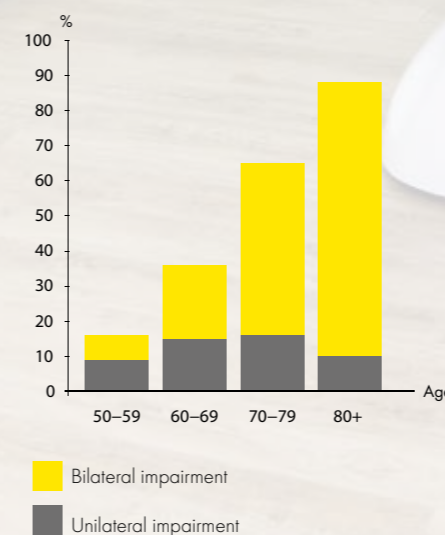
Lastly, everyone ages. With age, our hearing capacity is gradually reduced. This makes us even more sensitive to noise and disturbing sound. If you live in an elderly care unit, it serves both as a healthcare facility and as your home. You need to feel safe and comfortable, you need to be able to enjoy your private space and you need the environment to be adapted to your perception abilities and the elderly ear, so you can fully enjoy others' company and actively participate in conversations.

There are acoustic solutions for all these establishments and situations, consisting of a combination of sound-absorbing solutions for ceilings and walls that reduce reflections, noise levels and enhance speech clarity. The result is a pleasant indoor environment for everyone that reduces negative reactions to noise and instead increases wellbeing and performance.

<sup>1</sup> Stansfeld et al., Noise pollution: non-auditory effects on health, British Medical Bulletin 2003; 68: p243–257



## Hearing loss reduces quality of life



Age-related hearing loss (presbycusis) affects approximately 37% of 61–70 year-olds, 60% of 71–80 year-olds and almost 90% of people over 80. Frequent communication problems and misunderstandings are known to lead to withdrawal, self-doubt, depression and dogmatism. Impaired hearing also affects spatial orientation and increases the risk of falling.

References: Baur et al., Einfluss exogener Faktoren auf Altersschwerhörigkeit, HNO 2009, Springer Medizin Verlag 2009, p1023–1028

Arneborg, E., Deutsche Seniorenliga e.V., Altersschwerhörigkeit – Symptome, Ursachen, Folgen, Diagnostik, Therapie, Age-related hearing loss – symptoms, causes, consequences, diagnosis, therapy, Ausgabe 2010

# 1 Activity

What will people be doing in the space? This question applies to both the staff and the care recipients. Will the activities be noisy? Will they involve use of equipment and machines? Is confidentiality an issue? How much time is spent communicating?

# 2 People

Who is involved in the activities? Consider both staff and care receivers. How many people are there? Are they old or young? Do they have special needs?

# 3 Space

Is the space big or small? Where is it situated in the building? Are there disturbances from other areas nearby? What is the geometry and volume of the space? What are the surfaces on walls, ceilings and floors? Are there fans, alarms or other frequently recurring sounds in the space?



## Bring the outdoors in to enhance wellbeing and performance

*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. Ecophon provides innovative sound-absorbing solutions that make it possible to achieve indoor acoustic comfort, helping people to work, learn, heal and relax.*

In order to create a space where people can perform a certain activity comfortably and to the best of their ability, Ecophon has developed Activity Based Acoustic Design. This is a method that anybody can use when acoustically designing indoor environments. In practice, it means defining the needs from three perspectives – activity, people and space – and finding the common ground where all perspectives benefit. After this, optimal solutions are achieved using a combination of high-quality acoustic elements.

### Sustainability through innovation

Caring about people is the best way to ensure a better tomorrow. That's why Ecophon takes great pride in making its business sustainable, inside and out. Our systems are 100% recyclable and we use glass wool made of more than 70% recycled glass. All our acoustic solutions are continuously tested to meet all relevant hygiene demands and performance standards.

By using the appropriate sound-absorbing solutions in healthcare facilities, you can create spaces where patients can feel more comfortable and recover better. Places where doctors and nurses can focus on what they are there to do, and still have energy left at the end of the day. Together, we can turn noise into a health issue of the past.

Ecophon – a sound effect on people





# Assistance towards a healthy indoor environment

If you want to know more about indoor acoustics, Ecophon sound-absorbing ceilings and wall absorbers, or find the most suitable solution for a specific room, please contact us or use our digital tools.

## Learn more and meet the experts

Ecophon has been involved in international studies and gathering acoustic knowledge for more than 50 years. The most important information has a dedicated place on our website and is freely accessible to everybody. Here you can also meet our acoustic experts. There are currently 21 of them, all over the world. Their objective – to spread knowledge and help anyone who requests assistance.

[ecophon.com/knowledge](http://ecophon.com/knowledge)

## Ecophon Acoustic Calculator

Ecophon has developed a free calculator that you can use to get accurate acoustic values for rooms that have not been built yet. It is also easy to use when planning refurbishments. Simply fill in the specifications of the room and the calculator will tell you what the sound environment will be like.

[ecophon.com/e-tools](http://ecophon.com/e-tools)

## Product guide

In the product guide you can learn the acoustic considerations of all the common spaces in different facilities, such as healthcare, offices, education, industry, cinemas, kitchens and swimming pools. It also offers product recommendations for each environment.

[ecophon.com/productguide](http://ecophon.com/productguide)

## Installation films

The collection of installation and accessibility films are live action films where you follow an installer who takes you through the process step by step. The films are available on the product pages on our website and on the Ecophon YouTube channel.

[ecophon.com](http://ecophon.com)

[youtube.com/ecophonTV](https://youtube.com/ecophonTV)

## Cleaning and maintenance films

Want to see how to clean our different surfaces and what they withstand? Our cleaning and maintenance films tell you everything you need to know. They are available on the product pages on our website and on the Ecophon YouTube channel.

[ecophon.com](http://ecophon.com)

[youtube.com/ecophonTV](https://youtube.com/ecophonTV)

## More e-tools

When you have chosen your solution, the Ecophon Quantification Tool will help you make an estimation of all the components you need to build an Ecophon acoustic system.

The Ecophon Maintenance guide is a web-based tool for generating maintenance instructions for Ecophon ceiling and wall systems, tailored for your specific project.

BIM objects are widely used in construction projects today. By downloading Ecophon BIM objects, you automatically have free access to a wide range of up-to-date, technically relevant data. The files are compatible with both ArchiCAD and Revit.

[ecophon.com/e-tools](http://ecophon.com/e-tools)

## Social media

We are on LinkedIn, Twitter, YouTube and Facebook. Following us means you stay abreast with all the latest acoustic findings, acoustic research and product development, and can also see inspirational new reference cases.



# Acoustic solutions for all rooms and hygiene demands

Product group	Type of product	Common cleaning <sup>1</sup>	Advanced cleaning <sup>2</sup>	Hydrogen peroxide vapour	Disinfection chemicals	Strong chemicals <sup>3</sup>
Ecophon Hygiene Clinic™	Ceiling	•		•		
Ecophon Hygiene Meditec™	Ceiling	•		•	•	
Ecophon Hygiene Performance™	Ceiling, baffle and wall	•	•	•	•	
Ecophon Hygiene Protec™	Ceiling	•		•	•	
Ecophon Hygiene Advance™	Ceiling, baffle and wall	•	•	•	•	•
Ecophon Focus™	Ceiling	•				
Ecophon Master™	Ceiling	•				
Ecophon Akusto™	Wall	•				

<sup>1</sup> Dusting, vacuum cleaning and wet wiping.

<sup>2</sup> Steam cleaning, wet cleaning and high pressure washing.

<sup>3</sup> Withstands daily cleaning with strong chemicals, according to ISO 2812-1.

## Features for all Ecophon Hygiene™ products

Mould and bacteria resistance: No mould & bacteria growth. Class 0, method A/C (ISO 846)

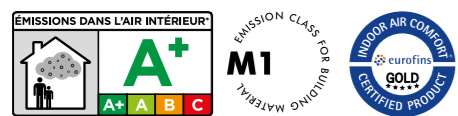
Clean room: Zone 4 (NFS 90-351)

Clean room classification ≤ ISO 4 (ISO 14644-1)

Kinetic class for particle decontamination,  $CP_{(0,5)} \leq 5$  (NFS 90-351)

Bacteriological class M1 (NFS 90-351)

There are also solutions for areas where air pressure control is required.



Local standards:



# Ecophon®

SAINT-GOBAIN

A SOUND EFFECT ON PEOPLE

Ecophon is the leading supplier of acoustic solutions. We contribute to healthier indoor environments, improving quality of life, wellbeing and working performance. As evolution has adapted the human senses to a life outdoors, our focus is to bring the ideal acoustic environments of nature into our modern indoor spaces. We know they will have a sound effect on people.



The principles guiding our work are grounded in our Swedish heritage, where a human approach and a common responsibility for people's lives and future challenges come naturally.

Ecophon is part of the Saint-Gobain Group, a world leader in sustainable habitat solutions. This is also one of the top 100 industrial groups in the world, constantly innovating to make living spaces more comfortable and cost-efficient. Saint-Gobain offer solutions to the major challenges of energy efficiency and environmental protection. No matter what new needs emerge in the habitat and construction markets, the future is made of Saint-Gobain.

