

# Healthy sound environments

**for patients and staff**



**Ecophon**<sup>®</sup>  
SAINT-GOBAIN

A SOUND EFFECT ON PEOPLE



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# A clean start

## to a natural sound environment

*The human ear developed over thousands of years. Outdoors our environment with the irregular shapes of trees, rocks and open fields helped sounds to be heard clearly - giving us important clues to where threats were coming from and how close they were - which triggered our instincts. The sound environment changed when we moved indoors. It brought sounds closer by forcing them to bounce between hard and smooth surfaces. The bouncing distorts the sound itself which give an unnatural input to our hearing. What is most important - our bodily responses to sounds, whether natural or distorted, remain the same as thousands of years ago.*

*When designing health care premises the scenario is really brought to a head. On one hand the hygiene demands must never be compromised, but on the other hand traditional hard and smooth hygiene solutions have amplified the sound issues making health care facilities louder than recommended by the World Health Organisation (WHO). This is particularly disturbing to patients, who in their vulnerable state are more sensitive to sound, and to staff with very stressful jobs that do not allow for stress induced mistakes.*

*It is possible to build a comforting outdoor sound environment indoors - still permitting the harshest of cleaning methods used in the health care sector!*

# Improving acoustic quality

## a good investment

*Is it possible to create better sound environments in health care facilities, and still meet rigorous hygiene demands? The good news is that there are products and systems available that are specially developed for health care environments, meeting stringent hygiene and functional demands. Now you can design health care facilities with a sound environment that will benefit patients and staff.*



### **A better quality of care**

Modern society is creating more and more sound pollution. This is also the case in health care facilities, which are getting bigger, more efficient and have to meet demands from numerous people. The sound level is constantly increasing, due to more technical equipment and people moving around. Research shows that noise pollution negatively affects the medical and economical outcome. Studies also show that improvements in the acoustic environment lead to a better quality of care. Health care facilities that are built today are going to impact on quality of health care for the next 30-40 years. It is therefore a good investment to prioritise the sound environment and use system solutions specially developed for health care conditions.

### **Your guide to the right solution**

This brochure gives you all the information you need for creating healthy sound environments by choosing the right acoustic system solutions in different health care areas.

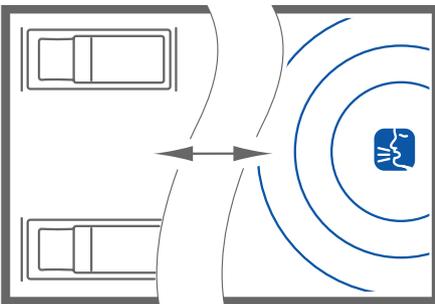
# Sound environment planning

## the fundamental principals



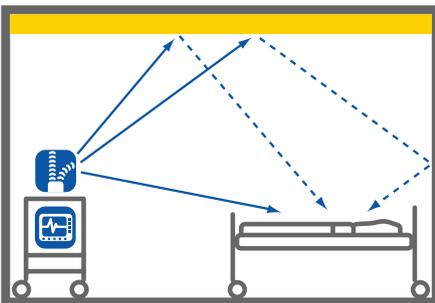
### Reduction of equipment noise

Alarms, signals, pumps, beepers, telephones, televisions, radios: the equipment used to facilitate health care work is procured in separate processes, with acoustic performance often being neglected in the brief. Ensure that equipment sound is taken into consideration and that it can be controlled.



### Layout and zoning

The use of distance and layout to separate loud and quiet activities is an effective way of reducing disturbance. A well-planned, logistic flow of supplies and people reduces the noise level, allowing patients to rest and staff to focus on the tasks at hand.



### Room acoustics

In rooms with hard surfaces, sounds build up and increase the general noise level. The use of sound-absorbing material reduces noise levels and increases comfort. In larger rooms, the amount of sound absorption will also affect sound propagation in the room and from the room to other areas as well as vice versa.





# Good room acoustics

## the invisible medicine

When people think of a place to recuperate from illness or medical treatment, most visualise somewhere quiet and peaceful. Unfortunately this is not the situation in many health care facilities, where there is noise from equipment, alarms, telephones, footsteps, voices and much more. The surfaces are often hard for hygienic reasons, so the sound bounces around, creating discomfort for everyone. Disturbing noise is one of the most common complaints from patients. Interest in applying good acoustic solutions that do not compromise hygiene requirements is constantly growing.

### For secure communication

A crucial aspect of sound control in health care facilities, is the importance of accuracy in communication between patients and staff, and between staff in intensive emergency situations. Optimal conditions for communication also play a central role when it comes to applying rules for patient privacy and patient data security.



### Measurable benefits

There is a lot to be gained from creating healing surroundings that give both patients and staff the very best conditions for positive progress in care environments. Using acoustic system solutions to control sound levels is a highly effective way to improve the quality of care. Research shows that a better sound environment contributes to:



**Stabilising blood pressure\***



**Improving quality of sleep\*\***



**Reducing intake of pain medication\*\*\***



**Reducing the number of readmissions\***



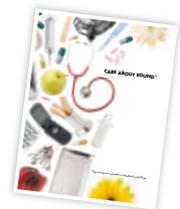
**Improved well-being among staff and improved perceived performance\***

To learn more about effects of sound on health and hospital efficacy please also read "Care about sound" which can be downloaded from [www.ecophon.com](http://www.ecophon.com) or ordered through your Ecophon office.

\* V. Blomkvist, C. Eriksen, T. Theorell, R. Ulrich, and G. Rasmanis, Acoustics and psychosocial environment in intensive coronary care, *Occup. Environ.Med.* 62:1-8 (2005)

\*\* Berg, S.; Impact of reduced reverberation time on sound-induced arousals during sleep. *Sleep.* 24(3):289-92. (2001)

\*\*\* Mincley, BB., A study of noise and its relationship to patient discomfort in the recovery room. *Nursing Research.* 17(3):247-50. (1968)



# The Ecophon approach

## for creating sound comfort

Creating a healing and stress reducing sound environment is becoming an urgent issue in health care premises. There are many sound sources that disturb patients and compete for staff's attention, while patient safety also demands high surface cleanability. Traditionally hygiene demands have been met by using hard materials, but at the expense of the acoustic environment.

Now there is no need for compromising between hygienic and acoustic performance. Ecophon has spent many years developing know-how, our holistic approach, and system solutions create an optimal hygienic sound environment.

### Meeting the standards

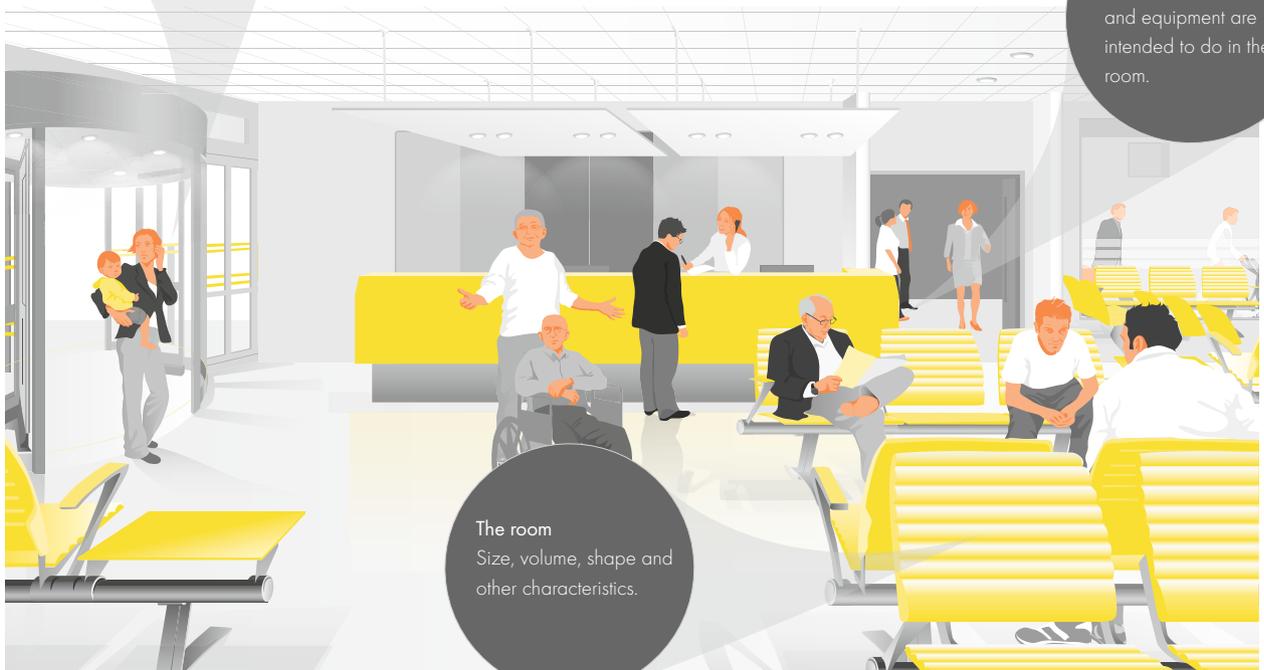
Standards and building regulations give guidance or regulate technical and quantitative values for hygiene and acoustic performance. In the UK, HTM 08-01 is the main standard for acoustics in health care premises. This standard requires acoustic treatment, usually ceilings, to be provided in all occupied areas, including corridors.

The requirement is for a *minimum* area of absorption equivalent to Class C absorber, covering an area *at least* equivalent to 80% of the floor area. If materials of a better absorption class are used the required minimum surface area can be reduced. Besides the national standards health care buildings may also be governed by local rules and regulations, these are generally local interpretations of the more general standards and have to be obtained from each individual health care facility.

The people  
The human perception  
of sound

The activity  
What the people  
and equipment are  
intended to do in the  
room.

The room  
Size, volume, shape and  
other characteristics.



## Going beyond the standards

When aiming to define people's acoustic preferences, describe or assess the acoustic environment, it is advisable to use acoustic parameters that reflect the relevant acoustic demands and preferences. Most acoustic standards around the world include requirements regarding reverberation. But people often have other acoustic preferences that go beyond reverberation. Moreover, our sense of hearing is multi dimensional, so it cannot be defined by a single parameter.

At Ecophon, our approach is to take the human perception into account and to work with at least four acoustic qualities, which allows for a more nuanced description of the acoustic environment.

### 1. Find out how the people perceive, and are affected by sound

Start by asking people how they perceive the acoustic environment and what their acoustic preferences are.

### 2. Take activities into account

Different activities require different acoustic priorities. Find out what the room is to be used for and the most highly prioritised acoustic parameters, such as sound strength, sound propagation, speech clarity or reverberation.

### 3. Use relevant acoustic parameters

Acoustic perception is multi-dimensional, so several acoustic parameters are needed to objectively define acoustic requirements and ascertain that they are fulfilled.

- If the main acoustic priority is lowering the sound strength,  $G$  (dB) is a relevant acoustic measure.
- If the main acoustic priority is reducing sound propagation,  $DL_2$  (dB) and  $DL_4$  (dB) are relevant acoustic measures.
- If the main acoustic priority is optimal speech clarity,  $D_{50}$  (%) is a relevant acoustic measure.
- If the main acoustic priority is to maintain a reverberant space, reverberation time  $T$ (sec) is a relevant acoustic measure.

### 4. Design the room and choose materials that enhance acoustic comfort

When designing the room, it is important to consider how the room's shape, volume and choice of materials will affect the acoustics.



#### The four acoustic qualities \*

##### Sound strength

$G$  (dB) measures the extent to which a room amplifies the sound from a sound source, compared to measurement in a laboratory with no sound reflections.

##### Sound propagation

$DL_4$  (dB) measures how the room contributes to sound propagation compared to an outdoor environment with no sound reflections, at a specified distance from the sound source.

$DL_2$  (dB) measures the extent to which the sound strength drops when the distance from the sound source is doubled.

##### Speech clarity

$D_{50}$  (%) is the energy of all useful reflections including the direct sound, which enhance speech clarity, divided by the total energy including the direct sound. The higher the value, the better the speech clarity.

##### Reverberance

Reverberation time,  $T$  (sec) indicates how long it takes for the sound to drop by 60 dB after a sound source stops emitting sound.

\* According to ISO 14257, ISO 3382-1, ISO 3382-2.

# Meeting the hygienic demands

## Sound in health care premises

*Traditionally the surface materials used in health care facilities have been hard and smooth to allow for cleaning and disinfection to prevent microbial growth and particle emission. However, these surfaces also make health care premises noisy and unpleasant to work in. As hard materials make sounds bounce and amplify in the room, the sound environment becomes an obstacle for patient healing and recovery.*



### Hygiene surfaces

**Akutex™ HP:** A painted particle repellent surface intended for environments where there are demands on low particle emission and where wet wiping and/or disinfection are required.

**Akutex™ TH:** A painted surface intended for environments where contamination might occur and cleaning or disinfection is required.

**Advance film:** A high-performance film that is impervious to particles and water, dirt repellent and resistant to most chemicals. Use in environments where there is a high risk of contamination and where daily cleaning and disinfection is required.

### Acoustic solutions in hygienic premises

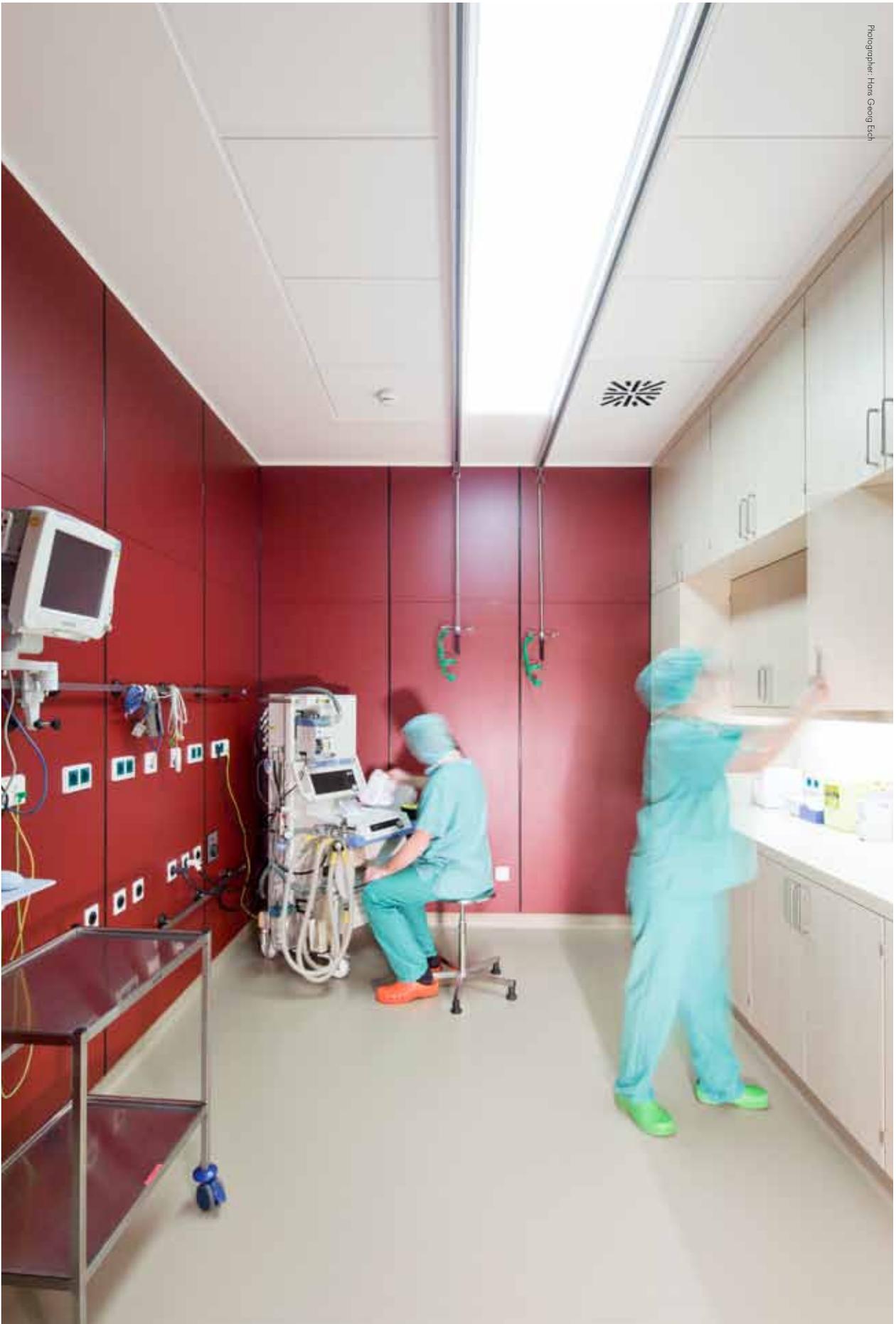
Luckily, nowadays you do not have to choose between hygienic and acoustic performance when designing your health care facility. Innovative surface technology developed by Ecophon, combines high absorbing performance with the toughest demands on hygiene and particle emissions. Our hygienic surfaces are particle or stain resistant to prevent contamination. The hygienic surfaces also withstand the common mechanical cleaning methods and detergents used in health care premises.

### Cleaning methods, particle emissions and hygienic sound absorbing surfaces

Regarding the ceiling, there are normally no specific cleaning routines for premises like receptions, corridors and waiting rooms. However in more specialised areas like laboratories, operating theatres, intensive care and general wards, the hygiene properties of the ceiling and ability to clean it is important. Alcohols (isopropanol or ethanol) are often used to disinfect surfaces as they kill most micro-organisms. Other chemicals used for different applications of disinfection are hydrogen peroxide and sodium hypochlorite. In laboratories and operating theatres there are also requirements for low particle emissions. Ecophon Hygiene range offer systems that meet ISO Class 3 and ISO Class 5 according to ISO 14644-1.

### Combining good room acoustics with good hygiene

Thanks to research and our own developments we can advise you on what to consider when planning and designing acoustic solutions in health care premises. However, we always recommend that an acoustician and hygiene expert is involved in the final design. There are several different acoustic ceiling systems that will meet different acoustic and hygienic demands. From a hygienic point of view the systems can be divided by properties and the different hygiene surfaces.





# Different acoustic needs

## depending on room type

Health care premises incorporate a large variety of activities. Sound requirements vary considerably depending on how many people occupy the room, what they do, and what the room looks like. Factors such as the room's shape, volume, surfaces, equipment and furniture will all affect the sound environment. Installing a suitable system consisting of an acoustic ceiling or wall absorbers specially developed for health care environments will greatly reduce negative sound effects caused by various factors.

### **Solutions for specific health care needs**

Ecophon offer system solutions that undertake the highest hygiene demands combined with excellent acoustic performance for all types of rooms in health care. Our recommendation of acoustic system solutions is based on the activity and demands of these spaces and

is derived from the complexity of human perception of sound, rather than a single acoustic parameter. When you know what the specific acoustic challenges of a room are, it is easy to choose solutions that address these.



Entrance



Consulting room



Operating theatre



Photographer: Inpress, Tulu BurchChristmann



Photographer: Szymon Polinski



Intensive care unit



Ward room



Corridor



# Entrance

The entrance to a hospital is often a large, open space where patients, staff and visitors are in constant movement. A lot of people will be talking to each other, waiting for assistance, asking questions and finding their way. Reception areas need to facilitate communication, as well as orientation within the building. The entrance provides the first impression of the building, and should be perceived as inviting, secure and comfortable. A good sound environment will greatly contribute to this experience.

## **Prioritised acoustic qualities**

### • *Minimise stress (Sound strength)*

Patient and visitor stress should be reduced to a minimum. Using a sound absorbing ceiling to optimise the acoustic properties will reduce noise levels, making it easier for patients to orientate themselves and remain relaxed while waiting. Staff will be better able to assist and direct patients.

### • *Support communication (Speech clarity)*

In a reverberant room with disturbing background noise, it can be difficult to pick up speech. The communication between patients, visitors and staff at

a reception desk will benefit from good speech clarity. Wall absorbers will help optimise communication and can be used to create “quiet corners”.

### • *Secure confidentiality (Sound propagation)*

Sound spreads easily and threatens confidentiality in reception and waiting areas. The reduction of sound propagation depends on the total amount of sound absorbing material on all surfaces in the room. By using effective acoustic ceilings, the risk of overhearing conversations is reduced.



Photographer: Hans Georg Esch



Photographer: Olaf Jais

The shape, size, surface finish and furnishings of a room all determine its acoustic properties. Room acoustic design involves controlling these factors, thus influencing sound absorption, reflection, propagation and diffusion in order to support a certain type of function or activity.

### Recommended acoustic solutions

- **Ecophon Focus™:** range that offers a wide range of possibilities allowing easy assembly, integration of light fittings and ventilation.  
**Surface:** Akutex FT  
**Cleanability:** Daily dusting and vacuum cleaning. Weekly wet wiping.
- **Ecophon Wall Panel™ C:** System of vertical absorbers used together with a sound absorbing ceiling to achieve excellent acoustic properties in the room, particularly in larger areas.  
**Surface:** Texona or Muralis  
**Cleanability:** Weekly dusting and vacuum cleaning.
- **Ecophon Solo™:** with free hanging absorbers in different shapes and sizes (or create your own shape).  
**Surface:** Akutex FT  
**Cleanability:** Daily dusting and vacuum cleaning. Weekly wet wiping.



# Consulting room

*The consulting room is the place where good communication is essential. The patient and the medical staff need to understand each other, and to feel relaxed and secure. Various types of equipment may be used, but verbal communication is usually the main focal point. Time can also be a critical factor, so the interaction between patient and staff must be as efficient as possible, yet maintain a high quality.*

## **Prioritised acoustic qualities**

- *Ensure confidentiality (Sound strength)*

The main aim is to ensure that the consultation can be performed in a quiet environment with a feeling of privacy. The amount of absorbing material is a decisive factor and a sound absorbing ceiling produces the optimal results.

- *Optimise communication (Speech clarity)*

To avoid misunderstandings, it is crucial to provide the best possible conditions between doctor and patient. Wall Panels should ideally be placed closest to where conversation takes place.



Photographer: Ole Jøns



Photographer: Fancy



Photographer: Fancy

Human beings are designed for a life outdoors, where sight and hearing can function optimally. Our senses have not developed to any great extent over the last 40,000 years. Our environment however has changed dramatically, not least the sounds around us.

### Recommended acoustic solutions

- **Ecophon Hygiene Meditec™ A/E C1:** System for health care premises, fulfils ISO class 5 (ISO 14644-1).  
**Surface:** Akutex TH  
**Cleanability:** Daily dusting and vacuum cleaning. Weekly wet wiping. Steam cleaning 4 times a year. Withstands the use of the most common disinfecting chemicals and detergents.
- **Ecophon Hygiene Labotec™ Ds C1:** with concealed grid that meets demands for low particle emissions, fulfils ISO class 5 (ISO 14644-1).  
**Surface:** Akutex HP  
**Cleanability:** Particle repellent. Daily dusting and vacuum cleaning. Weekly wet wiping. Steam cleaning 4 times a year. Withstands the use of the most common disinfecting chemicals and detergents.
- **Ecophon Wall Panel™ C:** System of vertical absorbers used together with a sound absorbing ceiling to achieve excellent acoustic properties in the room, particularly in larger areas. (for additional sound absorption)  
**Surface:** Texona or Muralis  
**Cleanability:** Weekly dusting and vacuum cleaning.



# Operating theatre

The working environment and hygienic requirements are key factors in the operating theatre and adjacent areas. Conducting a surgical operation is a team effort underpinned by communication between the team members. Noisy equipment combined with a high density of people in a small space results in a sound environment that is quite stressful which may cause reduction in vital concentration. Patients are also in an exposed situation, and may feel worried by sharp sounds and noise.

The materials typically used in operating theatres are hard surfaces that are easy to clean with the necessary disinfectants, to ensure a high level of infection control. This produces a challenging sound environment, which can be managed by installing specially developed acoustic system solutions that meet the toughest of cleaning routines.

## **Prioritised acoustic qualities**

### • *Strength (Sound strength)*

Auditory strength is the level at which we experience sound. Surgeons and assistants will deliver a better performance and feel less tired when working in a tranquil environment. The quantity of absorbing material is decisive for the sound reduction, and the best results will be created by the use of sound absorption Class A\* products.

### • *Optimise communication (Speech clarity)*

Speech clarity concerns the quality of speech transfer from the source to the listeners. In order to avoid medical errors due to misinterpretation of instructions between staff, good speech clarity should be the priority. To create speech comfort, sound absorption is important. Due to recommendations for a jointless sealed ceiling in an operating theatre environment it is recommended that sound absorption is placed on the walls.



Photographer: Park Seonhwan



Photographer: Park Seonhwan

“The cost of readmitting a cardiac patient to critical care is very high. Preventing just one or two readmissions would save so much money that it could pay for most if not all the cost of upgrading the acoustic ceilings throughout the cardiology department.”

Roger S. Ulrich, Professor  
Centre for Health Systems and Design  
Texas A&M University, USA

### Recommended acoustic solutions

- **Ecophon Hygiene Protec™ A C3:** System with visible grid that meets demands for low particle emissions, fulfils ISO class 5 (ISO 14644-1).  
**Surface:** Akutex HP  
**Cleanability:** Particle repellent. Daily dusting and vacuum cleaning. Weekly wet wiping. Steam cleaning 4 times a year. Withstands the use of the most common disinfecting chemicals and detergents.
- **Ecophon Hygiene Advance™ Wall C3:** System for use in environments with very high demands on hygiene and cleanability, fulfils ISO class 3 (ISO 14644-1).  
**Surface:** Advance film  
**Cleanability:** Daily dusting, vacuum cleaning, steam cleaning and wet wiping. Withstands the use of most disinfecting chemicals and detergents.



Photograph: Inpress, Trine Busch-Christensen

# Intensive care unit

Work in an intensive care unit is generally dependent of high staffing levels and a high amount of technical equipment. Since patients need full-time observation, intensive care units are often filled with numerous monitoring devices, pumps etc. Noise from equipment not only disturbs patients, it also makes the staff's job to detect and analyse alarms more demanding. A high level of hygiene must be maintained around the patient to prevent infection, so surfaces are often hard in order to be totally cleanable. This can result in higher noise levels than those found in most other types of ward, impairing rest and sleep quality. Research has shown that use of highly absorbing material in ICUs has lowered patient's blood pressure, increased staff well-being and reduced readmission rates.

## Prioritised acoustic qualities

- *Create quietness (Sound strength)*

A quiet, soothing environment is of crucial importance to patients being treated in an ICU, and will aid recovery. Reducing sound levels to a minimum will require the use of high-performance absorbers, and a sound-absorbing ceiling is the optimal solution for achieving this.

- *Patient safety (Speech clarity)*

A good acoustic environment is important to assist the staff in detecting and analysing alarms and hearing

calls for assistance from patients. To secure patient safety, it is critical to be able to:

- Identify the sound source. Is it an emergency situation, and what action should be taken?
- Identify the origin of the sound source. What room does the alarm come from, and which patient needs help?

Flawless communication and a good sound environment, is of vital importance in situations that entail exchanging patient information.



“A patient in an ICU can be surrounded by up to 33 different alarms. In nine out of ten times no action is taken when an alarm goes off, except for turning off the alarm. Not only are the alarms disturbing to the patients, they also make the task for the staff to detect and analyse them more demanding.”

Dr. Ilene J. Bush-Vishniac  
 Mc Master University  
 Hamilton, Ontario

### Recommended acoustic solutions

- **Ecophon Hygiene Protec™ A C3:** System with visible grid that meets demands for low particle emissions, fulfils ISO class 5 (ISO 14644-1).  
**Surface:** Akutex HP  
**Cleanability:** Particle repellent. Daily dusting and vacuum cleaning. Weekly wet wiping. Steam cleaning 4 times a year. Withstands the use of the most common disinfecting chemicals and detergents.
- **Ecophon Hygiene Labotec™ Ds C1:** System with concealed grid that meets demands for low particle emissions, fulfils ISO class 5 (ISO 14644-1).  
**Surface:** Akutex HP  
**Cleanability:** Particle repellent. Daily dusting and vacuum cleaning. Weekly wet wiping. Steam cleaning 4 times a year. Withstands the use of the most common disinfecting chemicals and detergents.
- **Ecophon Hygiene Advance™ Wall C3:** System for use in environments with very high demands on hygiene and cleanability, fulfils ISO class 3 (ISO 14644-1).  
**Surface:** Advance film  
**Cleanability:** Daily dusting, vacuum cleaning, steam cleaning and wet wiping. Withstands the use of most disinfecting chemicals and detergents.
- **Ecophon Wall Panel™ C:** System of vertical absorbers used together with a sound absorbing ceiling to achieve excellent acoustic properties in the room, particularly in larger areas. (for additional sound absorption)  
**Surface:** Texona or Muralis  
**Cleanability:** Weekly dusting and vacuum cleaning.



# Ward room

*A ward is the place where patients spend most of their time, and should offer the patient a sense of control and privacy. It should also offer comfort so that the patient can rest and sleep, or interact securely with staff or visitors. It is also crucial for staff to be able to perform their work optimally, and communication plays a central role in this respect. Many patients have a need for additional sleep, not only during the night. With the ongoing activities in the ward, patients need to be protected from noise. In wards where patients share rooms, use of sound-absorbing material is often the only way to reduce the negative effects of noise.*

## **Prioritised acoustic qualities**

### • *Support recovery (Sound strength)*

Patients in a ward benefit from quiet conditions. They are usually most disturbed by unwanted sound in the room and noise from nearby corridors. Sleep and recovery requires low sound levels, and for this reason, a fully covering absorbing ceiling is recommended.

### • *Limit disturbance (Sound propagation)*

Preventing sound from spreading is mainly relevant if the ward is designed as an open plan solution.

The aim is to prevent spreading of unwanted sound that is unintentionally produced by other patients or equipment in the room. The greater the amount of absorbent ceiling used, and the higher the acoustic performance, the less sound will spread. Use of furniture and screens will further help to reduce and diffuse the sound, and thus increase the efficiency of the ceiling. Installation of wall panels will reduce unwanted reflections.



“We noticed a huge difference once we had a new acoustic ceiling installed. Noise is prevented from spreading to other parts of the room. We are now able to hear each other more clearly when talking, which helps reduce stress. The beeps and alarms from monitoring devices are now lowered to bearable levels, and the noise from ventilation is no longer a problem.”

Agneta Haglind  
Head Nurse at post-surgery recovery room  
Halmstad Hospital, Sweden

### Recommended acoustic solutions

- **Ecophon Hygiene Meditec™ A/E C1:** System for health care premises, fulfils ISO class 5 (ISO 14644-1).  
**Surface:** Akutex TH  
**Cleanability:** Daily dusting and vacuum cleaning. Weekly wet wiping. Steam cleaning 4 times a year. Withstands the use of the most common disinfecting chemicals and detergents.
- **Ecophon Wall Panel™ C:** System of vertical absorbers used together with a sound absorbing ceiling to achieve excellent acoustic properties in the room, particularly in larger areas. (for additional sound absorption)  
**Surface:** Texona or Muralis  
**Cleanability:** Weekly dusting and vacuum cleaning.



# Corridor

Corridors are often busy areas in a health care building, and sound has a tendency to carry along their length and into adjacent rooms. Patients, visitors and staff move from one place to another, sometimes with beds or medical equipment. Supplies and material are also transported, often in large containers that may cause noise. It is common to keep doors open while working so that patients and monitoring equipment can be heard. Corridors are also used as waiting rooms, and patients are sometimes temporarily placed there. People need to talk to each other, and the atmosphere can be quite stressful. As corridors are noisy places but there is still great need for communication, the noise must be restricted as far as possible.

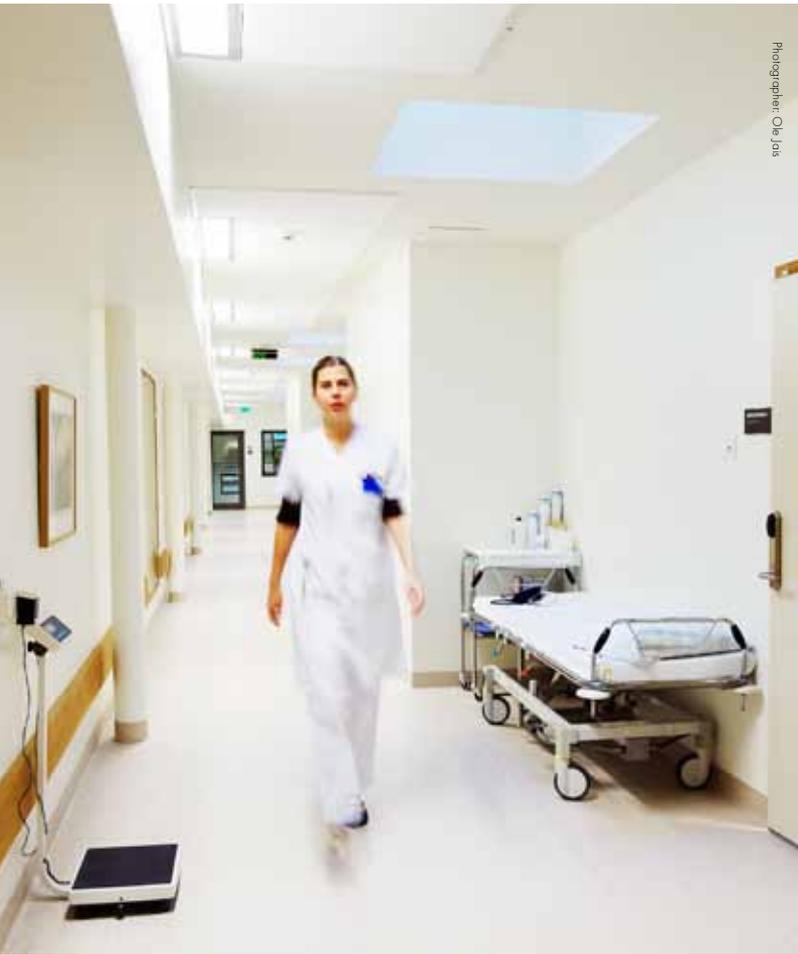
## **Prioritised acoustic qualities**

- *Reduce sound levels (Sound strength)*

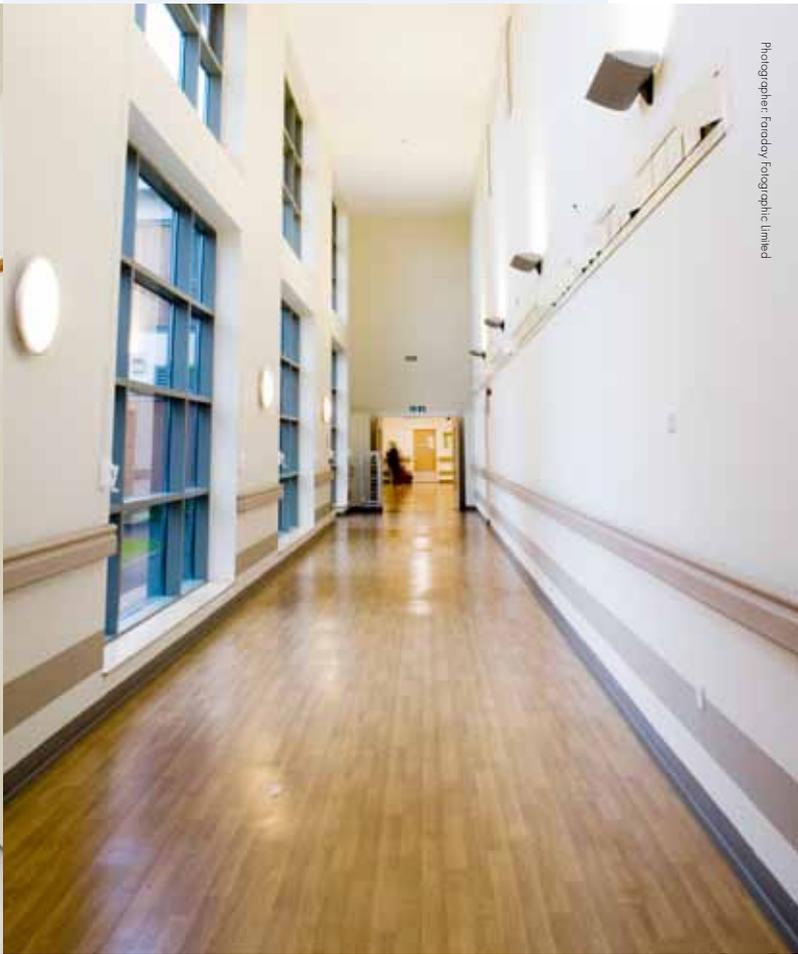
Corridors are among the noisiest areas in a hospital, due to all the activity that goes on in them. Reducing the high sound levels to a minimum is best achieved by installing a high-performance sound-absorbing ceiling plus additional wall panels to avoid flutter echo caused by the long thin shape.

- *Prevent sound spreading (Sound propagation)*

Due to the shape of corridors, sound travels extremely fast and creates unwanted noise, which in turn affects the rooms that are directly adjacent to the corridor. Sound is most effectively prevented from spreading by installing a highly sound-absorbing ceiling plus additional wall panels to avoid flutter echo.



Photographer: Ola Jäs



Photographer: Fendry Fotografic Limited

“Staff feel that what happens in the corridor affects the noise level in the room. We try to keep the door shut but it’s difficult since we have to move around a lot in our work.”

Maura Krook  
Head nurse at Thorax ICU  
Karolinska University Hospital, Sweden

### Recommended acoustic solutions

- **Ecophon Focus™ XL:** System range that offers a wide range of possibilities allowing easy assembly, integration of light fittings and ventilation.  
**Surface:** Akutex FT  
**Cleanability:** Daily dusting and vacuum cleaning. Weekly wet wiping.
- **Ecophon Access™:** System range for environments where it is important to have easy access to installations.  
**Surface:** Akutex FT  
**Cleanability:** Daily dusting and vacuum cleaning. Weekly wet wiping.
- **Ecophon Hygiene Meditec™ A/E C1:** System for health care premises, fulfils ISO class 5 (ISO 14644-1).  
**Surface:** Akutex TH  
**Cleanability:** Daily dusting and vacuum cleaning. Weekly wet wiping. Steam cleaning 4 times a year. Withstands the use of the most common disinfecting chemicals and detergents.
- **Ecophon Wall Panel™ C:** System of vertical absorbers used together with a sound absorbing ceiling to achieve excellent acoustic properties in the room, particularly in larger areas. (for additional sound absorption)  
**Surface:** Texona or Muralis  
**Cleanability:** Weekly dusting and vacuum cleaning.

# We offer tailored solutions

## for other rooms and premises

*Health care premises have many more room types that benefit from acoustic treatment than are specifically covered in this brochure, and Ecophon can provide a varied range of solutions to fit every need.*



### **Administrative areas**

The hospital is a complex building that features many areas for care and medical treatment. It also has large administrative office functions, conference facilities for meetings and auditoriums for teaching and lecturing.

For recommendations on less hygiene requiring areas, please see our Office and Education solutions, available on [www.ecophon.co.uk](http://www.ecophon.co.uk)

### **Clean room competence**

Our high performing Hygiene range is of course also suitable for other hygiene dependant rooms such as laboratories, pharmacies or other clean room facilities. For acoustic system recommendations, we recommend that you consult us for specialised advice.

### **Other care facilities**

Health care premises mean more than just hospitals. It also includes premises for primary care and elderly care homes for instance; these are all places where comfort, communication and perception of sound are a focus. As our population grows older, the incidence of hearing disabilities increases and these may be exacerbated by sound environments with poor speech clarity. Sufferers of dementia are also very sensitive to sound, and treating residential care facilities acoustically may contribute to a more peaceful home environment for these patients. By reducing the sound levels in these facilities you contribute to a calmer environment that is appreciated by both patients, visitors, residents and staff.



# Focus on function

## meeting all health care demands

In health care environments certain crucial factors may never be compromised. The most important factor, naturally, is infection control; every single piece of material installed must meet stringent hygiene demands. This means that it must be easy to clean, resistant to moisture, dirt and dust, and not emit harmful particles or substances. Ecophon offers products that comply with stringent hygiene regulations, which make them suitable for use in health care environments.



### Cleaning

For acoustic ceilings and wall absorbers to deliver good infection control and also have a long service life and low maintenance costs, the exposed surfaces must be dirt and dust repellent and easy to clean. Ecophon Hygiene systems can be dusted, vacuum cleaned; wet wiped, disinfected and steam cleaned depending on the type of system.



### Fire resistance

A fire in a hospital can develop very quickly and have devastating consequences. When planning, designing and choosing material for health care facilities it is very important to also look at fire safety and compliance with fire regulations. Most Ecophon systems have high fire classifications (A2-s 1, d0).



### Dust and emission free

For infection control reasons, it is desirable to install a ceiling that does not emit any particles. Ecophon systems have a number of certificates and classifications, and are a safe choice in health care environments.



### Accessibility

An important function in acoustic ceilings is easy access to installations, such as electricity, ventilation or computer cables. Many acoustic tiles in health care facilities will have to be demounted during their life cycle. In Ecophon solutions both the suspension system and the absorbers are designed to facilitate demounting and remounting.



### Resistance to moisture and heat

All materials are more or less affected by the surrounding environment, and it is important to evaluate how a long period of exposure will affect the material's properties. Ecophon Hygiene systems are developed to withstand a tough indoor climate with high humidity, heat, microbiological activity and corrosion. Microbiological tests, conducted by the test and research institute TNO in the Netherlands, show that the material is totally inert and do not contain substances that promote bacterial growth.



### Environmental aspects

Ecophon absorbers are made of glass wool, of which more than 70% consists of recycled glass. The suspension systems are made of steel consisting of 50% recycled material, and are completely recyclable. Ecophon is constantly working towards minimising environmental impact by using eco-friendly packaging and efficient transportation.

Read more about our environmental efforts on [www.ecophon.com](http://www.ecophon.com).

# Choose a system

## that matches the acoustic design

When choosing an acoustic system, it is vital to make sure that the products' performance matches your acoustic requirements and preferences. At Ecophon, we work with four acoustic qualities to describe the acoustic requirements – sound strength, sound propagation, speech clarity and reverberation. Ecophon systems are designed to ensure the best possible performance for each of the qualities.

### Sound strength

If a low sound strength is the main priority – choose absorbing products with the highest possible *absorption factor* ( $\alpha$ ).

### Sound propagation

To ensure short sound propagation choose absorbing products with high *articulation class values* ( $AC$ ), preferably  $> 180$ . The higher the  $AC$  value, the shorter the sound propagation.

### Speech clarity

If speech clarity is the main priority – contact Ecophon to choose the right combination of absorbers and reflectors.

### Reverberation

If reverberation is the main priority – contact Ecophon to choose the right combination of absorbers and reflectors.

For open space environments it is important to focus on the acoustic quality sound propagation, and thus products with high  $AC$ -values.



#### Product performance

**Sound absorption class** – sound absorbers are categorised in classes A-E. Class A has the highest sound absorbing capacity and class E has the lowest, according to EN ISO 11654.

**Sound absorption factor** – a measure of the extent to which the sound is absorbed, measured according to EN ISO 354.

$\alpha = 1$  means that all sound that reaches the absorber is absorbed.

$\alpha = 0$  means that all the sound is reflected.

**Articulation Class (AC)** – is a measure for rating a ceiling's effectiveness in limiting sound propagation. The higher a product's  $AC$  value, the shorter the sound propagation.  $AC$  is measured according to ASTM E1111-07/E1110-06.

# Labelling

## health, safety and functional characteristics

*Ecophon acoustic systems comply with the requirements of eco labelling boards and building research and public health organisations. The voluntary third-party audits provide documented certainty with respect to both the indoor environment requirements and the acoustic systems' characteristics.*

### Audit of emissions to the indoor environment

Recommended  
by the  
Swedish Asthma  
and Allergy Association

The Swedish Asthma and Allergy Association has investigated Ecophon's products with regard to substances that may contribute to allergic reactions and other irritation, and has established that the association can recommend Ecophon's sound absorbers. [www.astmaoallergiforbundet.se](http://www.astmaoallergiforbundet.se)



Ecophon has products that are certified and comply with the most stringent requirements of the Danish Indoor Climate Label. The organisation looks for substances in building materials that have been found to contribute to allergies and other hypersensitivity, and measures the length of time it takes after installation for these substances to subside to an acceptable level. In addition, a subjective smell test is carried out to assess the presence of any remaining smells deriving from emissions. Ecophon holds the first certificates issued by Dansk Indeklima, no. 001 and no. 002 from 1995, when labelling began. [www.dsic.org](http://www.dsic.org)



Most Ecophon products comply with the emission requirements of Finland's leading information centre for the construction sector, the Building Information Foundation RTS. Products labelled M1, which is the best emission class, have the lowest emission values for a number of substances harmful to health. [www.rts.fi/english.htm](http://www.rts.fi/english.htm)

### Audit of functional characteristics



Ecophon has chosen to subject its sound absorbers to an impartial audit by SP Technical Research Institute of Sweden so that their sound absorption capacity can be P-labelled (SP's own quality label).

This eliminates any uncertainty regarding more or less incomplete or home-made test values. SP annually inspects our plants and carries out check measurements, which represents an important part of our quality efforts. [www.sp.se](http://www.sp.se)

### CE-marking

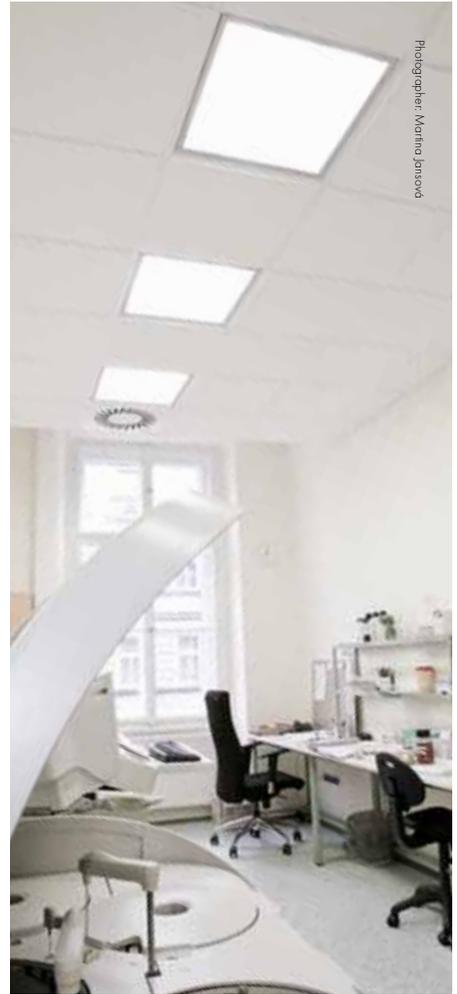


Ecophon's sound absorbers, grids and accessories are CE-marked in compliance with European standard EN 13964, facilitating comparison between different makes and types of sound absorbers. CE-marking includes sound absorption, fire safety and certain emissions. Our CE-marking of sound absorbers requires production inspection to be supervised by an independent body. [www.ecophon.com](http://www.ecophon.com)





Photographer: Ulf Odenspij



Photographer: Martina Janová



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# Contact us for

## **your optimal solution**

*The challenge in choosing the right acoustic system solution in health care premises is to meet a number of demands. In the planning and design of the room, one should consider staff and patients, their activities, the size and shape of the room and aspects like infection control and safety. In addition, some rooms require compliance with relevant hygiene and acoustic standards and regulations such as HTM60. These may vary from room to room and require a thorough understanding.*

### **Are you looking for:**

- technical assistance
- test certificates
- assistance in interpreting standards and regulations
- further suggestions for acoustic solutions

Regardless of where you are in the design process, With our 50 years of experience Ecophon will help you to find the solution that fits your needs and can definitely contribute to the success of your project.

### **Want to know more?**

- Visit us at [www.ecophon.com](http://www.ecophon.com)
- Order “Care about Sound”



Care about sound is brochure on how to improve the quality of care. It lists relevant research that describes the benefits associated with well planned room acoustics.







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's efforts are guided by a vision of earning global leadership in acoustic ceiling and wall absorber systems by providing superior end user value. 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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