Rockfon®

Good acoustics make moments matter

Sounds Beautiful

CONTENTS

We begin in sound.

Before we ever see the world,
we hear it. A heartbeat.
A rhythm. A sense of calm.
And from that very first breath,
sound begins to shape our lives.

Every day, without realising it, we experience the profound impact of acoustic environments. Some days, sound supports us – enabling focus at work, clear communication in learning, healing in care. Other days, noise works against us – fragments our attention, isolates us, disrupts our rest.

At Rockfon, we've spent decades studying this invisible force. What we've discovered is simple yet powerful: interior acoustics are not a luxury. **They are foundational to wellbeing through life and in our most important moments.**

From our first breath in a hospital to our final conversations in care facilities, from classrooms where children learn to offices where we build careers, **sound is always present – shaping how we heal, how we grow, and how we belong**.

This guide explores the acoustic journey of life – **revealing why good acoustics matter at every stage**, and how thoughtful acoustic design creates spaces where people flourish.

CHAPTER 1

The first breath

NEWBORN STAGE

A gentler start – calm sound from the very first breath.

When Noise Overwhelms

In the hospital, the newborn meets a world of alarms, voices, and machines. What feels normal to us can overwhelm them.

Every sound a newborn hears shapes their earliest experience of the world. When that environment is quieter and more controlled, the difference shows up where it matters most: a steadier heartbeat, deeper sleep, and stronger growth.

Sound can disrupt life. Or it can support it right from the start.

CHAPTER 1

When Sound Becomes Support

The science is clear: noise peaks trigger stress responses in newborns[1], and newborns exposed ≥45 dB (A) may experience elevated vital signs and decreased oxygen[2]. But there's another side to this story – one about possibility.

Calming sounds (heartbeat + white noise) improve sleep, weight gain and heart rate[3], allowing infants to rest and develop in the way their bodies are designed to. Acoustic management enhances infant comfort, development and family privacy[4].

A Class A acoustic ceiling system contributes to lower background noise levels and reduced reverberation in critical care environments such as neonatal units, supporting physiological stability, rest and development.

KEY FACTS

- Noise peaks **trigger stress responses** in newborns (sympathetic activation)[1]
- Newborns exposed ≥45 dB (A) may experience **elevated vital signs** and **decreased oxygen**[2]
- **Calming sounds** (heartbeat + white noise) improve sleep, weight gain and heart rate[3]
- **Acoustic management** enhances infant comfort, development and family privacy[4]

See all sources on page 26.

CHAPTER 2

Learning to listen

TODDLER & KINDERGARTEN STAGE

In a quiet classroom, every word reaches the child.

When Every Sound Competes

First day at school. A child tries to follow the teacher but every sound competes equally. Children are “inefficient listeners” with limited ability to filter noise[24] – so they don’t just hear less clearly. They learn less effectively.

In noisy classrooms, their mental energy is spent trying to hear, not understand. Noisy classrooms reduce language and pre-reading skills[25], creating foundational gaps that compound over time.

See all sources on page 26.

CHAPTER 2

When Words Come Into Focus

But here's what changes everything: in quiet, well-designed classrooms, something shifts. Words become clear. Confidence grows. Learning accelerates.

Good acoustics improve word recognition by up to 15%[26], and adequate acoustic conditions enable students to correctly understand approximately 95% of spoken content[27].

When acoustic environments support speech clarity, children don't just hear better – they understand better, engage more actively, and develop stronger foundations for language and learning.

Short reverberation times (T < 0.6 sec.) deliver measurable results:

- **14% improvement** in phonological processing[28]
- **15% higher positive** teacher relationship ratings[28]
- **59% higher** student attention performance (8.75 vs. 5.50 scores)[29]

+15%

improvement in word recognition with good acoustics[26]

See all sources on page 26.

In typical classrooms, a full Class A ceiling will generally reduce reverberation time to around or below 0.5 seconds, subject to room geometry and surface finishes. For deeper rooms, achieving optimal speech intelligibility across all seating positions may require a combination of absorption, reflection and rear acoustic wall treatment.

RECOMMENDED STANDARDS FOR CLASSROOMS

- **≤ 0.5 sec. reverberation time**
- **≤ 35 dB (A) background noise**[30, 31, 32]

KEY FACTS

- Children are **"inefficient listeners"**. Limited ability to filter noise[24]
- **Noisy classrooms reduce** language and pre-reading skills[25]
- **Good acoustics improve** word recognition by up to 15%[26]
- **Adequate acoustic conditions** enable students to correctly understand ≈95% spoken content[27]
- **Short reverberation times** (T < 0.6 sec.) improve classroom learning and relationships[28, 29]

See all sources on page 26.

CHAPTER 3

Reaching your potential

TEENAGER STAGE

Students can fully concentrate with optimized acoustics.

When Noise Becomes Distraction

As children grow, so does the demand on their attention. Noise has a moderate negative effect on memory, attention, and comprehension[5]. In noisy classrooms, their mental energy is spent fighting distractions.

The numbers tell the story: a +10 dB (A) increase in noise correlates with approximately a 7% drop in test performance[7]. But here's the critical difference: children need 5–7 dB better Signal-to-Noise Ratio (SNR) than adults[6] – meaning they require significantly quieter environments to learn effectively. This isn't a preference; it's a developmental necessity.

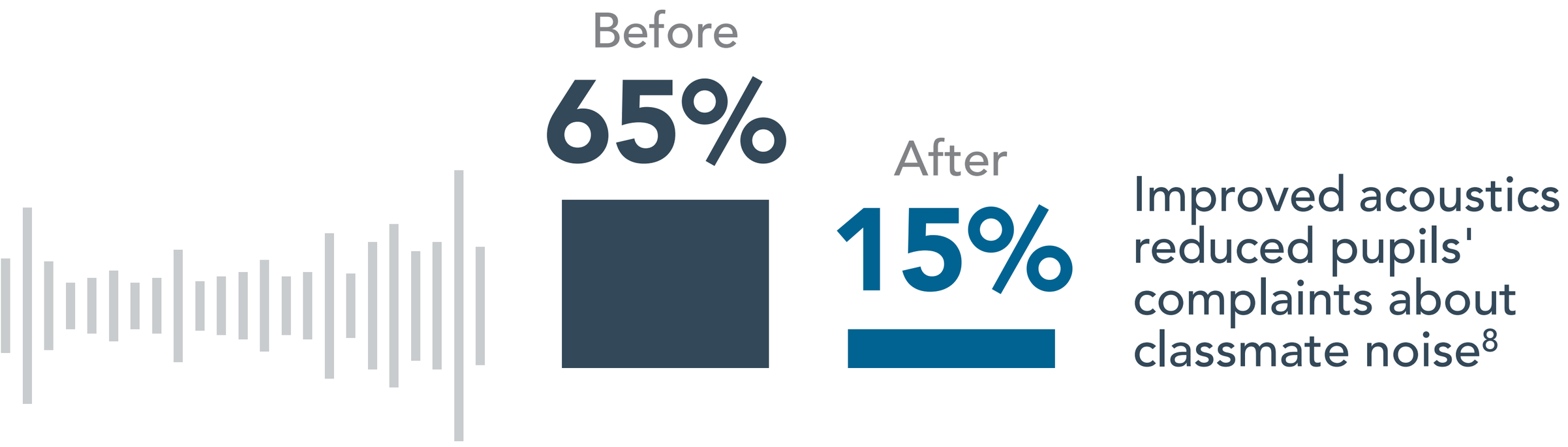
Sound becomes an invisible barrier to potential.

See all sources on page 26.

CHAPTER 3

Breaking Through The Noise

When acoustics are optimized for learning, teenagers can finally concentrate. Focus returns. Memory strengthens. Academic performance improves. **Improved acoustics reduced pupils' complaints about classmate noise from 65% to 15%**[8] – a dramatic shift in their experience of the learning environment.



Good acoustic design in schools isn't a nice-to-have – it's essential infrastructure for educational success.

KEY FACTS

- **Noise has a moderate negative effect** on memory, attention, comprehension[5]
- **Children need** 5–7 dB better Signal-to-Noise Ratio (SNR) than adults[6]
- +10 dB (A) noise ≈7% drop in **test performance**[7]
- **Improved acoustics** reduced pupils' complaints about classmate noise from **65% to 15%**[8]

See all sources on page 26.

CHAPTER 4

The rush of being young

YOUNG ADULT STAGE

Loud venues bring people together, but the sound can harm hearing.

When Energy Comes With Risk

The club. The music. The energy. Loud music triggers bonding hormones – dopamine and oxytocin[9] – bringing people together, releasing connection, creating memories. But it also pushes the limits of what our bodies can handle.

Here's what matters: In clubs and bars, noise exposure can exceed 100 dB (A), which becomes dangerous after just 15 minutes[10, 11]. What feels exciting today can leave lasting impact tomorrow.

See all sources on page 26.

CHAPTER 4

The scale of impact is sobering: Over 1 billion young people globally are at risk for hearing loss due to recreational noise exposure[12]. In fact, 88% of young adults experienced tinnitus after leaving a nightclub[13], and 50% or more report fatigue after loud sound exposure[14]. For venue staff – DJs, bartenders, sound technicians – the implications are even more serious. Their nightly exposure isn't a few hours; it's a career-long accumulation of risk.

Sound, Safely Shared

A well-designed acoustic environment makes conversations effortless and music enjoyable -without strain or risk. Good acoustics don't mean killing the energy; they mean creating spaces where people can connect safely, enjoy the moment fully, and protect their long-term hearing health.

Optimizing acoustics for safe listening improves sound quality and enhances the listening experience for audience members and performers. Sound-absorbing ceiling and wall panels can reduce noise levels up to 9 dB (A), creating safer, more enjoyable spaces[24].

RECOMMENDED STANDARDS FOR VENUES

For venues with amplified music (≈1000 m³), **reverberation time (T60): 0.6 – 0.8 sec.**[15]

See all sources on page 26.

CHAPTER 4

A highly sound-absorbing ceiling

improves overall satisfaction levels of occupants[23]

KEY FACTS

- **Loud music triggers** bonding hormones (dopamine, oxytocin)[9]
- In clubs and bars, **noise exposure** can exceed 100 dB (A). **Dangerous** above 15 min.[10, 11]
- Over 1 billion **young people are at risk** for hearing loss due to recreational noise exposure[12]
- 88% of young adults **experienced tinnitus** after leaving a nightclub[13]
- **50%+ report fatigue** after loud sound exposure[14]
- **Sound-absorbing solutions** can reduce noise levels up to 9 dB (A)[24]

See all sources on page 26.

CHAPTER 5

Finding focus

ADULT STAGE

The right acoustics support finding focus.

When Sound Steals Your Attention

First job. Open office. You're ready to think but sound gets in the way. Conversations, calls, constant noise.

78% of workers report being negatively affected by workplace noise[16], and 94% say they'd be more productive with less noise. Yet 63% lack access to quiet spaces for focused work[18]. It's not just annoying – it reduces productivity, increases stress, and fragments attention.

In spaces designed without acoustic consideration, focus becomes a luxury few can afford.

See all sources on page 26.

CHAPTER 5

When Work Becomes Meaningful

When sound is controlled through thoughtful acoustic design, everything changes. With an optimized indoor acoustic environment, organizations see:

- **48% improvement** in the ability to focus[19]
- **27% reduction** in stress levels[19]
- **66% improved** work motivation[20]
- **20% improvement** in the performance of mental arithmetic[21]

A highly sound-absorbing ceiling improves overall satisfaction levels of occupants[23], creating spaces where meaningful work can happen. An optimized acoustic environment doesn't just improve productivity – it transforms how people experience their working lives.

+66%

improved work motivation with an optimised acoustic environment[20]

RECOMMENDED STANDARDS FOR OPEN OFFICE ENVIRONMENTS

Reverberation time (T60)

- avg ≤0.5 sec., T ≤0.8 sec. (125 Hz)[22]

Background noise (L_{Aeq})

- ≤ 48 dB (A) to ≤ 55 dB (A), depending on activity[22]

See all sources on page 26.

CHAPTER 5

WITH AN OPTIMIZED ACOUSTIC ENVIRONMENT

+48%
improvement in the ability to focus[19]

+27%
reduction in stress levels[19]

+66%
improved work motivation[20]

+20%
improvement in the performance of mental arithmetic[21]

KEY FACTS

- **78% negatively affected** by workplace noise[16]
- 94% say they'd be **more productive with less noise**[17]
- **63% lack access** to quiet spaces for focused work[18]

See all sources on page 26.

CHAPTER 6

Being heard again

ELDER STAGE

Clear sound helps older adults stay part of the conversation.

When Hearing Becomes Isolation

Later in life, hearing becomes harder. 65% of those aged 75–85 and 80% of those 85+ experience presbycusis[40] – age-related hearing loss that develops gradually and affects communication.

Conversations blur into background noise. In elderly care environments with poor acoustics, the result goes beyond frustration – it isolates. Care homes often measure 55–68 dB (A), above recommended levels[41] – making communication even more difficult for those already struggling to hear.

People withdraw from community, miss connections, lose moments of human contact.

See all sources on page 26.

CHAPTER 6

Reconnecting Through Clarity

When sound is clear again, people reconnect. Acoustic treatment can reduce noise 5–11 dB (A)[42], and adding sound-absorbing solutions can reduce reverberation time 29–53%[42] – measurable improvements that translate directly to better communication.

Reverberation reduction improves communication, comfort and social interaction[42, 43], enabling elders to remain engaged and connected.

Good acoustic design in elder care isn't just about hearing better - it's about belonging, community, and maintaining the human connections that give life meaning.

29–53%

shorter reverberation time
with sound-absorbing solutions[42]

KEY FACTS

- 65% aged 75-85 and 80% for 85+ **experience presbycusis**[40]
- **Care homes** often measure 55–68 dB (A) (above recommended levels)[41]
- **Acoustic treatment** can reduce noise 5–11 dB (A)[42]
- **Adding sound-absorbing solutions** can reduce reverberation time 29–53%[42]
- **Reverberation reduction** improves communication, comfort and social interaction[42, 43]

See all sources on page 26.

CHAPTER 7

A universal concern across every stage of life

CARE AND RECOVERY STAGE

Quieter wards: better rest for patients and sharper focus for staff.

When Hospitals Become Noisy

Throughout every chapter of life – from the moment we're born to our final years – healthcare environments shape our most vulnerable moments.

In hospitals, sound becomes critical to healing and recovery. Noise affects not only patients but also clinical staff. Due to noise, ICU staff report: 66% irritation, 66% fatigue, and 43% concentration problems[33].

See all sources on page 26.

CHAPTER 7

Fatigue rises. Concentration falters. Errors increase. Recovery slows. In high-stress environments where precision matters, poor acoustics create additional burden – both on those healing and those providing care.

Whether it's a newborn in a neonatal unit, a recovering patient in an intensive care unit, or an elderly person receiving palliative care, acoustic quality becomes inseparable from the quality of care itself.

Due to noise, ICU staff reports[33]

46% concentration problems

RECOMMENDED STANDARDS

Reverberation time (T60)

- 0.4–0.6 sec. for **speech-critical rooms**[36, 37, 38, 39]
- 0.6–0.8 sec. for **patient care spaces**[36, 37, 38, 39]

Background noise

- 30–35 dB (A) **in patient sleeping areas**[40]

See all sources on page 26.

CHAPTER 7

Healing Spaces That Actually Support Healing

Quieter, better-designed healthcare environments reduce stress and improve healing outcomes. Improved acoustics support fewer errors, less stress, and less irritation among staff members[34], while improved acoustics and noise reduction support better patient recovery and sleep[35].

When acoustic design is prioritized, patients rest better, staff perform better, and the entire care environment supports recovery. Adding a sound-absorbing ceiling can reduce noise levels up to 6 dB (A), which is a clearly audible difference that directly impacts patient and staff wellbeing[34]. Good acoustics in healthcare isn't about comfort alone – it's about clinical outcomes. It's about creating spaces where healing can actually happen.

KEY FACTS

- **Due to noise**, ICU staff report: 66% irritation, 66% fatigue, 43% concentration problems[33]
- **Improved acoustics** means fewer errors, less stress, less irritation among staff members[34]
- **Improved acoustics and noise reduction** support better patient recovery and sleep[35]
- **Adding a sound-absorbing ceiling** can reduce noise levels up to 6 dB (A)[34]

See all sources on page 26.

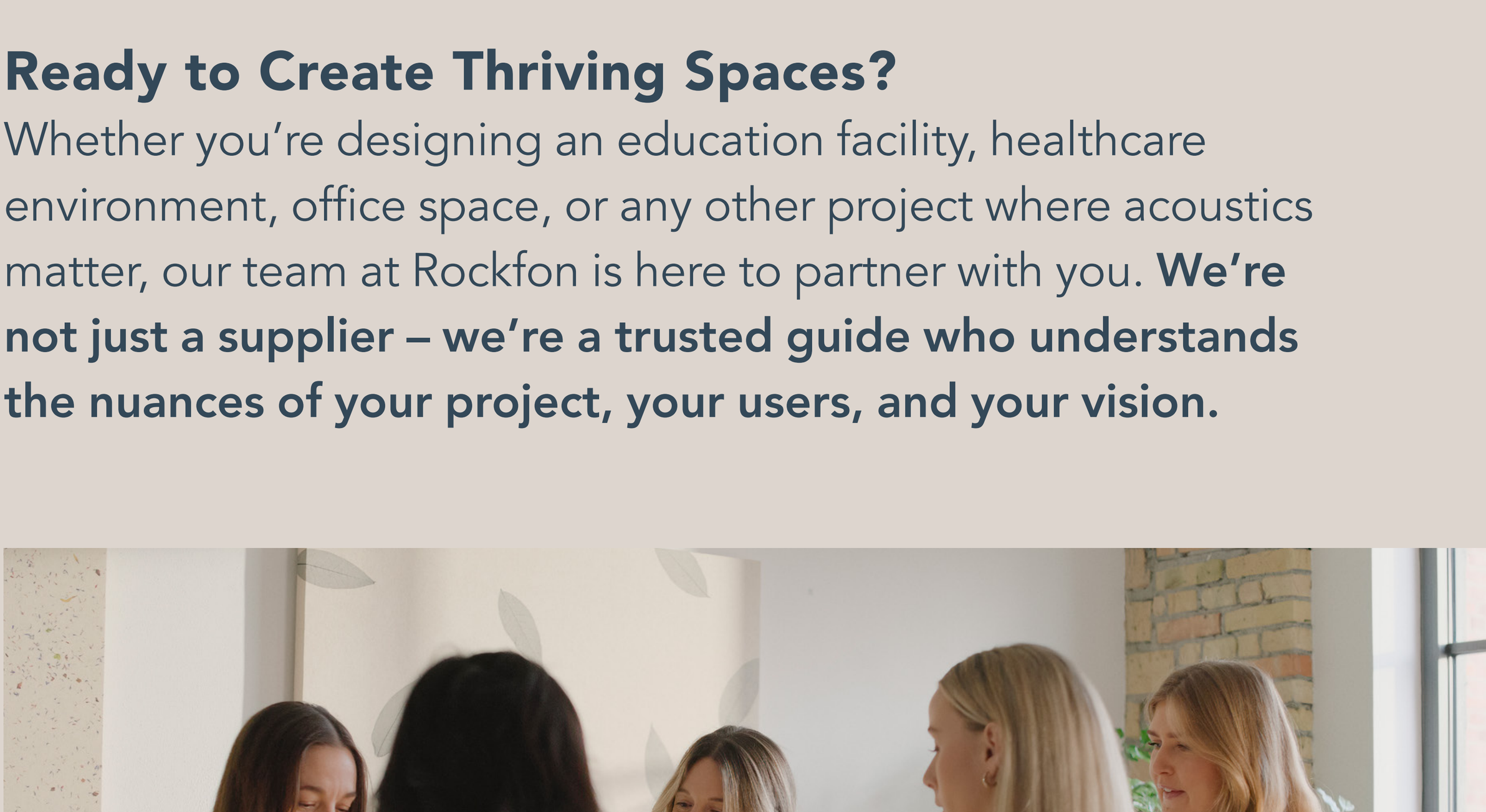
OUTRO

The thread through life. From our first breath to our final conversations, sound is always there.

It shapes how we learn, how we connect, how we heal, and how we belong. The difference is not just volume. It's how acoustics are designed. Because sound is never just sound. It is clarity. It is focus. It is wellbeing. It is connection. And when we shape it right, we shape every moment that matters.

Ready to Create Thriving Spaces?

Whether you're designing an education facility, healthcare environment, office space, or any other project where acoustics matter, our team at Rockfon is here to partner with you. **We're not just a supplier – we're a trusted guide who understands the nuances of your project, your users, and your vision.**



OUTRO

Here’s What Sets Us Apart

For over 60 years, we’ve built our solutions on **stone wool – a natural, durable material that performs for decades while remaining fully recyclable**.

Our extensive product range gives you creative freedom: floating panels, wall systems, baffles, seamless ceilings, and more – in countless colours, finishes, and configurations. **Whatever your design calls for, we have the flexibility to make it real.** And because we’ve worked across every sector and building type, we bring deep expertise to every conversation. Our team provides tailored guidance backed by rigorous testing, local knowledge, and hands-on support from concept through installation.

Beyond acoustic excellence, we’re committed to building a more sustainable future. **Our stone wool is made from naturally abundant volcanic stone, and we’re continuously reducing our carbon footprint through electric melters and clean energy initiatives**.

OUTRO

Through our Rockcycle programme, we’re transforming used stone wool back into new products – closing the loop and giving building materials a second life.

As we expand this initiative across all our markets, it represents our commitment to making circular solutions accessible everywhere. We design with modularity in mind, meaning spaces can adapt and evolve, and damaged elements can be replaced without waste.

Your project deserves a partner who understands that good acoustics are about more than sound – they’re about wellbeing, sustainability, and creating spaces where people thrive.

Let’s work together to make that happen.

GLOSSARY LIST

Acoustic Management
Controlling and optimising sound in a space to support comfort, communication and wellbeing. Involves reducing unwanted noise, managing reverberation and improving speech clarity through design, materials and technology.

Background Noise
Unwanted or distracting sounds present in an environment, such as traffic, ventilation systems or conversations. Background noise is often measured using L_{Aeq}, which represents the average sound level over a specific period of time. For example: quiet office: ~40 dB (A), normal conversation: ~60 dB (A).

Decibel – dB/dB (A)
A decibel (dB) measures sound level or loudness. Higher values mean louder sounds. dB (A) is adjusted to reflect how the human ear naturally hears different frequencies and is commonly used in workplace and environmental noise measurements.

Frequency
The rate at which a sound wave vibrates, measured in Hertz (Hz). Fast vibrations create high-pitched sounds (like a whistle), while slow vibrations create deep sounds (like thunder). The human ear typically perceives frequencies between 20 Hz and 20,000 Hz. In acoustic design, different materials absorb different frequencies at different rates, which is why tailored acoustic solutions are essential for creating effective spaces.

Mental Arithmetic
Mental arithmetic is the practice of performing mathematical calculations in your head without using external tools like calculators, paper, or writing implements. It relies entirely on memory, concentration, and mathematical reasoning.

Phonological Processing
The cognitive ability to identify, recognise and manipulate the individual sounds (phonemes) in spoken language. Essential for reading, language development, and communication.

Presbycusis
Age-related hearing loss that develops gradually with aging, primarily affecting high-frequency sounds. A common cause of hearing impairment in older adults that can impact communication and quality of life.

Reverberation / Reverberation Time (T60)
Reverberation is the persistence of sound caused by reflections from surfaces such as walls and ceilings. Reverberation Time (T60) measures how long sound takes to fade by 60 decibels after the source stops. Excessive reverberation can reduce speech clarity.

Signal-to-Noise Ratio (SNR)
The difference in decibels between the desired sound (e.g. a teacher's voice) and the background noise level. A positive SNR means the signal is louder than the noise. Children typically need an SNR of +15 to +20 dB (A) to understand speech reliably, adults can manage at +5 to +10 dB (A).

Sound Perception
The way the brain interprets and understands sounds received by the ears. Sound perception includes recognizing loudness, direction, meaning, and emotional context, not just detecting sound itself. Perceived loudness depends on: frequency, listening environment, duration and what kind of sound (e.g. music, speech or tones).

Tinnitus
The perception of ringing, buzzing or similar sounds without an external source. Tinnitus may be temporary or chronic and is often associated with hearing loss, stress or exposure to loud noise.

White Noise
A consistent sound containing many frequencies played at equal intensity, often perceived as a steady “hissing” sound. White noise can help mask distracting background sounds, improve speech privacy, and support concentration, relaxation, or sleep in certain environments.

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ABOUT US

Creating a world that sounds good to everyone

When we set out to create the most effective acoustic **solutions on Earth we started with people.** The student struggling to hear. The business person trying to concentrate. The couple wanting an intimate conversation over dinner out.

It inspired our beautiful range of colours and styles. **It expanded our vision to go beyond acoustics and design products that improve visual comfort, reflect daylight, resist moisture and repel bacteria.** And it drives continual innovation to transform human wellbeing.

LET'S CONNECT

Whether you're looking for expert advice on optimising acoustics, want to explore our solutions in more detail, or need technical support, our team is here to help.
Visit our contact page to get in touch.