



**5** facts about

# Acoustics and stone wool



Not all sound is bad, as any lover of loud music would agree. But unwanted sound, otherwise known as noise pollution, poses a real threat to human health and wellbeing.

Noise can affect your sleep, raise your heart rate and blood pressure, and lead to cardiovascular diseases, diabetes and cognitive impairment with the potential to take years off an average person's life. In buildings where concentration and healing are most important, noise has harmful consequences. Fifty percent of employees say noise keeps them from being productive.<sup>1</sup> In schools, it means students score lower on standardized tests.<sup>2</sup> Noise in hospitals decreases patient and staff satisfaction, impacting health and recovery time.<sup>3</sup>

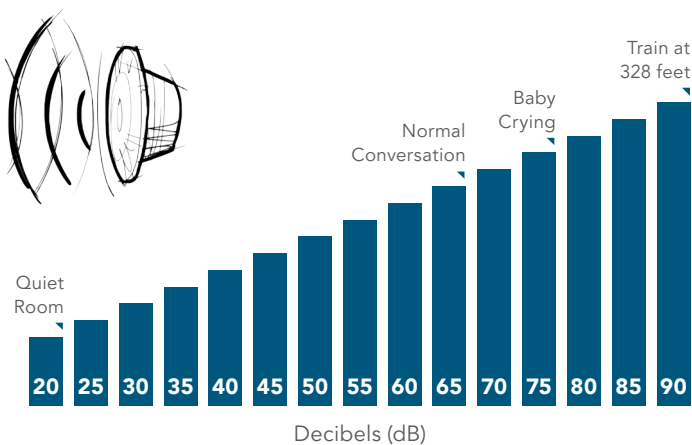
# 1

## What is sound and how is it measured?

At its most basic level, sound is a very small and very rapid fluctuation in air pressure above and below atmospheric pressure. All sounds – a ventilation system, a vibrating cell phone, road traffic – operate by this principle. The ear is very sensitive to sound and the range of pressure variation from the weakest to the loudest sound heard is extremely large.

The ear doesn't experience sound loudness in a linear fashion, however. Instead, a logarithmic scale is used with a measure of energy in decibels (dB). To the ear, a sound heard at 60dB only needs to decrease to 50dB to be perceived as being half as loud.

The figure below gives you an idea of how loud things are on the decibel scale and an overview of sound absorption.



# 2

## Good building acoustic design is important for our wellbeing

The acoustic environment of buildings has a significant impact on our comfort, productivity and wellbeing, for example:

- In hospital environments, noise control is very important for patient recovery as noise can increase heart rate, blood pressure and respiration rate.
- In many classrooms, the speech intelligibility can be 75 percent or less, meaning that on average students cannot hear every fourth word from the teacher's mouth.<sup>4</sup>
- At work, better acoustics, particularly in open-plan offices, improve employee productivity by 75 percent, motivation by 57 percent and 49 percent report being happier at work overall.<sup>5</sup>

**Sound Absorption:** Ability of a material to absorb rather than reflect sound waves by converting the energy of moving air molecules into heat through friction inside the pores of the material. Stone wool has a multi-directional complex fiber structure that results in high-performing sound absorption.

1. GSA Public Buildings Service, Sound Matters: How to achieve acoustic comfort in the contemporary office.  
 2. Antioxidants & Redox Signaling, The Adverse Effects of Environmental Noise Exposure on Oxidative Stress and Cardiovascular Disease.  
 3. The Construction Specifier, The New Era of Healthcare Acoustics  
 4. Classroom Acoustics 1, 2000 [https://acousticalsociety.org/wp-content/uploads/2018/02/classroom\\_acoustics\\_1.pdf](https://acousticalsociety.org/wp-content/uploads/2018/02/classroom_acoustics_1.pdf)  
 5. Statistics from the Udemy 2018 Workplace Distraction Report



# 3

## Construction materials affect the acoustic environment

Every element of a building's construction contributes to its acoustic characteristics. It's more than just walls and ceilings. Also shapes, surfaces, furniture, light fixtures, mechanical systems and materials used in construction have an impact on a building's acoustics.

When the acoustic properties of construction materials are not considered during the specification process, the result is likely to be a poor acoustic environment. As an example, if the surface of the construction material allows sound waves to bounce back into a space, it can create a very noisy interior environment. A sound-absorbing material, on the other hand, can reduce the ambient sound levels and help prevent noise travelling from one space to another.

# 4

## Stone wool contributes to good room acoustics

Room acoustics focus on sound behavior inside a room and most often concern two aspects:

- Sound absorption: the ability of a material to absorb rather than reflect sound (think about the difference between throwing a rubber ball against a wall vs. you jumping into a pile of pillows).
- Reverberation time: a measure for how long it takes for a sound to 'die out' after the source of it has stopped.

Depending on the application, the acoustic properties of the building materials you specify and use will play a significant role in overall indoor acoustics. Stone wool is a fibrous material that functions as a high performing sound absorber and contributes to improved room acoustics. It does that by absorbing and damping sound waves.

Rockfon stone wool tiles offer high sound absorption and comply with all acoustic requirements in building

standards and guidelines including those from the Facilities Guidelines Institute (FGI), Green Building Initiative (GBI), Collaborative for High Performance Schools (CHPS) and others. They also meet or exceed all environmental and sustainability standards, such as the LEED® Green Rating System and the WELL™ Building Standard.

# 5

## Stone wool provides versatility in acoustic design

In some buildings, the acoustic treatments are featured design elements. In others, they are intended to be heard but not seen. High-performing, sound-absorptive, stone wool products are offered in a variety of formats and options.

**Modular Ceilings:** One of the most frequent application of acoustic stone wool is modular ceiling panels that are suspended using a metal grid to form a contiguous ceiling. Panels are available in various sizes, colors and edge designs that either express or conceal the metal grid visually.

**Open Plan:** At times, a more lofty and open overhead aesthetic is desired. Stone wool Islands and Baffles can be suspended horizontally or vertically within a space in eye-catching patterns to allow space to flow up and around them.

**Challenging Spaces:** Stone wool panels can be mounted directly to a concrete, plaster or a gypsum board surface. This approach is very popular when adding acoustic absorption to existing, historic or modern spaces.

Stone wool helps deliver acoustic comfort, privacy and improved speech intelligibility while providing freedom to meet your design vision.

**Inspired to learn more? [Click here to discover Rockon's Optimized Acoustics™ approach.](#)**