

Acoustic and Aesthetic Suspended Ceiling Solutions Using Stone Wool



Rockfon, a part of the ROCKWOOL Group

At ROCKWOOL, we are committed to enriching the lives of everyone.

Whether it is energy consumption or water scarcity, we are developing products to tackle the world's biggest sustainability and development problems. Our products span everything from building insulation to horticultural systems.

Our heritage is rooted in stone wool. We are the world leader in this field, with more than 11,000 passionate experts spread across 39 countries.

80

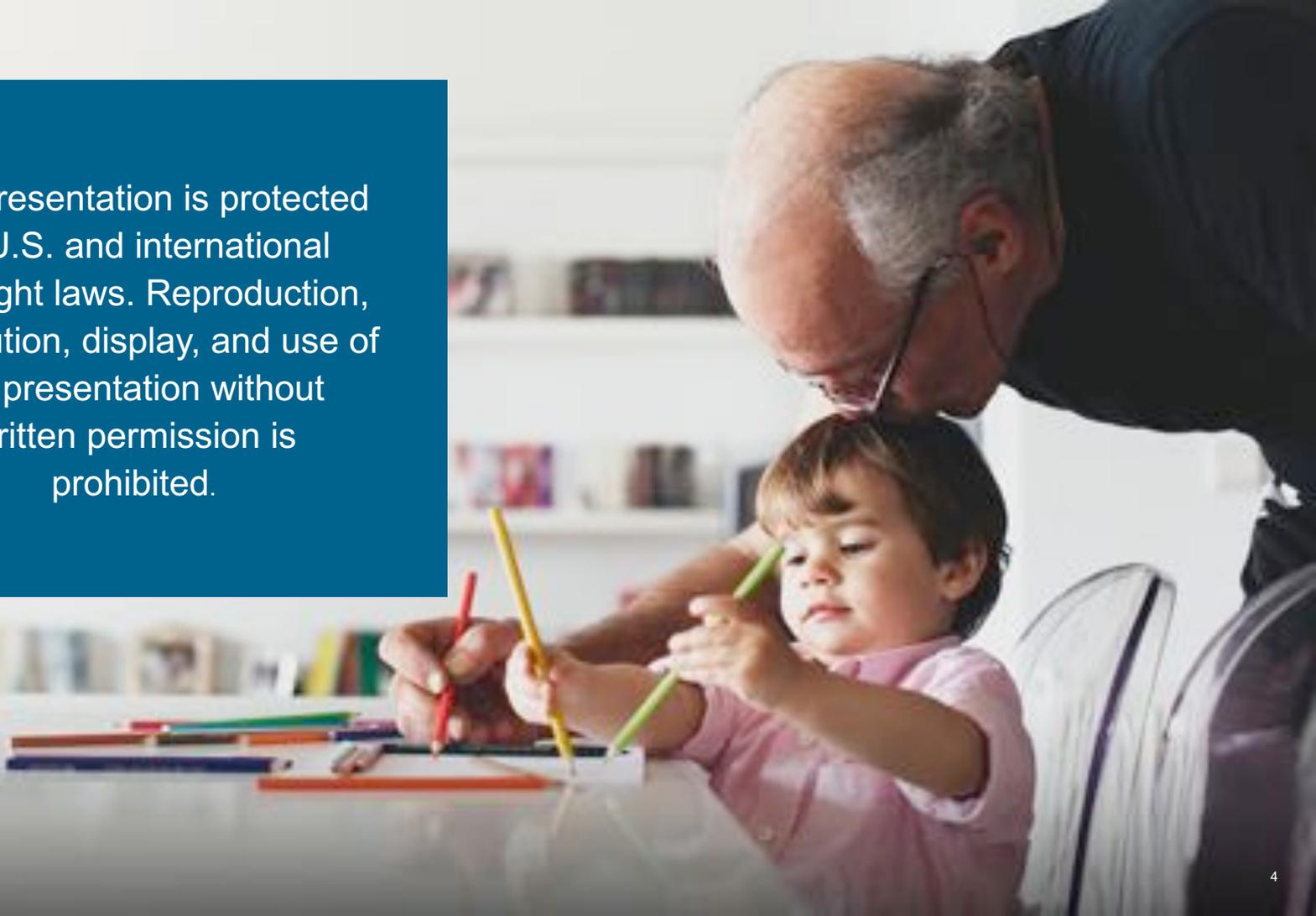
**ROCKWOOL Group's
years of experience in
the stone wool
manufacturing industry**

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Learning Objectives

After completing this course, you should be able to:

1. Describe the characteristics of mineral wool with regards to fire performance, sound absorption, and resistance to moisture and bacteria.
2. Explain how noise can negatively impact occupants, and how improved ceiling absorption can promote better learning and productivity.
3. Identify the health benefits of mineral wool ceiling tiles in health-care settings.
4. Discuss how mineral wool ceiling tiles can help ensure occupants safely exit a building in the event of a fire.
5. Review how high-reflectance mineral wool ceiling tiles can contribute to daylighting and reduce energy usage.

Summary

- **Origins and properties of stone wool**
- **Use of suspended ceilings**
- **Performance attributes of stone wool**
- **Design attributes of stone wool ceilings**
- **Questions**



(60 Minutes)

Use of Suspended Ceilings



Use of Suspended Ceilings

Plenum: Area above the dropped ceiling

Why use a suspended ceiling:

- Aesthetics, acoustics
- Simple access to plenum
- Concealing HVAC, piping, wiring



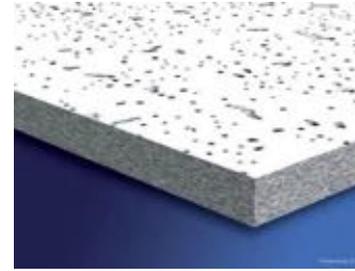
Materials used for Suspended Ceilings



Wood



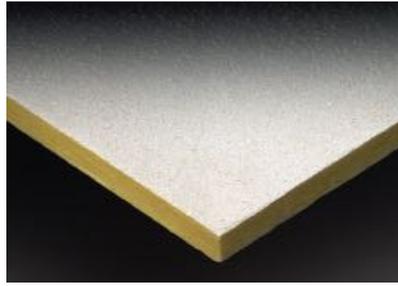
**Gypsum
plaster of Paris**



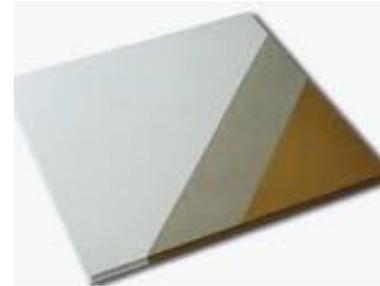
**Mineral fiber
wet felt or cast**



Metal



**Fiberglass
silica sand, limestone**



**Stone wool
basalt and slag**

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Origin and Properties of Stone Wool



Origin of Stone Wool

- Discovered on the islands of Hawaii at the beginning of the century
- Occurs naturally as a product of volcanic activity
- Nondirectional fiber orientation; exhibits some unique and valuable characteristics



Replenishes

38,000

times faster than
depletion

Components of Stone Wool

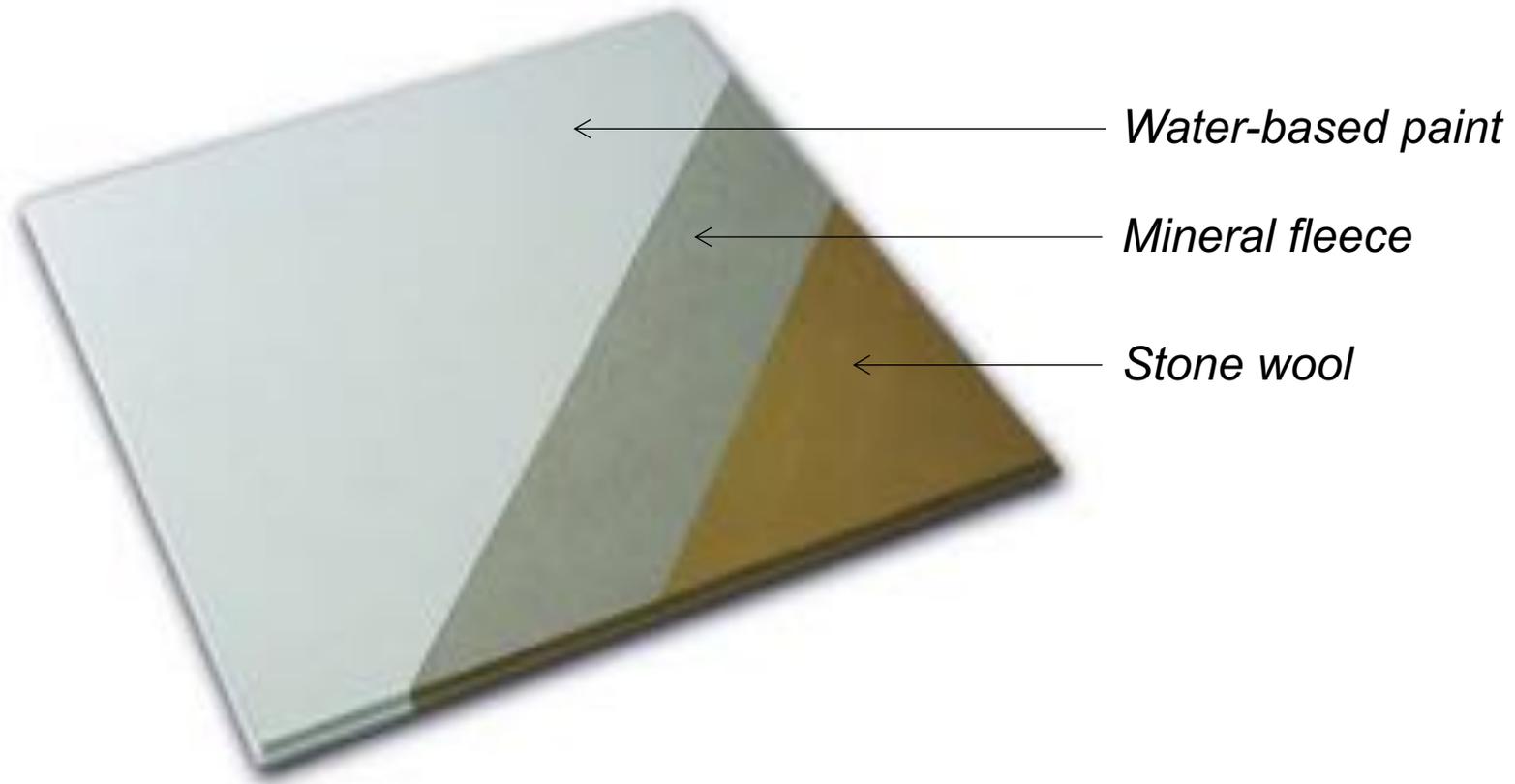


Basalt



Slag

Composition of Stone Wool Ceiling Tiles



Key Properties of Stone Wool



Acoustic comfort



Cleanability



Humidity resistance



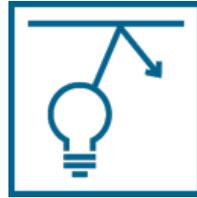
Mold and mildew resistance



Fire performance



Indoor air quality



Light reflectance





Acoustic Comfort

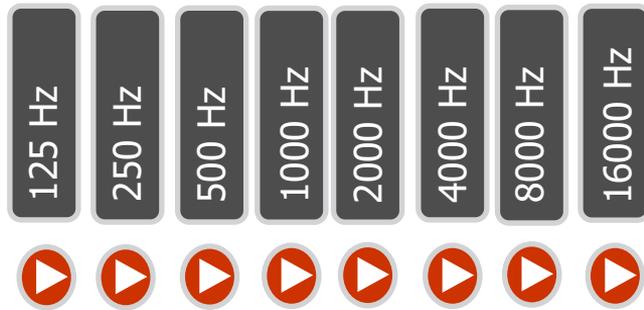


- Acoustic ceilings: perfect for sound absorption, not sound blocking
- High noise reduction coefficient (NRC) for absorption
- Too lightweight and fibrous to block sound

Acoustics: Sound Frequencies and Levels



- Level: Intensity of vibration measured in dB; perceive sound pressure as loudness (40dB–80dB mostly experience in our daily lives)
- Frequency: Number of complete cycles of vibration per second; perceive frequency as pitch



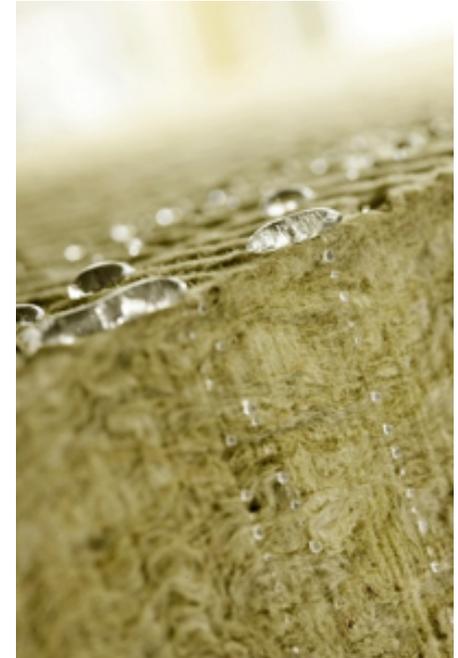
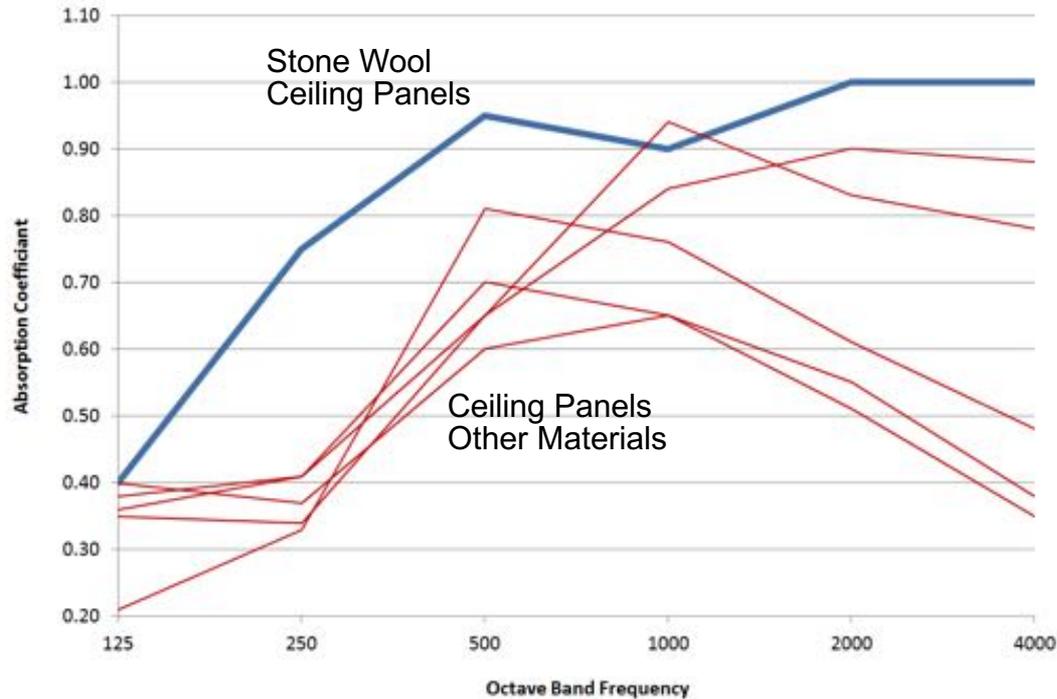
Studies show that 16000 Hz can only be heard by people under the age of 26!



Stone Wool: Top Sound Absorption



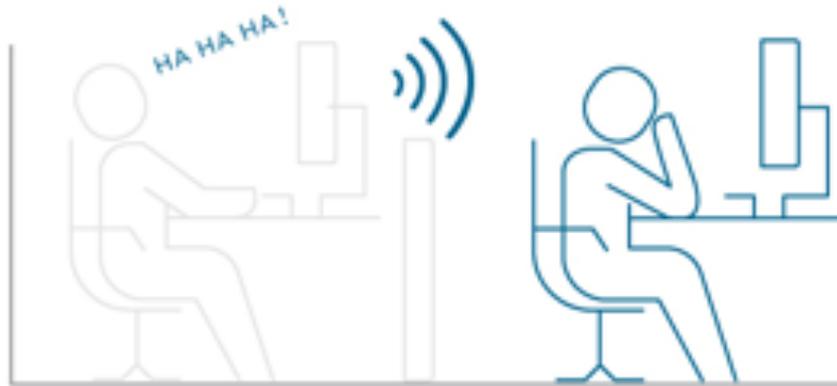
- No material outperforms stone wool for sound absorption
- Most ceiling panels NRC 0.75 to 0.95, some NRC 1.0+



Unique nondirectional fiber structure

Did You Know...

Building for productivity



Bad office acoustics can lead to a **66% decrease** in staff performance because of distracting noise

Source: "Building the Business Case: Health, Wellbeing and Productivity in Green Offices," World Green Building Council, October 2016

Optimized Acoustics



The apple cruncher



Did You Know...

In many classrooms in the United States, speech intelligibility tests show students with normal hearing can understand only 75 percent of the words read from a list (every fourth word is missed).



Source: Classroom Acoustics, Acoustical Society of America, 2000

Listen to the Difference



Higher NRC
0.90 Best
0.80 Better
0.70 Good



Shorter
Reverberation
Time



Students
Understand
More Words

Shorter Reverberation.
Improved Intelligibility.

(Listen using in-ear headphones)

Did You Know...

In general, hospitals seek high-performing acoustical ceilings to reduce noise and help create a healing environment for the patients.

It is also important that the ceilings are cleanable to support infection control with no added chemicals.





- Provides smooth, non-fissured finish; cleanable
- Specially treated medical and hygienic surface finishes allow cleaning with water and specified disinfectants, such as chlorine, ammonia, and quaternary ammonium.

Cleanability

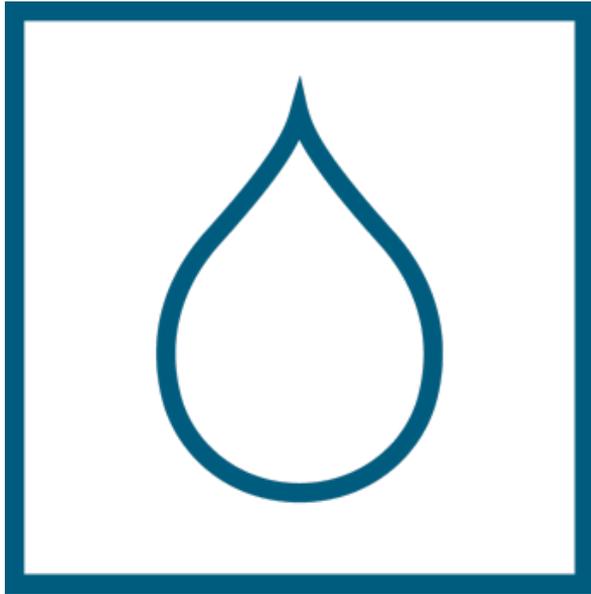


Did You Know...

North American and European studies show a relationship between mold and damp conditions, and an increase in the following symptoms:

- **Eye, nose and throat irritation**
- **Coughing and phlegm buildup**
- **Wheezing and shortness of breath**
- **Allergic reactions**





Humidity Resistance

- Does not sag or lose its shape
- Does not rot, corrode, or promote the growth of mold or bacteria.



Stone wool is hydrophobic



Mold and Mildew Resistance



- Water-repellent stone wool has no nutritional value.
- Provides no sustenance to harmful microorganisms.
- Products designed for medical use have been classified ISO Class 5 or better in accordance with ISO 14644-1.

Note: Federal Standard 209E for Cleanrooms was eliminated in 2001 and replaced with ISO 14644-1 for Cleanrooms.

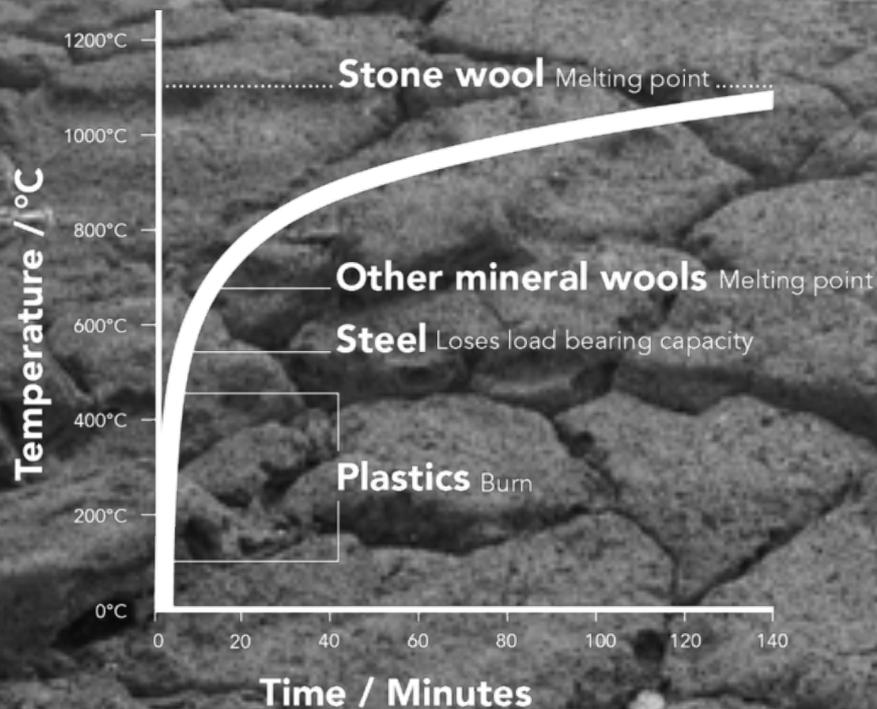
Did You Know...

Every second counts once a fire has started.

Choosing the right building materials can delay the spread of fire and provide the vital extra minutes needed to save the occupants and limit the damage.



Did You Know...



Stone wool materials do not burn and have a higher melting point than other competing materials.



Fire Performance



- Fire-resistant materials create a **safer indoor environment**.
- Acoustical and thermal insulating materials typically must have a Class A rating.

○ **Class A** = Flame Development 0–25 and Smoke Developed 0–450

○ **Class B** = Flame Development 26–75 and Smoke Developed 0–450

○ **Class C** = Flame Development 76–200 and Smoke Developed 0–450

Did You Know...

The U.S. Environmental Protection Agency (EPA) concedes that about 30 percent of new or renovated buildings have serious indoor air quality problems and ranks IAQ as the most prominent environmental problem.



Source: "IAQ in Hospitals – Better Health through Indoor Air Quality Awareness"



Indoor Air Quality



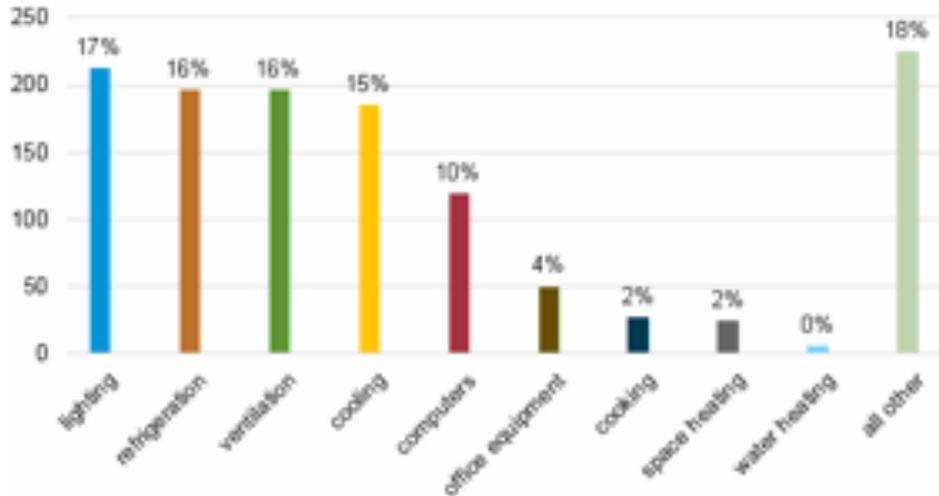
- VOCs can be present in building materials and many are considered harmful to your health.
- Choosing low-VOC products, like stone wool, can improve indoor air quality.



Did You Know...

Electricity use in U.S. commercial buildings by major end uses, 2012

Total = 1,243 billion kilowatthours (kWh)



Note: All other includes motors, pumps, air compressors, process equipment, backup electricity generation, and miscellaneous appliances and plug-loads.

Source: U.S. Energy Information Administration, 2012 Commercial Buildings Energy Consumption Survey, Consumption and Expenditures, Table E5, May 2016



Lighting fixtures generate 23–29 percent of total energy consumed in today’s commercial buildings.

Better light-reflecting ceiling tiles can reduce the need for additional electrical lighting.



Light Reflectance

- Ceilings with high light reflectance can play a significant role in enhancing energy efficiency through better distribution (reflection) of natural and artificial light.
- Lowering light loads can reduce cooling costs by 7 percent.



Light Reflection (LR): Stone Wool

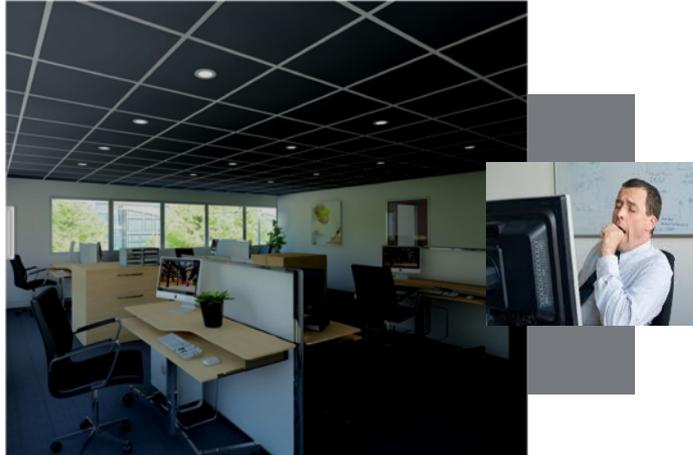


Too light: LR above 90 percent



- Eye strain, migraines, hard to focus
- Increases in absenteeism

Too dim: LR below 70 percent



- Stress, headaches, lack of focus, drowsiness
- Negative impact on employee motivation

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Creating Inspirational Spaces with Stone Wool





Design Attributes

- Surfaces
- Edges
- Sizes
- Colors
- Shapes and forms



Surfaces: Stone Wool



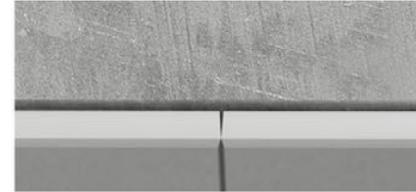
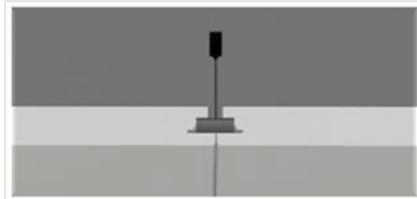
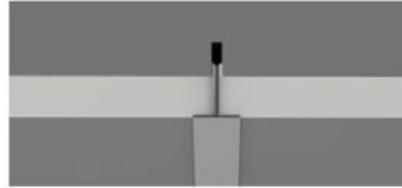
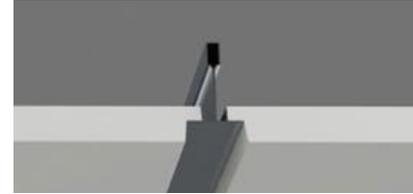
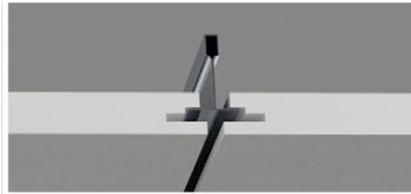
- Strong
- Monolithic
- Modern
- Sleek Feel



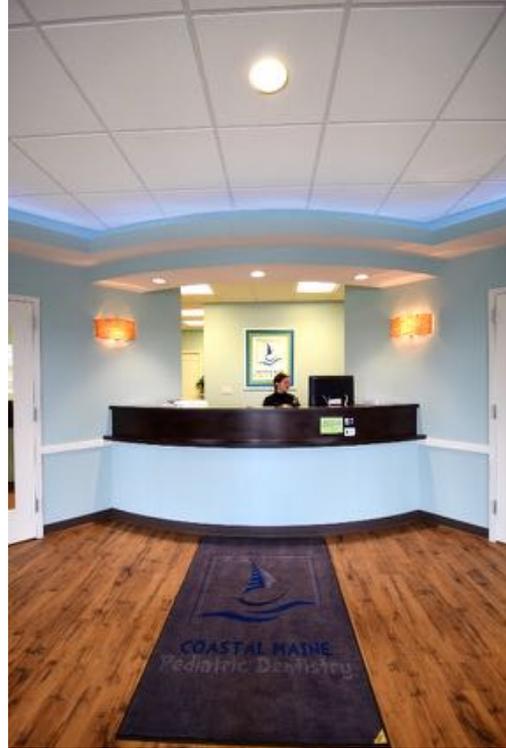
Edge Details: Stone Wool



From traditional to a modern seamless feel



Sizes: Stone Wool



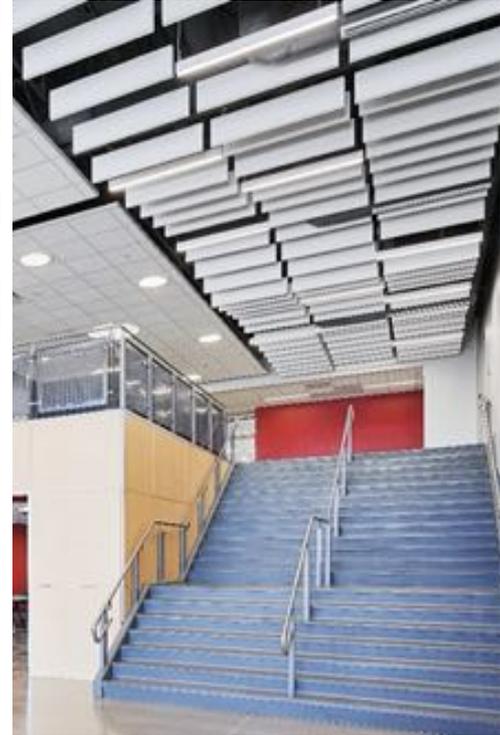
Colors: Stone Wool



Shapes and Forms: Stone Wool



- Shape: two-dimensional squares, rectangles, etc.
- Form: baffles, islands, clouds



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Summary of Stone Wool Ceilings



Key Properties of Stone Wool



Acoustic comfort



Cleanability



Humidity resistance



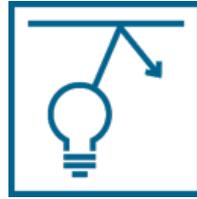
Mold and mildew resistance



Fire performance



Indoor air quality



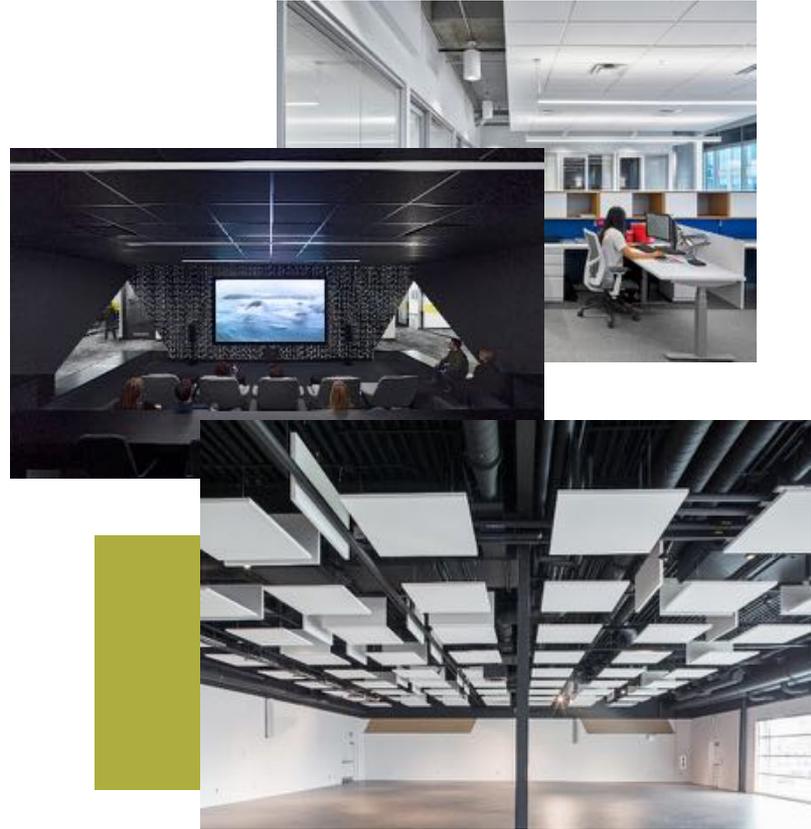
Light reflectance



Summary of Stone Wool Ceilings: Design Attributes



- Surfaces
- Edges
- Sizes
- Colors
- Shapes and forms



Acoustic Solutions



Acoustic Stone Wool Ceilings



Stone wool ceiling panels, NRC 0.60–1.05

Suspension Systems



15/16 inch, 9/16 inch, cleanroom, bolt slot, drywall, specialty systems

Acoustic Metal Ceilings



Linear, panels, planks, perimeter trim, curved, open cell

Questions?

Please contact:
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Phone: 800-323-7164
Email: cs@rockfon.com
Website: rockfon.com



Thank you

Other AIA-CES programs by Rockfon:

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4. Ceiling Systems for High Performing Schools

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