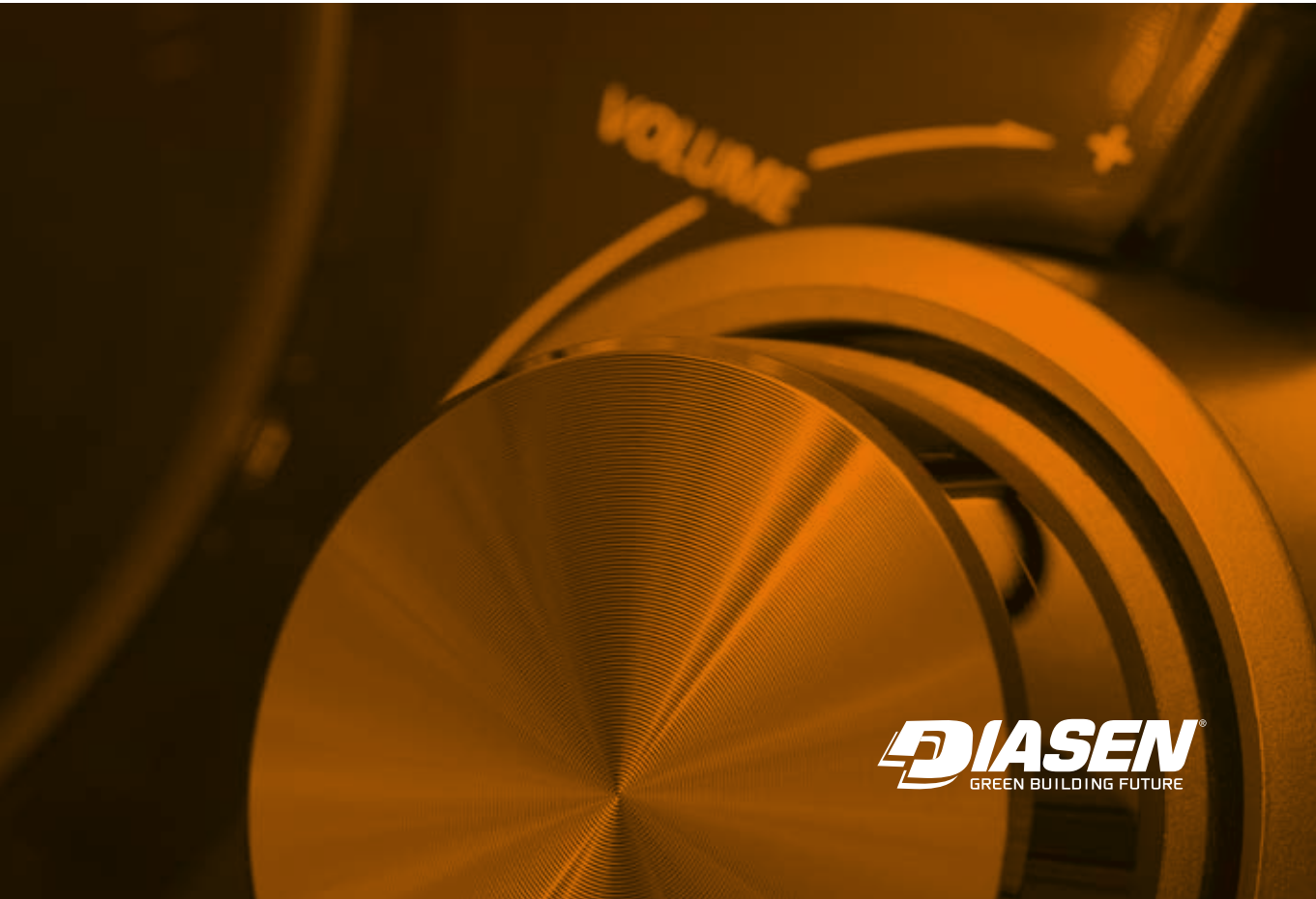
DIATHONITE® ACOUSTIX+

NATURAL CORK-BASED PLASTER FOR ACOUSTIC COMFORT



CORK AND ITS SOUND INSULATION PROPERTIES

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THE SIGNS OF ACOUSTIC COMFORT

We experience the world through our senses.

They make us relate with others and give us a face and an identity. Hearing allows us to connect to the world. It is the first sense that develops in the foetus, a primordial faculty that regulates our interactions with the world.

We draw energy and pleasure from listening to good music, talking, seeing a stage play, provided that acoustic conditions are optimal, when noise and disturbance are limited. **Noise is a challenge for acoustic comfort**, which is an essential element for the quality of life. That's why it must be taken into consideration when designing the interiors of the places where most of social and work activities take place.

Our concepts of design and well-being revolve around products and systems to improve acoustic comfort.

THE INSULATION PROPERTIES OF CORK

Cork is the bark of a Mediterranean oak tree. A bark that looks similar to the others but with unique characteristics that make it different.

Cork is the result of nature's creative flair. The more in-depth you go, the closer you get to the millions of alveoli that make up the structure, the more you understand its peculiarity.

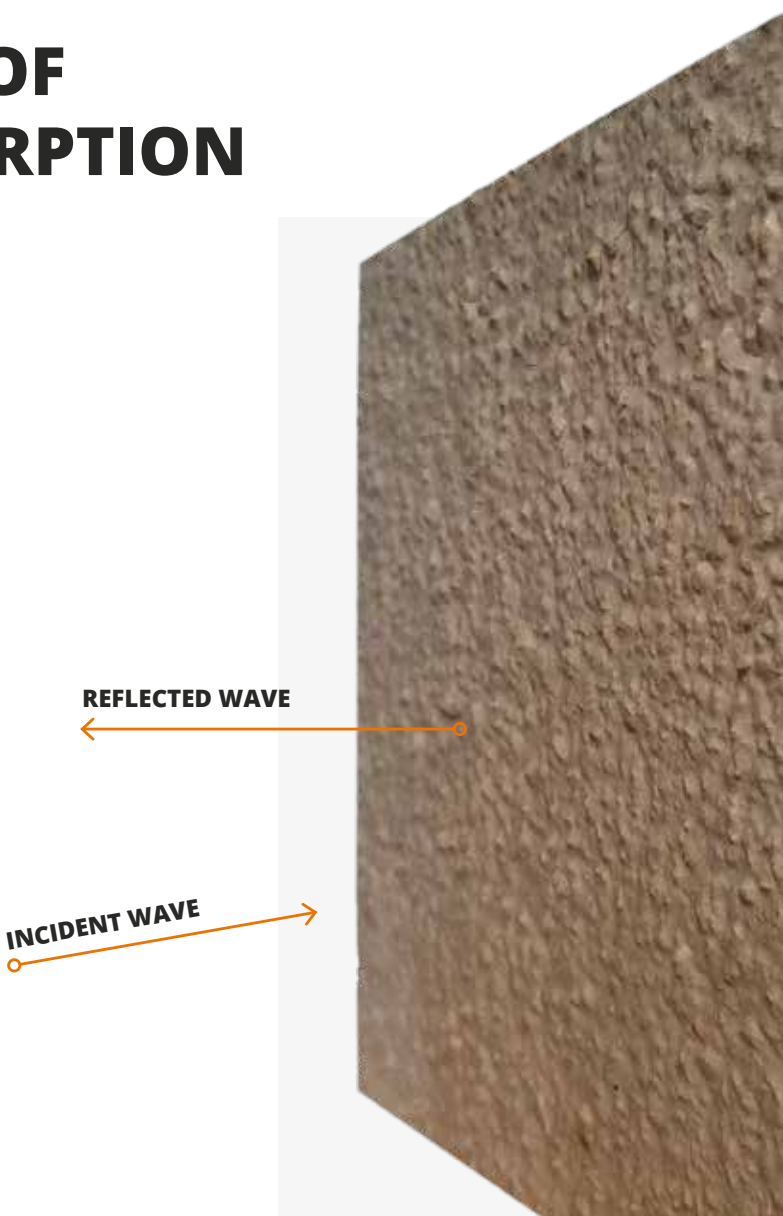
The single cells of this immense and tidy hive embed a large amount of air, making the bark extremely light, elastic and breathable.

Air is an excellent sound conductor. However, sound tends to disperse when it's embedded into the cavities of a porous body. In this case, **the material acquires sound insulation properties.**

DIASEN HAS MADE THE MOST OF THESE PROPERTIES CREATING **DIATHONITE ACOUSTIX+**, the environmentally-friendly cork-based plaster that enhances the sound-absorption properties of surfaces and the sound insulation of façades, walls and partitions. A flagship for housing comfort.

THE VIRTUES OF SOUND-ABSORPTION

Diathonite Acoustix+ is an original type of plaster resulting from experimental research. The aim was to develop a unique product that could enhance the sound performance of spaces that need high sound-absorption levels, such as music venues, theaters, schools, offices and restaurants.



SOUND ABSORPTION

Sound absorption describes the **ability of a material to absorb the energy of sound waves without reflecting it but transforming it into heat.**

Sound Absorbing Material

When a sound wave hits a surface, a portion of it is reflected, another portion is absorbed and dissipated into the surface and a third portion is transmitted through the construction element.

The sound-absorption level of a material is given by its ability to absorb and not reflect the incident sound wave. **Reverberation** – the vibration and echoing effect resulting from multiple sound reflections – **is directly proportional to the reduction of the reflected wave.**

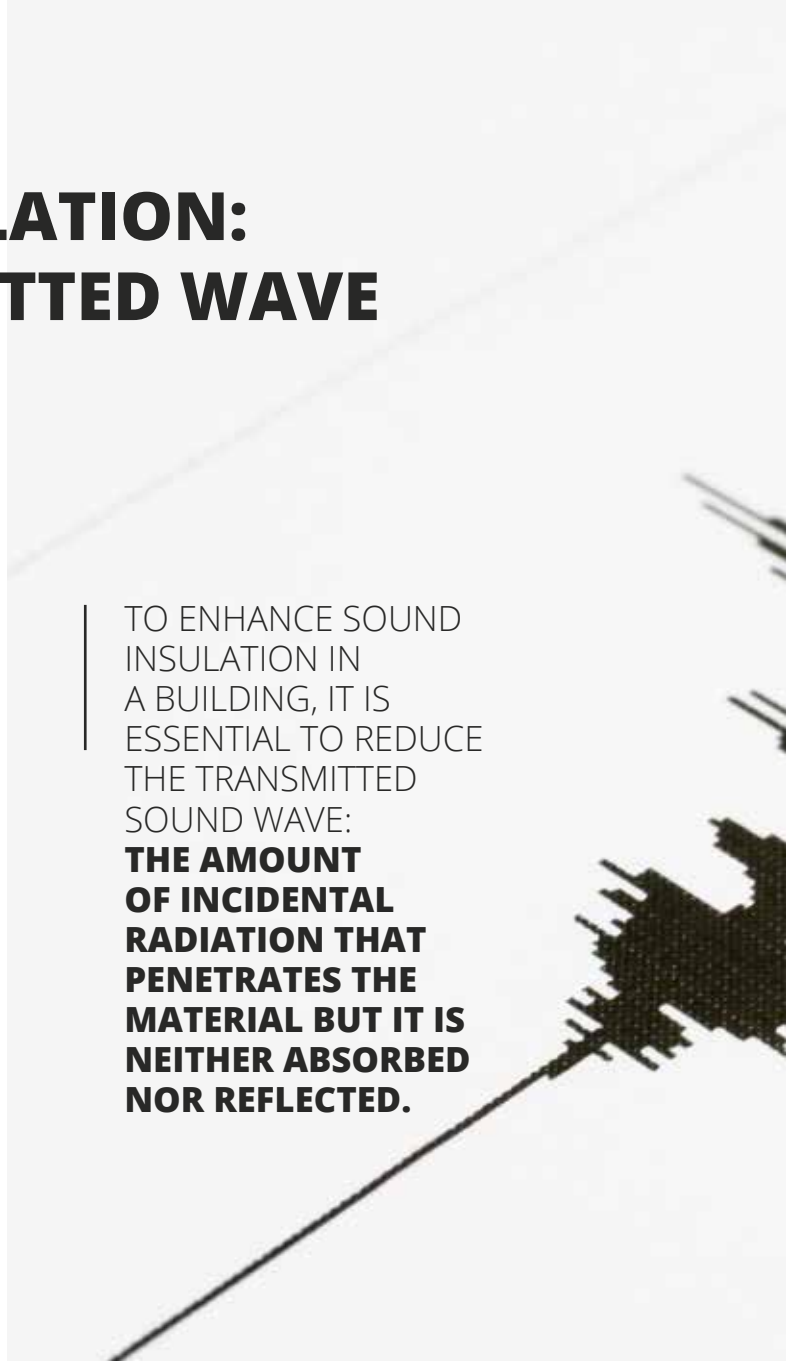
A smooth and compact surface tends to reflect the sound wave. Instead, **porous and fibrous materials, featuring cavities that hold the sound and weaken the wave, ensure a high sound-absorption performance.**

SOUND INSULATION: THE TRANSMITTED WAVE

A high sound insulation level limits the transmission of a sound wave from one room to another, from the inside to the outside and vice-versa.

That's why, **sound-insulation materials are ideal for walls and partitions of condos**, where noise can often be a serious problem for the residents.

TO ENHANCE SOUND INSULATION IN A BUILDING, IT IS ESSENTIAL TO REDUCE THE TRANSMITTED SOUND WAVE: **THE AMOUNT OF INCIDENTAL RADIATION THAT PENETRATES THE MATERIAL BUT IT IS NEITHER ABSORBED NOR REFLECTED.**



PROPERTIES

The challenge is to improve sound insulation while preserving the sound-absorption inclination of the material.
In order to achieve this combination, we increase the level of absorption and dissipation of the sound wave within the material.

That's why **porosity is so important** to find a fair compromise with the other characteristics of the material.

THE HORIZONS OF THE REGULATION

Acoustic standards differ from country to country and there is no shared view worldwide. For this reason, the International Organization for Standardization (ISO) has decided to adopt a universal standard with the aim of standardizing the guidelines relating to acoustics. In this regard, the organization has defined the acoustic classification criteria for dwellings and the relative procedures to be followed: ISO 19488 - Acoustic classification of dwellings.

The regulations in force in Europe implement **DIRECTIVE 2002/49/EC dated 25 June 2002** relating to the assessment and management of environmental noise. Each Member State has adopted its criteria for acoustic classification of buildings but the directive is associated with all European regulations concerning environmental acoustics.

In Italy, the regulation of reference is the **Prime Ministerial Decree dated 5 December 1997**, which defines the passive acoustic requirements of a building, meaning the insulation performance compared to external noise, footsteps, system noise, reverberation time of classrooms and gyms. **UNI 11367** defines the limit values of acoustic classes to identify the acoustic classification of building units and the procedure for the evaluation and in situ measurements.

MATERIAL PERFORMANCE

One product alone cannot ensure excellent sound-absorption and sound insulation performances.
That's why you need different materials with specific properties.

DIATHONITE ACOUSTIX+ IS DESIGNED TO PROVIDE BOTH SOUND ABSORPTION AND SOUND INSULATION.

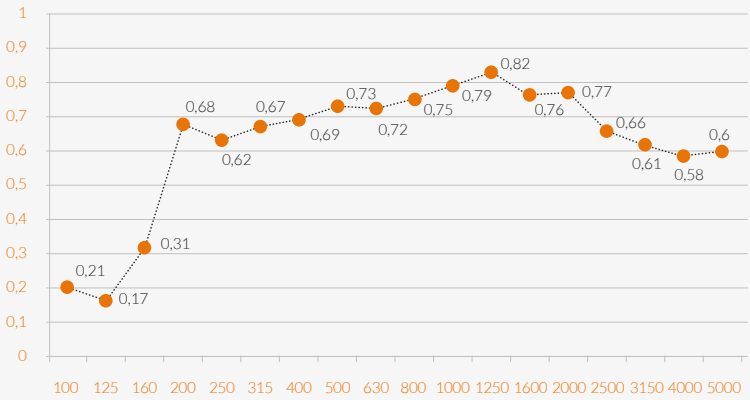
Research on raw materials and experimentations have allowed us to formulate a **premixed plaster** with the following characteristics:

1. a **high level of porosity** of the raw materials, starting from cork, to improve sound absorption

2. the **presence of lime** which acts as a binder giving the material a solidity that optimizes sound insulation.

DIATHONITE ACOUSTIX+ ABSORPTION COEFFICIENT

The sound absorption performance of **Diathonite Acoustix+** has been validated by acoustic tests, which show the variation in the absorption coefficients - ranging between 0 and 1 - in a scale of frequencies (Hz).



The graph shows a sequence of values that highlight how absorption always exceeds 70% in the speech frequency range (from 500 to 2000 Hz).

> This means that the share of the incident sound wave that is reflected is less than 30%, an acoustic absorption value considered to be of a high level of performance.

SOUND-ABSORPTION VALUES AND PERFORMANCE

The results shown in the graph, that crosses frequency and absorption, can be summarized using some parameters that use single values to evaluate the acoustic performance of materials. These values are indicated in the following table.

PARAMETER	DESCRIPTION	DIATHONITE ACOUSTIX+ RESULT
NRC (Noise Reduction Coefficient)	NRC is the average between 250Hz, 500Hz, 1000Hz and 2000Hz, it describes the sound absorption performance of a material.	**0.75**
SAA (Sound Absorption Average)	The Sound Absorption Average (SAA) is the average sound absorption coefficient ranging between 200 and 2500 Hz.	**0.72**
Sound absorption class	The UNI EN ISO 11654 standard identifies sound absorption classes. These classes are divided by decreasing sound-absorption values from A to E.	**CLASS C**

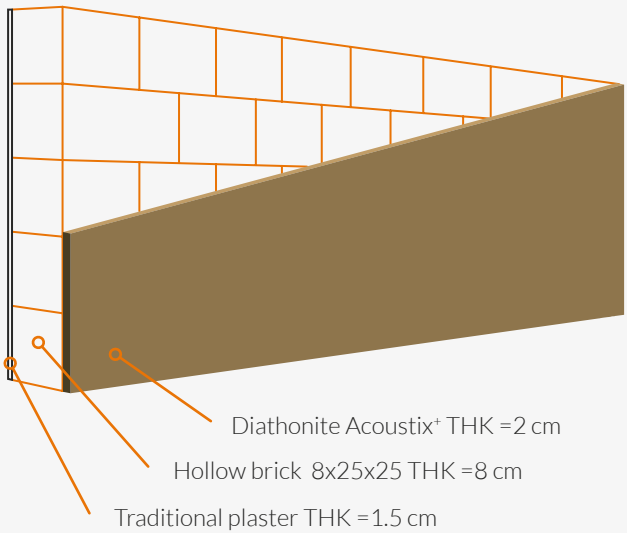
SOUND INSULATION PARAMETERS

Diathonite Acoustix+ performance has been estimated using parameters, such as Rw and $D_{2m,nT,w}$.

Rw (dB) – laboratory measurement of airborne sound – indicates the capability of a wall to decrease the passage of sound from one room to the other. The regulation uses Rw, the apparent sound reduction index measured on site.

$D_{2m,nT,w}$ is the standardised noise insulation index for façades obtained on site. This index considers the reverberation of the room and the noise of the outdoor traffic.

APPLYING 2 CM OF **DIATHONITE ACOUSTIX⁺** TO AN 8 CM HOLLOW BRICK PARTITION **REDUCES THE TRANSMISSION OF NOISE BY 3 DB** COMPARED TO A TRADITIONAL PLASTER.

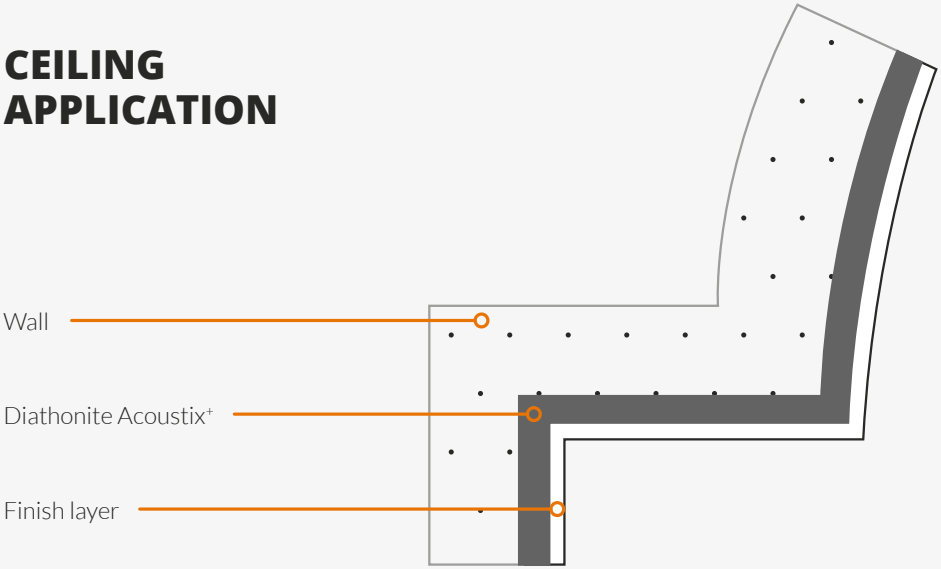


FIELDS OF APPLICATION

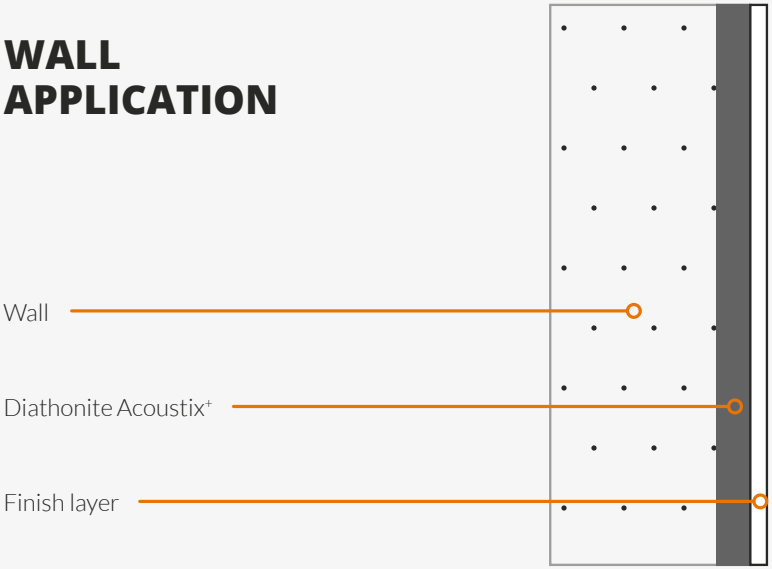
Diathonite Acoustix⁺ is extremely versatile since it can be used on walls and ceilings of any shape without using plugs or other fixing systems.

The surface results elegant and free from joints or seams.

CEILING APPLICATION



WALL APPLICATION



APPLICATION METHODS

PLASTERING MACHINE

Thanks to a mix of additives and the excellent thixotropy

DIATHONITE ACOUSTIX+ CAN BE SPRAYED USING PLASTERING MACHINES FOR LIGHTWEIGHT PREMIXED PLASTERS.

The cohesive admixture of the product ensures that in all phases, from mixing to application, there is no separation between the different components.

MANUAL APPLICATION

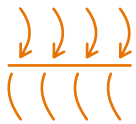
ITS PLASTICITY AND EXCELLENT ADHESIVE POWER ALLOW YOU TO **APPLY THE PRODUCT MANUALLY.**

Plasticity is given by the right percentage of additives and a good distribution of fibres, and it prevents the product from dripping. Adhesive power, on the other hand, is ensured by the quality of the raw materials, lime in particular.

BEYOND SOUND INSULATION: PERFORMANCE BY NUMBERS

DIATHONITE ACOUSTIX⁺ IS INNOVATIVE
because it's a sound-absorbing and sound-insulation plaster that ensures thermal, mechanical and fire resistance, making it a truly versatile product.

Diathonite Acoustix⁺
is capable of satisfying a wide range of needs related to the idea of living comfort in indoor spaces.



BREATHABILITY

μ = 4

It improves housing comfort.

THERMAL CONDUCTIVITY

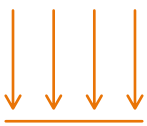
λ = 0.075 W/mK

It helps you save energy

FIRE RESISTANCE

Euroclass A1

It doesn't burn and it doesn't emit smoke.



MECHANICAL RESISTANCE

2.7 N/mm²

High resistance, durability.

THREE REASONS WHY DIATHONITE ACOUSTIX+ IS SUCCESSFUL

DIATHONITE ACOUSTIX+ IS AN EXTREMELY VERSATILE CORK-BASED PLASTER. THANKS TO ITS TECHNICAL AND APPLICATION PROPERTIES, IT CAN MEET MULTIPLE REQUIREMENTS IN TERMS OF PERFORMANCE AND SUSTAINABILITY. ITS MULTIFACETED NATURE MAKES THIS PRODUCT SUCCESSFUL.

APPLICATION

Quick and simple
Use a plastering machine or apply it manually to the wall or ceiling. No plugs or fixings needed.

For any shape
The ideal solution for any surface, no matter the shape or complexity.

Efficient and affordable
More affordable application methods compared to traditional modular systems.

PERFORMANCE

Fire resistant
Class A1. It doesn't burn and it doesn't emit smoke.

Durable
Natural materials and stable solutions over time.

Low thickness
To save space.

Hygroscopic
Its hygroscopic properties make it ideal for humid environments.

SUSTAINABILITY

Environmentally-sustainable
It has obtained the environmental product declaration (EPD), important to obtain LEED credits.

Energy savings
Its thermal conductivity helps you save energy.

Housing comfort
It regulates internal humidity levels for healthier environments.

SOUND INSULATION SYSTEMS

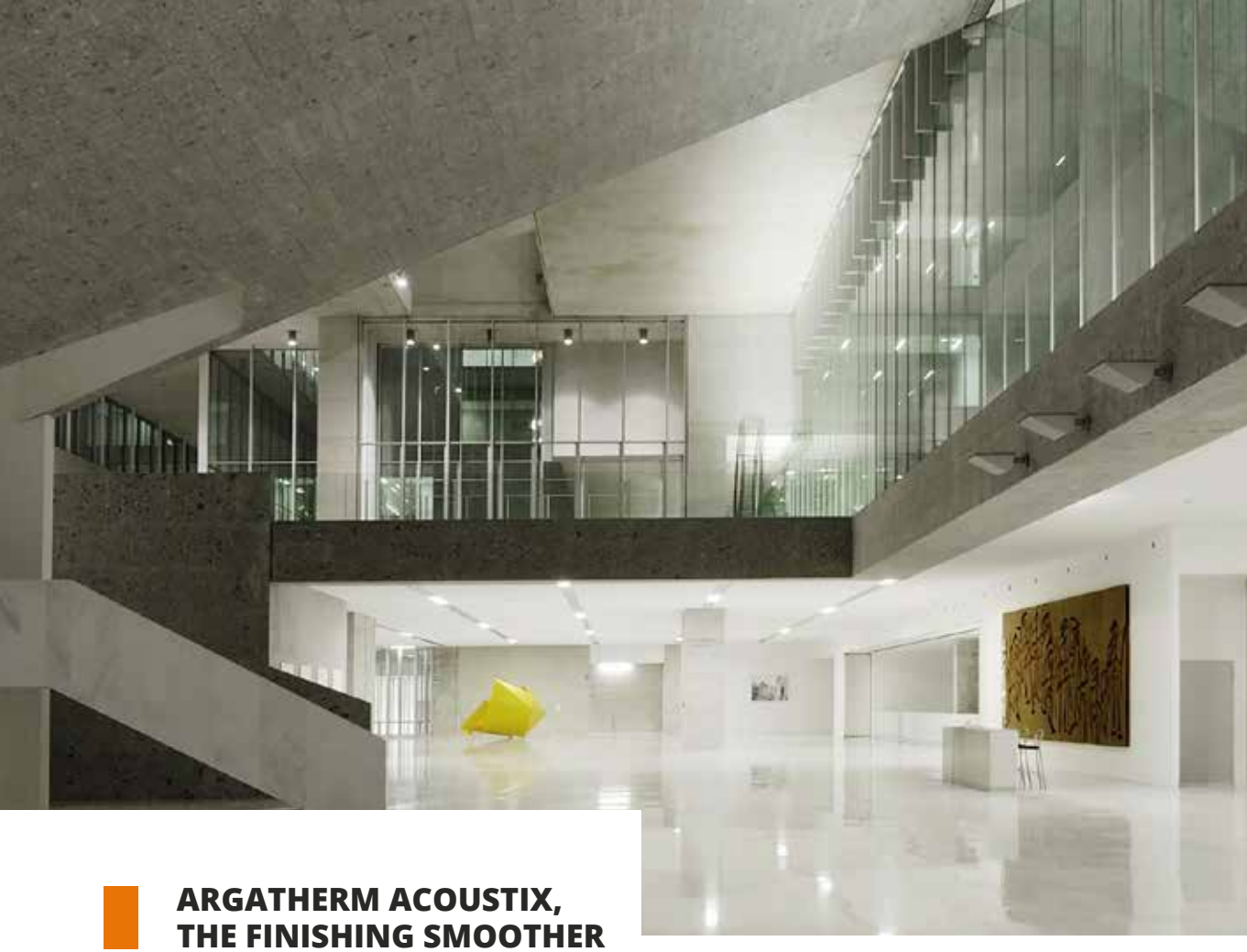
Diathonite Acoustix⁺ is Diasen's key product for sound insulation. The proposed systems include solutions in which the cork-based plaster is coated with a smoothing compound or with finishes capable of optimizing the performance of the system adopted.

The finishing smoother applied on the Diathonite Acoustix⁺, uniforms and smooths the surface while maintaining good sound absorption, especially in the low-frequency range.

The finish ensures sound absorption and gives the wall a pleasant appearance.

DIASEN **SOUND INSULATION SYSTEMS:**

- **Diathonite Acoustix⁺ – Argatherm Acoustix**
- **Diathonite Acoustix⁺ – D20 – Limepaint**



ARGATHERM ACOUSTIX, THE FINISHING SMOOTHER

Argatherm Acoustix is a finishing smoother lightened with the finest expanded and micro-porous minerals powders, which create a smooth uniform surface.

Thanks to the use of high porosity raw materials and the fiber-reinforced structure, **Argatherm Acoustix** does not alter significantly the acoustic absorption characteristics

of Diathonite Acoustix+, but their combination is highly effective especially in the low frequency range.

POROSITY

Macro-porous structure with high air content to ensure excellent acoustic insulation performance.

THERMAL CONDUCTIVITY

λ = 0.128 W/mK

Excellent thermal insulation thanks to the right mix of raw materials.

SOUND ABSORPTION

NRC= 0.50

This product combined with Diathonite Acoustix+ ensures excellent sound absorption.

LIMEPAINT, THE BREATHABLE WATER-BASED PAINT

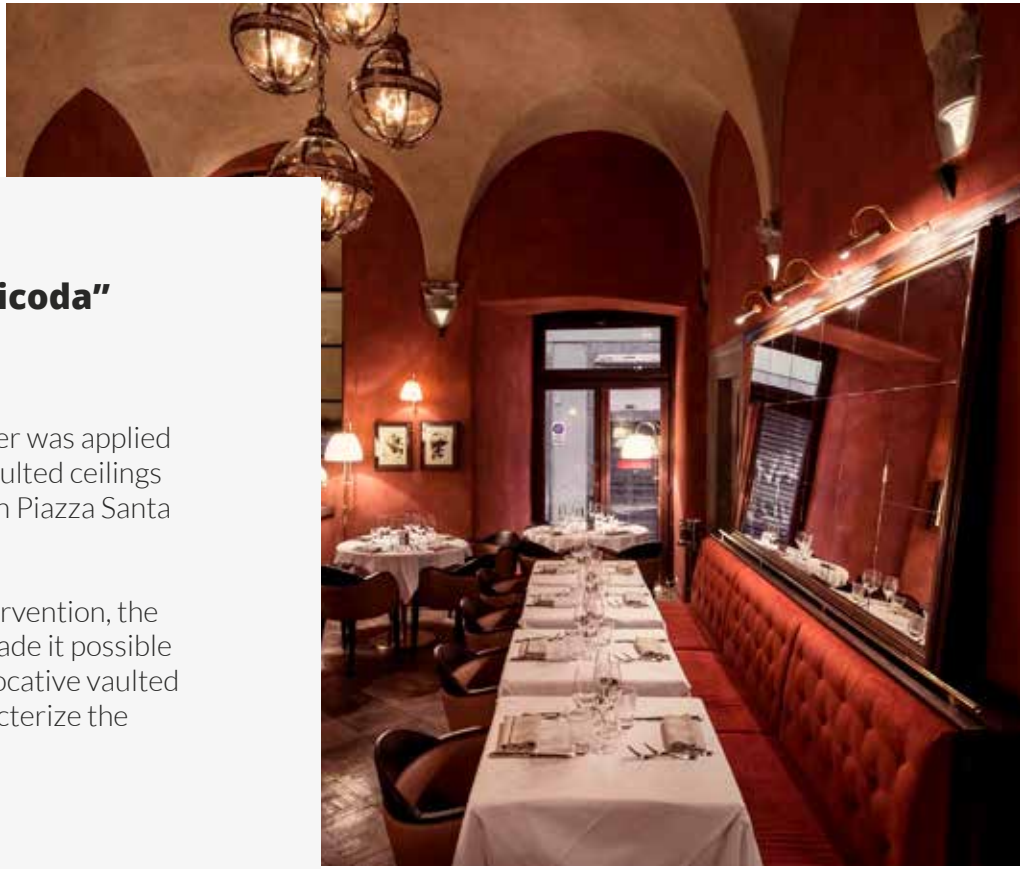
Limepaint is a breathable, water and lime based paint for interiors, with high pigmentation and low-filling characteristics. It is suitable for finishing **Diathonite Acoustix**[+], because it does not close its porosities and it does not alter its permeability. Compared to other

paints, Limepaint ensures the sound absorption properties of the system, giving the walls and ceilings a pleasant appearance.

PERMEABILITY
Its high vapour permeability is the evidence that porosity improves acoustic performance.

SOUND ABSORPTION
This product combined with Diathonite Acoustix* ensures excellent sound absorption.

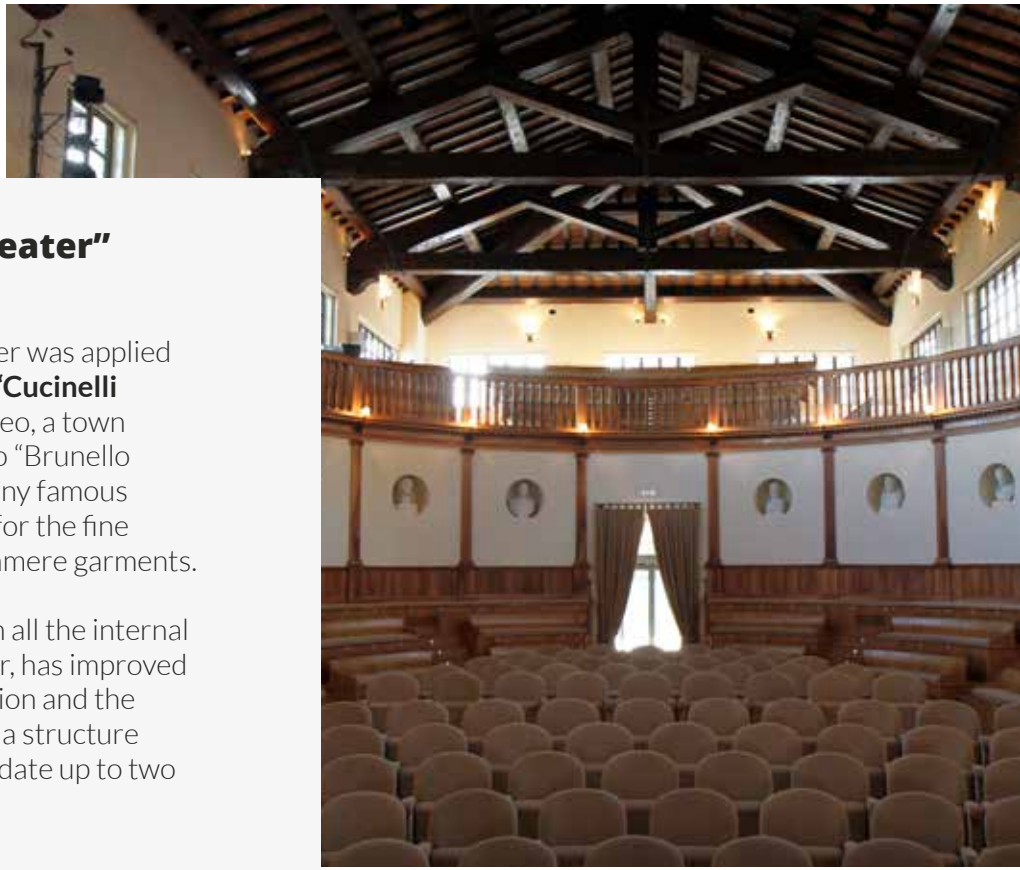
CASE STUDIES



“Cucina Torcicoda”
Restaurant
Florence, Italy

The acoustic plaster was applied to the walls and vaulted ceilings of the restaurant in Piazza Santa Croce, Florence.

Thanks to this intervention, the acoustic plaster made it possible to enhance the evocative vaulted ceilings that characterize the room.



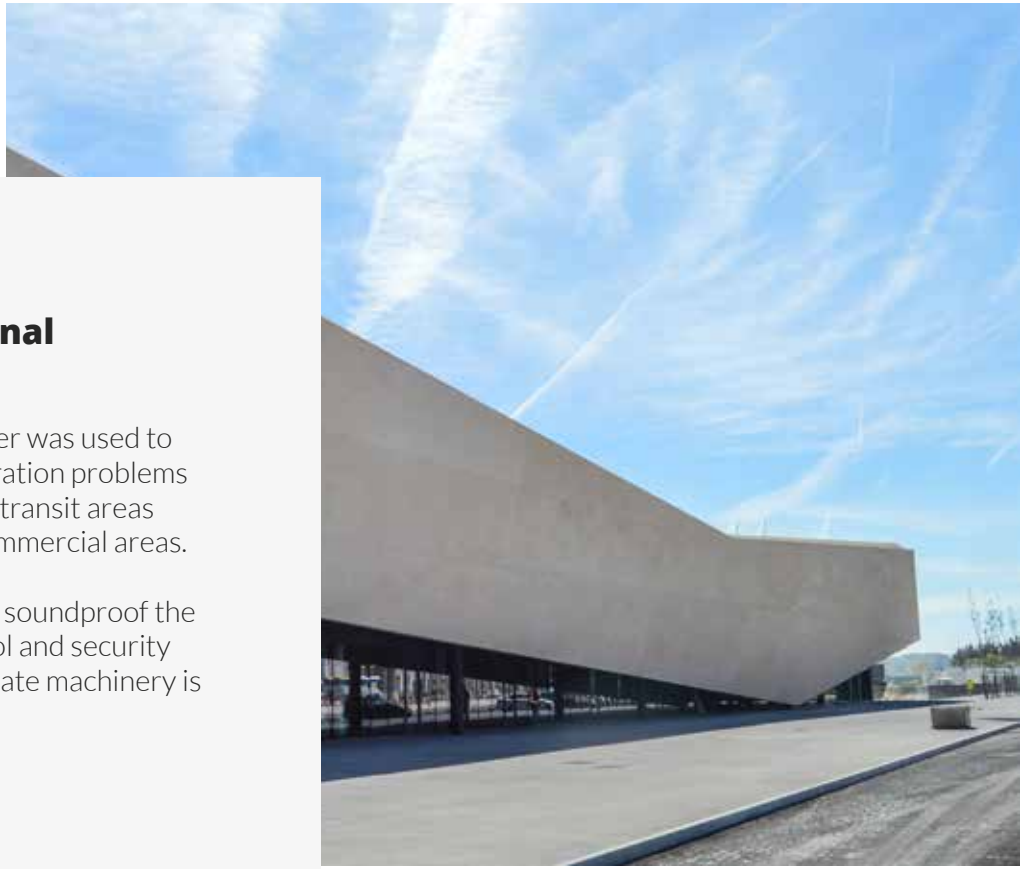
“Cucinelli Theater”

Solomeo, Italy

The acoustic plaster was applied in the prestigious **“Cucinelli Theater”** in Solomeo, a town in Umbria, home to “Brunello Cucinelli”, a company famous all over the world for the fine production of cashmere garments.

The application, on all the internal walls of the theater, has improved the sound absorption and the acoustic quality of a structure that can accommodate up to two hundred people.

CASE STUDIES

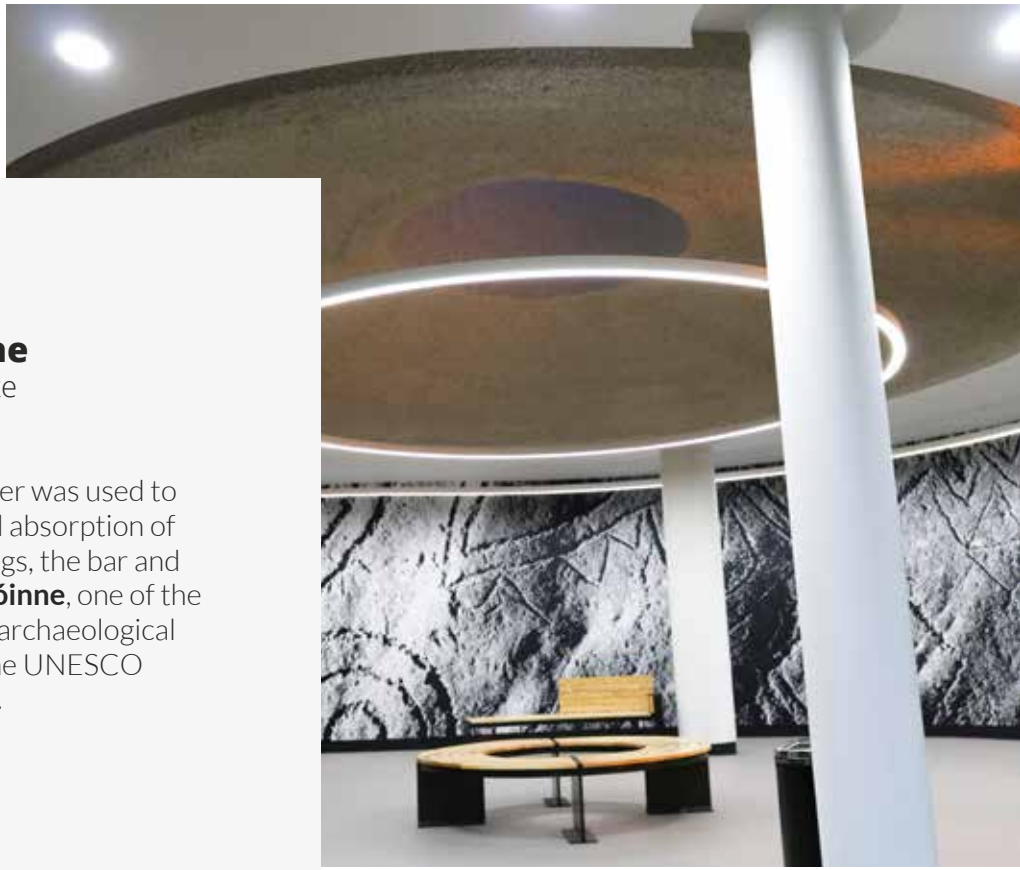


Cruise Terminal

Lisbon, Portugal

The acoustic plaster was used to eliminate reverberation problems in the passengers' transit areas and in the busy commercial areas.

It was also used to soundproof the mechanical, control and security rooms where delicate machinery is present.

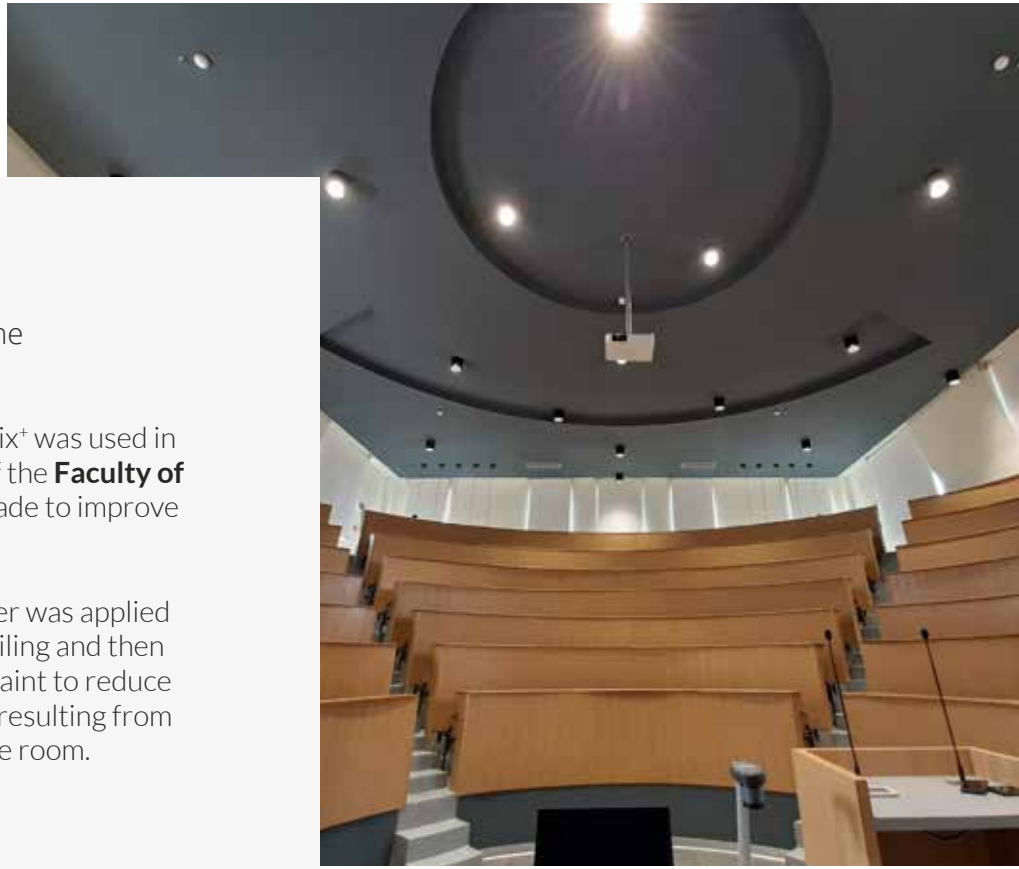


Brú Na Bóinne

Archaeological site
Ireland

This acoustic plaster was used to improve the sound absorption of the entrance ceilings, the bar and shops of **Brú na Bóinne**, one of the oldest prehistoric archaeological sites included in the UNESCO world heritage list.

CASE STUDIES

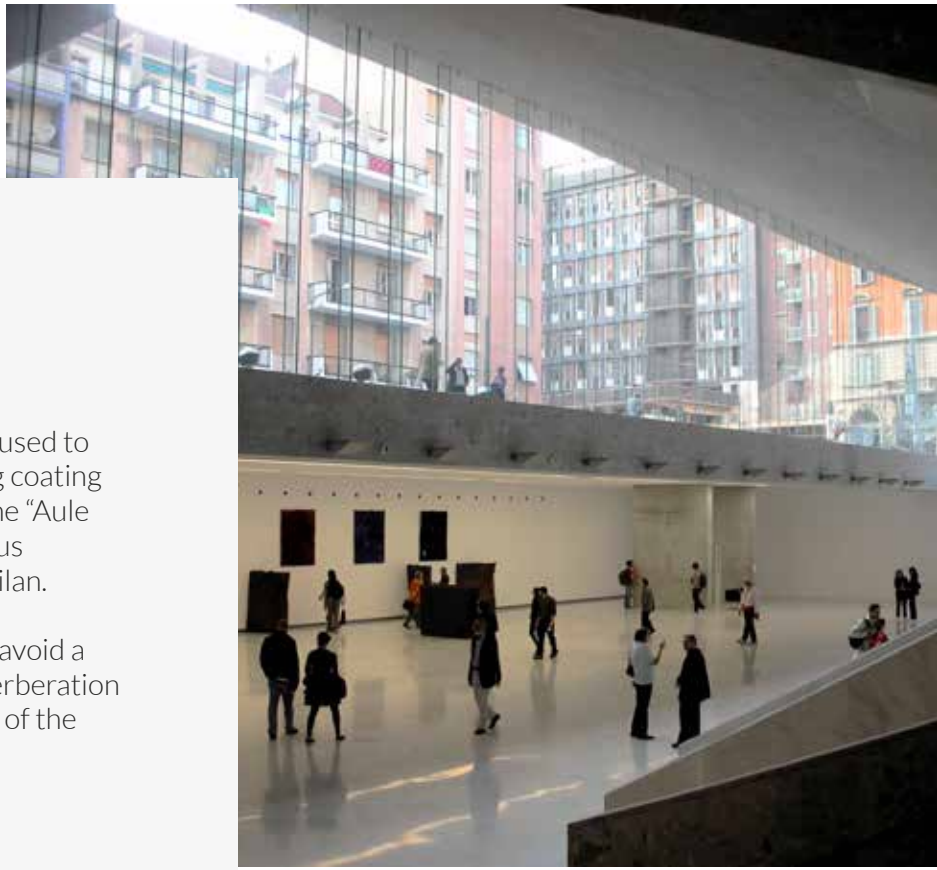


Lecture Hall

Faculty of Medicine
Belgrade, Serbia

Diathonite Acoustix+ was used in the Lecture Hall of the **Faculty of Medicine** in Belgrade to improve sound absorption.

The acoustic plaster was applied to the walls and ceiling and then coated with LimePaint to reduce the reverberation resulting from the large size of the room.



Bocconi University

Milan, Italy

The acoustic plaster was used to create a sound-absorbing coating for the internal walls in the “Aule Building” of the prestigious **Bocconi University** in Milan.

The application aimed to avoid a possible presence of reverberation caused by the parallelism of the walls.

DIATHONITE® ACOUSTIX+

NATURAL CORK-BASED PLASTER FOR ACOUSTIC COMFORT

EUROCLASE A1

LEED

EPD

AVIS TECHNIQUE

Certified B Corporation

ASSOCIATE ANIT

DIASEN QUALITY SYSTEM ISO 9001

DIASEN ENVIROMENTAL SYSTEM ISO 14001

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