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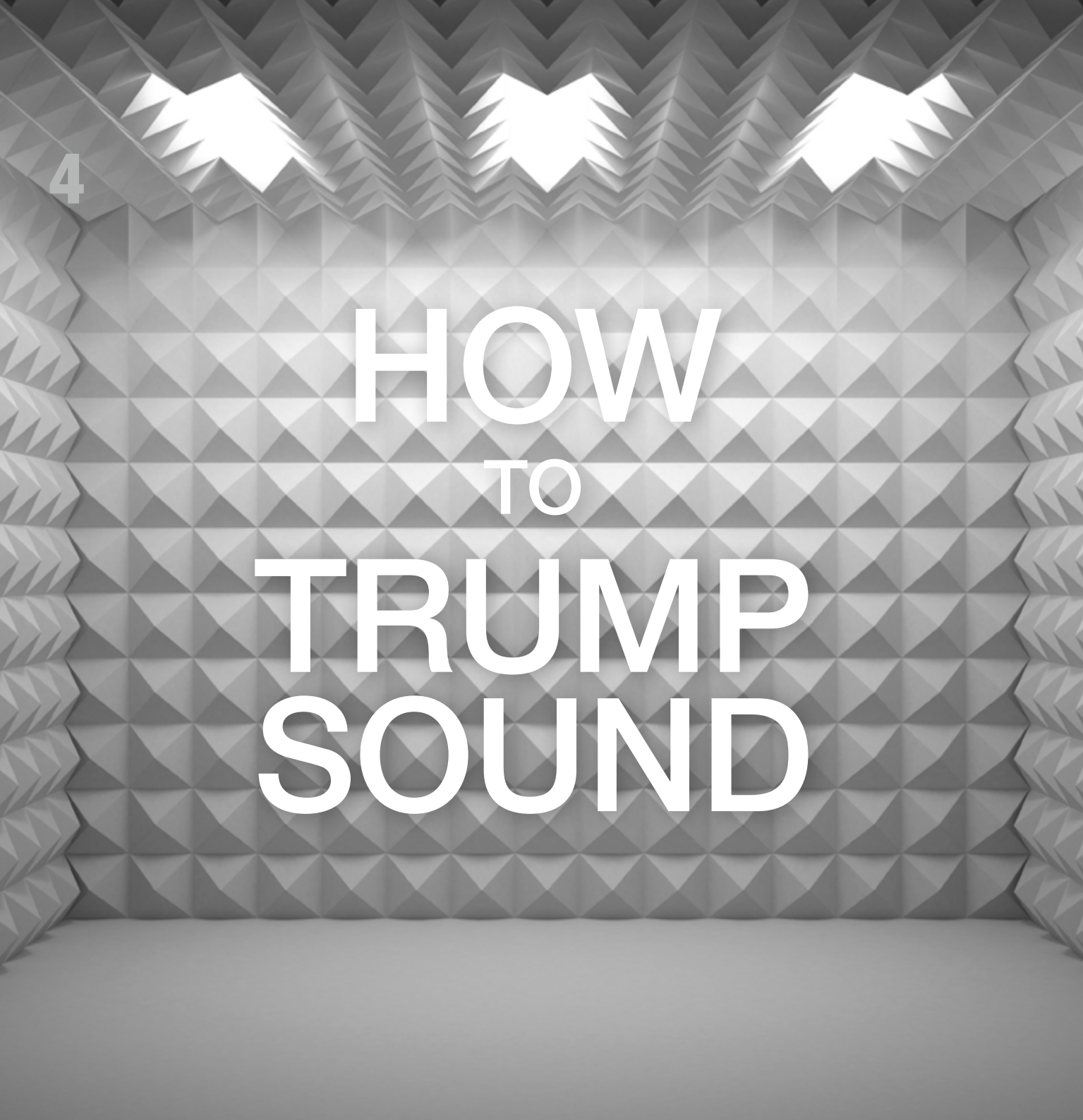
modulyss®

dBack

ACOUSTIC BACKING


IT’S OH SO QUIET
IT’S OH SO STILL
SSHHH …


HOW
TO
TRUMP
SOUND

SOUND & THE WORKING ENVIRONMENT

The importance of acoustics in modern offices

Sound is part of the everyday working environment, but noise is a significant concern that is well documented to affect productivity and wellbeing. In short, it makes offices less profitable. Everything from footsteps, computers and photocopiers to mobile phones, meetings and conference calls cause sound, but it is when that sound turns into disturbing background noise that the acoustics of the working environment become important.

At modulyss®, we believe that you shouldn't have to suffer excessive noise in the work place. Not only is it distracting, at times it can be down right irritating and so anything we can do to soothe irritation we will.

The challenges of modern offices

With wide-open spaces to provide a feeling of space and to encourage communication, the modern office is devoid of natural sound absorbers such as ceilings, partitions and separate offices and so noise is ever-present.

With the current popularity of cool, cold and acoustically reflective architectural surfaces such as glass and concrete, this problem is highlighted even further. Modern office environments simply aren't equipped to deal well with noise.

6

THE SCIENCE OF ACOUSTICS

The science of sound

Sound is a vibration that travels as a wave in all directions until it encounters an obstacle such as a wall, floor or ceiling. When it comes to the acoustics of interior spaces, there are two characteristics of sound that become particularly interesting:

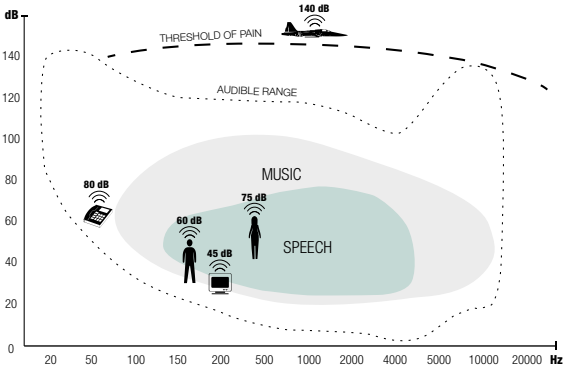
Loudness: This is how loud the sound is perceived to be. Loudness is measured in the logarithmic scale of 'dB', which means that an increase of 10 dB corresponds to a perceived doubling of the sound's level.

Frequency: This is the pitch of the sound and is determined by the number of oscillations within a given time. Usually expressed in Hertz (Hz), where one Hertz is equal to one cycle per session.

When two different sounds are equally intense (with the same dB measurement), the lower frequency sound will be less intelligible than the higher one.

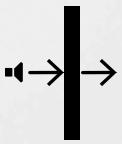
The frequency of the sounds present must be taken into account when designing an indoor space to be acoustically efficient for the task at hand.

The illustration shows how humans interpret sound. Understanding what sounds we can hear and which of these sounds we want to hear enables designers to select the best materials to banish noise.



Behavior of sound

When sound reaches a surface, there are three things that can happen individually or at the same time. The behavior of sound when it reaches the surface determines that surface's acoustic performance:



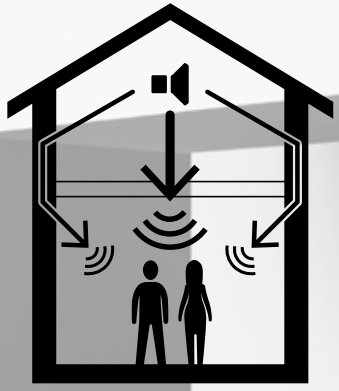
THE SOUND PASSES STRAIGHT THROUGH THE SURFACE INTO THE SPACE BEYOND

THE SURFACE ABSORBS THE SOUND

THE SOUND HITS THE SURFACE AND IS REFLECTED BACK

1

NOISE COMING FROM ADJACENT SPACES



THE ABILITY OF THE FLOORING SURFACE TO ABSORB NOISE FROM ADJACENT SPACES IS KNOWN AS THE IMPACT NOISE RATING AND IS GIVEN AS ΔL_W.

2

NOISE FROM WITHIN THE SPACE ITSELF

THE ABILITY OF THE FLOORING SURFACE TO ABSORB NOISE FROM WITHIN THE SPACE ITSELF IS KNOWN AS THE SOUND ABSORPTION RATING AND IS A GIVEN AS α_W.

OFFICE ACOUSTICS

The impact of noise

In modern offices, noise has a major impact on people's psychological and physical wellbeing and so can reduce performance and productivity. The main challenge is to design noise out to allow concentration, yet at the same time provide an environment where communication is easy. There are three important noise issues that all play their part.

Too much noise:

- ➜ entering the space from outside
- ➜ coming from adjacent spaces
- ➜ within the space itself

In terms of the floor, which after all is what modulyss® is all about, there are two parameters that must be taken into account when working out how the material will help fulfil the acoustic needs of the building:

1 Noise coming from adjacent spaces
2 Noise from within the space itself

Most flooring materials just aren't capable of minimizing external noise because they just aren't thick or heavy enough and the same is true for carpet. Carpet can only help to subdue vibrations.

At modulyss® we've looked at how we can make carpet better at dealing with noise and developed a solution that will go a long way in making it quieter… **dBack**.

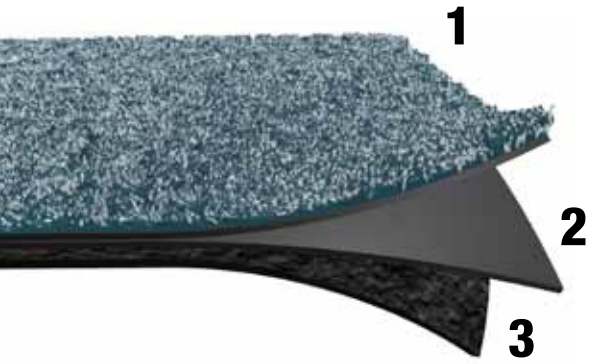
ALL ABOUT dBack

The principle of dBack

With dBack we've looked towards how we can improve the impact noise and sound absorption qualities of our carpet tiles and we've developed a new backing that is even better at soaking up sound than our traditional back2back bitumen backing. Using a careful combination of textile materials, we've make sure that dBack is not only better at taking on noise, but also kinder on the environment too.

The construction of a dBack equipped carpet tile

1 Pile material + primary backing + precoat (latex)
2 Bitumen
3 dBack: a recycled polyester felt



The concept of the brand dBack

dBack gets its name from the measurement used to define the amplitude of sound (dB) – a well established and well recognised value. By inference, dBack indicates sound-related performance for a punchy sounding brand.

Improving sound absorption

As a textile, carpet is a natural sound absorber and works to reduce impact noise while absorbing sound within the space. Initial acoustic performance will be based on the type of carpet, how thick it is and how resilient it is. An increase of any of these parameters will increase the carpet's ability to absorb sound and you can find out just how much on page 14–17.

dBack versus back2back

Compared with our 100% bitumen back2back, dBack provides a minimum improvement of 50% in sound absorption. We've been able to achieve such a dramatic improvement by replacing a cover fleece of 85 g, with a far-denser 800 g recycled polyester felt.

KEEP CALM AND USE dBack

OUTSTANDING PERFORMANCES

modulyss® selected the most dense and stable felt backing in order to assure the **perfect seams** and the steadiness all through the life cycle of the carpet tiles.

As a result of the high-grade felt backing, all dBack carpet tiles have a **dimensional stability** of less than 0.2%. This is tested in accordance with the European EN 986 standard.

dBack carpet tiles comply with the strictest European regulations for **fire safety**. Certified to the European EN 13501-1 standard, dBack carpet tiles have all earned a **B_{fl}-s1** classification, the highest possible class for textile floorcoverings.

To improve the **environmental credentials** of dBack, each and every dBack equipped carpet tile employs FiberAcoustic®. This secondary backing is made from **recycled polyester** (70%) and is free from chemical binders, making this felt backing harmless to the environment.

THE ADVANTAGES OF dBack

Sound Absorption to die for
The three-dimensional structure of carpets generally causes the reflection of sound waves to be reduced as sound energy is absorbed, dBack increases the strength of sound absorption in the sensitive speech frequencies.

Reducing Impact Noise
Lying between the building structure and the interior, dBack improves impact noise insulation making for a quieter environment.

Fire Resistant
The dBack carpet tiles comply with the strictest European regulations for fire safety and have a B_{fl}-s1 classification.

Built to Last
The felt backing used for dBack has the performance for the most demanding applications, bringing long-term durability and strength to the carpet tiles.

Superior Stability
dBack has been developed using a special process that gives it a superior dimensional stability. This has been tested according to the EN 1307 standard.

Keeping Quality High
All the quality markers set by our back2back (bitumen) carpet tiles are upheld with dBack. Burning behaviour, perfect seams, dimensional stability and more are reassured.

Underfoot Luxury
As a cushion backing, dBack absorbs footfall impact, reduces leg muscle fatigue and makes the office environment a more comfortable place to be.

Endless Design Possibilities
In open spaces, the freedom to make changes in the future are an important part of the designing process. The dBack equipped carpet tiles help to make this possible, all while keeping acoustics fitting to a minimum.

Adhesive Recommendations
No permanent gluing is needed to install the dBack equipped carpet tiles. We recommend a slip-resistant and tackifier coating, such as the UZIN U 2100 adhesive. This type of solvent free and low-emitting adhesive has a lasting, non-hardening adhesive effect once it's dry.

Testing the

SOUND ABSORPTION

of dBack carpet tiles

When a sound hits a carpet some of its energy is lost (absorbed) into the carpet itself, making the reflect sound appear quieter. This effect can be measured at lots of different frequencies and described as coefficient α_s. A α_s value of 0 means no sound at all has been absorbed, while a α_s of 1 means that all sound has been absorbed.

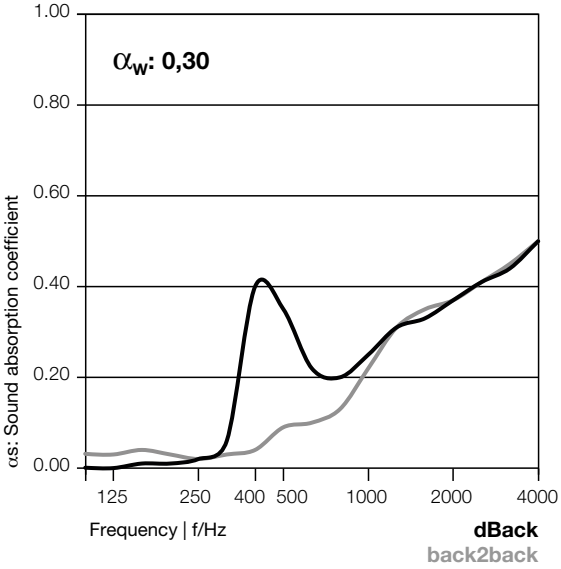
For testing the sound absorbing efficiency of carpet tiles, we use the α_w rating. All modulyss® dBack carpet tiles achieve somewhere between 0.25 and 0.35 at the maximum of ± 400 Hz, the frequency range that includes speech (between 250 to 800 Hz). This has been tested in accordance with EN ISO 354.

minimum improvement:

50%

dBack vs back2back

AFFINITY



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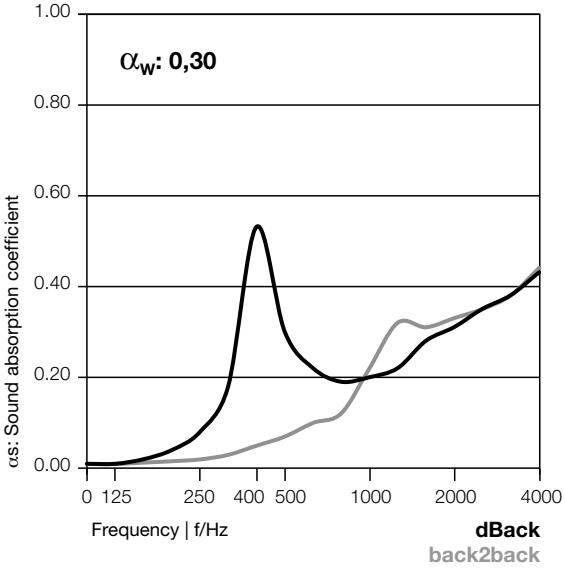


Testing the

IMPACT NOISE

of dBack carpet tiles

When an impact, such as a footstep or a falling object, hits a carpet, some of the impact energy will be transformed into emitted noise in spaces below or adjacent. The difference in emitted noise between a 'naked' floor, versus a floor covered with carpet is a value given in dB.

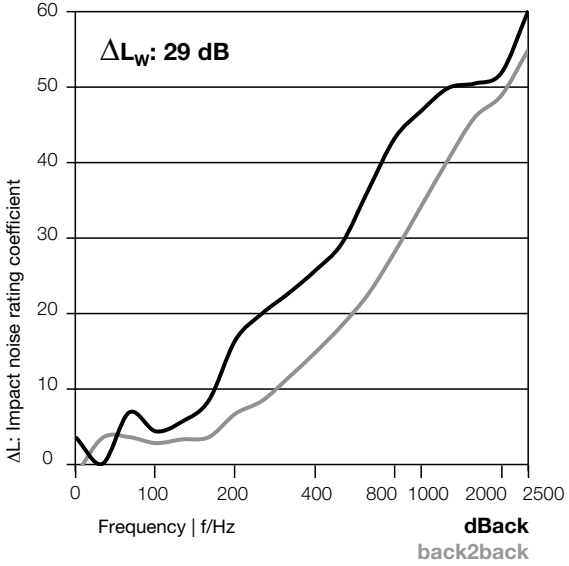
All dBack equipped modulyss® carpet tiles reduce impact noise by 3 to 4 decibels extra. This has been tested in accordance with EN ISO 10140.

average improvement:

15%

dBack vs back2back

AFFINITY



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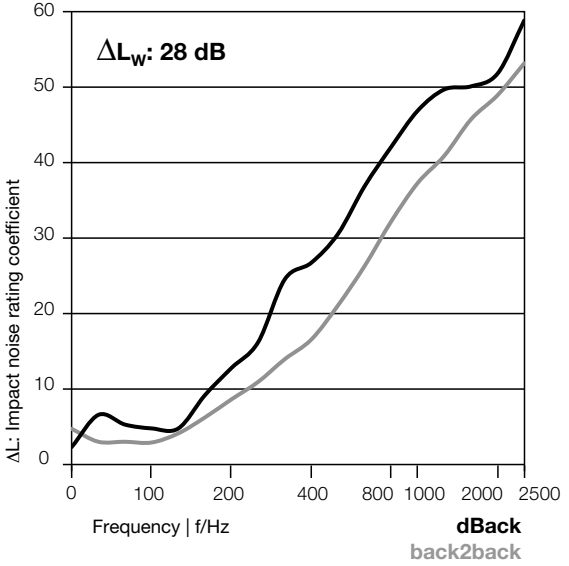


SSHHH ...

dBack PROJECT

SILVER TOWER PROJECT
GERMANY

METALLIC dBack
38 200 SQM


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22 THE WORDS OF SOUND

Decibel
A logarithmic unit that indicates the ratio of physical quantity, for the process of sound measurement the intensity, to a specified or implied reference level.

Frequency
The pitch of the sound and is determined by the number of oscillations within a given time. Usually expressed in Hertz (Hz), where one hertz is equal to one cycle per session.

Hertz
The measurement of the frequency of sound equivalent to cycles per second. Most vowel sounds are between 200 and 600 Hz. At 500 Hz human speech is at its loudest (around 75 dB in amplitude).

Impact noise
When an impact, such as a footstep or a falling object, hits a carpet, some of the impact energy will be transformed into emitted noise in spaces below or adjacent. The difference in emitted noise between a 'naked' floor, versus a floor covered with carpet is a value given in dB. All dBack equipped modulyss® carpet tiles reduce impact noise by 3 to 4 decibels extra. This has been tested in accordance with EN ISO 10140.

Loudness
This is how loud the sound is perceived to be. Loudness is measured in the logarithmic scale of 'dB', which means that an increase of 10 dB corresponds to a perceived doubling of the sound's level.

Noise
Sounds, particularly loud ones, that disturb people or make it difficult to hear wanted sounds, are noise.

Reverberation
Reverberation is the persistence of sound in a particular space after the original sound is produced.

Sabin
A unit of sound absorption. One square metre of 100% absorbing material has a value of one metric sabin.

Sabine formula
The calculation used to work out the reverberation time, which is currently considered the most important characteristic for gauging the acoustical quality of a room.

Signal to noise ratio
Signal-to-noise ratio (often abbreviated to SNR or S/N) is a measure used in science and engineering that compares the level of desired signal to the level of background noise.

Sound
A mechanical wave that is an oscillation of pressure transmitted through a solid, liquid or gas that is composed of frequencies within the range of hearing and at a level strong enough to hear.

Sound absorption
When a sound hits a surface some of its energy is lost to the surface (absorbed) making the reflected sound quieter. This effect can be measured and expressed as a coefficient from 0 to 1 and given as α_w.

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