SOLID & ECOLOGICAL NOISE PROTECTION SYSTEMS

We control noise.
As a sustainable company, we pay close attention to our environmental responsibility. Our commitment to the environment begins in the product development phase of PHONOBLOC® – from the raw materials through the manufacturing process to the disposal at the end of the product life.

Short transport distances through an international production network and an excellent carbon footprint characterise the PHONOBLOC® HB product range. The use of all-natural components has a positive effect on the service life and the recycling ability of the elements.

The sustainable PHONOBLOC® products are customisable, highly absorbent and durable. These are our contributions to ensuring a higher quality of life in your immediate surroundings through noise protection and an outstanding carbon footprint.

Ralf Dirnberger
Sales Director u. Business Development Manager
DELTA BLOC International GmbH
Noise becomes noise when it starts to bother us.

Noise may not only be unpleasant for people, it can also affect our health. This is especially true of persistent noise in everyday life.

**Noise as a health hazard**

A continuous sound level of 60 decibels can cause stress during sleep, sound levels above 80 decibels can affect health. The limit is 130 decibels. At this level, people will automatically close their ears.

**Noise and traffic**

Traffic is by far the largest source of noise. The population is most affected by street noise, as more than 80 percent of traffic noise is caused by cars, lorries, buses and motorcycles. But air and rail traffic also contribute to the noise pollution of a region.

With the PHONOBLOC® product range, DELTA BLOC International has developed structural solutions for traffic-congested roads and railway tracks to protect residents from excessive noise pollution.

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**Overview: noise level and its consequences**

A level difference of 10 dB corresponds approximately to double or half of the subjectively perceived volume.
Sound absorption versus sound insulation

The two most important criteria

Acoustic performance is defined in groups (A1–A5 in the case of sound absorption and B1–B4 in the case of sound insulation). Information on the specific capacity is provided by the individual values.

**Sound absorption DLα** in accordance with EN 1793-1 (road) or EN 16272-1 (track) describes the effect of a protection system on the side of the noise source.

**Sound insulation DLR** in accordance with EN 1793-2 (road) or EN 16272-2 (track) describes the reduction of the noise level of a protection system for residents behind the noise source. It is given by the "difference between impinging sound" and measured sound following "penetration of the noise protection system" on the side facing away from the sound.

### Sound absorption versus sound insulation

#### Sound absorption

<table>
<thead>
<tr>
<th>Absorption groups</th>
<th>Sound absorption coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>up to 4dB</td>
</tr>
<tr>
<td>A2</td>
<td>4–7dB</td>
</tr>
<tr>
<td>A3</td>
<td>8–11dB</td>
</tr>
<tr>
<td>A4</td>
<td>12–15dB</td>
</tr>
<tr>
<td>A5</td>
<td>&gt; 15dB</td>
</tr>
</tbody>
</table>

#### Sound insulation

<table>
<thead>
<tr>
<th>Insulation group</th>
<th>Sound insulation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>&lt; 15dB</td>
</tr>
<tr>
<td>B2</td>
<td>15–24dB</td>
</tr>
<tr>
<td>B3</td>
<td>25–34dB</td>
</tr>
<tr>
<td>B4</td>
<td>&gt; 34dB</td>
</tr>
</tbody>
</table>
PHONOBLOC®
NOISE PROTECTION & APPLICATIONS

1. Noise barrier walls straight
2. Noise barrier walls curved
3. Combined noise protection with restraint system
4. Wall claddings with absorbers
Noise barrier wall
Panels both sides with top element
Sonically soft deflection edge

Noise barrier wall
Panels both sides

Noise barrier wall
Panels one side

Combined noise barrier wall with restraint system

Combined noise protection with restraint system
DB 150 NBF

Combined noise protection with restraint system
DB 100 NBF

Noise barrier wall
Big curve

Absorber wall cladding

Noise barrier wall
Small curve
PHONOBLOC®
NOISE BARRIER WALLS
Noise protection without compromise

PHONOBLOC® HB wood-concrete absorbers consist of cement-bound fresh wood chips. By using wood as a locally available and renewable raw material, CO₂ emissions can be noticeably reduced. The material structure provides for high stability and maximum absorption thanks to the ideal ratio of solids and absorption-effective cavities. As a result, absorption values of up to 20dB can be achieved depending on the structure.
Attractive surface structure
By combining a variety of standard structures, inspirational landscape architects can utilise the interplay between light and shade. The profile and the natural colour of the wall are perceived as natural and varied even from a great distance.

The absorption body with a length of 50cm and a width of 25cm is ideal for designing noise barriers. They are also easy to handle.

Grey concrete has long been a thing of the past!
Architects and planners can use PHONOBLOC® to make the most of the entire colour palette.

To ensure a harmonious landscape design, the absorption cladding is available in different shades of integrated natural colours.

For special colour effects, the surfaces can be painted with standard RAL colours.
PHONOBLOC® HB
WOOD-CONCRETE ABSORBER STONES

Without compromise: wood-concrete absorber stones for optimum noise protection and design variety

Tested safety and environmentally sustainable

The PHONOBLOC® HB absorber block system is the safe and tested solution for effective noise protection for road and rail traffic.

PHONOBLOC® HB not only offers the best absorption and sound insulation values. Thanks to the high quality of production and materials and solid design, PHONOBLOC® HB is maintenance-free and self-cleaning for up to 50 years – important advantages not only in road and rail transport but also for companies.
### PHONOBLOC® HB wood-concrete absorber stones

<table>
<thead>
<tr>
<th>Structure</th>
<th>Type</th>
<th>Absorption DL&lt;sub&gt;α&lt;/sub&gt;</th>
<th>Reflection DL&lt;sub&gt;RI&lt;/sub&gt;</th>
<th>Absorber thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Road according to EN 1793-1</td>
<td>Track according to EN 16272-1</td>
<td>In-Situ road according to EN 1793-5</td>
</tr>
<tr>
<td>WAVEline</td>
<td>HB 10/3,5 WAVEline</td>
<td>9dB</td>
<td>11dB / 10dB</td>
<td>5dB</td>
</tr>
<tr>
<td>with corrugated surface</td>
<td>HB 5 WAVEline</td>
<td>6dB</td>
<td>6dB</td>
<td>n.t.</td>
</tr>
<tr>
<td>FLATline</td>
<td>HB 9 FLATline</td>
<td>7dB / 6dB</td>
<td>7dB / 6dB</td>
<td>n.t.</td>
</tr>
<tr>
<td>with smooth surface</td>
<td>HB 12 FLATline</td>
<td>10dB / 9dB</td>
<td>11dB / 10dB</td>
<td>3dB</td>
</tr>
<tr>
<td>CUTline</td>
<td>HB 12 CUTline</td>
<td>16dB / 13dB</td>
<td>20dB / 16dB</td>
<td>n.t.</td>
</tr>
<tr>
<td>with milled surface</td>
<td>HB 12 ROOFline</td>
<td>10dB</td>
<td>12dB</td>
<td>6dB</td>
</tr>
<tr>
<td>ROOFline</td>
<td>HB 12 TRAPline</td>
<td>20dB / 15dB</td>
<td>20dB</td>
<td>7dB</td>
</tr>
<tr>
<td>with trapezoidal structure</td>
<td>HB 12 CONEline</td>
<td>20dB</td>
<td>20dB</td>
<td>6dB</td>
</tr>
<tr>
<td>CONEline</td>
<td>HB 9 / HB 5 FLATline</td>
<td>8dB</td>
<td>9dB</td>
<td>3dB</td>
</tr>
<tr>
<td></td>
<td>HB 9 / HB 5 FLATline</td>
<td>8dB</td>
<td>9dB</td>
<td>3dB</td>
</tr>
</tbody>
</table>

* sound absorption value without support (e.g. DB noise barrier, wall cladding, support cladding ...)
**WAVEline**  
- with a corrugated surface

- corrugated surface
- absorption class A3
- in-situ reference value $D_{L_1}$ 5dB for road and 6dB for track
- material thickness of absorption layer only 10cm
- horizontal, vertical or special contouring
- highly absorbent either on one or both sides
- can be combined with other noise protection elements

**FLATline**  
- with a smooth surface

- block-shaped, flat surface
- absorption class A2 with a material thickness of 5cm and 9cm
- absorption class A3 with a material thickness of 12cm
- in-situ reference value $D_{L_1}$ 3dB for road and track (applies only to HB12)
- maximum resistance against vandalism
- highly absorbent either on one or both sides
- can be combined with other noise protection elements

**FLATline**  
- with a structured surface

- block-shaped, structured surface
- absorption class A3 with alternating material thickness of 5cm and 9cm
- in-situ reference value $D_{L_1}$ 3dB for road and for track
- maximum resistance against vandalism
- highly absorbent either on one or both sides
- can be combined with other noise protection elements
**CUTline**
- with a milled surface

- cut surface
- absorption class A4 or A5 (depending on support cladding)
- in-situ not tested
- material thickness of absorption layer 12cm
- horizontal and vertical arrangement possible
- highly absorbent either on one or both sides
- can be combined with other noise protection elements

**ROOFline**
- with a jagged surface

- jagged surface
- absorbing class A3
- in-situ reference value $D_L$ 6dB for road and 7dB for track
- material thickness of absorption layer 12cm
- horizontal and vertical arrangement possible
- highly absorbent either on one or both sides
- can be combined with other noise protection elements

**TRAPline**
- with a trapezoidal surface

- trapezoidal surface
- absorption class A4 or A5 (depending on support cladding)
- in-situ reference value $D_L$ 7dB for road and 8dB for track
- material thickness of absorption layer 12cm
- horizontal and vertical arrangement possible
- highly absorbent either on one or both sides
- can be combined with other noise protection elements

**CONEline**
- wavy with undercut

- wavy surface with undercut
- highest possible absorption class A5
- in-situ reference value $D_L$ 6dB for road for track
- material thickness of absorption layer 12cm
- horizontal and vertical arrangement possible
- highly absorbent either on one or both sides
- can be combined with other noise protection elements
PHONOBLOC® HB / AHB
NOISE PROTECTION PANELS

Massive with a concrete core or as aluminium light wall construction

Optimum noise protection for wide-ranging applications

The latest generation of PHONOBLOC® noise protection panels combines optimum noise protection with wide-ranging areas of application.

PHONOBLOC® noise protection panels are available in two carrier systems, which provide extensive benefits particularly for your project, both in terms of ecology and economy.

- PHONOBLOC® HB Panels
  with concrete core as a carrier element
- PHONOBLOC® AHB Panels
  Aluminium light wall construction
PHONOBLOC® HB PANELS
WITH CONCRETE CORE AS A CARRIER ELEMENT

Your advantages:

► available in standard element lengths of up to 6 metres (custom elements up to 20 m in length available as self-supporting girders)
► maximum curbing of airborne noises due to high weight of the concrete core
► high mechanical resistance (e.g. in case of vandalism)
► weight of elements protects them against theft (approx. 400 kg/m²)
► no changes in material and thus no reduction in effectiveness due to ageing
► option of high noise absorption on one or both sides
► best noise absorption (reflection) values due to wood concrete facing formwork
► available in colours through the use of permanent dyes or subsequent painting in RAL colours
► suitable for climbing plants, vines, etc.
► high regional added value, wherever local production possibilities are available

PHONOBLOC® AHB PANELS
WITH ALUMINIUM LIGHT WALL CONSTRUCTION

Your advantages:

► available in a 5-metre element length
► low transportation costs due to utilised lightweight materials
► low assembly costs due to low weight and high degree of prefabrication
► can be used on bridges, due to low weight
► fast availability due to highly efficient method of production
► weight of elements protects them against theft (approx. 85 kg/m²)
► no changes in material and thus no reduction in effectiveness due to ageing
► best noise absorption (reflection) values due to wood concrete facing formwork
► option of high noise absorption on one or both sides
► wide-ranging design options due to varying absorber structures or colours through the use of permanent dyes or subsequent painting in RAL colours
► various design options available for reverse sides (e.g. wood concrete, aluminium trapezoidal sheeting, aluminium mesh, plastic, with advertising on back of mesh backing fabric, ...
Individual and harmonic landscaping

Optimum noise protection, harmoniously integrated into the landscape

With PHONOBLOC® HB absorber blocks a multitude of landscaping designs are possible. Combinations of different absorber surface shades and structures blend particularly well into the landscape. Steps in elevation are compensated by angled panels rather than sudden steps. Steel supports are covered by highly absorbent cladding and are therefore not visible to passing drivers. Especially appealing are PHONOBLOC® HB elements, that can be combined with appealing, transparent windows.

The same kind of design can be achieved over bridges by replacing the concrete support element with a light-wall substructure. This reduces the overall weight of the system from 400kg/m² to less than 150kg/m².
Easy and effective noise protection for better quality of life

The PHONOBLOC® HBX mantle block system is particularly suitable as a solid noise barrier wall or screen wall in the immediate vicinity of residential buildings or businesses.

The special advantage of the PHONOBLOC® HBX system is that this type of noise barrier wall can be installed easily and quickly by local construction companies with no need for costly machinery.
### PHONOBLOC® HBX wood-concrete mantle blocks

<table>
<thead>
<tr>
<th>Structure</th>
<th>Type</th>
<th>DL$_a$ front side according to EN 1793-1</th>
<th>DL$_a$ rear side according to EN 1793-1</th>
<th>Absorber thickness</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLATline / FLATline</td>
<td>HBX 26.5 FF</td>
<td>A3 8dB</td>
<td>A3 8dB</td>
<td>26.5cm</td>
<td><img src="image" alt="FLATline design" /></td>
</tr>
<tr>
<td>1:1 alternating with smooth surface on both sides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAVEline / FLATline</td>
<td>HBX 27.5 WF</td>
<td>A3 10dB</td>
<td>A2 6dB</td>
<td>27.5cm</td>
<td><img src="image" alt="WAVEline design" /></td>
</tr>
<tr>
<td>with corrugated and smooth surface</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAVEline / WAVEline</td>
<td>HBX 32.5 WW</td>
<td>A3 10dB</td>
<td>A3 10dB</td>
<td>32.5cm</td>
<td><img src="image" alt="WAVEline design" /></td>
</tr>
<tr>
<td>with corrugated surface on both sides</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
PHONOBLOC® HB
WOOD-CONCRETE WALL CLADDING

Noise protection for existing reflecting walls and special-purpose solutions

Easy installation and effective noise protection

PHONOBLOC® HB wall claddings are ideally suited for retrofitting and for special areas such as flood protection areas.

Like all PHONOBLOC® HB products, PHONOBLOC® HB offers optimum absorption values and a wide range of advantages and highest quality.
Installation: adhesive and dowels

PHONOBLOC® HB absorbers can easily be installed to existing walls with an adhesive and dowels. This type of application is referred to as wall cladding and perfectly withstands the adhesive/tensile tests.

This type of application is particularly popular:
- at the entrance/exit area of a tunnel
- on reflecting supporting walls
- As employee noise protection in inside areas of industrial and commercial complexes

Installation: aluminium rail system

The absorber blocks can also be installed on aluminium rails. This application method is used if the substructure is uneven. This system provides an additional advantage, e.g. in flood plain water protection areas or on building façades, which air circulation is a requirement.

Preferred application areas:
- on existing, uneven substructures
- in flood protection areas
- along building façades

Austrian railway approval for both installation systems
ALL THIS SPEAKS FOR
PHONOBLOC® HB / AHB & PHONOBLOC® HBX

Solid and environmentally friendly — PHONOBLOC®
wood concrete for maximum safety and
maximum noise protection

► quality standard
► service life &
maintenance
► ecological balance
► versatility
► sustainability
Quality standard
Because we take our responsibility seriously!
► best sound absorption and insulation values
► regular tests and inspections by accredited inspection bodies
► permanent development

Service life & maintenance
PHONOBLOC® HB / AHB panels and HBX mantle blocks are:
► resistant to aging – verified service life of 50 years, in accordance with EN 14389
► maintenance-free & self-cleaning (rain washes dirt off thanks to porosity of panels)

Ecological balance
Because noise protection is also environmental protection!
► The positive ecological balance is proof that the wooden constituents of PHONOBLOC® HB have bound more CO₂ than was released by the manufacture of the wood-concrete absorbers.
► Created with Austrian fresh wood chips combined with excellent concrete quality or high grade aluminium.
► PHONOBLOC® satisfies the requirements of the "natureplus" quality label – a Europe-wide quality mark for climate protection and sustainability in the area of construction.

Versatility
Extensive applications and easy installation:
► in road and rail transport
► for commercial and private use
► sturdy, extremely stable and easy to install

Sustainability
This is evident in:
► short transport routes
► local production
► full recyclability of panels
Maximum safety and the best noise protection

After more than 10 years of experience with the 1st generation of combined noise protection and vehicle restraint systems “DB LSW R und M” and a list of countless projects, there is now a 2nd generation adapted to the latest technology under the new product name “DB 100 NBF or DB 150 NBF”.

The innovative approach of integrating the noise protection barrier directly into the vehicle restraint system provides numerous benefits. This means the noise protection barrier can be set up close to the source of the noise, which considerably increases the noise reduction effect with no change in the wall height or of being able to benefit from a massive reduction in the costs with a reduction in the wall height with the same effect. In addition, this type of construction requires the smallest footprint, which in turn is an advantage, especially in urban areas.
DELTABLOC® DB 100 NBF / DB 150 NBF:

The system was symmetrically developed. This means, that it can be used both along the edge of the road and in the central reserve providing a prooﬁen two-sided effect in the area of restraint as well as with noise protection.

There are two types, which have both been crash-tested with positive results according to the highest standard requirements and which were tested in terms of noise both statically/structurally according to the highest criteria.

- **DB 100 NBF 200-450 / 5m T180:**
  - Containment level H2 tested in accordance with EN 1317
  - Free-standing without a foundation, wall heights to 4.50m above road surface
- **DB 150 NBF 250-600 / 5m T280:**
  - Containment level H4b tested in accordance with EN 1317
  - Free-standing without a foundation, wall height to 6.00m above road surface

Both systems offer maximum noise protection in accordance with EN 14388.

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**Your advantages:**

- **restraint system and noise protection** combined in one system
- **space saving and highly efﬁcient solution**, both in terms of noise and also within the area of restraint (highest containment level H4b and highest noise protection to A5)
- **affects both sides** due to symmetrical style
- **can be used on a permanent or temporary basis**
- **cost efﬁcient**, requires no foundation
- **design options** from heights of 2.00m (DB 100 NBF) or 2.50m (DB 150 NBF) using all noise protection panels available on the market (concrete, transparent, aluminium, wood, ...)
- **free-standing** without complicated foundations
- **fast installation and removal**
- **high regional added value** within respective ﬁeld of use
**DELTABLOC® – DB NBF SERIES**

**COMBINED PROTECTION SYSTEMS**

Maximum safety and the best noise protection

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**DB 100 NBF**

The DB 100 NBF restraint and noise protection system is used to secure the central reservation and the hard shoulder on roads and motorways with simultaneous noise absorption due to the absorption material on the surface.

**Major features:**
- high containment level H2
- combined noise protection and restraint system
- variable wall height: up to 4.5m free-standing
- low design width
- fixed or temporary installation

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**DB 150 NBF**

The DB 150 NBF restraint and noise protection system is used to secure the central reservation and the hard shoulder on highways and motorways with simultaneous noise absorption due to the absorption material on the surface.

**Major features:**
- highest containment level H4b
- combined noise protection and restraint system
- variable wall height: up to 6m free-standing
- low design width
- fixed or temporary installation
TESTED SAFETY
ACCORDING TO EN 1317
Sustainable and economical

DELTA BLOC International sets its standards not only for new developments, but also in the area of sustainability and cost-effectiveness of the utilised materials and systems.

Thus it is one of the “first” on the market, that has tested and positively verified the PHONOBLOC® HB / AHB noise protection wall system in accordance with EN 14389-1 and 2 for a service life of up to 50 years by means of an durability test with documented proof of the effects with regard to the acoustic effects (noise absorption and reflection) and the non-acoustic effects (e.g. frost resistance to de-icing salt, adhesive strengths, ...).

In a climate chamber of the independent test institute BTI in Linz/Puchenau, the test parameters were prepared based on the requirements of the European Standard 14389 so both the highly absorbent facing formwork PHONOBLOC® wood cement was tested on its own as well as in combination with various carrier materials (e.g. with concrete core, in an aluminium light wall construction AHB) and with various reverse side materials according to these stringent, acoustic and structural requirements.
Test requirements
The elements were aged in tests that lasted several months for 24-hour cycles and included temperature differences between -33 degrees and +40 degrees C in combination with the influence of UV light, and controlled weathering in water containing sodium. Each 24-hour ageing period simulated a one year cycle in the laboratory. After 5-year cycles, the elements were removed and tested sonically both in the acoustic test lab and also “in-situ” on a specially erected test wall according to the latest acoustic technologies, to compare and evaluate their sonic characteristic following the ageing using the values of the tested new condition.

Results
The acoustic mechanism of the PHONOBLOC® HB wood cement absorbers passed this test with flying colours. It was possible to prove that there was no deterioration in the sound-absorbing characteristic under the theoretical standard requirements of the test cycles even after 50 years of simulated ageing.

The structural characteristics, which were tested and evaluated, do not display any noteworthy deteriorations, neither due to the influence of de-icing salt, nor due to other ageing influences.

PHONOBLOC® HB IMPRESSES
If you rely on PHONOBLOC® HB noise protection systems, then you are investing well and safely in the future.

This applies especially for the applications shown and verified below
- PHONOBLOC® HB Panels with concrete core
- PHONOBLOC® AHB Panels with aluminium light wall construction
- PHONOBLOC® HB wall cladding
- PHONOBLOC® HBX mantle block absorbers for private or commercial use

- Figure 1 shows the in-situ testing of the respectively aged absorbers on the basis of EN 1793-5 (reflection value DLw).
- Figure 2 shows the in-situ testing of the wood cement absorbers in a new state as required by the standard, prior to ageing in accordance with EN 1793-5 on the test wall at BTI institute.
- Figure 3 shows the wood cement absorbers in the climate chamber during the moistening stage including the influence of UV light prior to the frost state.
- Figure 4 shows the same type of weathering in the climate chamber, but with differently tested reverse sides and carrier materials.
Noise protection installations on roads and rail are subjected to a number of loads (e.g. wind, pressure and suction).

In addition, noise protection installations can be exposed to the impact of stones or other objects hurled by vehicle tyres as well as, in some countries, dynamic loads in winter when snow clearance operations take place by winter utility vehicles. The deformations that occur under such loads during the expected service life must in no way render the noise protection installations useless.

To meet these stringent road and rail traffic requirements, all PHONOBLOC® products have been tested by accredited inspection bodies:

- **Absorption test report per absorber type**
  - in accordance with EN 1793-1
  - in accordance with EN 16272-1

- **Sound insulation for noise barrier system**
  - in accordance with EN 1793-2
  - in accordance with EN 16272-2

- **Measurements of the sound reflection index**
  - in accordance with EN 1793-5/2016 (EN 16272-3-2)

- **Measurements of the sound insulation index**
  - in accordance with EN 1793-6:2013 (EN 16272-2)

- **Fire resistance against scrub fires test report**
  - in accordance with EN 1794-2, Annex A

- **Danger due to falling wall panels (pendulum test)**
  - in accordance with EN 1794-2

- **Frost and de-icing salt resistance test**
  - in accordance with EN 1794-1

- **Structural analysis test report**
  - in accordance with EN 1794-1 and -2

- **Testing the long-term effectiveness and 50 year ageing verification**
  - in accordance with EN 14389-1 and -2

- **Preliminary type testing report depending on system including CE certificate**
  - in accordance with EN 14388
NOISE PROTECTION FROM A TO Z

Terms and abbreviations

**A**
- absorption [sound absorption behaviour]
- absorbing [sound absorption behaviour up to 4dB]
- AHB [aluminium wood-concrete lightweight wall construction]

**B**
- base plate [mounting part of supports on structures]
- benchmarks [values specified by standards]

**C**
- centre-to-centre distance [distance between supports]
- combined system [DB-NBF = road restraint system and noise protection combined in one system]

**D**
- DB = [DELTABLOC®]
- DB NBF [DELTABLOC® Noise Barrier Freestanding]
- dB [decibel]
- deep foundation [mainly piling pipe or foundation pipe as foundation]
- deflection edge [front, uppermost edge of the noise barrier]

**E**
- emission point [sound output point, noise source]
- EN standards [European regulations]

**F**
- far field reflection [sound propagation over long distances]
- frequency [measuring unit in hertz]

**G**
- gradient [parallel to the road surface]

**H**
- highly absorbent [sound absorption behaviour > 4dB]

**I**
- in-situ measuring method [measuring method suitable to be carried out on site]

**L**
- level reduction [= noise reduction; noise enhancement through noise reduction measures]
- line-side noise protection [low noise protection alongside railroad tracks]
- load [e.g. by wind, snow plough, pressure/suction]
- LSW [noise barrier wall]

**M**
- measurement data [test results]

**P**
- point of immission [sound input value]
- posts [= support = stand = carrier]

**R**
- Reflection (DLR)
- recess [recess in the finished part]
- reflecting [surface without sound absorption = acoustically hard]
- reverberant-field test [measurement under laboratory conditions according to EN standards]

**S**
- shallow foundation [strip or isolated foundation]
- sonically soft deflection edge [front, uppermost absorbing edge]
- sound deflection [change in sound propagation caused by the deflection edge of the noise barrier]
- sound insulation [sound reduction by wall obstacle]
- sound passage value [sound insulation/protection]
- strip foundation [basic element between ground and highly absorbent noise barrier]
- support cladding [conceals the steel support and thus increases absorption]

**T**
- top element [additional measure for improving sound reduction at the uppermost edge of the noise barrier]
- tunnel applications [noise protection measures at the entrance and exit areas of tunnels]

**W**
- wall cladding [noise protection measure carried out on existing structures]

**Z**
- ZTV-LSW06 [additional technical terms and conditions and guidelines regarding the implementation of noise barriers on roads]
Creativity and innovation is what drives DELTABLOC® to develop the safest road restraint systems in the world. Enthusiastic engineers constantly come up with new ideas to improve performance and efficiency. In fact, more than 30 patents have been incorporated into the entire DELTABLOC® product range, making them both unique and superior.
PROTECTING LIVES
IS OUR MOTIVATION
OUR NOISE PROTECTION IS SOLID & ECOLOGICAL.

Harmonious landscaping with lasting PHONOBLOC® wood concrete.