



EVOLUTION
OF
SILENCE

NOISE
PROTECTION
SOLUTIONS
THAT
OFFER
SOMETHING
SPECIAL

SP
EC
IA
LS



Noise is a worldwide environmental problem. Noise levels caused by road and rail traffic, but also by other sources, reduce quality of life and cause damage to health. At KOHLHAUER, we are doing something about it. And at the same time we are seizing opportunities that noise protection measures additionally offer. **Multifunctionality**, that's what we're fighting for – with visions for the future and an orientation towards what is technically feasible. We invite you to follow this path with us for a while. **Welcome** to the solution specialist for noise protection with special requirements.

R. KOHLHAUER GmbH, based in Gaggenau, is one of the leading service providers for noise and environmental protection technology in Germany and Europe.

As market-shaping specialists, we develop and produce innovative noise protection elements with added value for the environment and quality of life – for special requirements also together with experienced partners. At the same time, we drive the progress of noise protection. At KOHLHAUER, the focus is on the multifunctionality of the noise barrier. Additional benefits, for example higher aesthetics, PV integration or future integrated pollutant reduction, also increase acceptance among the population.

To achieve this, experienced experts at our headquarters in Gaggenau and at our subsidiaries in other European countries work with great passion and technical know-how.

With our European production sites, we have a total of 4,000 sqm of production space and 7,000 sqm of storage capacity. Here, noise barriers are produced that fit the needs of our customers and comply with the quality philosophy "Made in Germany".

That is why we offer the full service package from a single source:

- Detailed consulting
- Competent planning assistance
- Objective profitability analysis
- Project-specific processing

WHO
WE
ARE

The greatest challenges often lie in the everyday

Noise protection from the experts for pinpoint solutions



VAR LAB LE

The extraordinary in close proximity
Special requirements are our specialty

Solutions that prove themselves every day are the result of forward-looking, individual developments. Noise protection on roads or railways, in the vicinity of residential or industrial areas, in conurbations or rural regions – we at KOHLHAUER know what concerns residents, road users and clients. In doing so, we create added value that benefits people and the environment – with the development of innovative special products that are ready for use when the market demands them.

Our own research and development department makes valuable contributions to this. In addition, we successfully cooperate with institutions such as Fraunhofer ISE (Freiburg) or Lärmkontor GmbH (Hamburg). We also continuously develop our products through participation in the SEGES research program. This is a commitment with which we promote both the success of the company and progress in environmental protection. This is also achieved through intensive participation in various standards committees and specialist groups for noise control. Our memberships in

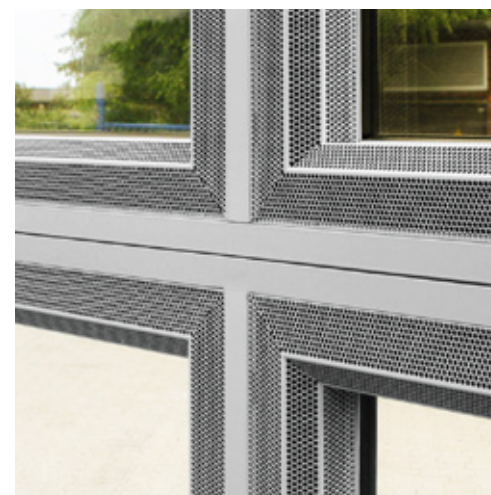
associations help us to anticipate legislative decisions and incorporate them into consulting discussions or project developments at an early stage.

Promising partnerships demand constructive cooperation. In cooperation with our customers, tendering authorities, municipalities, public authorities, architects, construction companies or the highway companies, we bring in the know-how from countless projects on an international level and assume responsibility. With KOHLHAUER, even special

requirements are optimally fulfilled and economically implemented.

Cooperation is also a cross-company concept for us. When we see synergy effects with other companies, we strive for a joint solution. This often results in excellent products, sustainable relationships and better opportunities to open up new markets.

*D-Westerheim
near Memmingen,
TAP-RAIL*



*D-Ginsheim-Gustavsburg, A60,
TAP-RAIL can also be used as
KOHLHAUER SCORSA® CLEARWALL HS
on roads*





Solution provider with vision and know-how

Maximum flexibility for special services

Flexibility is a recipe for success that has proven itself in many ways at KOHLHAUER. Thanks to a broad product portfolio and our know-how, we have enough flexibility to design all types of projects optimally and to react adequately to special features:

- through product combinations
- with a variety of materials
- if necessary via new developments

What is achieved is motivation and usually also the beginning of a new story. We are continuously developing our range of services – from road to rail, from rural to urban areas.

Here, too, the focus is on the multifunctionality of the noise barrier through combinations with PV or with components for pollution reduction. Flexibility is also required here: changing requirements, for example of an economic or environmental nature, are perceived and taken into account. One possible outcome could be rooftop solutions with PV modules for existing noise barriers – instead of their integration in noise protection elements.

Environmental protection begins on site.

Thanks to decades of know-how, KOHLHAUER can react flexibly to local conditions and adapt

its products accordingly. One result of the company's development from a pure noise protection specialist to an environmental protection specialist with technological expertise: we show that efficient sound insulation and absorption can be combined with solar energy generation. Or semi-transparent solutions on rail lines that offer a dual benefit with an unobstructed view and electricity yield. Whatever the future brings, with special solutions from KOHLHAUER you are optimally prepared.

FLEXIBLE

KOHLHAUER
VOLTA®



// **Numerous** projects
in environmental protection

*Shown here: D-Neuötting, Michaelifeld,
KOHLHAUER VOLTA® + KOHLHAUER SCORSA® FRAME
+ KOHLHAUER ALUFERA®*

REGENERATIVE

Highly functional, sustainable noise protection opens up new perspectives for resource-saving energy generation. Outstanding sound insulation and sound absorption are combined here in a forward-looking way with the generation of solar energy on an existing surface. The result is a significant contribution to environmental protection. At the same time, KOHLHAUER VOLTA® offers the optimum result for every application – on road or rail, in transparent or opaque, in east-west or north-south orientation.

Advantages and properties

- Increased contribution to environmental protection without additional costs
- Decentralized, sustainable energy generation
- Positive effect on image and acceptance of noise barriers among residents
- Can be used for energy self-sufficient operation
- Photovoltaic energy generation without consumption of additional cultivated land and without land use conflicts

- System integration of photovoltaics into the noise protection system allows considerable economic savings
- High degree of standardization for all elements
- Optimized electrical power range up to grid connection with energy supplier
- Easy exchangeability of solar modules in case of defect
- Depending on the basic element, high sound insulation and high sound absorption possible
- KOHLHAUER VOLTA® enables every investor to use photovoltaics
- Integrated cable ducts with flexible cover

Application

KOHLHAUER VOLTA® is the integration of solar technology into the proven KOHLHAUER noise protection elements. This sets standards and combines attractive appearance and easy installation with technical know-how. The optimal coordination of noise protection, solar modules and electrical performance makes it possible to define standardized elements for almost any application.

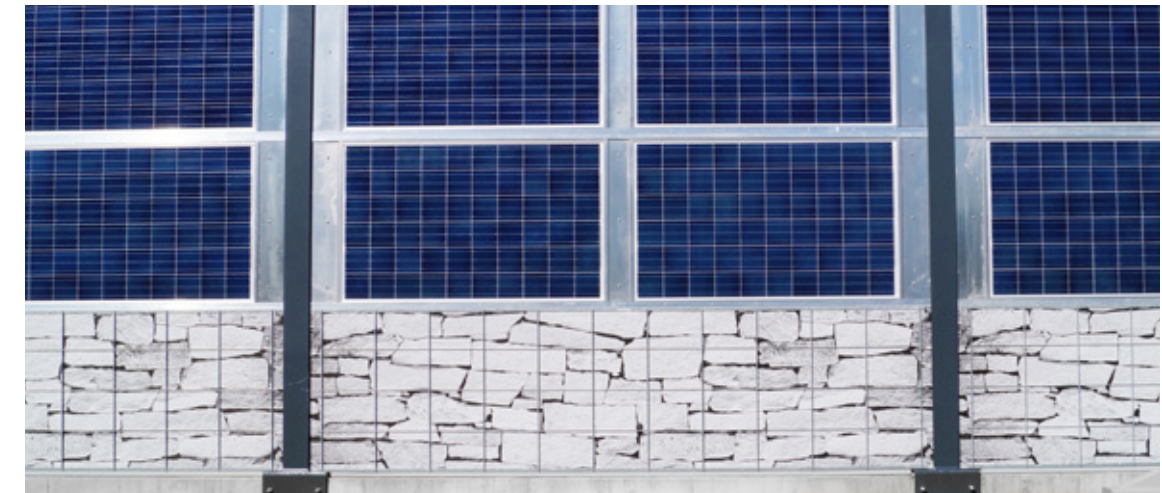
KOHLHAUER VOLTA®

Full of energy for environmentally noise protection

*D-Aschaffenburg,
Strietwald, A3,
KOHLHAUER VOLTA®*



*D-Neuötting, Michaelifeld,
KOHLHAUER VOLTA®,
KOHLHAUER SCORSA® FRAME,
KOHLHAUER ALUFERA®*



*D-Gaggenau,
KOHLHAUER VOLTA®,
KOHLHAUER ALUFERA® (printed)*

- Your choice** when high sound insulation and sound absorption are required.
- Standardized noise protection element in the format:
3,960 x 1,100 mm or 4,960 x 1100 mm
 - Has all the advantages of the innovative, double-sided absorbing grid insulation system
 - Integrated security to prevent theft of PV modules

- Module data**
- Aluminum frame modules with 300 to 400 Wp available from different suppliers
 - 2 pcs./element = 680 Wp at 4,40 sqm (3,96 x 1,10 m) noise barrier surface
 - 2 pcs./element = 800 Wp at 5,50 sqm (4,96 x 1,10 m) noise barrier surface

- Advantages**
- Lightweight, large-format, visually appealing noise protection element
 - Highly efficient acoustic properties
 - Easy to install, patented fastening system

- Your choice** when high sound insulation and transparency are required.
- Standardized noise protection element in the formats:
3,960 x 1,000 mm and 1,960 x 3,000 mm
 - Sound insulation > 30 dB
 - Can be combined with KOHLHAUER SCORSA® and KOHLHAUER ALUFERA®.

- Module data**
- Wafer between 2 safety glass panes
 - Also available in color
 - Transparencies from 10 to 30 % possible, according to customer requirements
 - Wafer thicknesses from 2 x 8 mm up to 2 x 10 mm
 - Aluminum frame integration for quick installation

- Future prospects**
- We are already working on the next innovations for noise protection with added value.
- Standardized element for stromautarkic use as street furniture
 - Noise/visibility/wind protection – illuminated advertising – separation – electrical support by small wind turbine

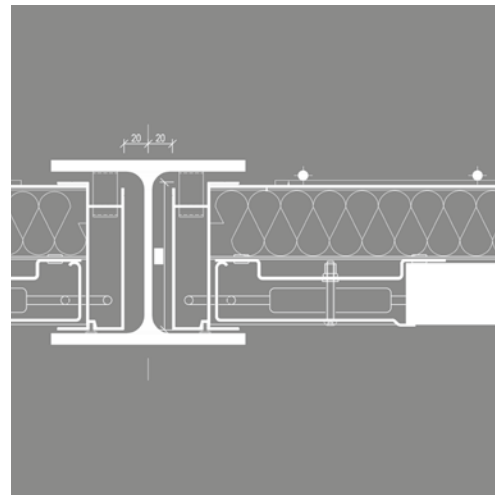
A. KOHLHAUER VOLTA® OPAK

Noise protection with fully integrated PV elements

D-Neuötting, Michaelifeld,
KOHLHAUER VOLTA® OPAK,
KOHLHAUER SCORSA® FRAME,
KOHLHAUER ALUFERA®



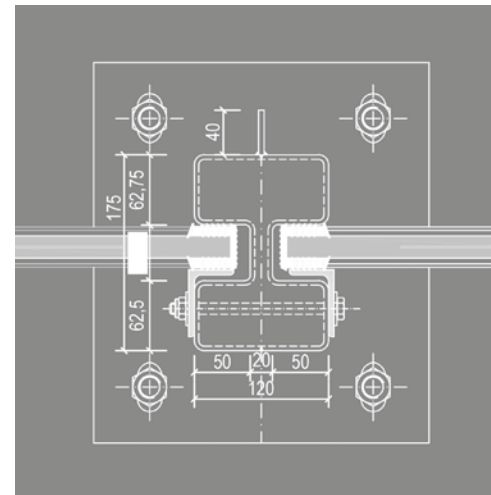
Example drawing
KOHLHAUER VOLTA® OPAK



B. KOHLHAUER VOLTA® THRU

Energy generation with first-class transparency

Example drawing
KOHLHAUER VOLTA® THRU



D-Munich,
Würmbrücke,
KOHLHAUER VOLTA® THRU

TAP-RAIL



// **Absorption**
can be so transparent

Shown here: Visualization, TAP-RAIL

ABS ORB END

TAP-RAIL is a modular frame system that has been tested for use on railroad lines. Thanks to highly developed technology, it combines transparent noise protection with integrated absorbing elements. And thus creates new perspectives. It is now possible to use transparent materials where absorption is required. On the one hand, this creates the kind of visual freedom that travelers like to enjoy, while on the other, cultural monuments,

cityscapes, unique landscapes retain their valuable signal effect. A wide range of possible combinations of different noise barrier elements also offers an interesting variety of designs for the noise barrier. The absorption values are 4 dB and can be increased up to 8 dB for the entire system by adding a highly absorbing base or by combining with highly absorbing aluminum noise protection elements.

- Advantages and properties**
- Absorbing noise protection without obstructing view
 - Highest noise protection for residents
 - Stable profile frame made of coated aluminum
 - Stable element structure for high loads
 - For rail speeds < 300 km/h
 - Sound absorption > 4 dB (1793-1)
 - Sound insulation 33 dB (1793-2)
 - Chamber dimensions of the HE 160 series
 - High resistance to aging and corrosion
 - Materials used 100 % recyclable

Structure

Highly active absorber elements are integrated into the frame construction and the center bar. This creates a harmonious-looking frame system, which can be colored as desired. The modular elements can be easily stacked on top of each other with different center distances (2.0 / 2.5 / 5.0 m), yet the horizontal character is retained by the transparent acrylic glass panes. The clear structure of the elements conveys a pleasant appearance to the road user and at the same time offers the highest level of sound insulation.

Standard modules

1,960 x 1,000 mm | 2,460 x 1,000 mm
3,960 x 1,000 mm | 4,960 x 1,000 mm

Slice thicknesses

approx. 15.0 mm | 20.0 mm

Weight

approx. 29.0 kg/sqm | 33.0 kg/sqm

- Tests**
- Transparent acrylic fillings with EBA approval
 - EBA approval of the entire system
 - User declaration of DB Netze AG
 - Tested grounding systems available

TAP-RAIL

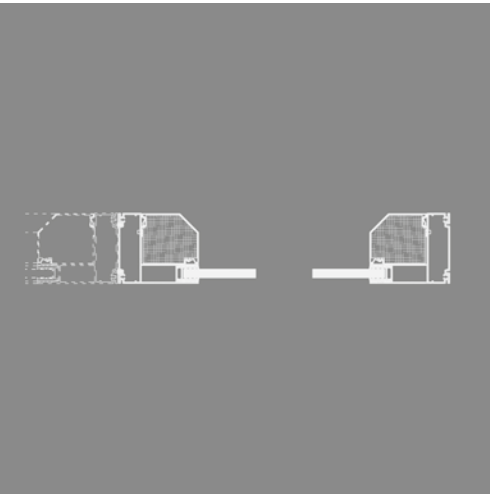
Clear track for a clear view

TAP-RAIL is a patented product of EUROVIA Beton GmbH – NL TECO Schallschutz

D-Westerheim
near Memmingen,
TAP-RAIL



Example drawing
TAP-RAIL



D-Flörsheim,
TAP-RAIL





URBAN
PROTECTION
SHIELD



// **Aiming high**
with appealing design

*Shown here: D-Troisdorf, Ohmstraße, residential
complex, URBAN PROTECTION SHIELD*

INDI VID UAL

The complete system for transparent noise protection in urban areas is a joint product of R. KOHLHAUER GmbH and HERING BAU GmbH & Co. KG. Due to different formats, pane thicknesses, various colors etc. noise protection constructions can be adapted to individual requirements and urban conditions. In addition to the wide range of design

possibilities of the overall system, time is saved by quick and easy assembly of the frame systems. The rigidity of the aluminum frames enables a slim steel structure. The point fixing as a frameless system grants a similar acoustic effectiveness.

Advantages and properties

- Conclusive overall concept: steel structure in combination with noise protection elements
- Easy to revise: due to the problem-free replacement of complete frames
- Wide variety of designs: frames and transparent element infills, steel or point fixings
- Additional benefits: Coating of the transparent element fillings (e.g. air purification by titanium dioxide coating, etc.)

- Modular: can be combined in many ways as a system
- Customizable: colored screen printing, colored PV elements (VOLTA)
- Versatile: integration of air purification systems (EXEL product under development)
- Absorbent: aluminum frame in sound-absorbing design
- Uniform: interface minimization

- Insulating: tested high sound insulation with "LAMEX NOISE PROTECT"
- Safe: crash/vandalism-proof due to special construction of the panes
- Quiet: absorbing frame towards the inside reduces sound reflections and creates quiet areas
- From one source: consulting, planning, production and installation

Variations

KOHLHAUER VOLTA®

Sustainable combination of noise protection and solar technology

KOHLHAUER EXEL

Trend-setting integration of noise protection and air purification (product under development)

URBAN PROTECTION SHIELD

Protecting and designing urban spaces

URBAN PROTECTION SHIELD is a joint product of KOHLHAUER and HERING Bau GmbH & Co. KG

*D-Troisdorf, Ohmstraße,
residential complex,
URBAN PROTECTION SHIELD*



*D-Unterschleißheim,
Pater-Kolbe-Straße,
URBAN PROTECTION SHIELD*





HOW TO REACH US

The way to us is shorter
than you think – and it
saves you a lot of detours.

R. Kohlhauer GmbH

Draisstraße 2
76571 Gaggenau/Germany

Phone: +49 7225 9757-0

Fax: +49 7225 9757-26

E-Mail: info@kohlhauer.com

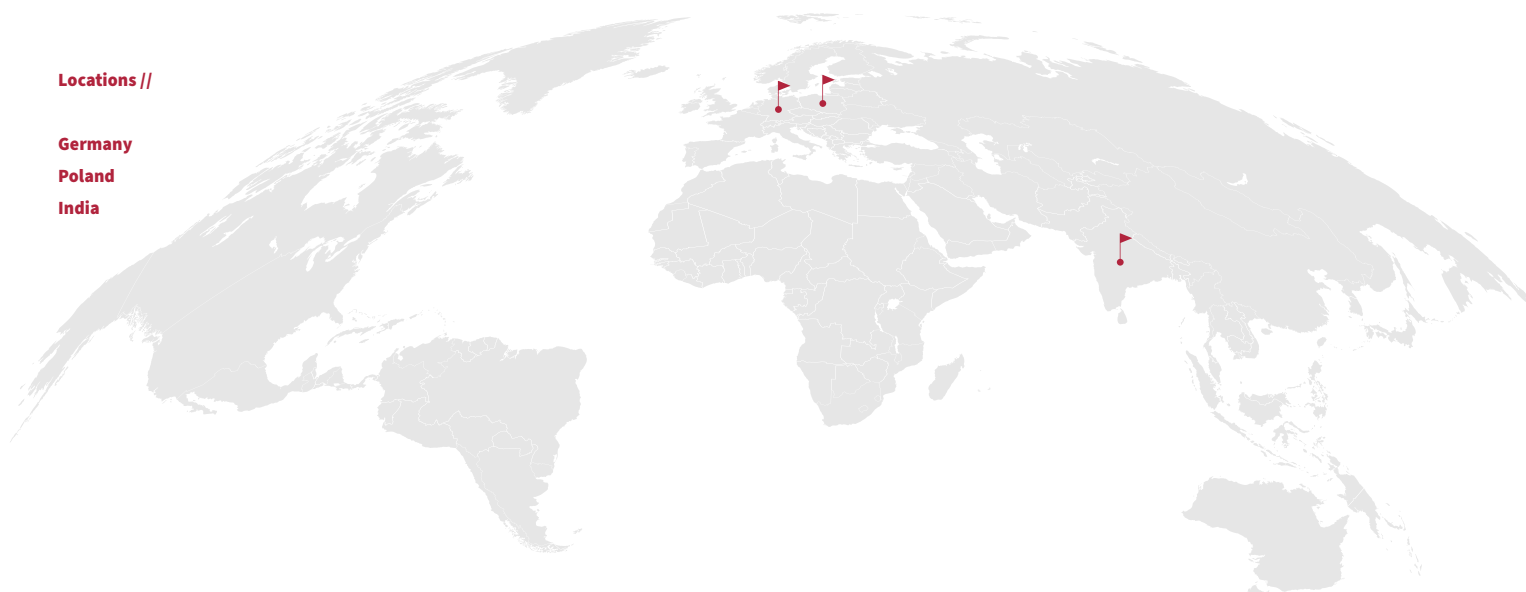
www.kohlhauer.com

Locations //

Germany

Poland

India



The transparent solution from KOHLHAUER works with proven materials such as acrylic or silicate glass in various aluminum frame systems.

The grid-insulation-system is highly absorbent on both sides as well as resource-saving and offers many design possibilities as well as acoustic advantages.

The modular, greenable solution is sustainable and environmentally friendly. It also opens up habitat for small animals and plants.

The solar integration solution in a wide range of system combinations, safe and with high yield due to standard modules.

High-quality aluminum elements, which can be designed to be absorbent on one or both sides, represent industrial style.

The unique wood systems convey naturalness. A boiler pressure impregnation or the material choice of larch heartwood give durability.

A modular frame system combines the necessary absorption with transparency. Specially tested for railroad lines, it offers unobstructed views and the best prospects despite noise protection.

The complete system that adapts to urban conditions and offers a wide range of design options – quick and easy to install, sleek in appearance.

