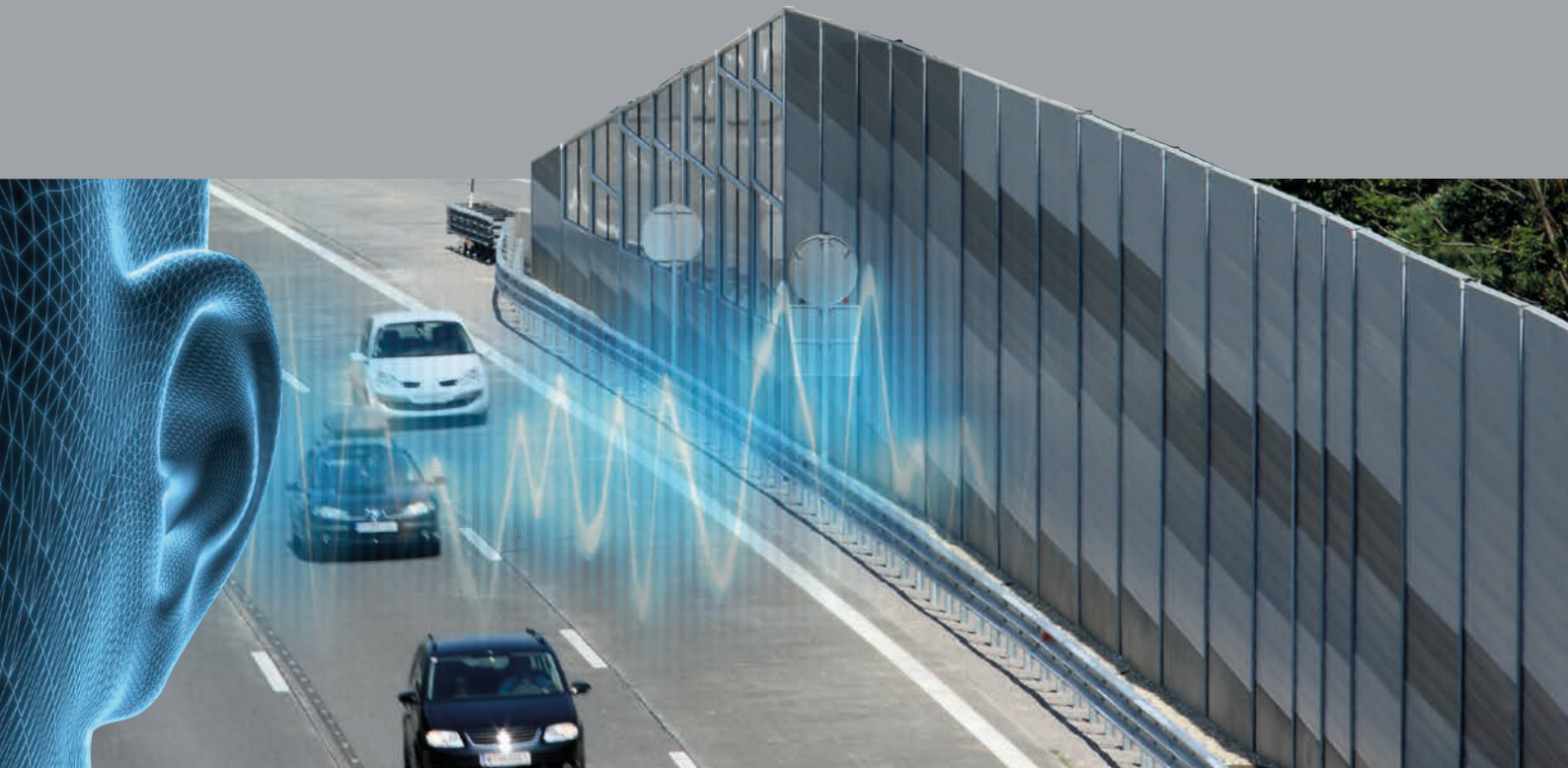


**FONOCON**

# **Noise Control Systems**

**Road  
Rail  
Urban**





1978

1980



1991



2004

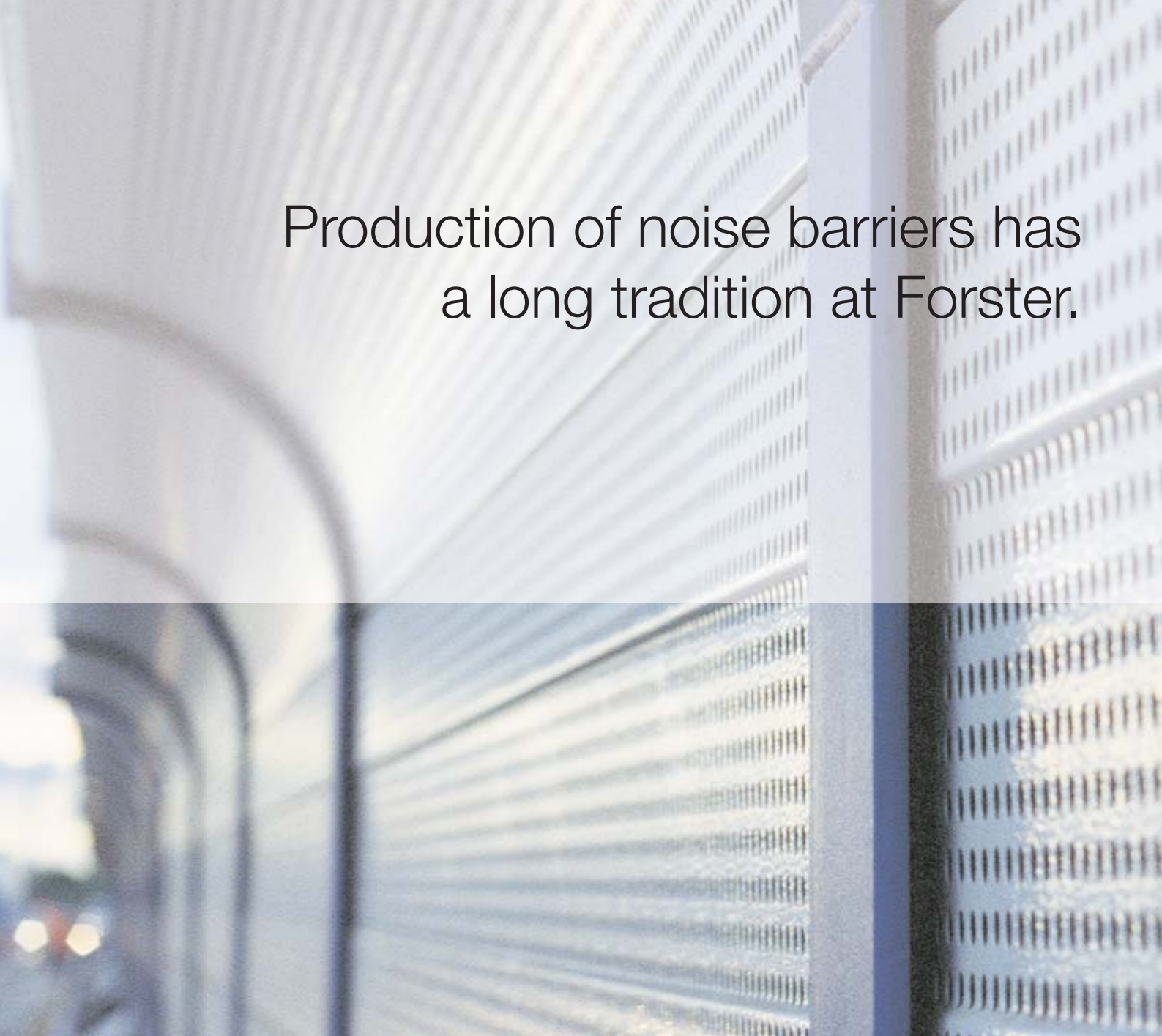


2017



2018

Forty years of competence, know-how and experience.



# Production of noise barriers has a long tradition at Forster.

Forster, a family business established in 1956, has accumulated 40 years of experience in the production of noise abatement systems. Drawing on its competence and know-how, Forster has accompanied and contributed to the development of noise control systems alongside roads and railways.

Pioneering developments and innovative solutions that offer maximised noise reduction are the basis for the success of our products. Patented products, cooperative ventures with experts, universities and testing institutes, and our membership in various specialist associations have helped us create customised noise control systems that meet global requirements and standards.

# Noise control systems for roads



Noise barriers have become a common sight along modern roads. Wherever heavy traffic passes residential areas, a noise abatement system is both necessary and practical. The best results are achieved by noise barriers made of aluminium.

FONOCON Road noise control systems are extremely flexible, offering a wide range of applications and options for customised projects.

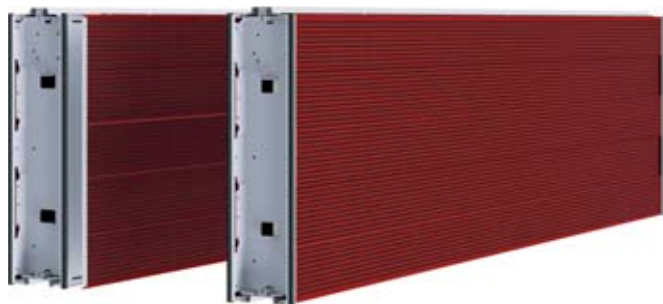


## Benefits:

- Superior noise abatement and sound absorption
- Visually attractive
- Homogeneous surfaces
- Individual designs
- Can be combined with other materials
- Low weight
- Compliance with all standards and guidelines
- CE certificate
- High resistance to freezing and de-icing salt
- Maintenance-free
- Low lifecycle costs

# Road elements

## Noise barrier element *Highly absorbent*



### **Design:**

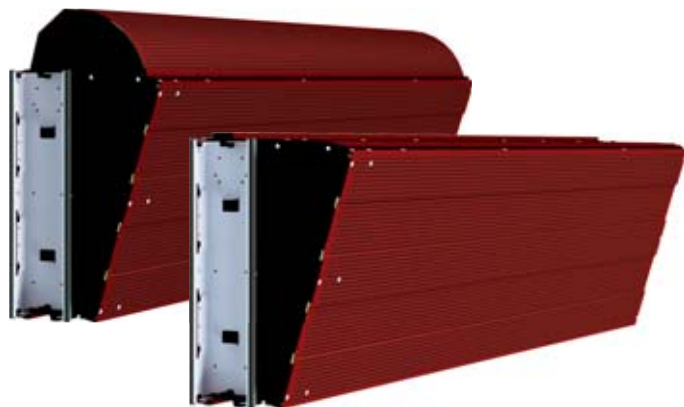
Highly absorbing on one or both sides.  
All types available in three sound insulation categories,  
also in a design that covers uprights.

Airborne sound insulation  $DL_r = 25 - 31$  dB (B3)

Sound absorption  $DL_\alpha = 8 - 12$  dB (A3-A4)

Aluminium, polyester powder-coated

## Delta top element / Delta element *Highly absorbent*



### **Design:**

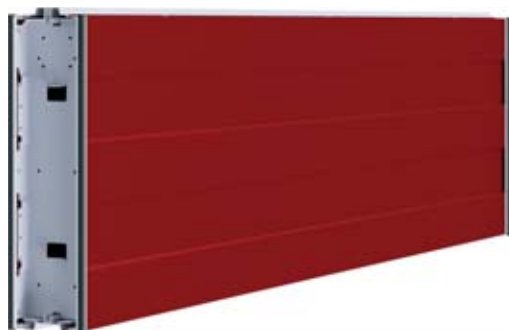
Highly absorbing on one or both sides, absorption zone  
tilted forward;  
standard version designed to cover the uprights.

Airborne sound insulation  $DL_r = 25 - 26$  dB (B3)

Sound absorption  $DL_\alpha = 12$  dB (A4)

Aluminium, polyester powder-coated

## Noise barrier element *Reflecting*



### **Design:**

Reflecting on both sides,  
also available in a design that covers uprights.

Airborne sound insulation  $DL_r = 25$  dB (B3)

Aluminium, polyester powder-coated

## Arched element *Highly absorbent*



### **Design:**

Highly absorbing on one side. Installed in a bent steel  
upright with screw-on flange.

Airborne sound insulation  $DL_r = 25$  dB (B3)

Sound absorption  $DL_\alpha = \geq 8$  dB (A3)

Aluminium, polyester powder-coated

# Road elements

## Transparent element with aluminium frame



### **Design:**

Reflecting, with or without central bar

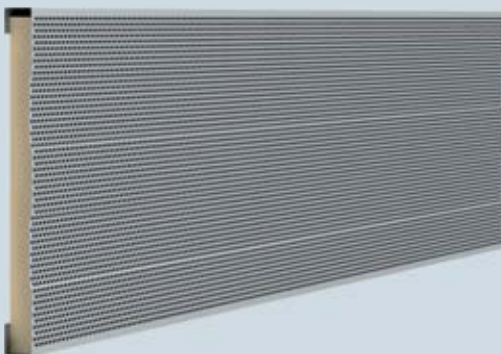
Airborne sound insulation  $DL_r = 26 - 33$  dB  
(depending on glass type)

Aluminium frame, polyester powder coated  
All transparent materials that comply with  
the standards are possible.

Glass panel thickness: min. 12 mm to 20 mm  
Acrylic glass optionally with cast-in polyamide threads  
or screen print.

## Panels

*For horizontal or vertical applications*

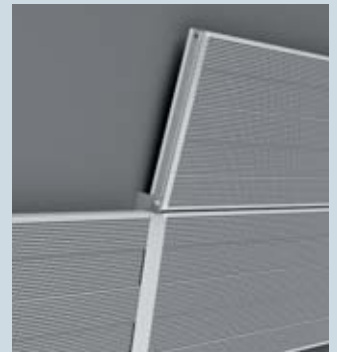


### **Design:**

Highly absorbing

Aluminium, polyester powder-coated

Sound absorption  $DL_{\alpha} = 12$  dB (A4)



The aluminium panels  
can be installed hor-  
izontally or vertically,  
with fixing material  
chosen accordingly.  
Substructures are used  
for attachment to  
compensate for an  
uneven underground or  
bored pile wall.



# Design with noise barriers

**Premium quality and attractive appearance**



## **Imprinted noise barriers**

Using digital printing, we apply images, graphic designs and symbols directly onto the noise control elements. Whether integrated in the landscape, projecting an advertising message or created as a work of art – noise barriers are elements that shape their environment.



## **Delta elements**

Forster's DELTA elements apply additional accents to a wall, furnishing positive acoustic effects as a bonus to their spatial impact and the diversity of designs opened up by them.



## **Photovoltaics**

Forster's new crown panel makes for a double use of noise barriers to protect the environment: the barrier screens off the noise and serves as a substructure for environmentally friendly energy sources. Standing noise barriers can be retrofitted by replacing some elements or by adding the cap on top of the wall.



# Noise abatement meets design

**New ideas for noise control**



This innovative solution achieves its effect from its special shape: the design is provided by the barrier itself. Steel supports bent twice at discretionary heights provide the basic system. These supports, which can be installed rotated along their longitudinal or cross axis, create a range of combinatory effects for the panels in-between. These are special 2Fold® aluminium and glass elements, available in three shapes – rectangular, triangular and parallelogram-shaped.



# Noise barriers for railway tracks



Trains are travelling at ever greater speed, noise barriers grow ever higher and need to be moved ever closer to the tracks. Forster created its FONOCON Rail system to respond to these challenges, enabling us to supply suitable and economic noise control systems for all applications in the networks of all national railway operators.

## Your key benefits:

- High stability
- Individual design
- Can be combined with transparent panels
- Simple and quick to install
- Large range of accessories
- Greater security through quick access
- Approved for high-speed lines
- Integrated earthing system



## Rail applications

FONOCON Rail noise control systems are ideal for all railway applications. We offer noise barrier panels for open track or in-station installation, panel-type cladding in tunnels and troughs, as well as solutions for bridges and special constructions.



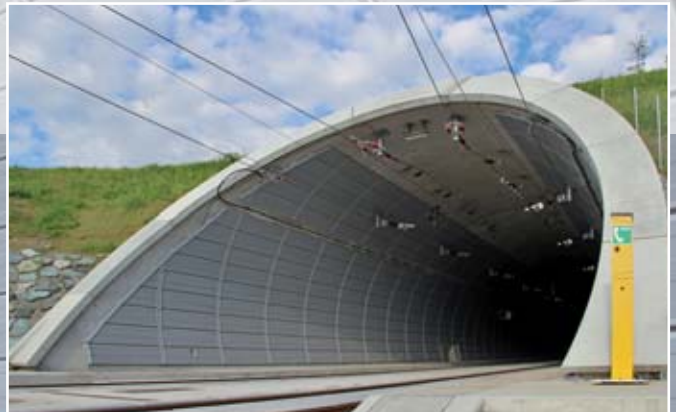
# Full scale noise control



For its rail products, Forster has transferred the high technological standard reached by its classic aluminium barriers to transparent systems, noise barrier panels and service access doors.

## Highly absorbing wall cladding

The highly absorbing wall cladding is used to suppress noise in tunnels. Their design makes them suitable for high-speed routes. Inspection is made simple thanks to rear-ventilation vents and freely accessible attachment elements.



## Benefits:

- Matching highest performance requirements in tunnels
- Suitable for high-speed lines
- High dynamic stability
- Simple inspection routines (sight check)
- Improved testing (interval tests)
- Simple dis- and reassembly of individual panels



# Rail elements

## Noise control element

*Highly absorbing*



Optional earthing panel to earth noise barrier element to the track.

**Design:**

Highly absorbing on one or both sides

Airborne sound insulation  $DL_r = 25 - 31$  dB (B3)

Sound absorption  $DL_\alpha = 12$  dB (A4)

Aluminium, polyester powder-coated

## Transparent rail noise control element

**Transparent rail noise control element**



**Design:**

Reflecting

Airborne sound insulation  $DL_r = 26 - 33$  dB (depending on glass type)

Aluminium, polyester powder-coated

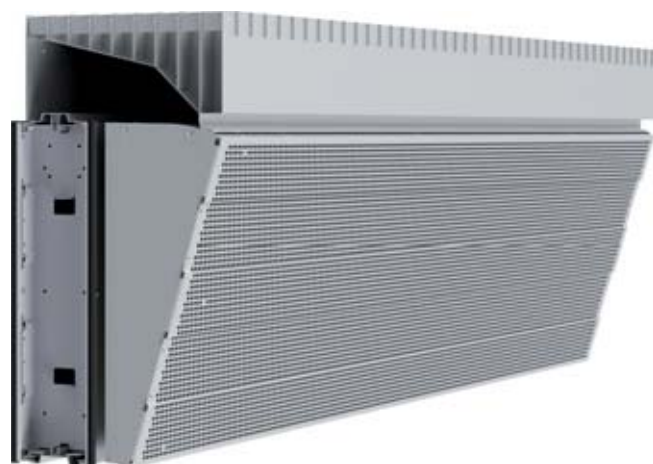
Transparent materials:

Plexiglass Soundstop XT; GS;

GSCC; laminated safety glass VSG

Glass thickness: 15-20 mm

## Sound resonator



Bonnet with  $\lambda/4$  resonator

Sound diffraction index difference  $DL_{R\Delta DI, SITU} = 2$  dB

**Design:**

Highly absorbing on one or both sides

Airborne sound insulation  $DL_r = 25 - 26$  dB

Sound absorption  $DL_\alpha = 12$  dB (A4)

Aluminium, polyester powder-coated

# Rail elements

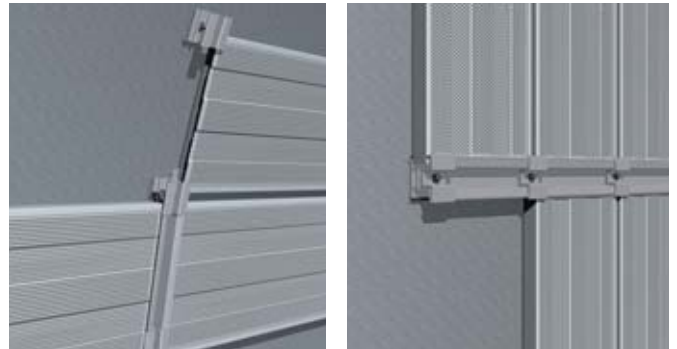
## Panels:



### Design:

Highly absorbing  
Sound absorption  $DL_{\alpha} = 12$  dB (A4)  
Aluminium, polyester powder-coated

## Horizontal and vertical applications



The highly absorbing wall cladding is used to handle high-noise situations in tunnels. Optionally, it can be fitted with an integrated earthing system.

## NOISE BREAKER RAIL ACOUSTIC SYSTEM

Noise abatement along railway tracks tends to be a sensitive issue for operators and neighbours alike. Noise Breaker is an innovative system that offers new ways and means to achieve effective noise control. Suited in particular for situations where lack of space or difficult access makes it problematic and very expensive to provide conventional noise protection, Noise Breaker opens up new opportunities to install a near-track, low-height noise barrier.



Link to the video



# Noise control in urban settings

## Your key benefits:

- Noise and visual barrier
- Site valorisation and investment incentive
- Zero maintenance
- Can be self-installed
- Economic solution through its long service life
- Can be individually designed and blends with its surrounding
- Can be combined with transparent elements
- Improves quality of living
- Protects privacy



## Noise control in industrial settings

Cooling plants, generators and other industrial sources of noise can be very obnoxious to neighbours, staff and visitors alike. FONOCON Urban noise control elements ensure effective protection. Flat structures of low weight that are flexible in their colouring and installation, these aluminium panels are the ideal noise control systems for buildings.





## Noise control to protect your privacy

Peace and quiet at one's own home is gradually becoming a luxury item. Especially when the surrounding area changes so much over time that structural measures need to be taken as a protection against the intrusive noise. Aluminium noise control systems made by Forster offer a visually attractive solution tailored to such needs.



# Elements for urban noise control

## Noise control element

### Reflecting



#### **Design:**

Reflecting on both sides

Airborne sound insulation  $DL_r = 25$  dB (B3)

Aluminium, polyester powder-coated

## Noise control element

### Highly absorbing



#### **Design:**

Highly absorbing on one or both sides

Airborne sound insulation  $DL_r = 25 - 26$  dB (B3)

Sound absorption  $DL_\alpha = \geq 8 - 12$  dB (A3-A4)

Aluminium, polyester powder-coated

## Aluminium-timber element

### Highly absorbing on one side, solid back wall



#### **Design:**

Highly absorbing on one side, solid back wall

The pinewood slates are arranged horizontally or vertically.

Airborne sound insulation  $DL_r = 25$  dB (B3)

Sound absorption  $DL_\alpha = \geq 8$  dB (A3)

Aluminium, polyester powder-coated;  
pinewood slates optionally thermally treated or boiler-pressure impregnated

# Elements for urban noise control

## **Aluminium-timber element**

**Highly absorbing on one side, absorbing back wall**



### **Design:**

Highly absorbing on one side, absorbing back wall

Airborne sound insulation  $DL_r = 25$  dB (B3)

Sound absorption at the front  $DL_{\alpha} = \geq 8$  dB (A3)

Sound absorption at the back  $DL_{\alpha} = 4$  dB

Aluminium, polyester powder-coated;  
pinewood slates optionally thermally treated or boiler-pressure impregnated

## **Glass combination element**

**With upper and lower chord**



### **Design:**

Reflecting

Airborne sound insulation  $DL_r = 26-33$  dB  
(depending on glass type)

Aluminium, polyester powder coated

All transparent materials that comply with the standards are possible.

Glass pane thickness: min. 12 mm to 20 mm

Acrylic glass optionally with cast-in polyamide threads or screen print

## **Glass combination element**

**With U-shaped upper chord**



### **Design:**

Reflecting

Airborne sound insulation  $DL_r = 26-33$  dB  
(depending on glass type)

Aluminium, polyester powder coated

All transparent materials that comply with the standards are possible.

Glass pane thickness: min. 12 mm to 20 mm

Acrylic glass optionally with cast-in polyamide threads or screen print

# Accessories



## Escape and service doors, escape route signs

Direct maintenance access and escape doors improve the safety of road and rail use. Such doors and gates have the same acoustic parameters as the noise barriers themselves. Different paint coats make them stand out from the barrier and clearly indicate their function. Angular signs to indicate escape routes and projecting signs to signal escape doors are also included in Forster's range of products.



## Noise control doors

The double-winged door is of the same design as the escape and service doors. If necessary, one more wing can be used which can be arrested on one side to enlarge the access area.

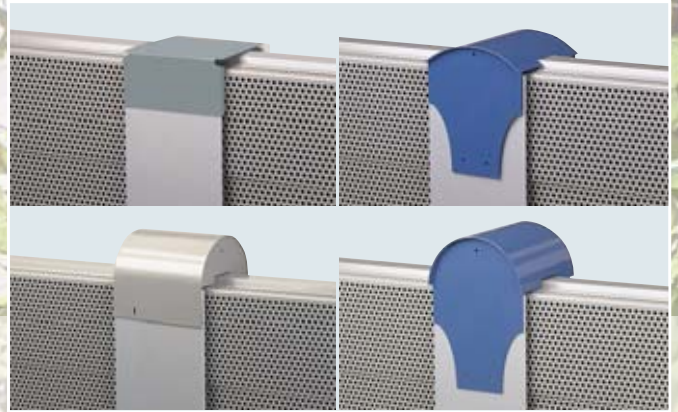


## Extra-large noise control doors

Useful for areas where emergency vehicles must be given access. Thanks to their robust design no upper crossbar is necessary so that the doors are not limited in height when opened.

## Caps

Steel uprights are usually topped by crowning caps. Their harmonious shapes add a distinct accent to the noise barrier. Different colourings give them an unobtrusive appearance or turn them into the highlight of the barrier.



## Trelliswork for plants

Several types of trellises are available to give plants a hand when they climb the barrier. Alternatively, the system allows simple greening without any trelliswork.



## Rope harness



Safety tool to keep elements safely in place at bridges over traffic routs.

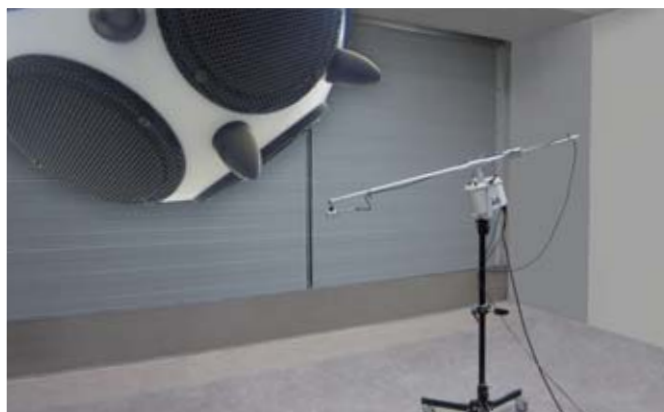
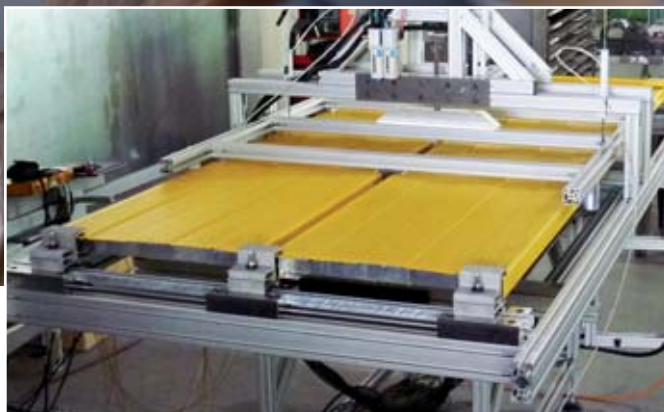
## Anti-graffiti coating

On request, Forster noise control systems come with a special layer of anti-graffiti coating that allows the multiple removing of spray paintings with commercial cleaning agents.



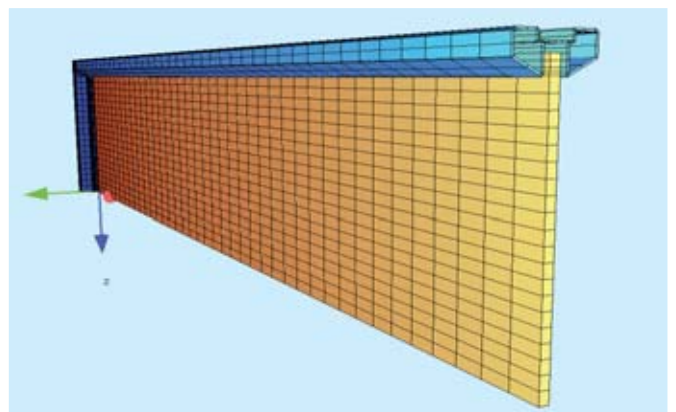
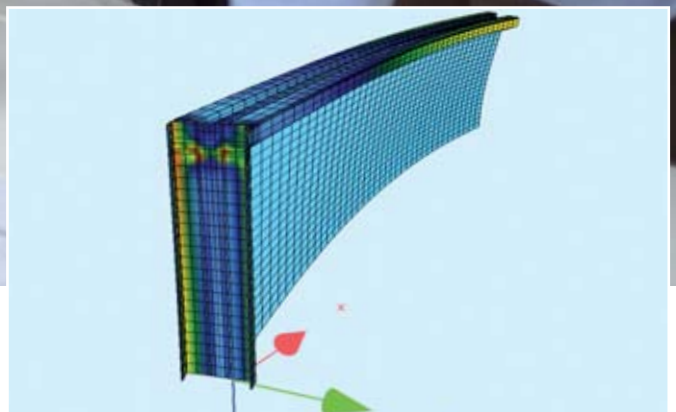
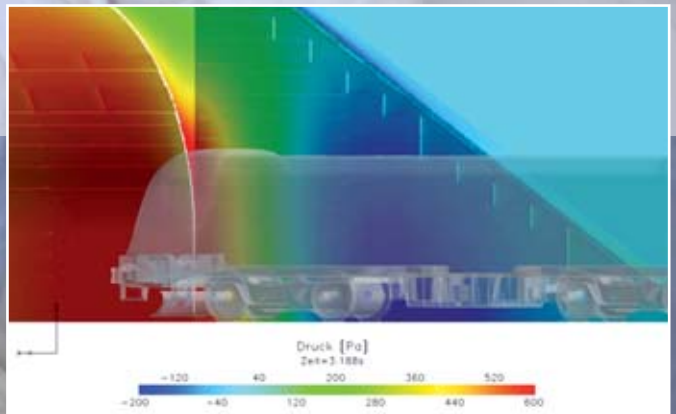
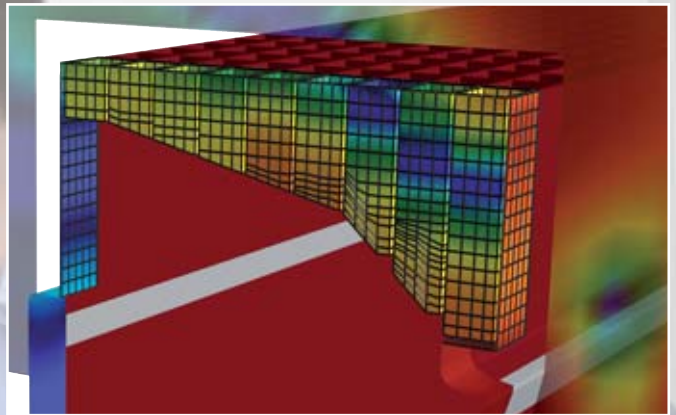
# Research and development

## Noise control competence



### Your competent partner for noise suppression

Our R&D department uses the latest software such as CFD (Computational Fluid Dynamics) or the finite elements method with dynamic modules to generate, analyse and implement the relevant products down to the smallest detail. In-depth testing of individual components and the full-scale system makes sure that our products meet the latest standards in terms of structural requirements, dynamic stability and maximised acoustic values.



## Our products comply with the following standards and guidelines:

- EN 14388: Road traffic noise reducing devices
- ZT-LSW 06: Additional technical contractual requirements for noise barriers
- RVE 04.01.01 Noise barriers – calculation and design
- DB Netz AG Guideline 804 – Railway bridges (and other civil engineering structures)
- Eurocode 1: Actions on structures
- Eurocode 3: Design of steel structures
- Eurocode 9: Design of aluminium structures

# Production of noise control systems

**Professional from the very start**



The Forster Group is known for its extraordinary degree of vertical integration and its use of the very latest production technologies. Uniformly high and stringently monitored quality and habitual adherence to delivery dates round off the service offered by Forster.



# Delivery and installation

## Compact noise control systems



Compact shipping units and low weight provide for low-cost transport to the construction site. Optimised product properties make it possible to handle the products quickly and easily on the site. The compatible modular system guarantees stress-free and economic installation of the noise control system.

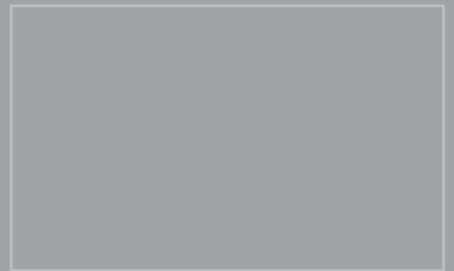
# International scope of projects

**Partnership: confidence ensures a competitive edge**



Forster is a globally active enterprise that has many distribution subsidiaries and partners to cooperate with. Noise control systems have been a fixed item in the Forster Group's portfolio for many decades. We are a competent partner and have the know-how to furnish you with attractive, premium-quality solutions for all problems of noise abatement.





Forster Metallbau Gesellschaft m.b.H.  
A-3340 Waidhofen a. d. Ybbs, Weyrer Strasse 135, tel. +43 7442 501-0, fax +43 7442 501-480  
E-mail: fonocon@forster.at, www.forster.at

