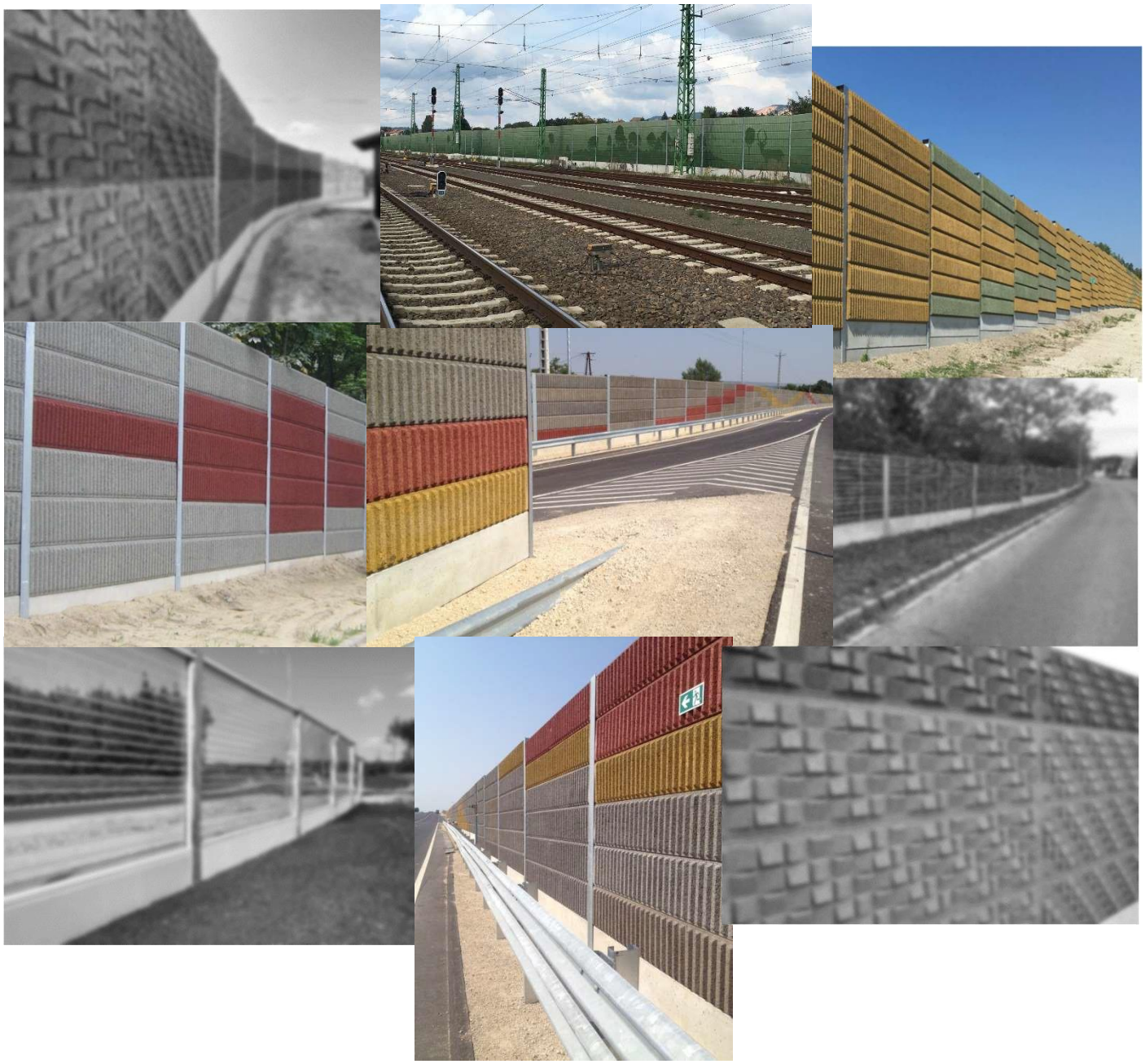
XTR AKUSZTIK

NOISE BARRIER SYSTEM



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ZAJKÖZ Kft.

Assessing the increased needs from the side of the Purchasers and Operators with regards to acoustic panels, the company had the Manufacturer work out a development for the panels previously made from wood-concrete material and proven effective. Serial production of the new XTR Akusztik acoustic panels satisfying all requirements started in 2017.

XTR Akusztik noise barrier system

The XTR Akusztik noise barrier system was examined and as an accredited body certified by ÉMI according to the standard MSZ EN 14388:2016.

The system was designed using decades of manufacturing experience in wood-concrete material noise barriers, and enhancing the positive properties of these, which is highly recommended mainly for reducing traffic noise in public road and railway projects due to its good acoustic and structural properties, but can also be recommended for the noise reduction of warehouse areas of department stores or industrial facilities.

Main applications of use:

to decrease noise created by

- highways
- national and local roads
- urban roads
- railroads
- stations
- industrial facilities and loading areas

to protect the human environment and to decrease noise below the noise exposure limit set for the certain zones.

Advantages of the XTR Akusztik noise barrier system:

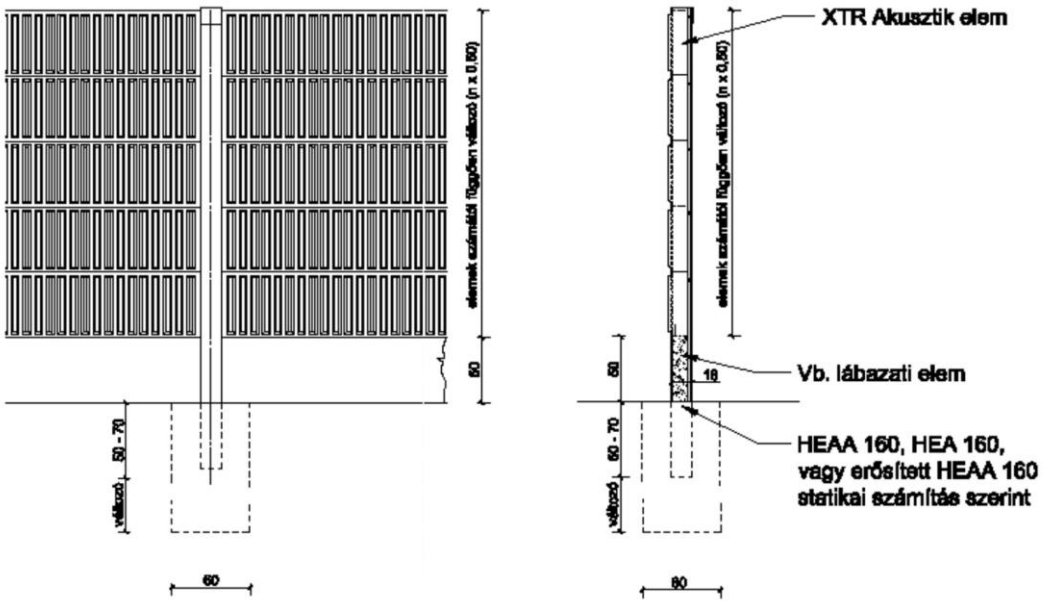
- Excellent acoustic and structural properties
- Long lifespan (30 years in the usual exposure class)
- Does not require maintenance inside the expected lifespan
- Resistant to vandalism
- Resistant to fire
- Can be combined with climbing plants without a further support system
- Can be combined with transparent acoustic panels
- With colors, different variations can be made
- By changing wall plane, different variations can be made
- Built-in, recessed, rustproof, certified lifting system, ensures liftability during the whole lifespan of the barrier
- A certified rustproof tension system ensures that the wall surface stays vertical in the full height of the barrier during the whole lifespan

Material, standard size of acoustic panel

The acoustic panels consist of wood-concrete made of cement-bound, mineralized wood chips and wood-concrete colored during production and concrete that is supporting the mechanic properties of the panels.

Their standard size is 396 x 50 cm, that provides the most economic solution for building a noise barrier during panel installation works and demolition works that may be required later (e.g. replacement of panels damaged due to an accident), with an axle spacing of 4 m. Using elements longer than these can result in saving a few posts and base structures, but the larger spacing of posts requires stronger reinforcement, for the foundation requires a longer base structure, and for the post requires a stronger section, and in summary this does not result in saving, in addition to all of these during demolition works the larger element weight causes unnecessary extra costs. A height of 50 cm is also beneficial for saving costs during installation/demolition works. Another significant factor is that the popular, standard element size is 396 x 50 cm, therefore the question of interchangeability is also solved when this size is used. Due to all of these, designing a 4 m posts spacing is ideal. Considering the local particularities (e.g. public utility crossings) some sections can be also planned with different spacing. The precast concrete footing made of reinforced concrete that is part of the system and is made in the same lenght as the acoustic panel is produced in heights of 25 cm, 50 cm and 75 cm.

View and cross-section of the XTR Akusztik noise barrier



Types of XTR Akusztik noise barrier systems

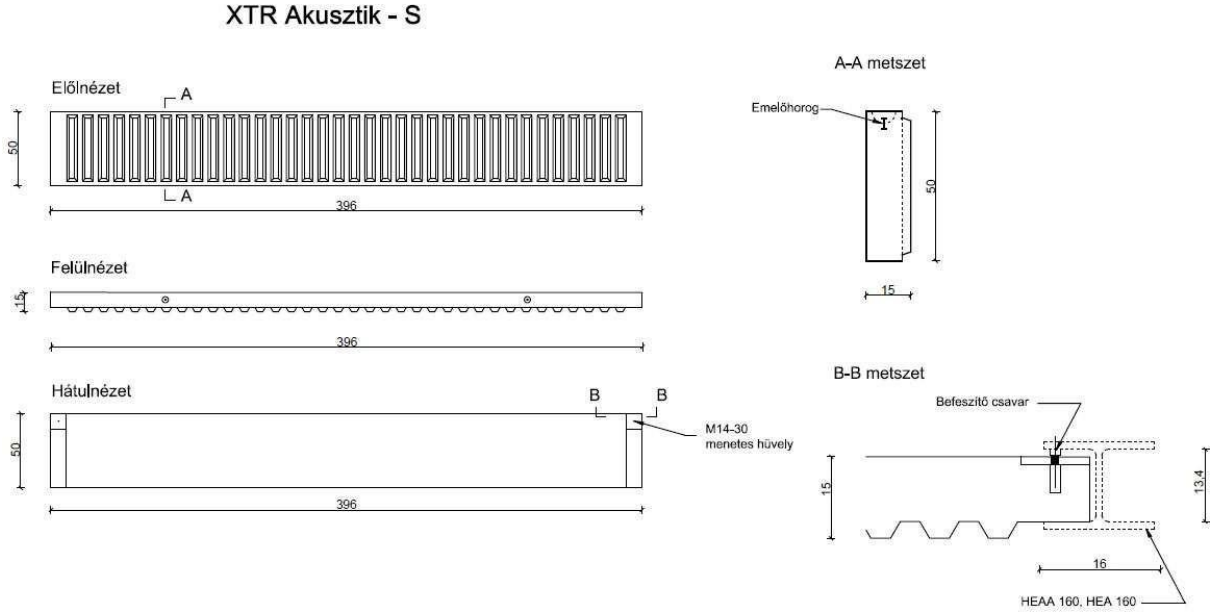
The XTR Akusztik system acoustic elements with a ribbed surface design are available in three types:

- **XTR Akusztik-S**
- **XTR Akusztik-F**
- **XTR Akusztik-2**

All types are certified by ÉMI Építésügyi Minőségellenőrző Innovációs Nonprofit Korlátolt Felelősségű Társaság (Non-Profit Limited Liability Company For Quality Control And Innovation In Building) according to the localized European standard (MSZ EN 14388:2016 Road traffic noise reducing devices. Specifications). Furthermore, for railroad applications, the examination of qualifying acoustic properties of noise barriers valid for railroad applications according to MSZ EN 16272-3-1 is also required, which is granted to all elements of the XTR Akusztik system. An escape door placed into the noise barriers by every 300 m is also part of the system. The acoustic compliance indicators of the XTR Akusztik system's escape door must be equal to the acoustic characteristics of the noise barrier – tested and certified by ÉMI.

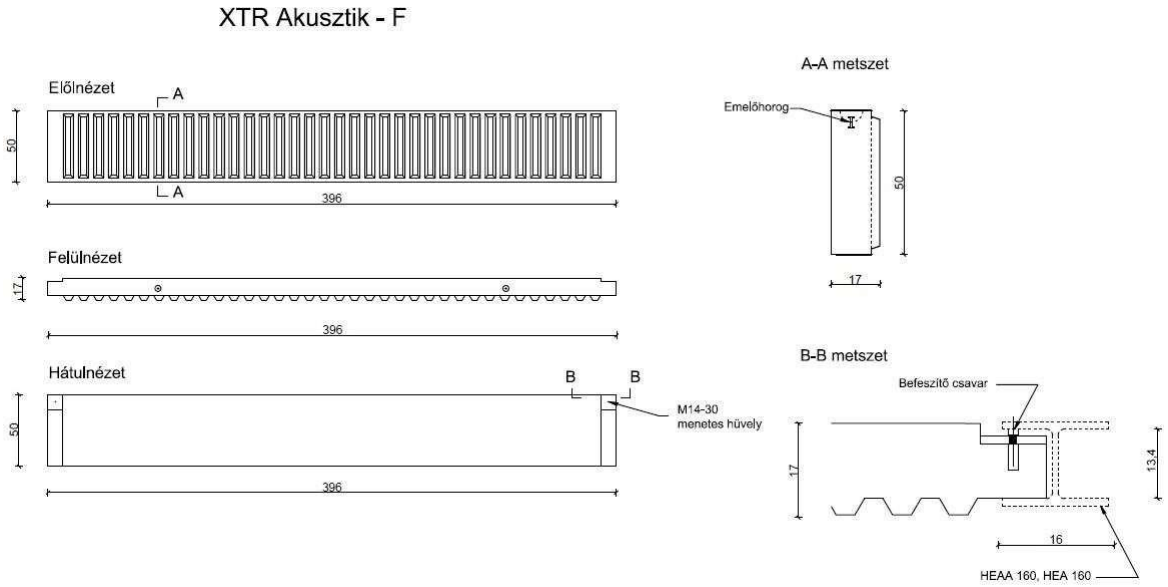
XTR Akusztik-S

One side absorbing noise barrier. Ribbed wood-concrete on the side of the noise source, concrete surface with cement smoothing on the back side. Acoustic properties: A4, B4.



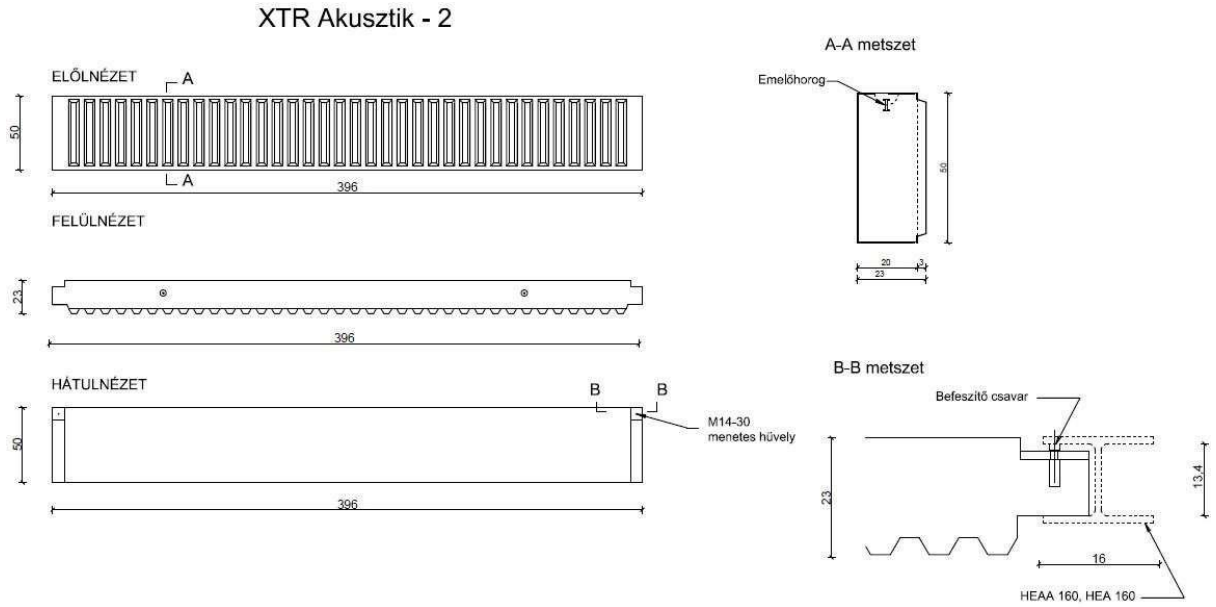
XTR Akusztik-F

Both sides absorbing noise barrier. Ribbed wood-concrete on the side of the main noise source, wood-concrete layer on the back side. Acoustic properties: A4,B4 / A2,B4. This type is recommended to be installed on areas with higher aesthetic requirements even when absorption is needed on one side, placing the ribbed surface on the side of the noise source.



XTR Akusztik-2

Absorbing barrier from two sides. Ribbed wood-concrete on one side, wood-concrete surface on the other side. Acoustic properties: A4,B4 / A4, B4



Support structure

A static designer determines the size of the base structures and the posts. The base structure is usually a drilled foundation of ø60 cm diameter, with longitudinal main reinforcements and spiral clevises. Its length depends on the barrier height, the current post distribution and the geotechnical data.

Base structure drilling

Reinforcement

Concrete base structure, with a cup formed for the post

Post setting – can be seen clearly on the belts

used reinforcements

The posts are HEAA 160 or HEA 160 galvanized holders, which can be reinforced with flat iron before they are galvanized, if necessary (depending on the barrier height, column distribution, place of the barrier).

If there is a break larger than 21 degrees in the path of the barrier, two U 160 posts can be built in. The space between the two U posts must be closed!

Lifting and tension substructures

Ball-head lifting anchors and lifting heads are used for the installation of acoustic panels.

The installation of reinforced precast concrete footing happens the same way, instead of the lifting hooks solution used years earlier.

Fixing the elements to the posts can be performed with a cost-effective – but unsophisticated – solution, with plastic wedges from the back side, which the XTR Akusztik system would only use upon the specific request of the client. A more sophisticated solution is a threaded sheath and tensioning bolt from the back side, or using a special tensioning elements with a string (in case of elements absorbing from both sides, from the side of the wood-concrete surface with plain design). The acoustic panels must be fixed to belt of the post from the side of the noise source.

It is recommended, and often required that the lifting of the acoustic panels should be solved with such a structural construction that is also used by the XTR Akusztik system, which ensures safe movement of the panels during the whole lifespan of the barrier. The same applies to the structures used for fixing to the posts, which must not move or fall out due to the changing weather conditions. The XTR Akusztik system uses one of the above described, more sophisticated solutions for this purpose.

Sealing

Between the elements, a self-swelling sealing tape of 10 x 1 mm size is recommended horizontally, to balance the installation deficiencies that are important from the acoustic aspect.

Placement of self-swelling sealing tape

Maintenance

The XTR Akusztik and XTR Akusztik Prizma noise barrier systems does not require any maintenance activities after installation.

Aesthetic factors

The XTR Akusztik and XTR Akusztik Prizma noise barrier systems can be combined with climbing plants and transparent barrier sections.

With color dynamics different variations can be created for the barrier, but this must be performed with special care, as vibration from very detailed pattern can be disturbing.

Changing the direction of the barrier ribbing can also provide variation in case of the XTR Akusztik barrier system, which we can apply in case a need for a large amount occurs. The different inclinations of the small surface blocks of the XTR Akusztik Prizma barrier system show a different sight as the play of light and shadow created by the changing of the time of day and the entrance angle of sunlight.