

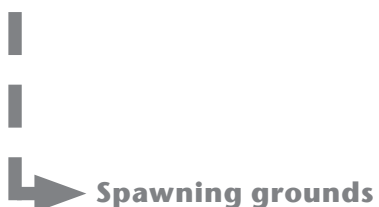


Tunnel and guide wall systems for amphibians and small animals

ACO Wildlife Protection Systems



Tunnel and guide wall systems for amphibians and small animals



Habitats bisected by road networks

Amphibians and small animals occupy a wide range of habitats which are often divided by roads. Amphibians in particular undertake seasonal migration between land habitats and their vital spawning grounds. Because they move slowly, and can spend a relatively long period on the roads that they cross, many amphibians and other small animals are doomed to join the countless victims of road-kill. Animals undertaking mass migrations at the end of winter, or in the summer after thunderstorms, experience a very high risk of being hit by vehicles. There is even a danger of complete eradication of local animal populations. In addition to animal protection is the risk to drivers and passengers from animals on roads, when vehicles swerve to avoid them. Public safety and species protection are mutual benefits from the Wildlife protection systems designed by ACO.



Tunnel system

Protection systems save wildlife

Constructing wild animal protection systems is a safe, effective measure for wildlife. Efficiently linking habitats with safe corridors requires custom-made construction solutions. Careful planning is needed for the selection of materials and the design and construction process. The needs of the animals and their migration behaviour have to be taken into consideration alongside a fully-compliant technical construction. Planning, consultation, fabrication and system monitoring are the foundations for cost effective, long lasting and successful protection systems.



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Guide wall system

The ACO Group



ACO drainage systems for the Olympic stadium London 2012

ACO symbolises top class products and system solutions around the world for drainage technology and construction elements in the construction, civil engineering and building services sectors. ACO also boasts special solutions for sports grounds, gardening and landscaping, special stainless steel engineering, process engineering and foundry technology. ACO's high quality is based on the global expertise of the Group, intensive research and development, and special competence in processing its most important materials: polymer concrete, stainless steel, cast iron, plastic, reinforced concrete.

ACO Wildlife

Working in conjunction with environmental specialists, ACO has utilized its extensive knowledge of surface drainage to develop a proven amphibian tunnel and guide wall system. The first tunnel systems were installed in Europe and North America in 1987. Since then many countries have adopted use of the ACO protection systems. At ACO Wildlife we are constantly working to develop new ideas for improvements.

ACO at a glance

- 1946 foundation of the company
- 3.500 staff in more than 40 countries (Europe, America, Asia, Australia, Arabia)
- 26 production sites in 14 countries
- Turnover 2011: Euro 600 million



Events and seminars in the ACO Academy, Rendsburg/Büdelsdorf, Germany



5,483 dead and 154 injured.



Thousands of amphibians were slaughtered every year on this seemingly harmless road. Amphibian tunnels from ACO Wildlife have finally stopped the carnage and contribute to ecosystem protection.

ACO Climate tunnel KT 500 made of polymer concrete with Entrance unit KP 1000-700

Safe crossings for amphibians in particular, are dependent on several factors: it is important for the length of the tunnel to be as short as possible; the material must not remove moisture from the animals; the temperature in the tunnel should be close to the ambient temperature; and to prevent any disorientation, the components should not contain any metal. The ACO Climate tunnel KT 500 satisfies all these factors because it is made of polymer concrete.

This system can also easily cope with high groundwater levels and roads in cuttings.



Climate tunnel KT 500, Entrance unit KP 1000-700 and Guide wall LEP 100

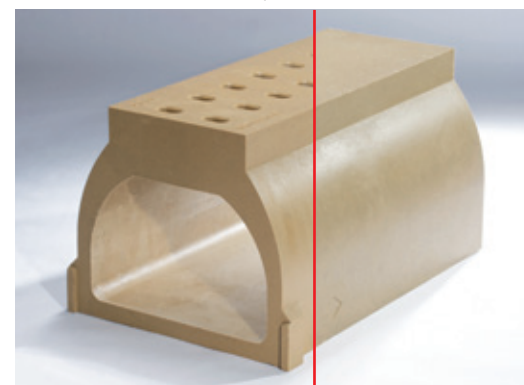
Entrance unit KP 1000-700



Climate stilt tunnel KST 500-700



Climate tunnel KT 500 with/without climate slots



Entrance unit

Amphibians, reptiles and small mammals reach the entrance to the tunnel – the ACO Entrance unit – by following the guide wall system. Thanks to its internal width of 1000 mm and a variable height of 500–700 mm, the Entrance unit can be optimally adapted to suit the local topography. After installation in the embankment, the surface of the tunnel entrance unit aligns neatly at the same level as the top edges of the side walls.

Climate tunnel with or without climate slots

The Entrance unit and the attached Climate tunnel or Climate stilt tunnel, form an integrated tunnel environment, fitted with slots at ground level which allow the internal temperature, relative humidity, ground moisture and light to adjust rapidly to the local outdoor conditions. These tunnels are therefore not affected by “central tunnel dryness” problems and also serve to reduce airflow through the tunnel. Climate tunnel elements without a slotted roof can be installed along some stretches such as under the main road traffic lanes. The surface layers close to the surface can be just 80 to 200 mm thick.

Climate opening



Installing Climate tunnel KT 500



Preparing the excavation



Laying the Climate tunnel



Building the entrance area with near surface tunnel



Alternative: Near surface tunnel



Material

Polymer concrete is manufactured without cement or steel reinforcing. Polymer concrete is resistant to de-icing salt and many environmental chemicals. The water penetration depth into polymer concrete is zero. These are excellent properties for very long service life and ready acceptance by a range of small animals and particularly amphibians. The components have been tested to withstand the highest loads (400 kN) pursuant to EN 1433.

ACO Guide wall LEP 100 made of polymer concrete with Entrance unit



Guide wall LEP 100, Entrance unit

The crucial transition zone to the tunnel is formed by the ACO Entrance unit together with the adjacent ACO Guide wall elements. The entrance is cone-shaped to guide the animals into the tunnel. The ACO Guide wall system made of polymer concrete consists of five profiles: straight, interior and exterior curves, and rising and falling elements to cope with changes in height. The components are all laid manually. Almost all fence layouts routes can be formed without cutting. The Guide wall LEP 100 has a double guard to prevent animals from climbing up and over it. Narrow vertical slits drain the filled area at the back of the fence. This effectively prevents saturation of the verge and any associated reduction in its load-bearing strength.

Amphibian protection and tree protection



Verge installation



Installation types

The ACO LEP 100 fence system is also suitable for installation in difficult terrain, and in areas affected by heavy loads. The fence is laid on gravel or chippings, with no concrete foundations. This has environmental benefits e.g. close to avenues of trees.

End box 180°



End box 90°

End in an arc 90°



Fence end “returns”

The design of the fence endings varies depending on the project. The polymer concrete ACO Guide wall system can be customised to satisfy a large number of different requirements and therefore ensure effective function and harmonious incorporation in the countryside.



Strength

Strength certification confirms that the fence can withstand the weight of a car up to its outermost edge. The weight of the soil up to an incline of 40° can be withstood when it is installed at the foot of an embankment.

Compensating for height differences



Fitting around obstacles



Difficult ground conditions

Special measures are needed when there is not much space available. When standard components are no longer adequate, systems are needed that enable customised adaptation to the surface of the ground – in other words, modular systems.

ACO Stop channel SR 400 G with cast iron gratings and frames for side roads and drives



High load strength of the Stop channel SR 400 G and Guide wall LEP 100

Wildlife guide wall systems along roads are often interrupted by side roads and drives. Special solutions are then required to ensure that the barrier effect is continuous and uninterrupted: use a stop channel. ACO Stop channels work in two ways: as a tunnel to guide animals along the guide wall, and as a grating which has such a wide mesh that small animals may drop safely through into the channel, instead of wandering out onto the main road. The special shape of the Stop channel grating prevents small animals from crossing the channel. All of the load-bearing bars are recessed.

Stop channel in a side road, steep gradient



Installation in a gravel path



Installation in every topographic situation

The ACO Stop channel is rugged and withstands heavy loads. The grating resists a test load of 400 kN. Installation is even possible in roads with steep gradients. The adjacent road surfacings can be made of asphalt, concrete, paving stones or gravel. The cast iron frames protect all the concrete parts of the channel which come into contact with vehicles.



Cast iron gratings and cast iron frames

The visible surfaces of ACO Stop channels are completely made of cast iron. The gratings are bolted onto the channel body, providing highly effective protection against vandalism. Cast iron is an excellent material to guarantee long lifetimes. And because all the exposed edges are rounded, the risk of injuring amphibians is kept to a minimum. Cast iron turns a rust-red colour over time – merging in nicely with the natural surroundings.

Installation with paved edges



Special solution: separate water drainage



Special solutions

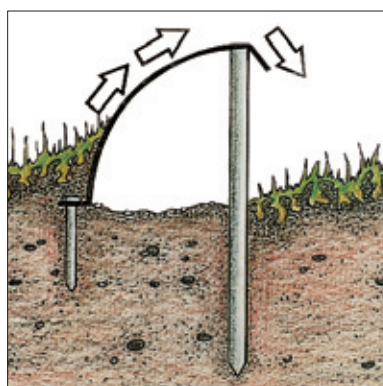
With a length of 1000 mm, the ACO Stop channels can be very flexibly installed whatever the length of channel required. However, special solutions are sometimes needed, e.g. when installed directly adjacent to a tunnel under a wall. The function required to protect the animals is guaranteed at the same time as maintaining an attractive appearance for the owner of the property. Sheep and cows can cross the Stop channel unhindered by temporarily covering it with rubber mats.

ACO One-way wildlife fence with a curved structure



ACO One-way wildlife fence

This ACO One-way fence option is used on Highway projects and also mineral quarry and development areas. It is extremely easy to install on-site. The system consists of curved fence panels supported by posts and ground pegs. The components are light and can be moved and installed manually. No machines are needed. Amphibians and small animals gain extra protection from the overhang when they move along the fence to the tunnel entrances. The surface they move along consists of natural soil and vegetation. On open ground animals are more shaded and less exposed to sunlight than with a vertical fence.



Curved shape

The simple geometry of the One-way fence includes a downward lip that stops small amphibians, reptiles and mammals from climbing over it and moving in the wrong direction. The curved shape on the other side is easy to climb and lets animals move away from danger to the safe side. No major excavations are required for installation on site. The excess soil dug out to create a smooth strip for laying the Guide wall can be used to fill up the lower third of the fence at the back.

Installing the One-way wildlife fence



Positioning the posts



Assembling the fence panel
with final topsoil backfill



Unobtrusive in the countryside

The ACO One-way wildlife fence is just perfect for forested areas. The fence can be installed without damaging tree roots, and the fence can be easily laid even in areas with rugged terrain. And when the One-way fence is properly installed, from the road it is invisible. You see – nothing



One-way wildlife fence overgrown on the back – completely integrated in the countryside

Your local sales contact

Find other local contacts on www.aco-wildlife.com

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