



Product description

ACO Climate Tunnel (Slotted) KT 500 (11120 & 11121)

For use in crossings installed flush with the surface

The ACO KT 500 Climate Tunnel with slotted upper surface is installed within the road structure, flush with the road surface. The advantages of this system are particularly apparent in difficult terrain conditions, such as where there are ditches on one or both sides of the road or if there are high groundwater levels. The benefits for amphibians and small animals are easily explained: installation flush with the road surface permits minimum crossing distances, uncomplicated entrance areas at road verge level, optimum climatic conditions due to the ingress of water and air and, at the same time, optimum adaptation of tunnel temperature to ambient conditions.



Technical data

System components and dimensions

Installed length = 1000 (11120) and 500mm (11121)

Installed width = 580 mm

Standard installed depth = 520mm

Weights

The standard 1000mm component weighs approx. 260 kg and can be transported and positioned using light construction equipment.

Material

Polymer concrete, characterised by

- high compressive strength and flexural strength
- high chemical resistance
- water penetration depth = 0 mm
- no reinforcement

Stability of shape

The components are inherently stable in shape. Minimal coefficients of expansion permit precise installation without expansion joints.

Load-bearing capacity

The units are certified to BS EN 1433 Load Class D 400.

The properties of polymer concrete guarantee a long service life.

The practical advantages

Ground water

Minimal installation depth ensures that the efficiency of ACO KT 500 Climate Tunnels is not affected by high levels of ground water. Extreme conditions, such as a temporarily flooded tunnel or water flowing through the tunnel from time to time, will not damage the superior polymer concrete material of the tunnel components.

Ditch locations

The ACO Climate Tunnel has a minimal installed depth of just 520mm so it can be installed even where there are ditches, without extensive construction works at the entrances.

Minimum crossing distances

In comparison with all other forms of tunnel crossing system, the ACO Climate Tunnel achieves the shortest possible crossing distance. The tunnel surface is aligned with the surface of the roadway or verges as appropriate to the gradients of the road. The floor of the tunnel exit is 480mm below the upper edge of the verge/roadway. Installation of the KT 500 system can be shown to reduce crossing distances in comparison to other forms of tunnel.

Example 1: Tunnel diameter Ø 1.00m, 1.00m cover, gradient 1:1.5 = 4.50m reduction in distance using the KT 500 system.

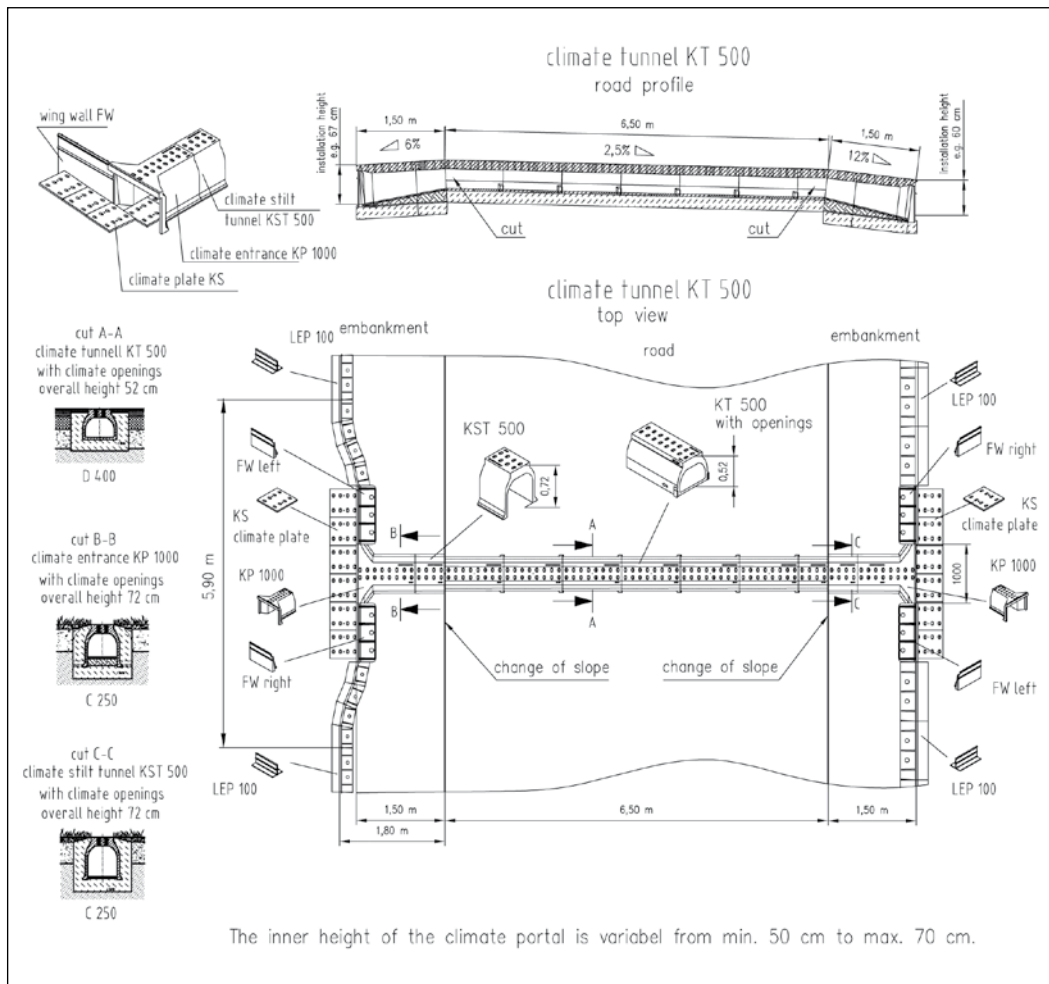
Example 2: Tunnel diameter Ø 1.50m at foot of gradient, 5m embankment height, gradient 1:1.5 = 13.50m reduction in crossing distance using the KT 500 system.

Protection of amphibians

Smooth, non-absorbent surfaces with minimal thermal conductivity form an ideal contact area for amphibians. ACO KT 500 Climate Tunnels are manufactured without using metal reinforcement, eliminating the possibility of disorientation to animals arising from distortion of magnetic fields. Optimally designed slotted openings at surface level permit the ingress of rainwater, thus not only serving the moisture needs particularly of younger amphibians, but also creating a thermal effect, helping the crossing temperature to approximate closely to ambient temperatures. The airflow in crossings often presents problems in closed systems due to "central dryness" inside the tunnel. The slots in the ACO Climate Tunnel form numerous air-inlet openings so that airflow is minimised and vital moisture is retained. Surveys have shown that this system is effective in use.

Installation

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The slotted ACO Climate Tunnel is installed flush with the carriageway, cycle path or verges and adjusted to suit any relevant gradients. The system can be installed in existing roadways by closing one lane at a time. The installation trench has a maximum width of 1000mm and depth of 700mm. The KT 500 system is bedded in concrete in accordance with good practice and the adjacent road surfaces are then repaired.

For detailed information please refer to the installation recommendations for the slotted ACO Climate Tunnel below.

Maintenance

The ACO Climate Tunnel is made from polymer concrete, a homogenous material resistant to various chemicals and salts. The product is manufactured without reinforcement. Even cut surfaces retain all their original material properties. Cover gratings are not necessary. When properly installed, maintenance is limited to flushing the contact surfaces at intervals of several years. In heavily forested areas such flushing is found to be necessary at 3 to 5 year intervals; under favourable conditions the amphibian contact surfaces are flushed naturally by the effects of rainwater. Regular checks should be made to ensure that the system continues to function efficiently. At minimum this should include a visual inspection prior to spring migration periods. A maintenance plan should be developed to keep the system free of accumulations of vegetation and leaves.

Recommendations/notes on installation

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Installation: flush with surface

General notes

These are general guidelines on the installation of ACO KT 500 Climate Tunnels in carriageway surfaces.

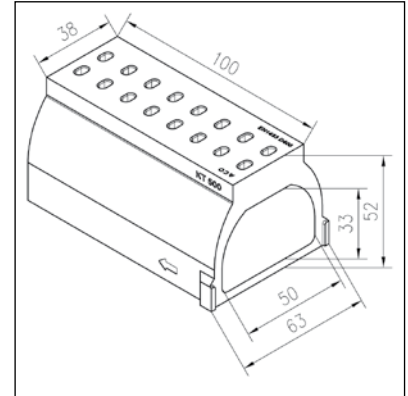
Specific details of an installation should always be determined by the designers, taking into account all local conditions.

The ACO KT 500 Climate Tunnel should fulfil two purposes:

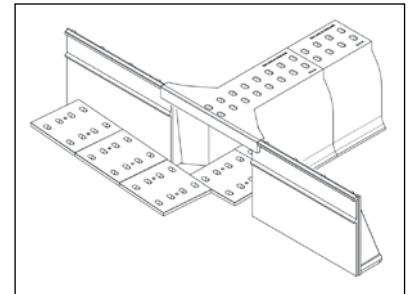
- amphibians and small animals should be able to cross the road without danger,
- static and dynamic loads from traffic must be accommodated.

When installing ACO Climate Tunnels the latest versions of the following technical standards should be observed insofar as they apply to the specific installation:

- compliance with the applicable load-bearing class in accordance with BS EN 1433 “Drainage channels for vehicular and pedestrian areas”,
- compliance with the requirements of the Highways Agency “Specification for Highway Works” Section 517 – Linear Drainage Channel Systems.



KT 500 climate tunnel



KP 1000-700 climate tunnel entrance with entrance wings and climate plates

Recommendations for laying out/installation

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Installation: flush with surface

Tips on laying tunnels

ACO Climate Tunnels are available with or without ventilation slots. This description of installation flush with the surface is for tunnels with ventilation slots. The upper surface of the tunnel sits flush with the upper surface of the carriageway. Bevelled cutting of tunnel elements (by the customer or on site) is required to suit changes in gradient within the length of the tunnel.

Climate tunnels are laid so that they extend outside the road surface into the verge areas. ACO KP 1000 Tunnel Elements are installed flush with the tunnel and at the same level at both ends. These are installed in the course of concreting work.

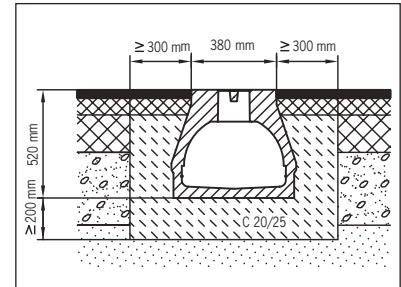
The KT 500 and KP 1000 combined length should extend through the width of the road safety verges (normally 1.50m from the edge of the roadway).

The following should also be taken into account:

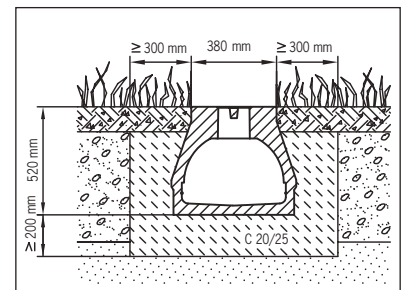
- siting of the guide wall.
- the use of closed elements where specially required. Please refer to the details of our Blind Climate Tunnel or to our Design Services Department for further details.

Installation:

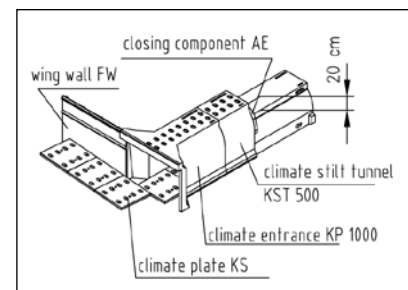
- 1) When carriageway asphaltting is completed, cut the road surface out to a width of 1000mm or to suit the width of the digger bucket or other special requirements.
- 2) For installation flush with the road surface, excavate the trench for the foundation to a depth of approx. 700mm.
- 3) Lay a C 20/25 concrete footing of approx. 200mm thickness and compact onto a load-bearing foundation.
- 4) Position the tunnel and entrance elements on this concrete footing to the correct line and level.
- 5) Lay the individual elements so that they butt tight up against each other.
- 6) Fill the voids on each side of the tunnel with C 20/25 concrete and compact evenly in layers on both sides. The final top level of the concrete will depend on such factors as the thickness of the asphalt binding and top courses. The top of the concrete should be approx. 100mm below the upper surface of the tunnel.
- 7) Next, repair the roadway surface either side of the tunnel, preferably by pouring asphalt. If rolled asphalt is used, do not roll over the line of the channel. Take care to ensure that the space is not overfilled or underfilled. The KT 500 system can also be installed before the top course is laid. Care should be taken to ensure an even height at the join between the surface of the tunnel and the top course and that there are also expansion joints at the edge of the concrete surround.
- 8) Lay a gravel bed in the verge areas before and after the tunnel.
- 9) Clean any residual concrete and/or asphalt from the floor of the climate tunnel.



Installation detail – roadway



Installation detail – verge



ACO KT 500/KP1000-700 P (typical)