



## Product description

### ACO Climate Tunnel (Blind) KT 500 (11122 & 11123)

#### For use in crossings installed flush with the surface

The ACO KT 500 Climate Tunnel has a closed top surface and is installed close to the surface of the road structure. The high load-bearing capability means it can be installed with minimum depth of cover. The slotted KT 500 system is installed in areas adjacent to the carriageway, e.g. verge areas. Special installation depths allow the elevation to be adjusted to the level of the terrain. When properly planned and constructed, the system keeps the length of the crossing to a minimum and ensures uncomplicated entrance areas at road gutter level and advantageous climatic conditions inside the tunnel. Optimum conditions are created in terms of both road construction and amphibian protection.



#### Technical data

##### System components and dimensions

Installed length = 1000 (11122) and 500mm (11123)

Installed width = 580mm

Standard installed depth = 520mm

Special installed depths = 580/600/620/640/660/680/700/720mm

##### Weights

The standard 1000mm component weighs approx. 270kg 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 = 0mm
- 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.

#### 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.

##### Trench 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. The minimal (80–200mm) depth of cover in the carriageway area and corresponding adjustment of elevations in areas adjacent to the carriageway mean that the floor of the KT 500 system is approx. 600–720mm below the surface of the road/verge.

##### Minimal crossing distances

The ACO Climate Tunnel System ensures very short crossing distances at a minimum cover depth in comparison to other forms of tunnel crossing. Installation of the KT 500 system can be shown to reduce crossing distances in comparison to other forms of tunnel (calculation basis 700mm floor depth).

**Example 1:** Tunnel diameter Ø 1.00m, 1.00m cover, gradient 1:1.5=3.90m reduction in distance using the KT 500 system.

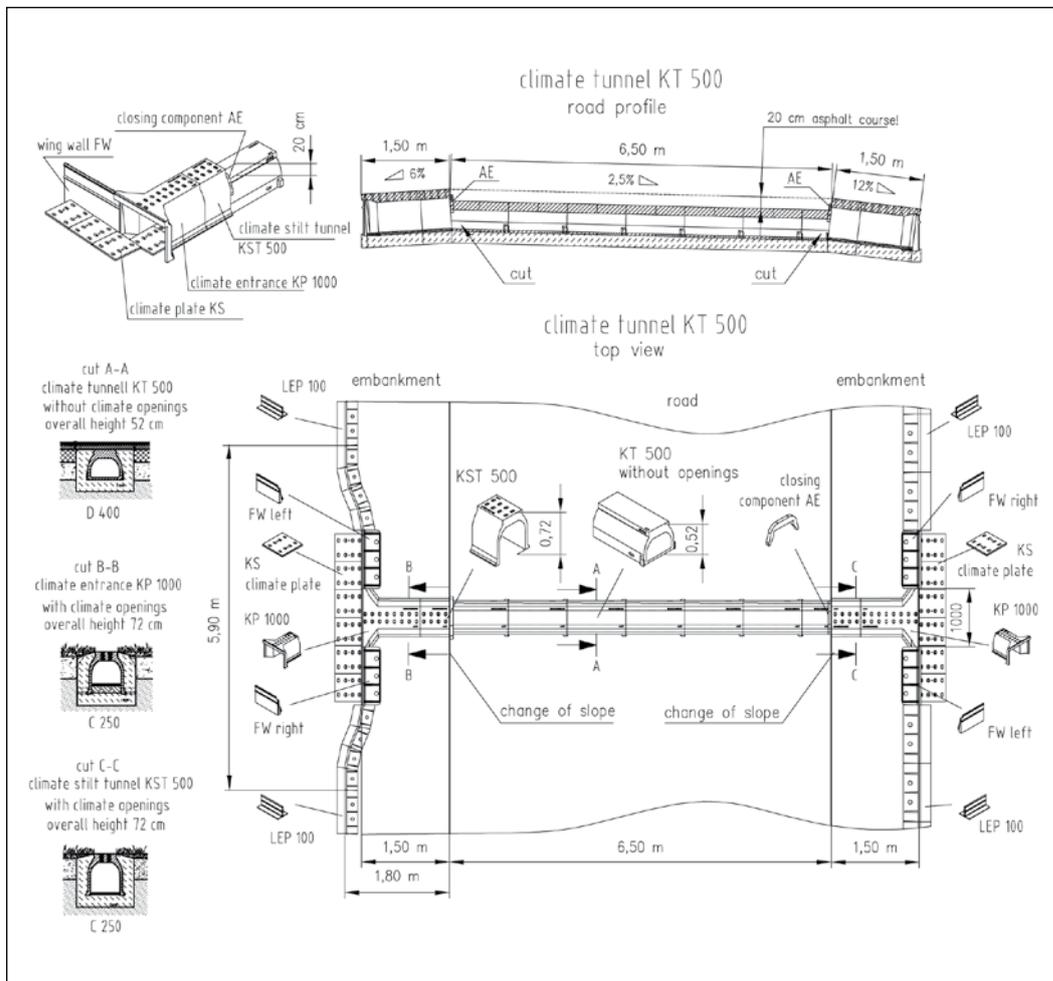
**Example 2:** Tunnel diameter Ø 1.50m at foot of gradient, 5m embankment height, gradient 1:1.5=12.90m reduction in crossing distance using the KT 500 system.

##### 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 thereby eliminating the possibility of disorientation to animals arising from distortion of magnetic fields. Tunnel units with optimally designed slotted openings are installed at surface level in the verges, permitting 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 rapidly to approximate to ambient temperatures.

## Installation: close to surface in the carriageway and flush with surface at verges

### ACO Climate Tunnel (Blind) KT 500 (11122 & 11123)



ACO KT 500 Climate Tunnels with slotted tops are installed in the verges. Blind elements are installed in the roadway area with minimum depth of cover. It is possible to install the system in existing roadways by closing one lane at a time. The installation trench has a maximum width of 1000mm and depth of 800–900mm. 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 blind 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 and do not need protection against corrosion. Cover gratings are not necessary. When properly installed, maintenance is limited to flushing the contact surfaces at intervals of several years. 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

### ACO Climate Tunnel (Blind) KT 500 (11122 & 11123)

#### General notes

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

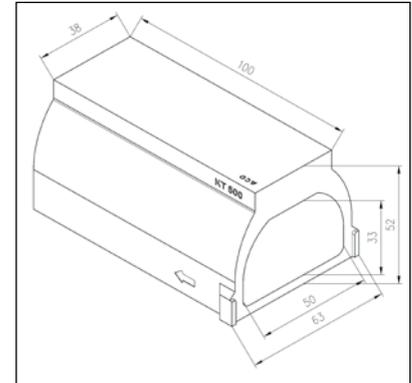
Specific details of an installation should always be determined by the designers, taking into account all local conditions.

The ACO KT 500 Climate Tunnel should fulfil two purposes:

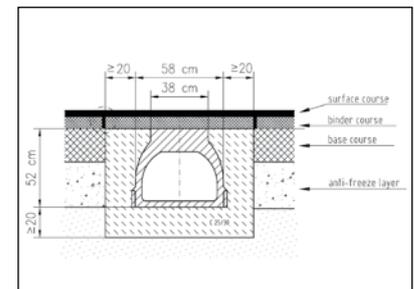
- amphibians and small animals should be able to cross the road without danger,
- static and dynamic loads from traffic must be accommodated.

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

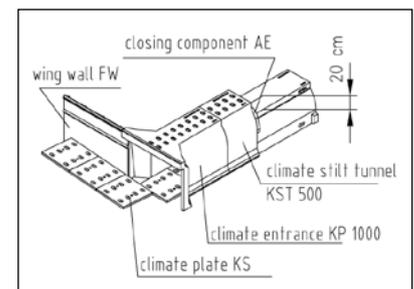
- compliance with the applicable load-bearing class in accordance with BS EN 1433 “Drainage channels for vehicular and pedestrian areas”,
- compliance with the requirements of the Highways Agency “Specification for Highway Works” Section 517 – Linear Drainage Channel Systems.



ACO KT 500



ACO KT 500 in roadway (typical)



ACO KT 500/KP1000-700 P (typical)

## Recommendations for laying out/installation

### ACO Climate Tunnel (Blind) KT 500 (11122 & 11123)

#### Installation: near to surface in the roadway area flush with surface at verges

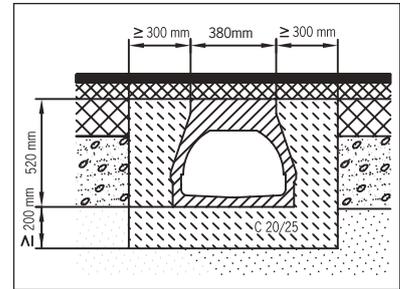
##### Tips on laying tunnels

ACO Climate Tunnels are available with or without ventilation slots. This description is provided for installation near the surface whereby closed tunnel elements with an installed depth of 520mm are built into the roadway area with a covering depth of 80–200mm as appropriate for the project. In all other areas tunnel elements with ventilation slots and an installed depth of 600–720mm are installed flush with the surface. The depth of coverage of tunnel units in the carriageway will determine the installation depth of the slotted units in the other areas. For instance, if the cover is 80mm then the slotted units will have an installed depth of 600mm (520mm + 80mm). Slotted units are available in depths increasing in 20mm steps. Where one verge is higher the entrance units should preferably be laid in the higher verge with a fall of 1% towards the carriageway. This ensures moisture in the blind section of the tunnel. The tunnel in the carriageway is built as appropriate for the camber with a fall of at least 1% and the chosen depth of cover. If a cover profile is available then the tunnel may also be laid with a zero fall or alternatively with a continuous fall. The entrance in the lower verge should be laid with a fall of up to 12% to allow swift clearance of water from the tunnel. No low point must be created within the length of the tunnel and entrances. ACO KP 1000 Tunnel Entrances are connected flush with the tunnel at each end. These are installed during the concreting works. 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).

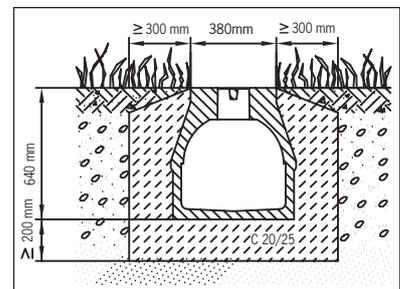
Please refer to our Design Services Department for further details.

##### Installation:

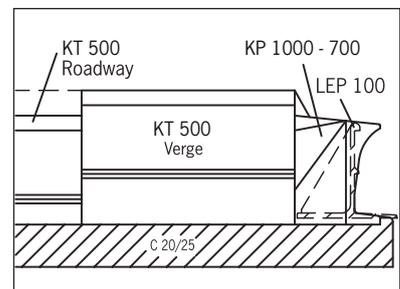
- 1) As a rule, after the load-bearing layer is applied, but before applying the binding and top layers, the road surface is excavated to a width of 1000mm.
- 2) Lay a C 20/25 concrete footing of approx. 200mm thickness and compact onto a load-bearing foundation.
- 3) If there is a camber then the tunnel elements should be positioned on the concrete base in correct elevation and alignment with the camber. The elevation points are determined by the transition from the verge to the carriageway. The depth of coverage may range from 80–200mm varying in steps of 20mm.
- 4) In the verge areas, lay the slotted and correspondingly deeper elements to match the floor elevation.
- 5) Lay the elements in the upper verge areas at a fall of 1% towards the carriageway. In the verge areas slotted tunnels should be installed to allow ingress of rainwater: in the lower verge areas the tunnels should slope away with a fall of between 0 and 12%.
- 6) Lay the individual units to butt tightly together.
- 7) Fill the voids on each side up to the top of the tunnel with C 20/25 concrete and compact evenly in layers on both sides.
- 8) The same procedure applies for the verge areas, albeit bevelled off at the top.
- 9) Carriageway asphaltting is then carried out. The upper surface of the top layer should then be flush with the upper surface of the tunnel in the verge areas. (Overfilling is permissible up to a maximum of 20mm. Underfilling is not permissible.)
- 10) Lay a gravel bed before and after the tunnel in the verge areas.
- 11) Clean any residual concrete and/or asphalt from the entranceway and floor units of the Climate Tunnel.



Installation detail – roadway



Installation detail – verges



Side-view – KT 500/KP 1000 - 700