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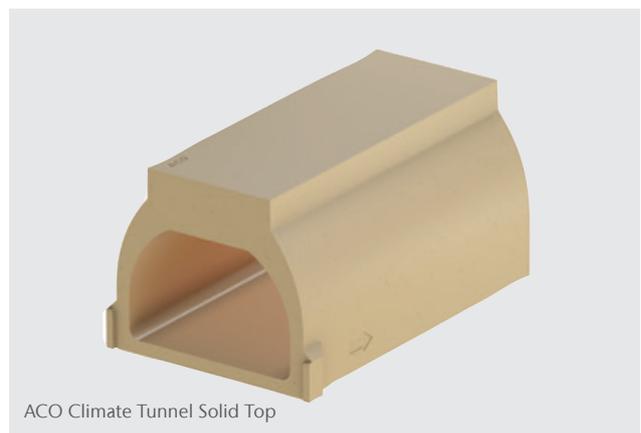
## ACO Climate Tunnel Solid Top

The 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 channel system is certified to BS EN 1433 Load Class D 400. 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. Optimum conditions are created in terms of both road construction, climatic conditions and amphibian protection.

### Benefits

- Compatibility with slotted climate tunnels and entrances
- Low installation height is less effected by high water levels
- Tunnel material unaffected by water flooding
- Crossing lengths reduced due to shallow installation
- Minimal coefficients of expansion permit precise installation expansion without joints

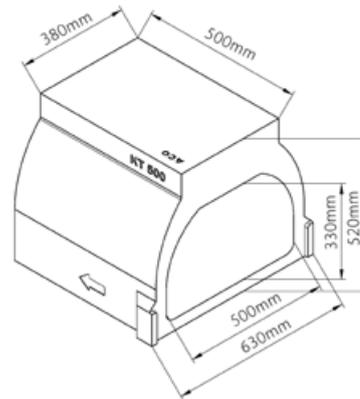
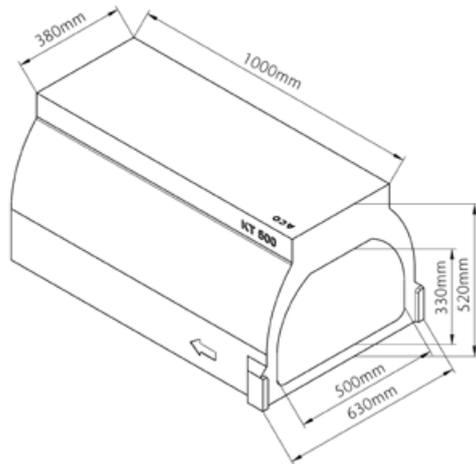


ACO Climate Tunnel Solid Top

### Applications

- Migratory paths across road systems
- Tunnels across roads, paths and verges

## System Overview



Product Code	Description	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
11122	Climate Tunnel Solid Top	1000	580	520	269
11123	Climate Tunnel Solid Top	500	580	520	134

## Compatibility

ACO Climate Tunnels with solid tops can be incorporated into tunnel crossing systems. The range includes solid top tunnels, stilt tunnels and tunnel entrances.

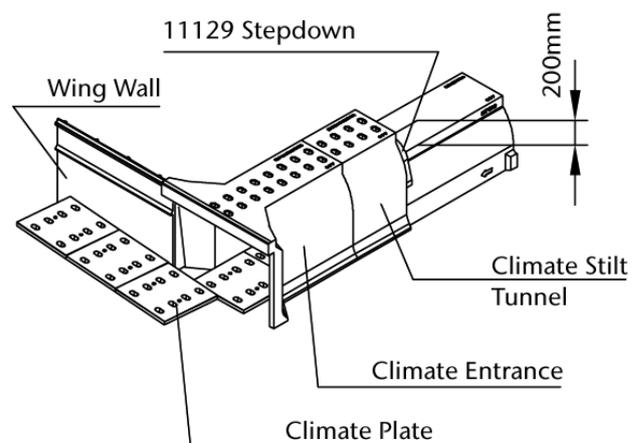
The versatility of the system allows the tunnels to be installed at road height and transitioning between roads, pedestrian areas and verges.

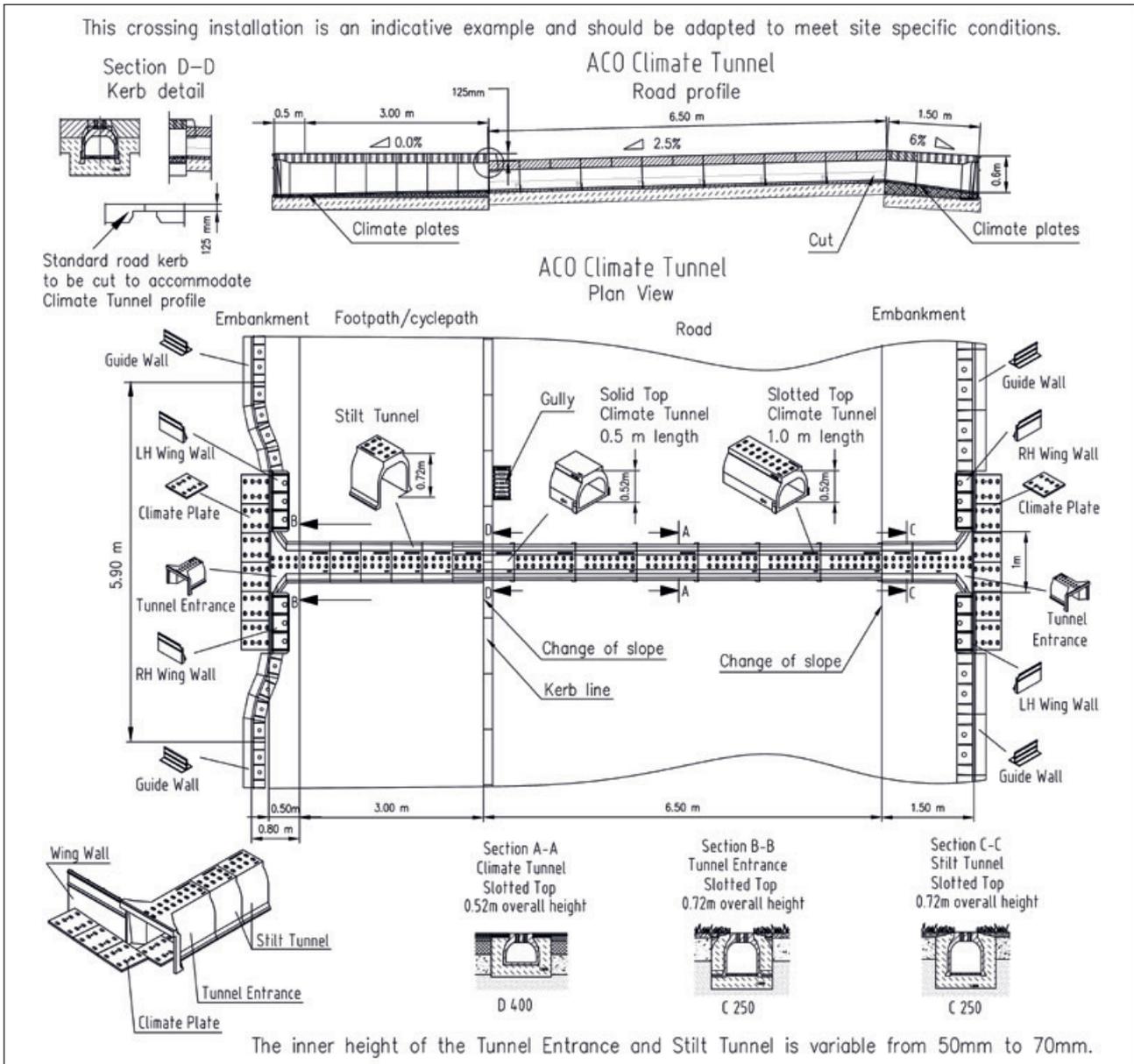
## Minimum crossing distances

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 system can be shown to reduce crossing distances in comparison to other forms of tunnel (calculation basis 700mm floor depth).

**Example 1:** Tunnel diameter  $\varnothing$  1.00m, 1.00m cover, gradient 1:1.5=3.90m reduction in distance using the Climate Tunnel system.

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





ACO Climate Tunnels are available in both slotted and solid top options and either can be used in the roadway or verges as required.

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 system is bedded in concrete in accordance with good practice and the adjacent road surfaces are then repaired.



## 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.

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.

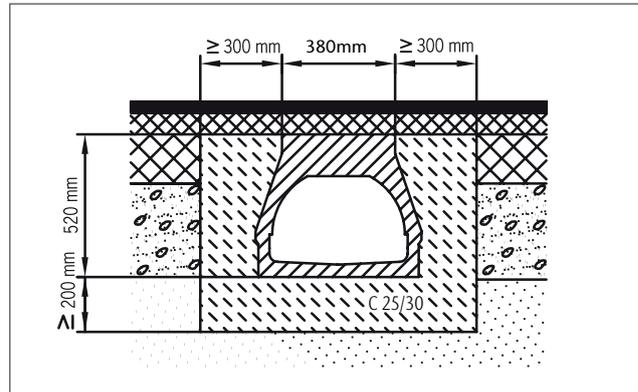
A maintenance plan should be developed to keep the system free of accumulations of vegetation and leaves.

## Tips on laying tunnels

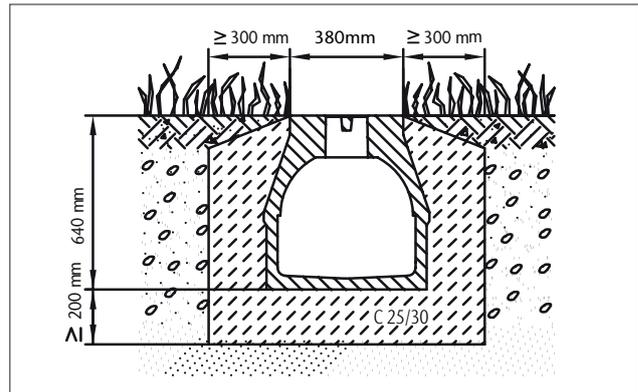
ACO Climate Tunnels are available with or without ventilation slots. This description is provided for installation near the surface whereby closed tunnel elements with an installed depth of 520mm are built into the roadway area with a covering depth of 80–200mm, as appropriate for the project.

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 Climate Tunnel Entrances are connected flush with the tunnel at each end. These are installed during the concreting works. The 500mm and 1000mm channels 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.



Roadway installation detail



Verge installation detail

## Installation

### STEP 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. Lay a C 25/30 concrete footing of approx. 200mm thickness and compact onto a load-bearing foundation. 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.

### STEP 2

In the verge areas, lay the slotted and correspondingly deeper elements to match the floor elevation. 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%. Lay the individual units to butt tightly together. Fill the voids on each side up to the top of the tunnel with C 25/30 concrete and compact evenly in layers on both sides. The same procedure applies for the verge areas, albeit bevelled off at the top.

### STEP 3

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.)

### STEP 4

Lay a gravel bed before and after the tunnel in the verge areas. Clean any residual concrete and/or asphalt from the entranceway and floor units of the Climate Tunnel.

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