

# DrinTec™ pipe underdrains with filtering limpets

High quality underdrains at reasonable cost

## Key values

- Over 120 drainage points per squared meter.
- Filtering slots of 0.25 mm in diameter.
- Very uniform water and air distribution for backwash.
- Low head losses.
- Materials compatible with drinking water standards.
- Flexible design for different flowrates.
- Proven design.
- Easy to install.
- Easy to repair.



## A special pipe configuration: How does it works

Water enters the main pipe and reaches the central manifold that is placed perpendicular to the main pipe. The manifold has a series of risers inserted vertically. The manifold has sufficient diameter to feed all risers with the same flow.

Each riser is connected to a horizontal arm. The horizontal arms consist of  $\varnothing 140$  mm pipe with holes of different diameters and at different heights to allow for a distinct an homogeneous water distribution along the pipe during drainage, as well as and uniform air and water distribution during backwash. (See Figures 1)

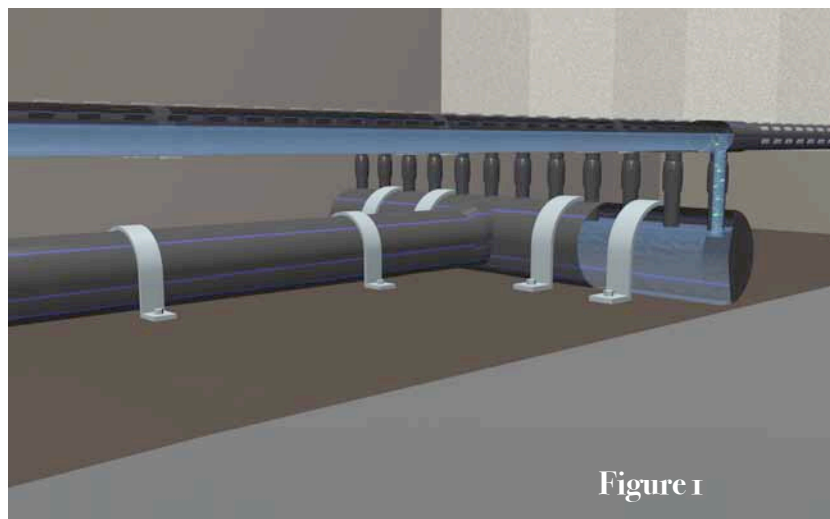


Figure 1

The risers are inserted about one third into the manifold. This allows the formation of an air cushion in the upper part of the manifold during air purging before it enters into the risers. The inserted part of the riser have small holes for allowing stagnant air to leave the manifold after purging. The risers have a diameter such that provide an uniform drainage of all the horizontal arms as well as an excellent water and air distribution during backwash.

The holes in the horizontal arms are placed 10 cm apart and have different diameters and are located at different heights at the pipe wall. Small holes are on the upper side. The allocation of holes at different levels and of different sizes allows the formation of a second air cushion inside the horizontal arms during air purging.

The size and number of the holes been obtained using a mathematical simulation program specially developed for this purpose. (Figures 2 and 3).

This simulation has been validated with various field experiments. (Figure 4, 5 and 6).

Flow distribution in central manifold

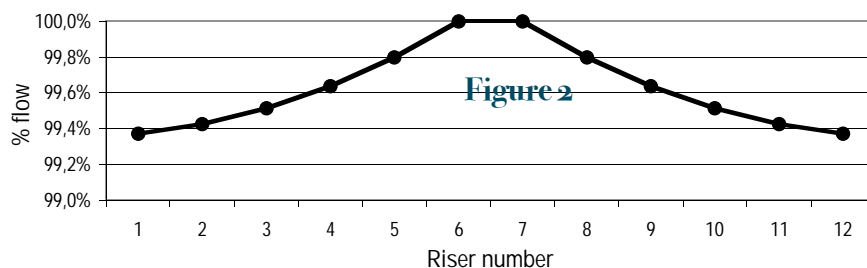


Figure 2

Flow distribution in horizontal pipes with limpets

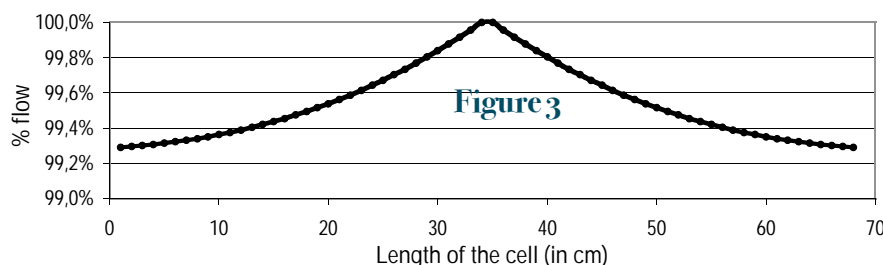


Figure 3



Figure 4



Figure 5

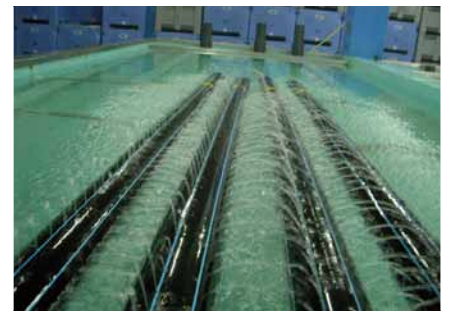


Figure 6

## DrinTec™ pipe underdrains with filtering limpets

### The filtering limpets

The filtering limpets are 62 mm long and 27 mm wide and have its surface covered with slots 0.25 mm in diameter. The filtering limpets have been mechanically soldered to cover each hole. This provides a fixed and secure barrier for the hole (see Figure 7 and 8)

The filtering are manufactured in HDPE or PVC using a plastic extrusion process (Figure 9). Limpets are soldered with ultrasonics equipment on top of each hole (Figure 10). The limpets are placed as well as the holes every 10 cm (Figure 11). They have positional pins for symmetrical allocation on top of each hole before been soldered to the pipe's surface.

The hydraulic characteristics of the limpets have been tested. Results of the head loss of the 140 mm HDPE underdrain with limpets and at different flow rates per squared meter is shown on Figure 13. Numbers on the curves indicate the diameter of the holes in mm.



Figure 7



Figure 8



Figure 9



Figure 10



Figure 11

Head loss of the Ø140 mm HDPE DrinTec™ underdrain with limpets

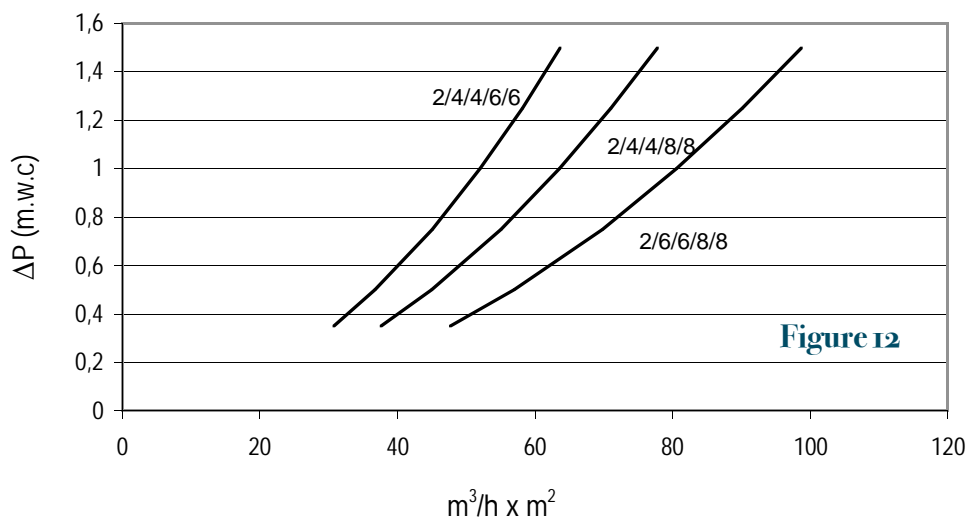


Figure 12



## Some layouts

The pipe underdrains with filtering limpets can be adapted to different layouts. Examples for an open rectangular filter (Figures 13 and 14), a vertical tank (Figure 15) and a closed pressurized horizontal filter (Figure 16, 17 and 18) are shown below.

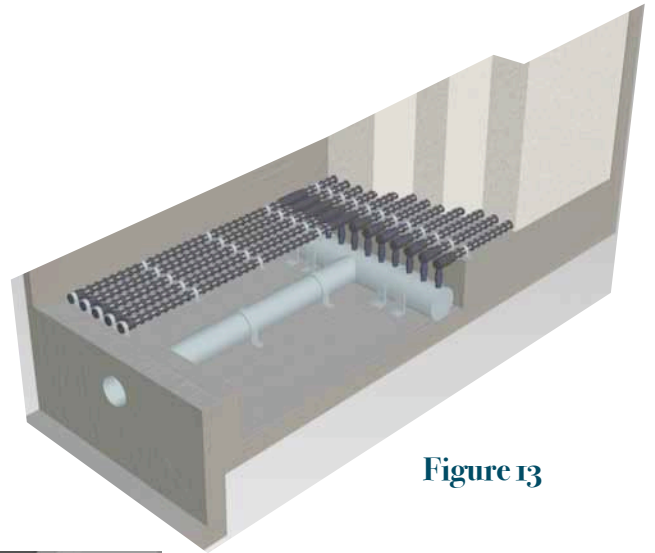


Figure 13

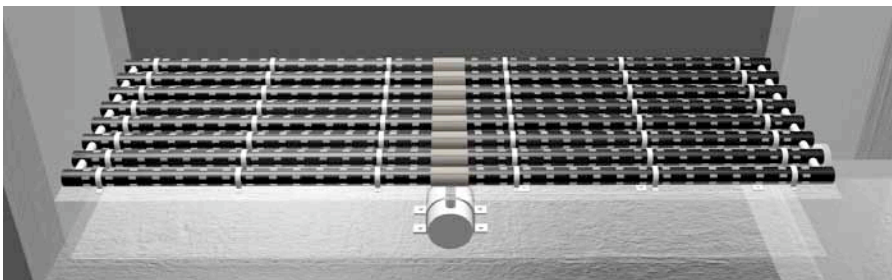


Figure 14

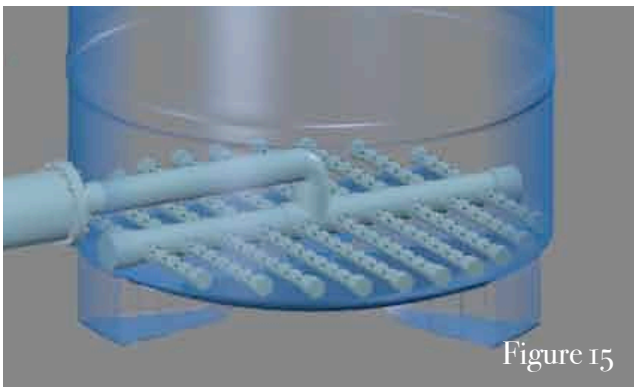


Figure 15

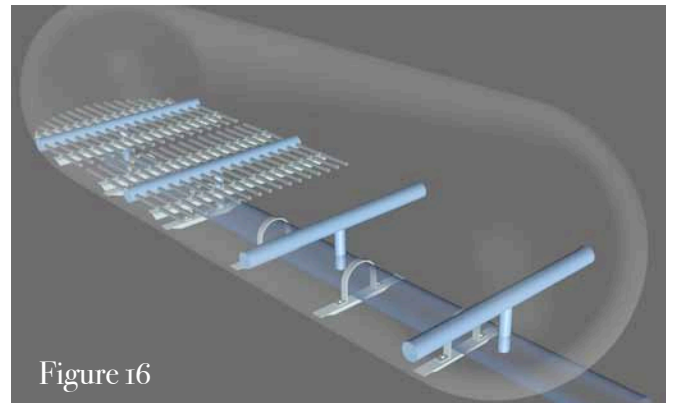


Figure 16

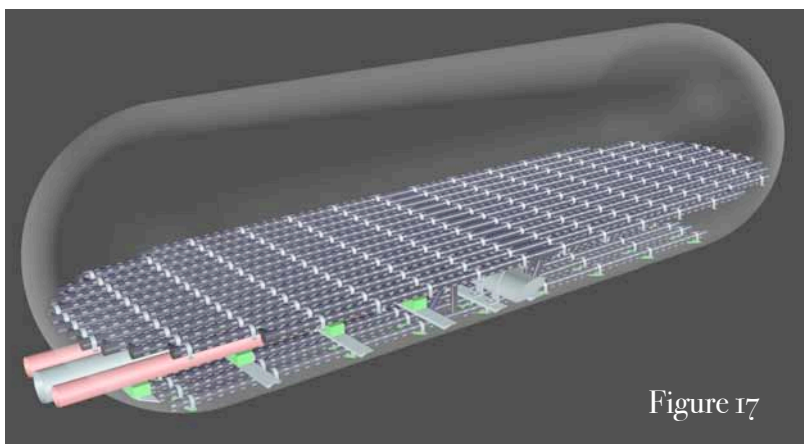


Figure 17

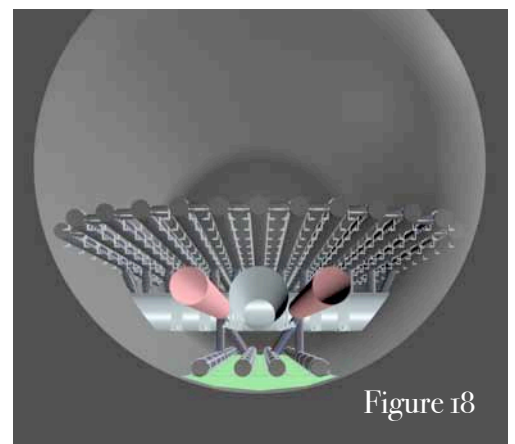


Figure 18