


Excursion Guide:

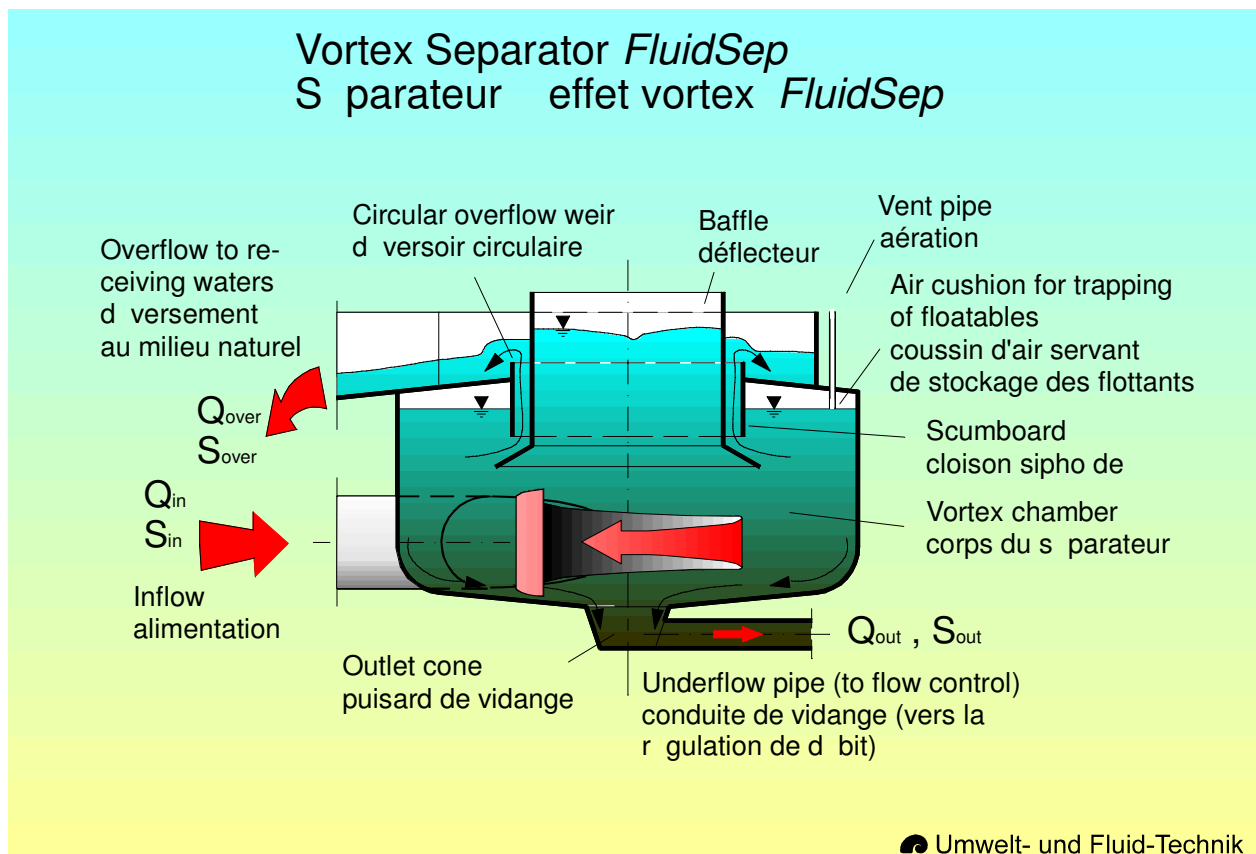
Stormwater Treatment Facilities in Walldürn

Vortex Separator RÜB 1 Hornbach

Description of the installation

The vortex separator Walldürn-Hornbach RÜB 1 is treating combined sewage of the village of Hornbach, which is politically a part of the city of Walldürn. The structure has been designed in the years 2001 – 2002 by the construction department of the City of Walldürn. It was planned originally as a conventional first-flush combined sewer overflow tank (CSO tank). The final design, however, is a vortex separator  UFT *FluidSep* Type 2. The structure features a separate flow control chamber.

During the inflow of combined sewage, in the circular structure a vortex flow is forming. Settleable solids will settle down in the structure and are finally driven to the centre due to the action of secondary currents near the bottom of the structure. This effect can be observed in any tea cup where the tea leaves are concentrated in the centre by gentle stirring, see graphics. The effect is used here in order to concentrate the solids in the underflow drawn from the central sump. This underflow is finally fed to the treatment plant. Inflow in excess of the underflow is filling up the structure. During strong storms, water is overflowing; it is mechanically pre-treated.




By choosing a vortex separator, it was possible to reduce the CSO tank volume from 140 m³ originally planned to finally 70 m³ while keeping the overflowing COD load (as a measure of degree of protection of the receiving waters) constant. The vortex separator is designed as an open structure in order to ease maintenance.

Technical Data


max. inflow during storm $Q_0 =$	1.000 l/s
volume of vortex separator $V =$	70,2 m ³
diameter of vortex separator $D =$	6,0 m
max. underflow to the treatment plant $Q_D =$	6,0 l/s
max. overflow $Q_{BÜ} =$	994 l/s

Technical Equipment

Vortex Separator

The structure itself is designed as a vortex separator  UFT *FluidSep* Type 2. The baffle and overflow weir inserts are made from stainless-steel

Flow Control Chamber

Hydraulic-electronic flow control (HE flow control) with vortex throttle  UFT *FluidVortex-E* and motor-driven valve, nominal diameter DN 150. Design pressure head $H_{bem} = 3,48$ m, design flow $Q_b = 6,0$ l/s.

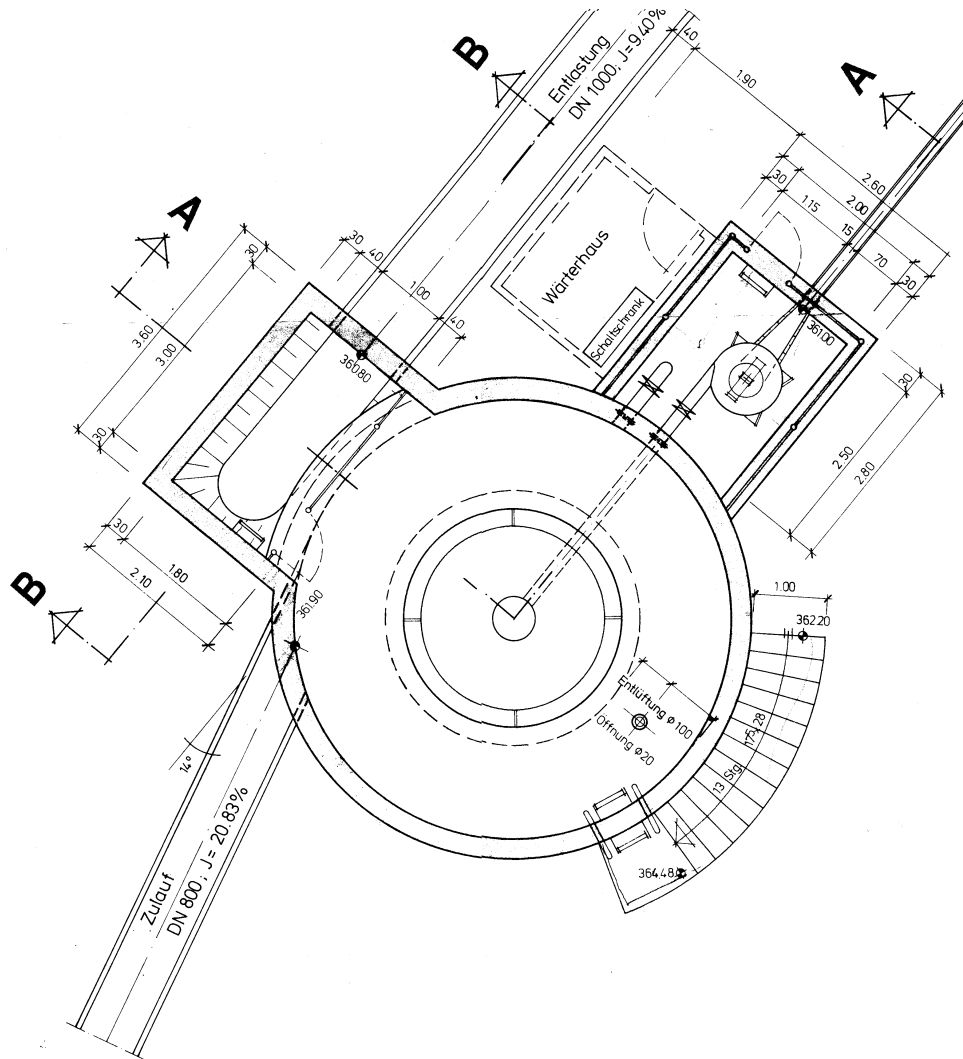
Cleaning of structure

The vortex separator is self-cleaning. There is no extra cleaning equipment such as tipping flushers or propellers.

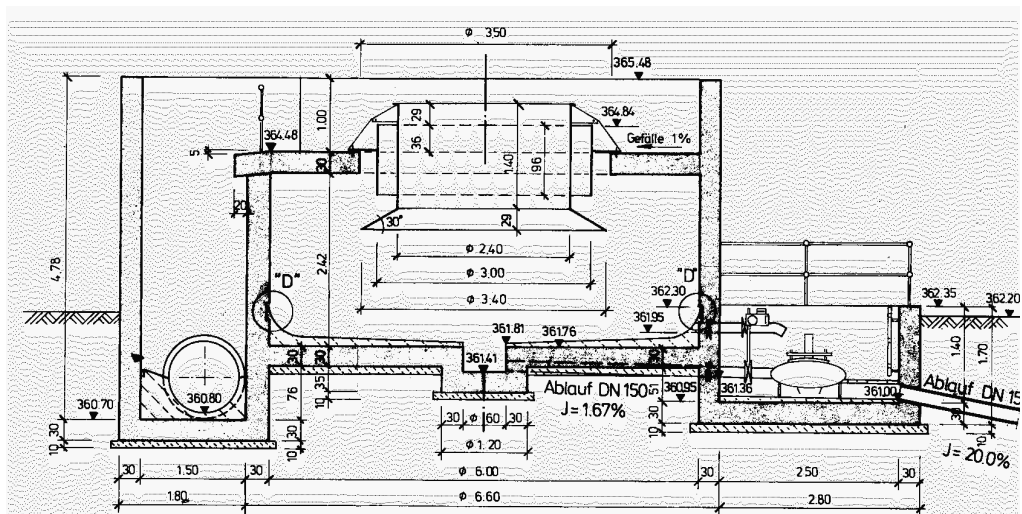
Electrical equipment, remote control

The electrical functions of the hydraulic-electronic flow control are implemented in a programmable logical unit Siemens S7. The water level in the vortex separator is measured by an ultrasonic level gauge and recorded. All operation data, such as the water level or any alarms of the motor valve, including some data from a pumping station located some 100 m downstream, are transmitted to the treatment plant and are visualized there on demand. This feature allows the operating personnel to keep informed on the actual state of the structure at any time. Moreover, the overflow activity of the structure is recorded (overflow duration and frequency). All electrical equipment is installed in a control box in a small protection house.

Plan view



Section A-A



The completed structure



Bafflework in the vortex separator



Protection house



Control Box



Hydraulic-Electronic Flow Control *FluidVortex-HE*

