

Operating description domestic wastewater treatment plant MONOfuido



General description

The domestic wastewater treatment plant MONOfuido operates with a sequencing batch reactor (SBR), where previously stored wastewater is discharged intermittently into a biological treatment chamber containing microorganisms (active sludge). It has two treatment phases, a buffer and sludge storage phase and the SBR phase. The complete treatment cycle of one charge lasts 8 hours appr. and is a combination of 6 hrs. of aeration and 2 hrs. of sedimentation. The cycle is controlled by a programmable electronic control unit and can be adjusted to the respective local conditions. Operating values may be optimized.

Buffer / sludge reservoir

Domestic wastewater is led directly to this unit which has three functions:

- transitory storage of wastewater and provision of a buffer volume
- mechanical pre-treatment by generation of „primary sludge“ through sedimentation processes
- storage of newly generated sludge during biological treatment („secondary sludge“)

Biological treatment chamber (SBR)

This is the section where a further biological wastewater treatment takes place. The cleaning aggregate FLUIDO consists of a floater (M) equipped with a feeding pump (D), aerator (E) and clearwater pump (F).

At the beginning of the treatment cycle and after two and four hours, the SBR section is fed with a certain quantity of wastewater from the buffer/ sludge reservoir. For a few seconds the feeding pump (D) pumps clearwater from the SBR chamber through the hose (B) to the buffer, thus ventilating it, so that meanwhile accumulated wastewater may flow into the SBR section, based on the principle of communicating pipes, until water levels reach an approximate equilibrium. An uncontrolled inlet is impeded by the ventilation of the pipe (B) when the aerator is activated via air cavity (N) and pipe (O).

During the biological treatment, the characteristic substances contained in domestic wastewater are degraded or reconverted into biomass with the help of floating microorganisms (active sludge). The required turbulence as well as the provision with air-oxygen is carried out by the aerator (E) through a propeller combined with the injection of air. It is an intermittent ventilation, that is to say according to the size of the equipment, the aerator is working only for short lapses of time between two break-intervals during operation (compare fig. operating modes).

After a phase of appr. 6 hrs of ventilation, an appr. 2hr sedimentation phase is initiated. At the end, the clearwater pump (F) pumps treated water into the clearwater outlet (H) until the lower position of the float-switch (L) is reached, or until the programmed maximum pumping time is over. The floating disposition guarantees an optimum submersion depth of the clearwater pump. The minimum volume in the SBR section (VR min) may be adjusted in site (possible variation of the installation height of the float switch).



Excessive sludge take out (removal)

In the middle of the aeration phase, the feeding pump (D) pumps water from the SBR section back through pipe (B) into the buffer. This water contains microbiologically activated sludge, the quantity of which corresponds to the amount newly generated during the treatment cycle (secondary sludge).

Energy saving /vacation mode

If the float switch (L) during the SBR cycle remains longer than 6 hrs in the lower position after having pumped off clearwater, no wastewater inlet into the SBR section has taken place and the control unit would automatically switch to the energy saving mode. That means, the operating intervals of the aerator will become shorter. They are restricted to the „basic provision“ of the microorganisms.

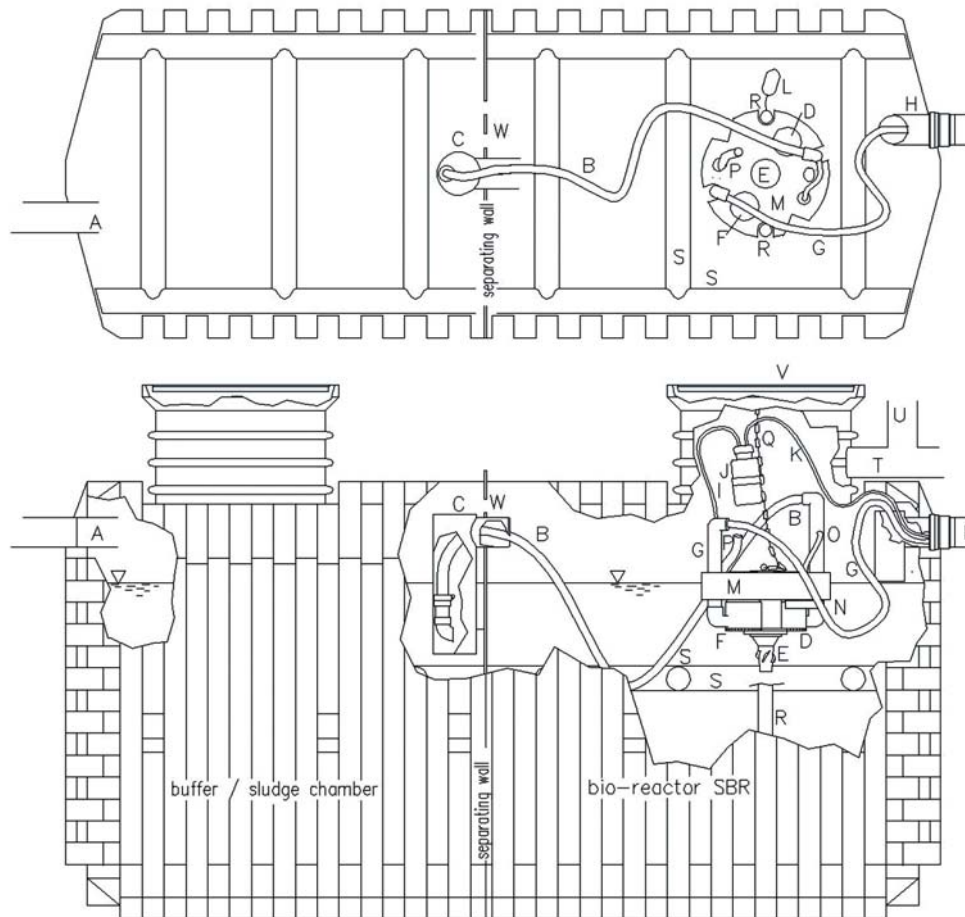
Sampling

In order to always have a representative wastewater sample available, despite relatively short clearwater take out phases, clearwater is led through a hose (I) into the sample bottle (J), which has an overflow via another hose (K) into the outlet pipe (H). This occurs parallelly to the clearwater take out through pipe (G).

Operating modes (main parameters, guidelines)

Inhabitants	aerator on (min)		break (min) normal/ energy saving	air out feeding(s)	sludge removal(s)	clearwater take out (min)
	normal	energy saving				
2	1	1	15	7	5	10
3-4	2	1	15	7	8	10
5-6	4	2	15	7	10	20
7-8	5	2	15	7	13	20
9-10	6	3	15	7	17	20
11-12	7	3	15	7	20	30

These parameters are preprogrammed at the factory and should occasionally be optimized by an expert in charge of servicing the equipment.



- A inlet DN 100
- B hose for inlet into SBR and for excessive sludge from SBR
- C emergency outflow DN 100 resisting floating materials
- D feeding pump
- E aerator and turbulence propeller
- F clearwater pump
- G clearwater outlet hose
- H clearwater outlet pipe DN 100
- I clearwater hose to sampling bottle
- J sampling bottle
- K clearwater hose from sampling bottle to pipe H
- L float-switch (attached to pipe R)
- M floater
- N air cavity for interruption of inlet into SBR
- O air pipe for interruption of inlet into SBR
- P air intake pipe of aerator
- Q chain
- R guiding pipe (horizontal position of the floater)
- S assembly system for container stabilisation
- T protective tube DN 100 for pipes
- U ventilation pipe DN 100 (optional)
- V shaft cover A 15 (EN 124), optional with ventilation holes
- W ventilation hole O 50, 4 holes in separating wall (only for one-chamber-plants)

SBR: sequencing batch reactor; container in which several treatment phases take place subsequently. Here: biological treatment and sedimentation