terra organic
by terrawater

for surface waters

for surface waters

The surface waters produced in biogas plants are treated by TerraOrganic for surface waters at 100% in a way that not only water is extracted that can be discharged into the receiving waters (on-site preflooder) but also an energy concentrate for the fermenter.

In a first step, the water to be treated (with arbitrary COD content) is pumped from a lagoon or similar into the TerraOrganic System where distillate is extracted in a natural, chemical-free evaporation process. Apart from a residual COD, this distillate does not contain further pollution like N or P.

While the energy-rich concentrate that has been produced in the TerraOrganic for surface waters is led to the fermenter, the distillate with a residual COD burden is pumped to the TerraOrganic bioreactor. This mainly consists of a multi-stage reactor room, a regulated ventilation system and an automatically discharge of solid matter (sludge).

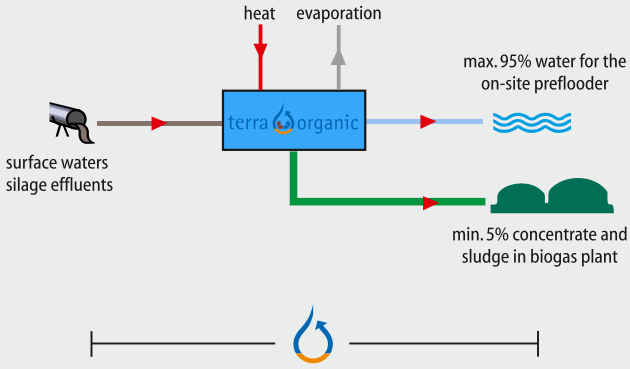
The distillate remains in the reactor room where micro organisms are settling until the contained nutrients have degraded and the water has at least a quality that can be discharged (COD < 150 mg/l).

The bioreactor has been designed in such a way that it can be heated by waste heat, so that ideal operation temperatures for the micro organisms are safeguarded also during cold periods.

As the COD charge in the surface water may show extreme seasonal variations for various reasons (from a few 1,000 mg/l to several 10,000 mg/l), TerraOrganic automatically identifies fluctuating COD values at the inlet and outlet and can adjust the retention time and/or the level of concentration to the changed parameters. In this way, a constant quality of the water to be discharged is guaranteed all the time.

The water that is able to be discharged then flows from the bioreactor into the receiving waters (on-site preflooder) via a pipe. The produced sludge is led to the fermenter with the concentrate.

Scheme



The volume that can be treated per TerraOrganic module depends on the selected concentration level. This is determined by the admissible water volume in the fermenter and may be fixed individually by the operator.

However, the volume of the produced water in a quality that can be discharged into the on-site preflooder is always constant.

With growing concentration, the energy content of the fermenter volume flow increases, the max. possible concentration depending on the starting concentration (pumpability).

	50% Concentration	75% Concentration	95% Concentration
treated surface water in m^3 / day	15,0	11,2	8,1
into the on-site preflooder	max. 3	max. 3	max. 3
evaporation in m^3 / day	max. 4,5	max. 4,5	max. 4,5
concentrate in fermenter in m^3 / day (including sludge of the bioreactor)	min. 7,5	min. 3,7	min. 0,6

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Inlet parameters of surface waters and silage effluents to be treated:

- temperature: 0°C to arbitrary
- COD load: arbitrary
- total nitrogen Ntotal: arbitrary
- total phosphorus Ptotal: arbitrary
- ammonium NH4-N: arbitrary
- pH value: arbitrary

Outlet parameters of waters to the on-site preflooder:

- max. amount: 3,5 m^3/day
- COD load: < 100 mg/l
- total nitrogen Ntotal: < 20 mg/l
- total phosphorus Ptotal: < 2 mg/l
- ammonium NH4-N: < 10 mg/l
- pH value: > 6.5

Technical data of system:

- dimensions
  - TerraOrganic for surface waters & bioreactor (WxDxH): 40' HC container 12.2 x 2.4 x 2.9 m
  - TerraOrganic for surface waters (WxDxH): 20' HC container 6.1 x 2.4 x 2.9 m
- thermal capacity (depending on situation on site):
  - TerraOrganic for surface waters & bioreactor: 120 kWth
  - TerraOrganic for surface waters: 120 kWth
- inlet flow temperature range: 80–95 °C
- return flow temperature range: 70–85 °C
- electrical power:
  - TerraOrganic for surface waters & bioreactor: approx. 8 Kwel
  - TerraOrganic for surface waters: 6 kWel
- electrical power connection: 380 V AC, 50/60 Hz
- remote monitoring: possible via mobile phone network

Others:

- No use of chemicals.
- Eligible to German "KWK Bonus".

Ambient conditions:

- Outside temperatures for unlimited operation
  min. down to -15 °C, at temperatures below the flow through the bio reactor will be slower
- max. up to 45 °C, at temperatures above a control panel cooling is required

General:

- Changes on the energy side have impacts on the daily production.
- Performance data may vary on the grounds of the ambient parameters.
- Subject to changes.

Terrawater GmbH, February 2017

terra water

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