Unpleasant smells with aerated sewage treatment plants

Principle:

Due to the nature and composition of wastewater, it is impossible to guarantee that a small wastewater treatment plant does not produce any odour. (This is independent of the make of the product because it is in the nature of the biological processes.) Unpleasant odours are produced during the treatment of wastewater by the degradation of organic substances by micro-organisms in anaerobic conditions. Well-planned treatment plants reduce potential problems with smells. It is necessary to determine whether a treatment plant develops odour emissions as a result of carbon decomposition (which is normal) or whether a plant generates hydrogen sulfide (as a result of rotting, which is not normal for an aerobic treatment plant).

In light of the following conditions, a check should always be made on the aeration function of an aerobic plant to ensure that it is operating correctly (aeration profile, oxygen concentration, rearrangement as a result of maintenance work).

In addition, the following points relating to the structure of a small sewage treatment plant should be considered during the planning stage:

Aeration of the plant:

Adequate aeration and ventilation of a treatment plant should always be assured. DIN 1986 T 1 and T 100 as well as DIN EN 12056 govern the requirements for a functioning ventilation of wastewater pipes. The ventilation ducts for this should be installed "above the roof". The high discharge opening and the chimney effect (dissipation of the odour) avoids unpleasant smells for the residents.

The main sources of smell (small wastewater treatment plants) should be built as far away as possible from emission-sensitive areas (patio, frequently used paths etc.).

Reasons for unpleasant smells:

Should unpleasant smells still occur, the place of discharge should first be isolated and localised. In the past the following areas could be recognised as being possible "weak points":

- Roof ventilation in accordance with DIN 1986 T 1 does not exist or was poorly installed. If the structure does not allow ventilation via the roof it might be advisable to install an additional ventilation duct to the tank. Nuisance very often occurs when existing tanks (previously stagnant air) are retrofitted with a ventilation system (ventilation of the gas compartment in the pre-chamber).
- The inlet and outlet sewers to the small wastewater treatment plant were installed at too steep an incline (resulting in air being "swept along").
- Discharge points without a siphon or dried-out odour traps. (Check whether outlet sections are filled with water).
- "Unplanned" connection and ventilation points. Disused connections on the drainage pipe could represent possible sources of smells indoors and outdoors.

- Manhole covers. Covers of small wastewater treatment plants in accordance with DIN 1229 and DIN EN 124 are not designed to be odour-tight. It is therefore not possible to prevent gases from escaping. A subsequent structural "sealing" might be considered.
- Over-long pipework resulting in stagnant wastewater in the sewer pipe.
- Indoor duct openings that were never sealed.
- Air connections to fat/grease separators or too much fat in the pre-chamber

Since the circumstances specific to each building have to be considered when installing a small wastewater treatment plant, especially when an existing tank is being retrofitted with an SBR plant, unpleasant smells may still occur even after the points listed above have been taken into account.

Remedial actions:

The following step should only be taken after it has proved impossible to find the error with the preceding checklist.

Seal off all ducts leading into the treatment plant.
Submerge all inlet pipes that have a bend below water level.
Install a separate ventilation extraction pipe for the biological reactor (it is sufficient to use a pipe that is equal to approx. twice the cross-section of the aeration pressure pipe, i.e. if this is 25 DN then the ventilation pipe should be approx. 50 DN)
This can be a hose located in the air space above the water line in the biological reactor. The other end should be installed sufficiently far away from housing or public thoroughfares. This serves to bundle the smell and to channel it in another direction. It is important that this is **the only connection** that exits the biological reactor carrying air (apart from the ventilation pipe from the blower)

If this step is not successful, it proves that the wastewater treatment plant is not the cause of the smell since there is no other connection to the air (continued search in sewer pipes, fat separators, siphons or other plant components concerned with water engineering installed upstream of the treatment plant.

Furthermore, we strongly recommend that treatment plants made from mineral materials be inspected at regular intervals since corrosion damage can result in the event of insufficient ventilation.