Unpleasant odour at small waste water treatment plants

Basic principle:

Due to the nature of waste water, it is impossible that a small waste water treatment plant is completely odourless. (This is irrespective of the make and is caused by the nature of the biological processes.) Odour is arising during waste water treatment by the degradation process of organics by micro-organisms under anaerobic conditions. Well-planned (and later well-maintained) plants reduce the eventuality for unpleasant odour. Therefore, it has to be differentiated whether odour emissions are arising during e. g. carbon degradation (which is normal) or when a plant generates hydrosulphides (due to digestion which is not normal for an aerobic plant).

Basically and first of all, the aeration function of the aerobic plant has to be checked for proper operation (aeration structure, oxygen concentration, mixing during maintenance operation mode) before taking any further actions. Mechanical defects might lead to increased digestion and therefore to increased release of odour.

Furthermore the following items have to be considered during the planning phase of a small waste water treatment plant:

Aeration of the plant:

Sufficient ventilation of the waste water treatment plant has to be provided basically. The standards DIN 1986 T 1 and T 100 as well as DIN EN 12056 specify the demands for an effective ventilation of waste water pipes. Please consider that the ventilation lines have to be led on top. Thus, unpleasant odour for the inhabitants can be avoided effectively due to a high exhaust port and the chimney effect (blowing-over of the odour).

Possible sources of origin (small waste water treatment plants) should be installed as far away as possible from especially odour-sensitive areas (terrace, frequently used footpaths, bedroom window).

Reasons for unpleasant odour:

In case unpleasant odours might arise anyhow, the emission location has to be defined and located first. During the past, following areas turned out to be “weak points”:

- The roof ventilation according to DIN 1986 T 1 is not existent or is carried out inadequately. In case ventilation over top is not possible on site, possibly laying an additional aeration pipe to the pit is recommendable. Especially during retrofittings of existing pits (before without air flow), frequently unpleasant odours arise after modification of the ventilation device (exchange of the expansion space in the primary treatment).
- The supply and effluent pipes to the small waste water treatment plant were laid in too steep incline (too high air speeds might lead to short-circuits).
- The planned ventilation pipe (possibly supply pipe) has lowered in the structure area and therefore an unplanned water-seal arose.

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- Waste water disposal points inside the house without water seal or dried-up anti-syphon traps are existing. (Please check if discharge devices are filled with water.)
- Unplanned connection or ventilation points: closed connections to the drainage lines might form possible odour sources for inside or outside areas.
- Manhole coverings: the coverings of small waste water treatment plants are not hermetically sealed according to DIN 1229 resp. DIN EN 124. Therefore, escaping gases cannot be avoided. An additional lining provided by the customer would be a possible solution.
- Another reason might be long pipes and therefore lentic and rotting waste water inside the pipe.
- Empty pipe openings to the house which were not hermetically sealed.
- Access of air to grease separators or high emergence of grease in the primary treatment.

As during installation of a small waste water treatment plant and especially during retrofittings of already existing pits with a SBR-system, the object-specific conditions have to be considered, unpleasant odours might arise despite considering the above mentioned facts!

Remedy:

Only in case the odour emission could not be stopped by the before mentioned check list, following actions can be taken.

- Sealing of all empty pipe openings leading into the plant.
- Immersing of all inflow pipes with a bow under the water level.
- Installation of a separate ventilation pipe from the biology (a pipe of the approx. double diameter of the ventilation pressure pipe is sufficient; e.g. at a DN 25, a DN 50 mm ventilation pipe is necessary).

The other end should be placed far away enough from housings or traffic areas. Thereby, the odour is concentrated and is led to another direction. It is important, that this is **the only connection** which is leading air from the biological reactor to the outside (besides ventilation line of the air blower).

Important:

Never seal a waste water treatment tank air-tightly! An air vent (over roof) must be available so that harmful gases can escape! Tank construction materials and built-in parts might be destroyed due to non-ventilated tanks.

Tip:

Gases resp. odours from small waste water treatment plants are invisible. The emission points inside the closed waste water treatment plant can be discovered by directed fog (e.g. “smoke-bomb” of the fire brigade). Fog or smoke also visualise leakages under hollow bottoms or at pipes on the surface so that the same can be sealed selectively.

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