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From Experience

Wastewater Pretreatment Systems PART 2

In the Summer issue of EH&S From Experience, we outlined six signs that you may need to install a wastewater pretreatment system...or improve the one you have. Based on your research and/or discussions with your local sewer department, if you have determined that it's time for a new or upgraded system, the next step in the process is to determine the type of pretreatment system you need. While the types of pretreatment systems can vary widely, the most common types are systems which:

1. Adjust pH
2. Remove Fats, Oils or Greases (FOG)
3. Reduce Total Suspended Solids (TSS)
4. Reduce dissolved pollutants, e.g., Chemical Oxygen Demand (COD) or Biochemical Oxygen Demand (BOD)

The first three pretreatment types are chemical or physical processes which commonly fall into a category known as Primary Treatment. From a cost perspective, Primary Treatment systems tend to be the least expensive treatment options, with costs increasing with the number of pollutants that need to be removed. Typical options for Primary Treatment include:

- **pH Adjustment Systems.** pH adjustment can be done in an underground basin that is mixed and has both a pH sensor to measure the pH as well as a system for chemical delivery. The sensors inform the control system which chemicals to add, and the resulting reactions adjust the pH into the acceptable range for discharge into the sewer. Other common pH adjustment systems use an above ground mixed tank. These are typically less costly than the underground systems and allow for easier maintenance of equipment.
- **Grease Interceptors.** FOG reduction is most economically achieved with a grease interceptor. This underground basin allows the wastewater time to separate water from oils, based on the density differences between those substances. A thick layer

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The federal rule for pre-paid Universal Waste (UW) containers (40 CFR 273.15) states that storage is allowed for one year once the first UW material (e.g., batteries, fluorescent bulbs, pesticides) enters a container. However, it is possible that these containers may not be filled within the allotted time. In such circumstances, it may be possible to continue to use the container past the one-year date...if it is done "solely for the purpose of accumulating quantities to facilitate proper recovery, treatment, or disposal." Keep in mind, though, that proper documentation is essential! For more information, contact Hixson or visit the USEPA website.

of greasy sludge will float in the basin and be pumped out on a regular schedule, while the cleaner water follows a path under the sludge, discharging to the sewer system. With these systems, reduction of FOG is on the order of 60 to 90%. Grease interceptors also reduce TSS and some BOD that is inherent in the suspended solids.

- **Air Floatation Systems.** These systems are employed when grease interceptors would not be enough, due to high levels of FOG or flows that would cause the size of the grease interceptor to be unwieldy. Air floatation systems typically involve a pH adjustment step, followed by chemical additions that help the FOG clump into larger, more easily floated particles. Air is dissolved into the wastewater stream where it makes micro-bubbles that assist the clumped FOG to rise quickly. The resulting sludge layer "float" is pumped to a tank to be hauled away and the cleaned water is discharged to the sewer. Reduction of FOG is on the order of 90 to 99%. Air floatation technology is also very efficient at reducing TSS: A reduction of 95% or more reduction is normally observed.

If your facility needs to reduce COD or BOD, Secondary Treatment will be required. This is a biological treatment which uses bacterial and other single-celled or microscopic organisms to "eat" the dissolved pollutants and remove them from the wastewater.

The processes that fall into the Secondary Treatment type are a large step up in terms of both complexity and cost, as you are essentially building a municipal system, but on a smaller scale. These systems need screens, equalization tanks, tanks that will contain the bacterial colonies, and several ancillary support tanks, pumps, and other equipment.

The two main types of Secondary Treatment systems are differentiated by the type of bacteria used: aerobic and anaerobic. Both have advantages, and selection is based mostly on the characteristics of the wastewater to be digested. After the main treatment step by the bacteria, further processing of the waste sludge (dead bacteria) and optional filtering steps are employed. Sensors and controls are also required to maintain optimal conditions for the colonies.

Of course, the selection of a wastewater system to treat your specific needs can vary widely so it is always a good idea to consult with a qualified engineering firm to understand your options.

RELATED CONTENT

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CONTACT US

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