

## DEFINITIONS AND TERMINOLOGY

- **Absorption.** The passage of one substance into or through another, e.g. an operation in which one or more soluble components of a gas mixture are dissolved in a liquid.
- **Activated Carbon.** A highly adsorbent form of carbon used to remove odorous and toxic substances from liquid or gaseous emissions. In waste treatment it is used to remove dissolved organic matter from wastewater.
- **Activated Sludge.** Sludge that results when primary effluent is mixed with bacteria-laden sludge and then agitated and aerated to promote biological treatment. This speeds breakdown of organic matter in raw sewage undergoing secondary waste treatment.
- **Adsorption.** An advanced method of treating waste in which activated carbon removes organic matter from wastewater.
- **Advanced Wastewater Treatment.** Any treatment of sewage that goes beyond the secondary or biological water treatment stage and includes the removal of nutrients such as phosphorus and nitrogen and a high percentage of suspended solids.
- **Aerobic Treatment.** Process by which microbes decompose organic compounds in the presence of oxygen and use liberated energy for reproduction and growth. Types of aerobic processes include extended aeration, trickling filtration, and rotating biological contractors.
- **Agglomeration.** The process by which precipitation particles grow larger by collision or contract with cloud particles or other precipitation particles.
- **Anaerobic.** A process that occurs in, or is not destroyed by, the absence of oxygen.
- **Bar Screen.** In wastewater treatment, a device used to remove large solids.
- **BOD (Biochemical Oxygen Demand).** A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water.
- **Biodegradable.** The ability to break down or decompose rapidly under natural conditions and processes.
- **Biological Treatment.** A treatment technology that uses bacteria to consume waste. This treatment breaks down organic materials.
- **COD (Chemical Oxygen Demand).** A measure of the oxygen required to oxidize all compounds in water, both organic and inorganic.
- **Chemical Treatment.** Any one of a variety of technologies that use chemicals or a variety of chemicals processes to treat waste.
- **Clarifier.** A tank in which solid is settled to the bottom and is subsequently removed as sludge.
- **Coagulation.** A clumping of particles in wastewater to settle out impurities. It is often induced by chemicals such as lime, alum, and iron salts.
- **Contaminant.** Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.
- **Dechlorination.** Removal of chlorine for a substance by chemically replacing it with hydrogen or hydroxide ions in order to detoxify the substances involved.

- **Decomposition.** The breakdown of matter by bacteria and fungi. It changes the chemical makeup and physical appearance of materials.
- **Denitrification.** The anaerobic biological reduction of nitrate nitrogen gas.
- **Diffused Air.** A type of aeration that force oxygen into sewage by pumping air through perforated pipes inside a holding tank and bubbling it through the sewage.
- **Digester.** In wastewater treatment, a unit process for degradation of sludge.
- **Disinfectant.** A chemical or physical process that kills pathogenic organisms in water. Chlorine is often used to disinfect sewage treatment effluent, water supplies, wells, and swimming pools.
- **DO (Dissolved Oxygen).** The oxygen freely available in water. Dissolved oxygen is vital to fish and other aquatic life and for the prevention of odors. Secondary and advanced waste treatment are generally designed to protect DO in waste-receiving waters.
- **Dissolved Solids.** Disintegrated organic and inorganic material contained in water. Excessive amounts make water unfit to drink or to use in industrial processes.
- **Evaporation Ponds.** Areas where sewage sludge is dumped and allowed to dry out.
- **Filtration.** A treatment process for removing solid (particulate) matter from water by passing the water through porous media such as sand or a manmade filter. The process is often used to remove particles that contain pathogenic organisms.
- **Flocculation.** The process by which clumps of solids in water or sewage are made to increase in size by biological or chemical action so that they can be separated from the water.
- **Heavy Metals.** Metallic elements with high atomic weights, e.g., mercury, chromium, cadmium, arsenic, and lead. They can damage living things at low concentration and tend to accumulate in the food chain.
- **Ion Exchange Treatment.** A common water softening method often found on a large scale at water purification plants that remove some organisms and radium by adding calcium oxide or calcium hydroxide to increase the pH to a level where the metals will precipitate out.
- **Mechanical Aeration.** Use of mechanical energy to inject air into water to cause a waste stream to absorb oxygen.
- **Nutrient.** Any substance assimilated by living things that promote growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.
- **Organic Matter.** Carbonaceous waste contained in plant or animal matter and originating from industrial sources.
- **Pathogens.** Microorganism that can cause disease in other organisms or in humans, animals and plants. They may be bacteria, viruses, or parasites and are found in sewage. Fish and shellfish contaminated by pathogens, or the contaminated water itself, can cause serious illnesses.
- **pH,** A measure of the acidity or alkalinity of a liquid or solid material.
- **Physical & Chemical Treatment.** Processes generally used in large-scale wastewater treatment facilities. Physical processes may involve air stripping or filtration. Chemical treatment includes coagulation, chlorination, or ozone addition.

- **Pretreatment.** Processes used to reduce, eliminate, or alter the nature of wastewater pollutants from non-domestic sources before they are discharged into publicly owned treatment works.
- **Primary Waste Treatment.** First steps in wastewater treatment; screens and sedimentation tanks are used to remove most materials that float or will settle. Primary treatment results in the removal of about 30 per cent of carbonaceous biochemical oxygen demand from domestic sewage.
- **Raw Sewage.** Untreated wastewater.
- **Residual.** Amount of pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment.
- **Reverse Osmosis.** A water treatment process used in small water systems by adding pressure to force water through a semi-permeable membrane.
- **Sand Filters.** Devices that remove some suspended solids from sewage. Air and bacteria decompose additional wastes filtering through the sand so that cleaner water drains from the bed.
- **Screening.** Use of screens to remove coarse floating and suspended solids from sewage.
- **Secondary Treatment.** The second step in most publicly owned waste treatment systems in which bacteria consume the organic parts of the waste. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. This treatment removes floating and settleable solids and about 90 per cent of the oxygen-demanding substances and suspended solids. Disinfection is the final stage of secondary treatment.
- **Sedimentation.** Letting solids settle out wastewater by gravity during wastewater treatment.
- **Settleable Solids.** Materials heavy enough to sink to the bottom of a wastewater treatment tank.
- **Skimming.** Using a machine to remove oil or scum from the surface of the water.
- **Sludge.** A semi-solid residue from any number of air or water treatment processes.
- **Stabilization.** Conversion of the active organic matter in sludge into inert, harmless material.
- **Suspended Solids.** Small particles of solid pollutants that float on the surface of, or are suspended in sewage or other liquids. They resist removal by conventional means.
- **Tertiary Treatment.** Advanced cleaning of wastewater that goes beyond the secondary or biological stage. It removes nutrients such as phosphorus and nitrogen and most BOD and suspended solids.
- **TDS (Total Dissolved Solids).** The total amount of dissolved solid materials present in an aqueous solution.
- **TOC (Total Organic Carbon).** TOC is a measure of the amount of carbon in a sample originating from organic matter only. The test is run by burning the sample and measuring the CO<sub>2</sub> produced.

- **TOD (Total Oxygen Demand).** A measure of the oxygen demand of wastewater by injecting a small volume of the sample into oxygen containing carrier gas and passed through a catalyst bed at 900 °C. The carbon, nitrogen, and many minerals are converted to their oxides by consuming oxygen from the carrier gas, this amount of gaseous oxygen consumed is measured and given as the TOD of the sample in mg oxygen/liter of wastewater.
- **TSS (Total Suspended Solids).** A measure of the suspended solids in wastewater, effluent, or water bodies.
- **Trickling Filter.** A coarse, biological treatment system in which wastewater is trickled over a bed of stoned or other material covered with bacterial growth, leading to bacterial break down of the waste.
- **Turbidity.** A cloudy condition in water due to suspended silt or organic matter.
- **VSS (Volatile Suspended Solids).** The suspended organic fraction which will oxidize and will driven off as gas at temperature  $550\text{ °C} \pm 50\text{ °C}$ .
- **Waste Treatment Plant.** A facility containing a series of tanks, screens, filters, and other processes by which pollutants are removed from water.