



What is activated sludge?

The process was discovered by the aeration of holding tanks for distributing raw sewage onto land. It was noticed that the nature of the sewage improved during aeration, which was applied mainly to prevent odours from forming. This improvement was even more marked when some of the sludge that was suspended and settled to the bottom during decanting, was re-suspended during aeration of the following batch of sewage. This led to the Fill and Draw method of treatment by which the sludge was allowed to settle to the bottom before decanting the effluent, filling the tank again with raw sewage, re-suspending the sludge by aeration and repeating the decanting process. It was noticed that under these conditions the sludge became more active and this process was referred to as **activating the sludge**. The basic layout of an activated sludge plant is illustrated in the sketch below. The aeration basin is followed by a clarifier, where the active sludge is separated from the liquid and returned (pumped) to the aeration basin, together with the raw influent. The aeration basin or reactor, the clarifier and return sludge pumping form integral parts of an activated sludge system.

The wastewater, containing numerous organic compounds, serves as a food source for micro-organisms in the mixture of activated sludge. Air is supplied for the respiration or breathing of these organisms and also for keeping the organisms in suspension and in contact with the food source. The organisms use the food to obtain energy, thereby growing to form new micro-organisms, carbon dioxide and water. The mass of organisms is constantly passed to the clarifier to be separated by settling and recycled by pumping back to the aeration basin (return activated sludge – RAS). The surplus sludge (waste activated sludge – WAS) formed by the additional growth of organisms must be removed from the system to keep the total mass of organisms constant.

