INTRODUCTION

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Question # 01: Discuss activated sludge process with the help of schematics.

➤ Activated sludge

The activated sludge process is a type of wastewater treatment process for treating sewage or industrial wastewaters using aeration and a biological floc composed of bacteria and protozoa.

The general arrangement of an activated sludge process for removing carbonaceous pollution includes the following items: An aeration tank where air (or oxygen) is injected in the mixed liquor. This is followed by a settling tank (usually referred to as "final clarifier" or "secondary settling tank") to allow the biological flocs (the sludge blanket) to settle, thus separating the biological sludge from the clear treated water.

➤ Activated-Sludge Process with the help of Schematic

An important part of the municipal wastewater treatment is the BOD-removal. The removal of BOD is done by a biological process, such as the suspended growth treatment process. This biological process is an aerobic process and takes place in the aeration tank, in where the wastewater is aerated with oxygen. By creating good conditions, bacteria will grow fast. The grow of bacteria creates flocks and gases. These flocks will removed by a secondary clarifier.

On the following picture you see a schematic diagram of an Activated-Sludge System. This system is usually placed between the primary clarifier and the disinfection of a municipal wastewater treatment plant. A Flow Diagram of a Municipal Wastewater Treatment Plant with a suspended-growth process, gives you a better picture of the whole process of wastewater treatment.

The parameters of which the symbols are shown in the schematic diagram, are used to model a suspended growth process. In a Summary of all the Related Calculations you can calculate all the necessary design characteristics of a Complete-Mix Suspended Growth Process. By choosing in the navigator besides, you can calculate the design characteristics separately and find some extra information about the calculation and the theory about the characteristic design parameter.
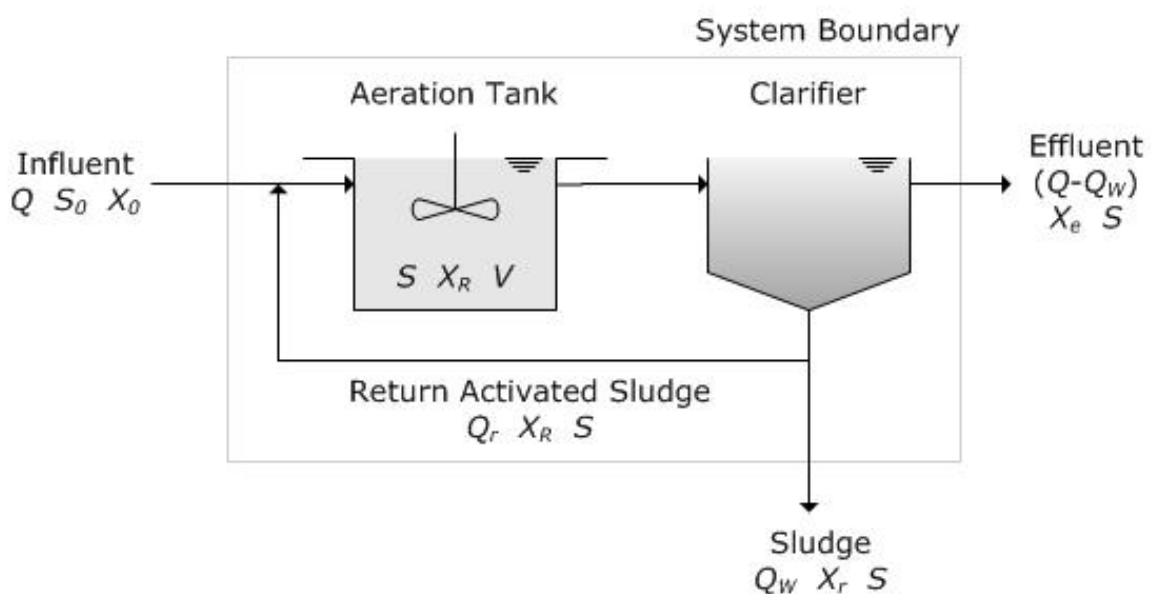
Where:

- *Q =   flowrate of influent   [m3/d]*

- *QW =   waste sludge flowrate[m3/d]*

- *Qr =   flowrate in return line from clarifier   [m3/d]*

- *V =   volume of aeration tank   [m3]*

- *S0 =   influent soluble substrate concentration (bsCOD)   [BOD g/m3] or [bsCOD g/m3]*

- *S =   effluent soluble substrate concentration (bsCOD)   [BOD g/m3] or [bsCOD g/m3]*

- *X0 =   concentration of biomass in influent [g VSS/m3]*

- *XR =   concentration of biomass in return line from clarifier   [g VSS/m3]*

- *Xr =   concentration of biomass in sludge drain   [g VSS/m3]*

- *Xe =   concentration of biomass in effluent [g VSS/m3]*

THE END