water & forestry
Department:
Water Affairs and Forestry
REPUBLIC OF SOUTH AFRICA

Water Quality
Water treatment processes
Sedimentation

Sedimentation is the process in which the flocs that have been formed during coagulation and flocculation are allowed to settle from the water.

Sedimentation is a suitable process for the removal of flocs formed from silt and clay particles that are relatively heavy and settle readily. However, certain flocs are relatively light and do not settle readily and a process such as flotation must be used for their removal. Light flocs are formed when algae or organic matter is flocculated.

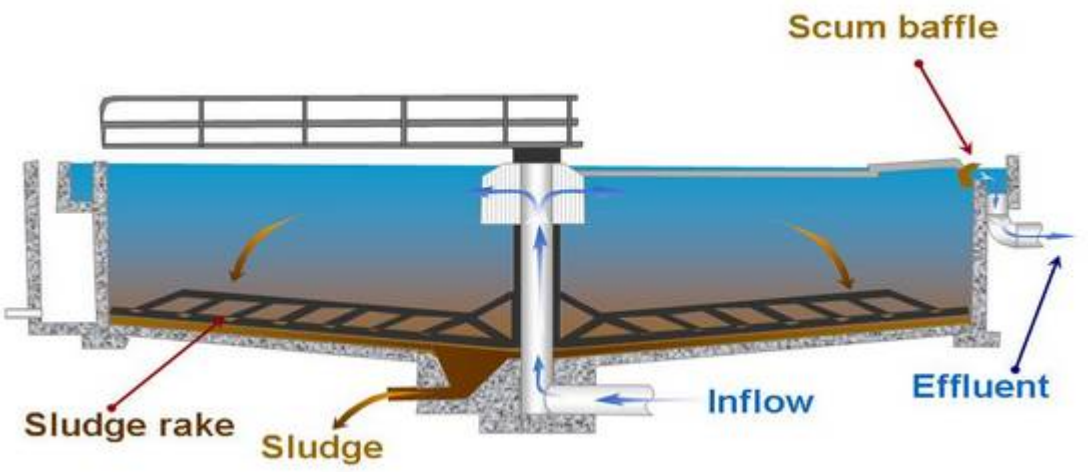
The flocs collect as sludge at the bottom of the sedimentation tank from where it must be removed on a regular basis. The clean water leaves the sedimentation tank through collection troughs located at top of the tank.

There are a variety of designs for sedimentation tanks available. These include:

- **Large rectangular** tanks in which the water enters one side and leaves at the other end. This type id normally used at large conventional treatment tanks.
- **Circular tanks** with flat or cone shaped bottoms are also used, especially at smaller works. Flocculated water enters the tank at a central distribution section and clarified water leaves the tank at collection troughs at the circumference of the tank. The design and flow conditions in a sedimentation tank must be such that the minimum amount of flocs leaves with the clarified water.

The flocs that settle in the sedimentation tank collect at the bottom of the tank as sludge from where it must be removed on a regular basis to prevent accumulation in the tank. If sludge is not withdrawn regularly according to operating schedules, the quality of the clarified water may deteriorate due to re-entrainment.

The sludge from the sedimentation tank has a large pollution potential because it contains all the suspended material removed from the water together with the chemicals used for coagulation. It must therefore be disposed of in a proper manner to prevent contamination of water source. The sludge is withdrawn from the sedimentation tank in a diluted form (2-5% solids) and is sometimes thickened (Excess water removed) before disposal. At smaller treatment works sludge is disposed of in sludge lagoons. The lagoons are large holding dams in which the sludge compacts and clear water accumulates on top of the sludge. The clear water may be recycled to the inlet of the plant.



References:
DWAF (2002). Quality of domestic water supplies. Vol. 4: Treatment Guide. WRC No. TT 181/02, p. 24.