



What waste products are generated during water treatment?

Substances removed during water treatment form waste products. These substances include:

- 🔥 **debris** removed from the raw water by screens
- 🔥 **suspended and colloidal** material removed during sedimentation and filtration
- 🔥 In the case of specialised processes, different **waste streams** are formed such as the brine from desalination plants.

How can waste be handled and disposed of?

There are different methods of handling and disposal of waste products. Organic wastes must be stabilised before disposal, while inorganic wastes are normally concentrated or dewatered before disposal.

- 🔥 **Sludge** is produced at a water treatment plants. It contains colloidal and suspended material that settled in the sedimentation tank. The quantity and quality of the sludge depends on the raw water quality and the type of coagulant and flocculants used. For turbid waters (where the suspended solids concentration is more than 1000 mg/ℓ), about 1% to 3% of the water treated, can be generated as sludge.

Sludge must be discharged in its most concentrated form, as the water discharged with the sludge is very seldom reclaimed on a small works and is therefore lost.

- 🔥 At small water treatment works, holding ponds or dams are provided of sufficient size to hold all the sludge produced at the water treatment works. The normal practice is to have two dams side by side, which would allow the waterworks operator to take one dam out of operation, allow the clear water on top of the sludge layer to drain out, or evaporate. The sludge is allowed to dry out after which it can then be removed from the dry pond and used as a landfill on a suitable site.
- 🔥 The solids remaining in the water after sedimentation are removed in the sand filters. The suspended solids remain in the upper layer of the sand in the filter bed and are removed during back washing of the filter bed, forming the **filter wash water** which normally contains 100 to 1000mg/ℓ solids. In small plants wash water is gravitated to a holding tank or sludge lagoon, where most of the suspended matter settles and the overflow runs into the nearest stream. At larger works, the supernatant from the wash water is returned to the head of the works, after settling of the suspended solids. At an effective water treatment plant, the filter wash water volume is between 2% and 5 % of the water treated volume.
- 🔥 **Chemical wastes** are produced in most treatment works. The chemicals used at the plant (coagulants, stabilizing agents and disinfectants) are fed into day tanks, where they are diluted to be fed, with dosing pumps or gravity feeders to the incoming raw water. When these tanks are cleaned, chemical wastes are produced. It is good practice to clean these holding tanks on a regular basis and drain the residues into the filter wash water/sludge system where it will find its way in the sludge lagoons.

The residues should not be discharged into a natural water course as it could lead to fish kills as slugs of the residues could dramatically change the Ph conditions in small ponds.

- 💧 **Screenings** are substances removed by screens placed at the entrance of a water treatment works. The purpose is to keep out weeds, algae and floating debris. These screenings consist of grass, weeds, wood, etc. and could be disposed of in fills or could be burned.
- 💧 **Algae** can be removed by mechanical screens or strainers, or by a flotation plant. These organic residues can be disposed of in sludge lagoons, to an existing sewage works or dumped on waste heaps. The dried algae can also be composted and then disposed of in landfills.
- 💧 The processes used for the removal of dissolved inorganic substances always produce **rejects and concentrates**, which must be disposed of and which require special methods to ensure that the environment is not polluted. The usual method of disposal is in a lined dam with sufficient area to allow for full evaporation and ensuring that overflow or leakage does not take place.