

Treatment of waste from pulp industry

TREATMENT OF WASTE FROM PULP INDUSTRY

PULP AND PAPER INDUSTRY• Use wood ad raw material to produce paper, pulp, board and other cellulose based products. • Baggase, hemp, straw are also used • Composition of the pollutants in the effluent depends on the raw material used.

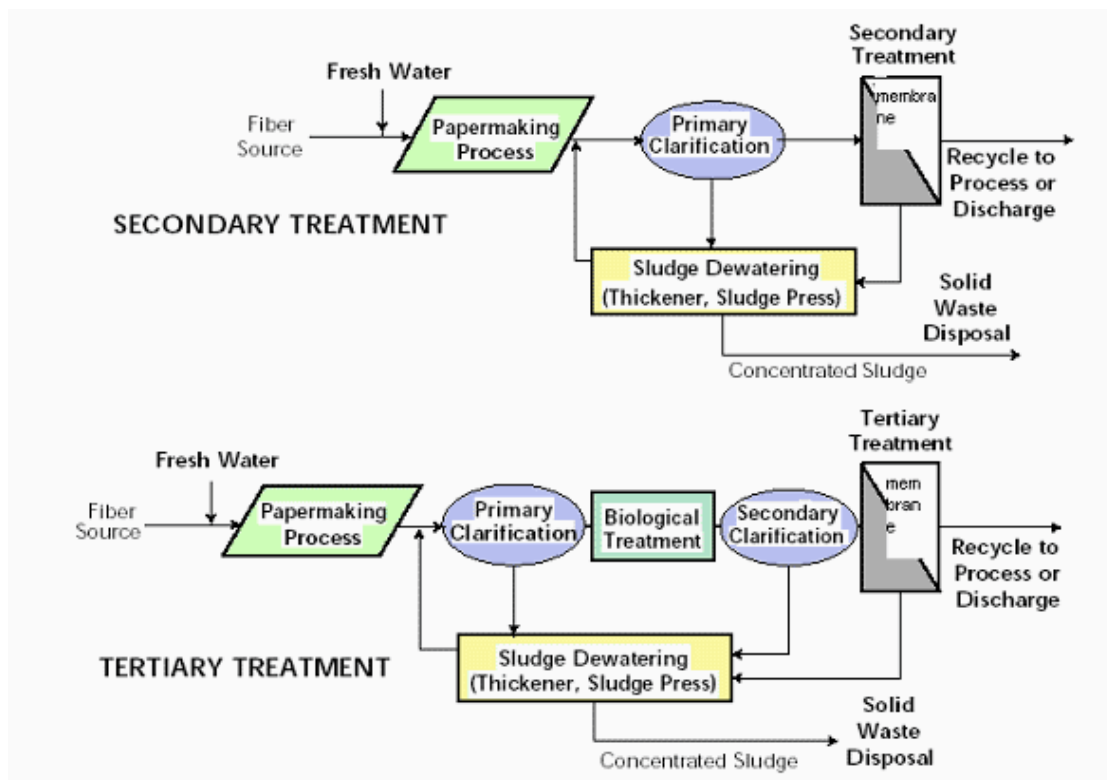
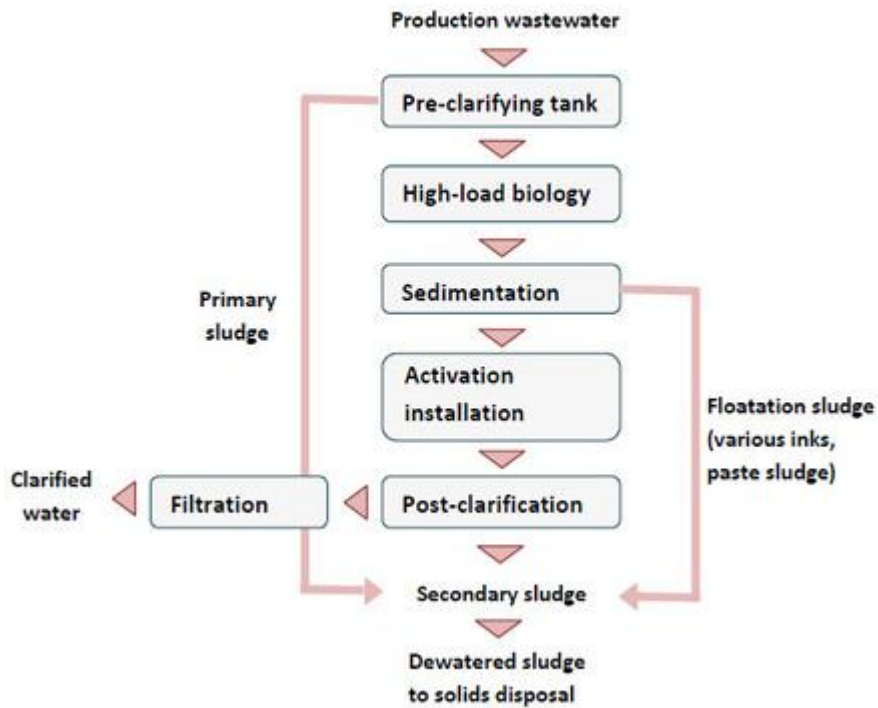
EFFLUENTS•

Waste water- of paper produced • Contain solids and dissolved matter. • Potentially very polluting • COD as high as 11000mg/l

SOURCE EFFLUENT CHARACTERISTICS

Water used in wood handling/ Solids, BOD, colourde barking Chip digestor and liquid evaporator Concentrated BOD, can contain concentrate reduced sulphur“ white waters” from pulp Suspended solids, can have screening, thickening and cleaning significant BOD Bleach plant washer filtrates BOD, color, chlorinated organic compounds Paper machine water flows Solids, often precipitated for reuse Fiber and liquor spills Solids, BOD, color

Current Wastewater Treatment Process in Paper Industry²



Pollution Characteristics	Conventional treatment
1. High BOD	(a) Chemical recovery of lignin (b) Lime treatment for colour removal (c) Physical treatment (d) Biological treatment
2. High BOD/COD rate	
3. Strong colour	
4. High alkalinity	
5. High sodium content	
6. Lignin, high resistant to Biological treatment	

EFFLUENT TREATMENT SCHEME

1. SCREENING

Screens- to remove coarse, bulky and fibrous components from effluents. Grid chambers and settling tanks are used. Efficiency of screening depends on the spacing between screen bars - fine screening, spacing < 10mm - medium screening, spacing 10-40mm - coarse screening, spacing > 40mm

2. SEDIMENTATION

Using gravity to remove suspended solids from water. Removal of suspended particles by sedimentation depends on size and specific gravity of the particles. Sedimentation tanks are used. Settled sludge is removed. High efficiency is achieved in the subsequent treatment processes.

3. Coagulants & Flocculants

Removal of suspended particles in water requires conditioning using coagulants and/or flocculants. These chemicals aid in removing solids and turbidity from water, improving water clarity and also assist in removing dissolved metals from water. Coagulants and flocculants destabilize particles in water by changing their surface charges and causing them to group together into a larger solid.

4. Clarifier or DAF system

Settlement clarification is the best process for removing coarse, heavy contaminants from water. clarifiers include an integrated rapid mix tank and floc tank. As water enters the tank, mixers agitate chemicals into the solution and create large agglomerations of solids. Water then flows up through inclined parallel plates. As the solids make contact with the plates, they settle downward into the sludge hopper for removal. The treated water is drawn off the top of the vessel for discharge or transfer to the next process.

5. BIOLOGICAL TREATMENT•

Degrade pollutants dissolved in effluents by the action of microorganisms. • Pollutants are used as nutrients • Microorganisms use these pollutants to live and reproduce.

AEROBIC DIGESTION• Bacteria, fungi, protozoa, rotifiers and other microbes • Oxygen is supplied to the effluent in the form of air by special aeration equipment • Complete biological treatment of paper mill effluents

6. TERTIARY TREATMENT•

To remove specific waste water constituents that cannot be removed by secondary treatment • Nitrogen, phosphorous, additional suspended solids, refractory organics or dissolved solids • It involves- ozone treatment, membrane filtration techniques.

7. OZONATION•

Ozone has the ability to remove solids from waste water by oxidation • A foam develops when waste water is ozonated • This foam traps a significant amount of solids and nutrient material such as phosphates and nitrates

ADVANTAGES•

Eliminates odors • Removes color, phenolics and cyanides • Reduces turbidity and surfactants • Increases dissolved oxygen • No significant toxic side products

8. Filtration system

Removal due to the impurity's particle size. The filtration of suspended solids by occlusion removes particles based on size. Particles are occluded, or held back, due to their inability to pass through the pores of a barrier of some sort. The barrier might be a packed bed of sand, a fiber mat, or a membrane surface. Filtration by occlusion is often called "surface filtration", since it occurs on the surface of the filtering media. Sand and Multi-Media filters are some of the filters working on this principle