



## SEWAGE TREATMENT PLANTS

### Overview of sewage treatment

#### 1. What is sewage treatment?

**Sewage treatment**, or **domestic wastewater treatment**, is the process of removing contaminants from wastewater and household sewage, both runoff (effluents) and domestic. It includes physical, chemical and biological processes to remove physical, chemical and biological contaminants.

#### 2. Objective of sewage treatment:

##### To Produce:-

A waste stream (or treated effluent), solid waste or sludge suitable for discharge or reuse back, Remove contaminates, toxic, disease causing materials which are harmful for environment , human health and reduce pollution.

#### 3. Origins and types of sewage

##### Domestic sewage

Basically contains graywater ( Kitchen waste) and soil ( Toilet), bathrooms, washing laundry etc. Sources houses, institutions, and commercial and industrial establishments, mercantiles etc. Gray water from kitchen contains high amount of oil & grease Soil or human excreta from toilets contains high organic contains, pathogen containing micro organisms. Wastewater from bathrooms, kitchens etc contains high amount of soaps, detergents, solids, chemicals etc. In India commonly all wastewater is transported through common drainage system hence causing sewage treatment tedious. New housing projects have dedicated pipelines for different wastewater transportation.

## GENERAL QUALITY OF SEWAGE INLET CHARACTERISTICS

### Range Parameters

Sewage Nature of Waste

5250 to 400 mg/l - BOD

600 to 800 mg/l - COD



50 mg/l max - Oil and grease

250 mg/l - Suspended Solids

6 to 8 - pH

## Types of sewage treatment

Basically sewage/ wastewater treatment is classified as:

### Primary/ Preliminary Treatment

Physical and chemical treatment

- Removes floating objects/ screenings, grit, solids via physical solid – liquid separation by gravity.

### Secondary treatment

Biological wastewater treatment

Removes organic contains ( COD, BOD ) which are most critical parameters by using microorganisms.

### Tertiary / final treatment

Chemical oxidation, disinfection, filtration, ion exchange etc.

- Removes trace organics, fine solid particles, pathogens, bacteria, colour, odour, and makes water useful for reusable\*

## Efficiency of treatment steps

Primary treatment: Removes ~25- 30 % pollutants from wastewater

Secondary treatment removes~60-65% of pollutants from wastewater

Tertiary treatment removes ~4-5 % pollutants from wastewater

Hence most important step is secondary or biological treatment.



## Secondary or biological treatment

**Bacteria and other microorganisms use waste water pollution as their nutrition and grow as this happens in natural waters or soils:**

in/on free floating flocs, separation from the treated effluent by sedimentation or membranes (activated sludge process, MBR) on a support medium (slag, stones, clay and plastic material, soil particles); only excess sludge separated from treated effluent by sedimentation or filtration (trickling filters, biofilters, rotating disks, constructed wetlands, etc.)

## Conventional biological treatment overview

Conventional biological treatment is simple activated sludge process. The microorganisms which are specially acclimatized for specific waste degrades organic matter hence reduce pollutant load this process is carried out in presence of air.

The MLSS (Mixed liquor suspended solids) content in this process is 3000- 4000 mg/l  
The treatment requires Pre treatment and post treatment of wastewater to achieve discharge norms.

This process is most common treatment process and proven however it has many limitations.

The capital cost ( installation cost) / operation & maintenance cost, oxygen requirement, efficiency, space requirement is high.

Treated water is not suitable for reuse application.

The open treatment units, causes nuisance, odor problems.

Now days outdated treatment process and being replaced by higher modifications of conventional wastewater treatment process.

**Aqua Clean Systems Provide Complete solution for Advance waste water technologies :**

MBBR / FAB (moving bed bio reactor or fluidized aerobic reactor)

### WHAT IS FAB REACTOR

**MBBR/FAB REACTOR is also a hybrid aerobic process that incorporates two different biological growth systems viz., attached growth process and suspended growth process. Media used for providing surface for microbial growth is in Floating /moving condition.**

### Process Description

It involves suspended & attached growth pattern of biological mass in a single reactor.

FAB Media is used as a medium for attached growth where the media provides surface area of 400 m<sup>2</sup>/m<sup>3</sup>. Where microbes starts growing uniformly.



## ADVANTAGES

- Significant reduction in the space requirement due to high media specific surface area
- Reduced Power consumption due to elimination of sludge recirculation
- No moving parts and hence less maintenance
- Easy up-gradation of existing suspended growth wastewater treatment plant.
- High BOD Loading rate
- High resistance to shock loads
- Compactness of the plants makes possible for indoor installations

