



# Treatability Study

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## TREATABILITY STUDY

- **What is a treatability study?**

- A wastewater treatability study is a study or a test that tells **us if the wastewater can be treated** and **how it needs** to be treated.

- If the study is done correctly, it will clearly identify the problem you're seeing in your wastewater stream, helping ensure the proper treatment solutions are considered.

- For wastewater, the treatability study should also **factor in local discharge regulations** and whether you release your waste to **local municipality or to the environment**.

- For example, a plant that discharges to the local municipal sewer would need to **meet guidelines outlined by** the local municipal utility to avoid violating permits **for discharging into the sewer**.
- Other **facilities will have a central** and state permits for **discharging to a nearby waterway**, or what is called a watershed, and that would be to a local river, stream, lake, etc.
- So when you're looking for someone to complete your treatability study, make sure they understand what discharge regulations your plant is required to meet as they will be able to better understand the chemistry of the wastewater stream you should be aiming for.

## Flow Measurement, characterization & Treatability Studies

- Characterization of Samples:
- Samples: analyzed by **Physical & Chemical** methods.
- **Physical methods:** temperature determination, color, odor, total solids, suspended solids, settleable solids, dissolved solids, volatile solids, oil & grease.
- **Chemical methods:** pH determination, acidity, alkalinity, BOD, COD, Total Organic Carbon (TOC),
- **Cations:** aluminium, arsenic, boron, cadmium, chlorine, chromium, copper, iron, lead, manganese, nickel, zinc
- **Anions:** chlorides, ammoniacal nitrogen, nitrite nitrogen, nitrate nitrogen, phosphates, sulphates, sulphides, etc.

# Flow Measurement, characterization & Treatability Studies

- In addition to the above tests, samples may have to be tested for: **cyanides, phenols, detergents, cellulose, hemicellulose, tannin, lignin, etc.**: specific to certain industrial waste waters.
- Sample analysis: procedures: those specified in Standard Methods (**APHA-AWWA**) for analysis of water & waste water.
- Standard method: not available for a certain constituent: modify the analytical procedure.
- In such case: **special mention** @ modifications to be made.
- Modified procedure: **should be subjected to a RECOVERY TEST.**

# Flow Measurement, characterization & Treatability Studies

- Recovery Test: consists of:
  - a) Adding a **known amount** of specific pollutant to waste water.
  - b) Determining its **concentration** by modified procedure &
  - c) Comparing the results of **analysis** with original sample.
- Analysis results: **interpreted: preliminary** idea of treatment to be given.
- Quality requirements of **treated effluent** (pollution control authorities): studied to
  - i) enable designer to narrow down choice of unit operations & unit processes &
  - ii) Decide degree of treatment to meet effluent quality standards.

# Flow Measurement, characterization & Treatability Studies

- **Laboratory-scale** experiments conducted.
- samples: subjected to unit operations & unit processes: find out suitability of each for treatment.
- Following parameters determined:
  - i) Detention time
  - ii) **Food to microorganism ratio**
  - iii) Surface loading
  - iv) **Volume of sludge to be expected**
  - v) Settleability of sludge
  - vi) **Types & quantities of chemicals required**

# Flow Measurement, characterization & Treatability Studies

- **Laboratory scale** studies: do not establish achievable effluent quality or suitability of mechanical equipment to be used in full-scale plant.
- Pilot plant studies: may be required.
- Pilot plants: designed to offer a **certain degree of flexibility**
- Pilot plants: enable collection of data to be used in finalizing:
  - i) Design
  - ii) **Degree of automation, if any required**
  - iii) Material of construction
  - iv) **capital & running costs of full-scale plant**