

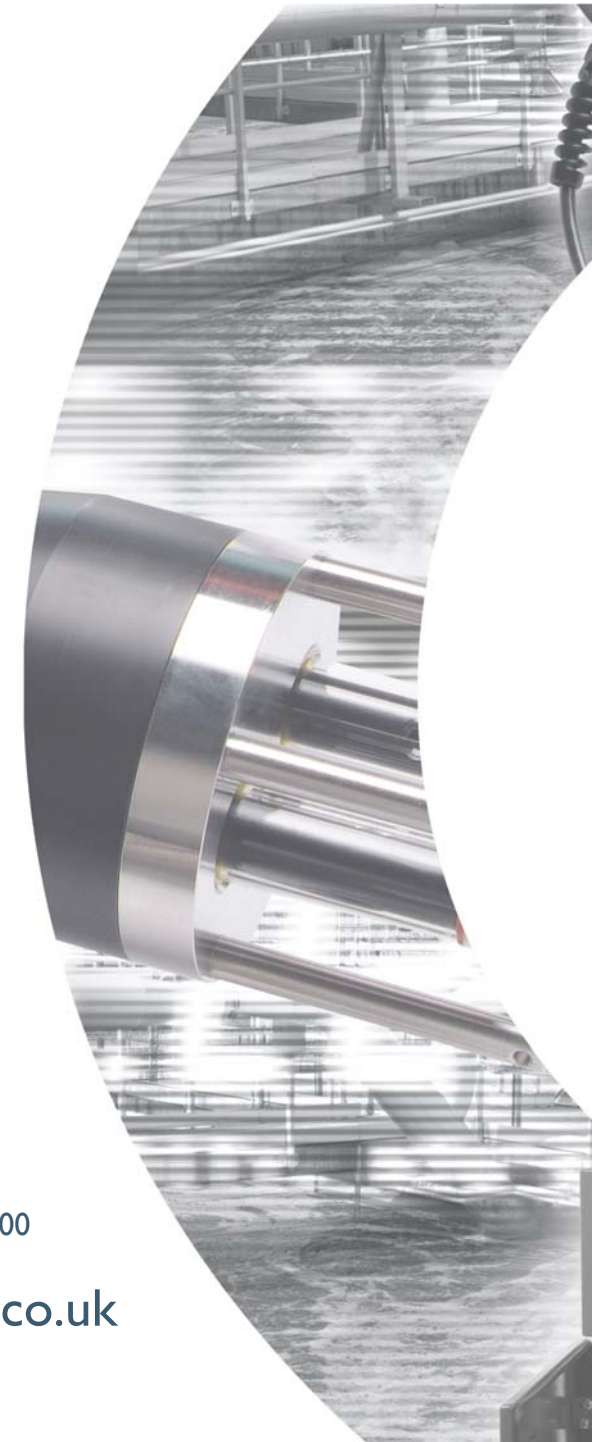
# Mixed Liquor Suspended Solids

## Application and Product Data

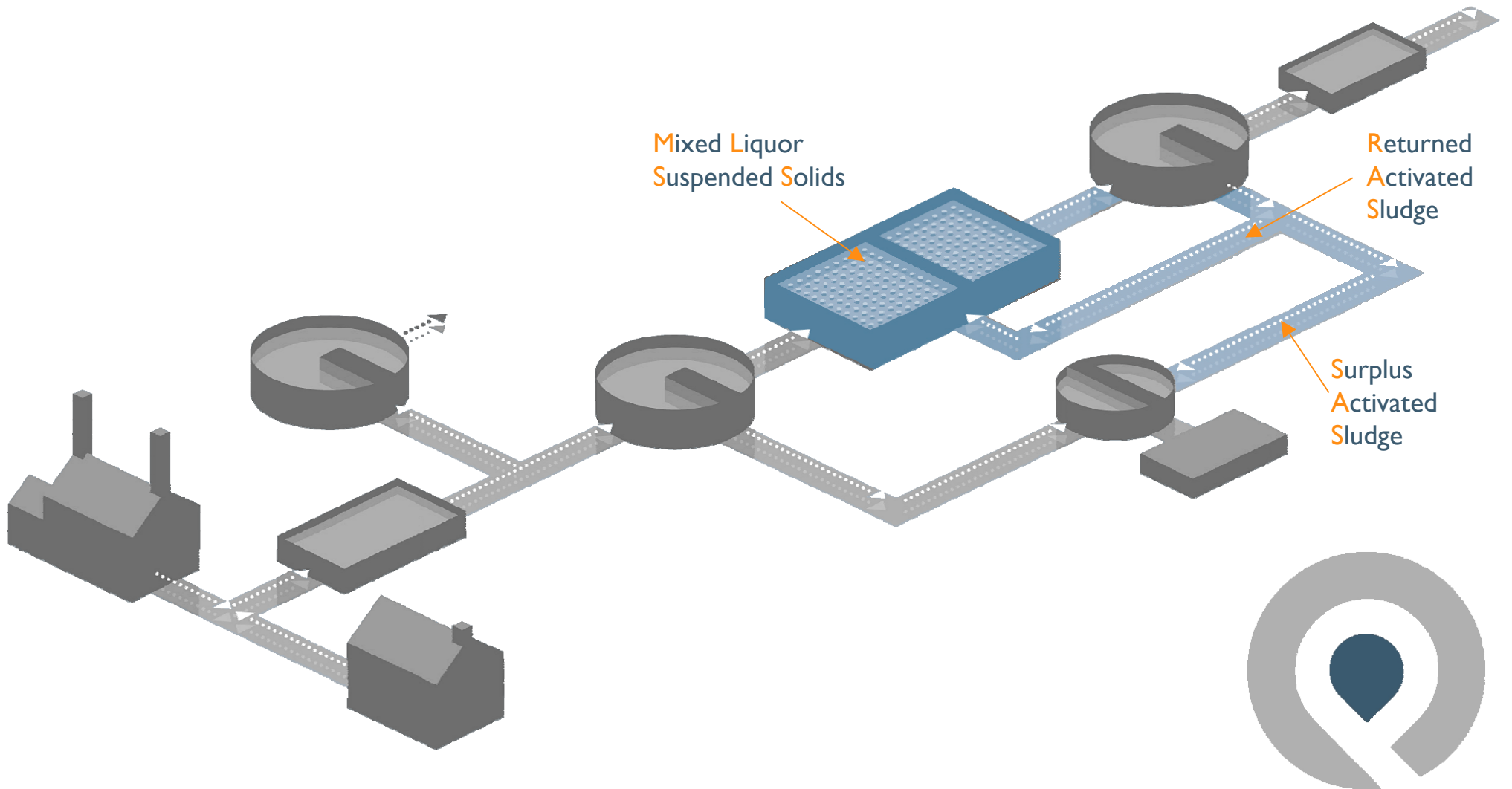


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# Typical Treatment Plant





# Activated Sludge Process Overview

- The process deals with the treatment of sewage (and industrial wastewater) and was developed around 1912-1914
- Activated sludge is a biochemical process for treating sewage and industrial wastewater that uses air (or oxygen) and microorganisms to biologically oxidize organic pollutants, producing a waste sludge (or floc) containing the oxidized material
- Atmospheric air or pure oxygen is bubbled through primary treated sewage (or industrial wastewater) and combined with organisms to develop a biological floc which reduces the organic content of the sewage
- The combination of raw sewage and biological mass is commonly known as Mixed Liquor.
- In all activated sludge plants, once the sewage (or industrial wastewater) has received sufficient treatment, excess mixed liquor is discharged into settling tanks and the treated supernatant is run off to undergo further treatment before discharge.
- Part of the settled material, the sludge (RAS), is returned to the head of the aeration system to re-seed the new sewage entering the tank.
- Mixed Liquor is a mixture of raw or settled wastewater and activated sludge within an aeration tank in the activated sludge process
- Mixed Liquor Suspended Solids (MLSS) is the concentration of suspended solids in the mixed liquor, usually expressed in milligrams per litre (mg/l)



# Why Measure MLSS

- If MLSS content is too high
  - The process is prone to bulking and the treatment system becomes overloaded
  - This can cause the dissolved oxygen content to drop with the effect that organic matters are not fully degraded and biological 'die off'
  - Excessive aeration required which wastes electricity
- If MLSS content is too low
  - The process is not operating efficiently and is wasting energy
- Typical Control band
  - 2,000 to 4,000 mg/l



# RAS and SAS

- A proportion of the floc is called Return Activated Sludge (R.A.S.) and is used to re-seed the process.
- Measuring the solids concentration of RAS allows the return volume to be adjusted to keep the solids level in the aeration basin within the control parameters
- Excess sludge which eventually accumulates beyond that returned is defined as Surplus or Waste Activated Sludge (SAS/WAS)
- This is removed from the treatment process to keep the ratio of biomass to food supplied (sewage or wastewater) in balance
- Typical Range
  - 4,000 to 6,000 mg/l



# Measurement Options

- Laboratory Tests
  - Sample sent away
    - Results known 24hours+ after the event
    - Sample degrades in transit
- Site Settling Jars
  - Very operator dependent
  - Takes 30 minutes+
- Portable SS Monitor
  - Traceable Calibration
  - Available when operator is on site, manual adjustment possible
- Fixed installation Monitor
  - 24/7 monitoring
  - Automated control possible



# Benefits of On-Line Monitoring

- Continuous On-Line Monitoring reduces the need for time-consuming laboratory analysis
- Removes operator dependency from the measurement
- Real-time monitoring provides more accurate process control
- Improves plant efficiency by providing stability and continuity to the treatment process



# Partech's Products



Portable: 740 Monitor with Soli-Tech 10 Sensor

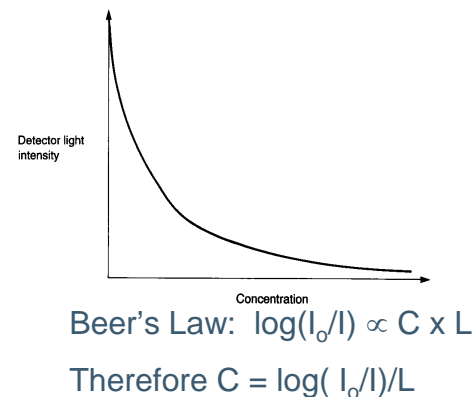
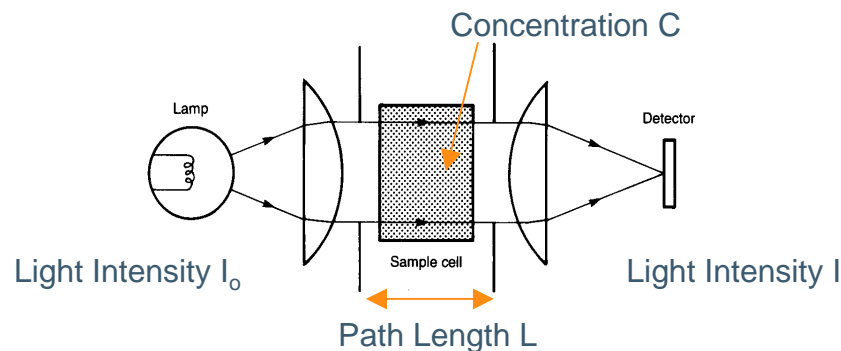


Fixed installation: 7200 Monitor with Turbi-Tech 2000LA Sensor



# The Turbi-Tech 2000LA Sensor

- The Turbi-Tech 2000LA Sensor has been designed for use in the aeration system of an activated sludge plant for monitoring
- The sensor can also measure Returned Activated Sludge (R.A.S.), Surplus Activated Sludge (S.A.S.)
- The large optical surface and sample volume ensures that the sensor is tolerant of fouling and provides a representative reading
- Wavelength is 860 nm
- Light Attenuation Principle



# Turbi-Tech Self-Cleaning System

- Deposits of fats and grease on the sensing area do not prevent the sensor from measuring unlike sensors with smaller optical surfaces.
- Self cleaning mechanism that ensures that the optical surfaces are kept clean
- The cleaning system is designed to avoid problems with ragging and does not smear the optical system.
- Manual intervention on a routine basis is not required, the sensor should simply be checked as part of general site housekeeping.
- The cleaning process is automatically initiated by the monitor at a user determined frequency. The cleaning process takes only 90 seconds, which means that the sensor is available for 99.5% of the time with a 5 hourly cleaning cycle.





# Possible Interferences

- Sensor Fouling
  - The Turbi-Tech sensors have an integral automatic self-cleaning system
- Sample Colour
  - Use of infrared light sources reduces the effect
- Photo Detector Ageing
  - Modern LED light sources do not suffer from ageing
- Air Bubbles
  - Good installation practice reduces problems, high damping on the reading further reduces the problem
- Varying Sample Characteristics
  - Not a problem in activated sludge process

