



Features

- The wastewater treatment plant on a laboratory scale
- Aerobic biological degradation of organic substances
- Nitrification and pre-de-nitrification

Tesca Activated Sludge Process Apparatus is the most important biological process in water treatment. 32118 enables this process to be demonstrated.

A pump delivers raw water contaminated with dissolved organic substances (organic matter) into the aeration tank. Aerobic microorganisms (activated sludge) in the aeration tank use organic matter as a source of nutrition, biodegrading it in the process. Since aerobic microorganisms need oxygen, the raw water is aerated in the aeration tank. The activated sludge is mixed with the raw water by stirring machines. In the secondary clarifier, the activated sludge is then separated from the treated water by sedimentation. A portion of the activated sludge is returned to the aeration tank (return sludge). The treated water is collected in a tank.

It is also possible to convert ammonium into nitrate (nitrification) and nitrate into nitrogen (de-nitrification). For de-nitrification, a zone without aeration can be created in the aeration tank by installing a partition wall. The following flow rates are adjustable: raw water, return sludge, internal recirculation for pre-de nitrification, and air. Oxygen concentration, pH value, and temperature can be controlled. Optionally a software program can be provided to display the operation states and measure data. A process schematic shows the current operating states of the individual components and the measured data.

Samples can be taken at all relevant points. Activated sludge from a wastewater treatment plant and analysis technology is required for the experiments. Recommended parameters are:

- BOD5 (biochemical oxygen demand)
- COD (chemical oxygen demand)

Note: Specifications are subject to change.

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- NH₄ (ammonium)
- NO₃ (nitrate)

Specifications

- Biological wastewater treatment
- Aeration tank with 3 stirring machines
- Secondary clarifier
- Nitrification and pre-de-nitrification
- Separate supply unit with 2 stirring machines
- All relevant flow rates adjustable
- Control of temperature, pH value, and oxygen concentration
- Measurement of flow rate, temperature, pH value, and oxygen concentration
- Optional software for data acquisition via USB under Windows and display of the operation states & visual inspection with a webcam on PC

Technical Specifications

- Aeration tank
 - Capacity nitrification zone: approx. 34L
 - Capacity de-nitrification zone: approx. 17L
- Tanks
 - Secondary clarifier: 30L
 - Raw water tank: 200L
 - Treated water tank: 80L
- Flow rates
 - Raw water pump: max. 25L/h
 - Return sludge pump: max. 25L/h
 - Circulation pump: max. 25L/h
- Speeds (stirring machines)
 - Secondary clarifier: max. 45min⁻¹
 - All others: each max. 600min⁻¹
- Measuring ranges
 - Flow rate:
 - 2...25L/h (raw water)
 - 50...550L/h (compressed air)
 - Temperature: 0...40°C
 - pH value: 0...14
 - Oxygen concentration: 0...10mg/L

Experiments

- Learning the fundamental principle of the activated sludge process
- Functional principle of nitrification and pre-de-nitrification
- Creation of a stable operating state
- Identification of the following influencing factors
- Return sludge ratio
- Return ratio of the internal recirculation
- Sludge age
- Sludge loading
- Volumetric loading
- Oxygen concentration, pH value, and temperature
- The efficiency of the pre-de-nitrification

Requirements

- Mains Power 220 – 240V @ 50Hz, 1Ph