

Aeration Optimization



COS 61D –
Dissolved oxygen

CUS51D – Mix liquor
suspended solids

CAS40D – ISEMax
ion selective electrodes



- Optical design
- 2-year sensor cap life
- Air calibration
- Time-based reference
- Optional air cleaning



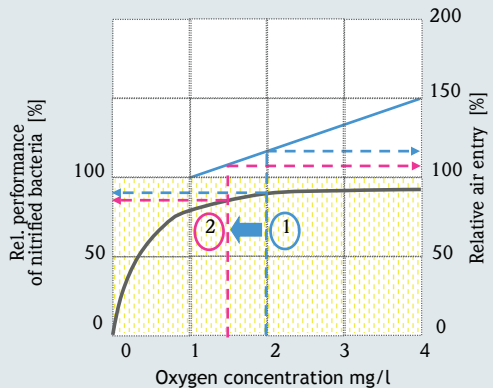
- Factory calibration
- 90°, 135°, or 4-beam in one sensor
- Optional air cleaning



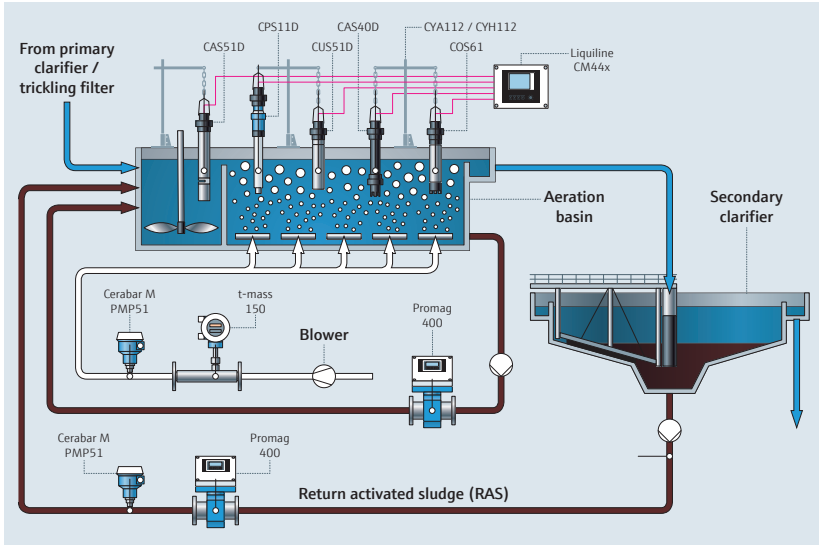
- Direct measurement of ammonium and nitrate
- Active pH compensation
- Refillable reagents
- Potassium compensation
- Chloride compensation
- Four parameters, one input

The oxygen demand depends on:

- Load of organic carbon
- Extent of nitrification and denitrification
- Current oxygen concentration in the basin
- Suspended solid concentration
- Temperature
- Recommended oxygen concentration: 1.5–2 mg/l



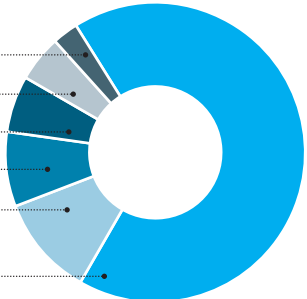
Biological Treatment



At Endress+Hauser we understand the demands of aeration. The proper removal of nutrients (BOD, ammonia and phosphorous) is essential, as well as energy efficiency. The aeration process can represent up to 60% of all energy used in a plant so it is critical to have proper measurements. The Liquiline platform, based around the CM44x transmitter and Memosens inline sensors makes the task of accurate, dependable measurements easy and minimizes maintenance requirements.

Typical Energy Usage Across the Plant

- Primary treatment 3%
- Sewage lift station 5%
- Infrastructure and other 6%
- Flocculation filtration 8%
- Sludge treatment 11%
- Biological treatment and secondary clarification 67%



CAS51D –
Nitrate

Promag 400 –
Sludge flow

Tmass 150 –
Air flow



- Optical measurement
- No reagents
- Optional air cleaning
- Fast response
- Integrated web server
- Heartbeat verification
- Easy install flanges
- HistoROM
- Cost effective
- Rugged sensor design
- Hot-tap
- Ultra low maintenance

ORGANIC LOAD REDUCTION

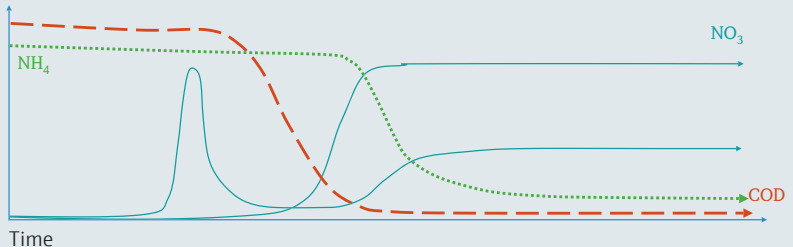
Org. Carbon + Oxygen →
 $\text{CO}_2 + \text{H}_2\text{O} + \text{Biomass}$

NITRIFICATION

Ammonium + Oxygen → Nitrate
 $\text{NH}_4 + \text{O}_2 \rightarrow \text{NO}_2 \rightarrow \text{NO}_{3e}$

DENITRIFICATION

Nitrate + Org. Carbon → Gaseous Nitrogen
 $\text{NO}_3 + \text{C}_{\text{org}} \rightarrow \text{N}_2 \uparrow$



CM44x Transmitter



- Up to 8 Memosens sensors
- Hot plug-and-play design
- Modular, flexible and expandable design
- Simplified commissioning, calibrations and maintenance
- Digital protocols – HART, PROFIBUS, Modbus, Ethernet IP
- Built-in web server
- On-board data logging
- Optional automatic sensor cleaning, built-in PID controllers x 2 and full diagnostics
- Simple data transfer using SD card

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