

SensyMaster thermal mass flowmeter

Helping sewage plants improve their aeration process and become more energy-efficient



SensyMaster helps to improve the operating costs of the most cost intensive process in sewage plants: Aeration.

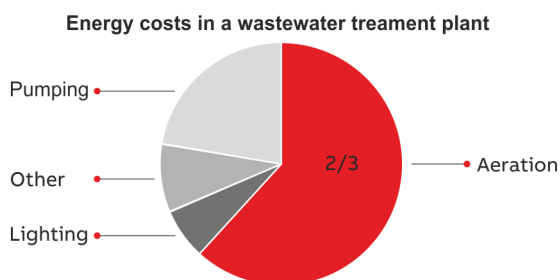
High-measuring performance and state of the art technology helps customers increase plant efficiency.

Measurement made easy

SensyMaster FMT430/450

Introduction

The energy costs associated with the operation of the aeration process are typically $\frac{2}{3}$ of the total cost.



Additional Information

Additional documentation on SensyMaster thermal mass flowmeter is available for download free of charge at www.abb.com/flow. Alternatively simply scan this code:





Thermal mass for air measurement in aeration basin

01 Application aeration in wastewater treatment plant

Dissolved Oxygen (DO) is a key ingredient in the secondary treatment (biological phase) of wastewater treatment.

Depending on the size of the plant and operation mode, the process area creates a nitrification performance area with air surplus or less (denitrification).

02 Aeration efficiency

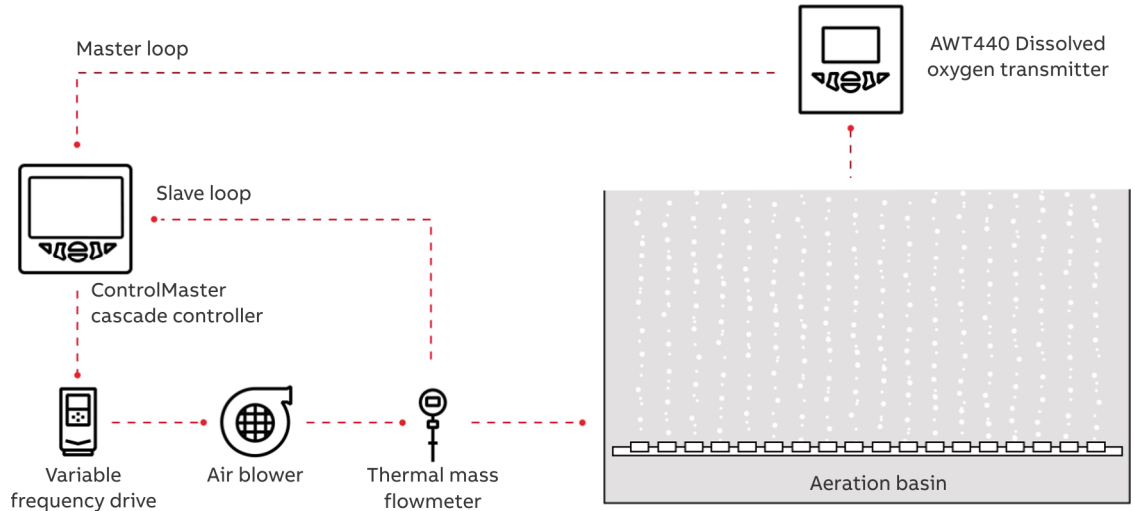
DO is added to the aeration basin to provide oxygen to the microorganisms so they can convert organic wastes into inorganic byproducts. The DO concentrations must be carefully controlled – too little and the bacteria will die, and the organic waste will not be broken down, too much and energy is wasted.

The SensyMaster FMT430 measures the air flow into the aeration basin.

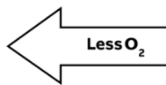
Most common application details are:

- Medium: Air
- Temperature: 0 to 40 °C (32 to 104 °F)
- Pressure: atmospheric to light overpressure
- Typical pipe sizes: DN 100 to 200 (4 to 8 in) depending on the basin size

Futhermore, the air is used for nitrification of the carbamide. Also, oxygen will be used to transform ammonium to nitrate. This is important to regulate the process in the aeration basin.



01



Efficiency				
Very low O ₂ supply	Low O ₂ supply	Optimum O ₂ supply	High O ₂ supply	Very high O ₂ supply
Insufficient air to support bacterial life so bacteria dies	Slow bacterial growth resulting in incomplete treatment	Complete treatment with high energy efficiency	Complete treatment with poor energy efficiency	Too much bacterial growth so bacteria starves and dies

02

... Thermal mass for air measurement in aeration basin

Installation examples of thermal mass flowmeters

—
03 Aeration basin in water treatment plant



03

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04 Aeration basin with thermal mass flowmeter



04

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05 Installed thermal mass flowmeter for air measurement (old and new generation)



05

More information about thermal mass flowmeters

06 SensyMaster
FMT430/450

07 Centering pin at the
pipe components

Why are thermal mass flowmeters suitable for this application?

Thermal mass flowmeters offer a high quality and cost-effective solution for precise and dynamic direct mass flow measurement of air with good measurement performance at an economic price level.

Thermal mass flowmeter provide:

- **Direct mass flow measurement**
No compensation of temperature and pressure required
- **Wide measuring range up to 1:150**
Measurement down to virtually zero
- **Low pressure drop**
No additional energy loss
- **Short response time**
Close control of the process
- **Best accuracy**
Efficient usage of precious gas

SensyMaster – Our solution for air measurement in aeration basins

SensyMaster cover a wide range of gas flow measurement applications.



06

The combination of SensyMaster FMT430 or 450 and pipe components ensure highest measurement performance and state of the art features such as:

- **Latest technology of sensor protection frames with optimized design**
Longer maintenance cycles due to self-cleaning effect of thermal sensor
- **Best in-class accuracy up to 0.6 % o.r. and short response time < 0.5 s**
Precise and dynamic process control
- **ABB common platform handling – Common look & feel**
Intuitive operation reduces training and commissioning time with e.g. EasySetup

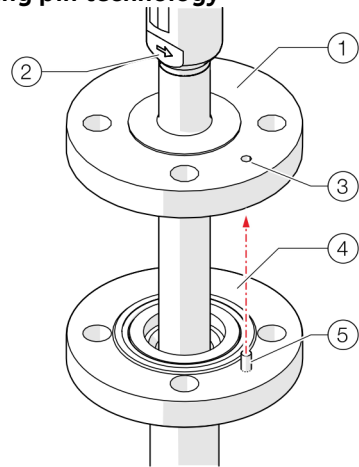
- **Modular I/O concept– Up to 5 I/Os in one instrument**
Optimal tailoring to the application, even 3 current outputs are possible
- **SensorApplicationMemory**
Plug and play electronic replacement, no recalibration and manual parameterization
- **Application Selector for up to 8 applications**
One device out of the stock can be used in different applications in one easy setup step
- **Easy & reduced maintenance due to diagnostic and verification**
Predictive maintenance and extended service intervals save internal resources

User-friendly handling of up to 2 factory set applications with SensyMaster.

- Computer based parametrization via ABB Field Information Manager (FIM) with infrared adapter or HART-Modem
- Several diagnostic features included in every device
- Enhanced diagnostic including SensorCheck optional
- Computer based verification report with clear pass or fail statement (ABB verification tool: SRV500)
- Onside diameter adjustment without recalibration
- Centering pin technology for quick and repeatable re-installation

... More information about thermal mass flowmeters

Centering pin technology



- ① FMT430
- ② Marking of flow direction
- ③ Centering hole
- ④ Pipe component
- ⑤ Centering pin

07

ABB pipe components are equipped with a centering pin. The FMT430 is equipped with a centering hole.

The centering pin at the pipe component allows to install the meter in correct position for easy installation and positioning after cleaning procedure. Measuring effects due to variations in installation are avoided.

Your value provided by our product features

The overall features of thermal mass are described in the following video, please scan the QR-code or click on it.



Additional ABB products in aeration

—
08 Optical Dissolved
Oxygen probe ADS430
with transmitter AWT440

—
09 ControlMaster CM30

Optical Dissolved Oxygen System



ADS430



AWT440

08

ABB offers the Optical Dissolved Oxygen System with Optical DO Probe (Product: ADS430) and Multi-Channel Digital Transmitter (Product: AWT440) to measure the concentration of the dissolved oxygen.

Recorders & Controllers in aeration



CM30

09

ABB offers the ControlMaster range of PID controllers, which have built in cascade control functionality.

For more information on using the ControlMaster in aeration applications please scan or click on the following QR code:



ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/flow

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