RS INDUSTRIA

Floating on Air.

USE CASE

How RS Industria could help make significant savings for industries utilising Dissolved Air Flotation

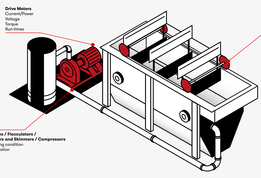
Introduction.

Dissolved Air Flotation (DAF) is a water treatment process that clarifies wastewaters (or other waters) by the removal of suspended matter such as oil or solids. The removal is achieved by dissolving air in the water or wastewater under pressure and then releasing the air at atmospheric pressure in a flotation tank basin.

The released air forms tiny bubbles which adhere to the suspended matter causing the suspended matter to float to the surface of the water where this layer of sludge is removed by a skimming device. Flocculants and coagulants are often added to improve the performance of the unit.

Dissolved Air Flotation performance depends on the air to solids ratio, and this will vary with different types of suspension as the floatation process is dependent on the surface area of the materials.

What we monitor.



The Challenges.

Energy

Pumps, compressors and augers are heavy energy users, but the energy consumption often goes unnoticed as most DAF units operate unmonitored. Most pumps and compressors are stop/start as required, meaning energy consumption is hard to capture.

Operations

pH inconsistencies can result in potential damage to equipment, non-compliance waste regulations and the inhibition of some coagulants used in wastewater treatment, as they are only effective within a neutral pH range. Substantial chemical usage can be required to rectify any water quality issues, if left unassessed.

Typically, the volume and air setpoints are set manually to achieve the desired air to solids ratio in a DAF system. The dosing rate of flocculant or coagulant is set to efficiently treat a certain concentration of contaminants. Most DAF units will not automatically adjust the settings for fluctuations in wastewater quality.

Maintenance

Unplanned bearing failures of pumps, compressors and augers can occur if static for too long (Standby) or due to duty pump mechanical stress transfer, along with other mechanical issues such as looseness and misalignment of the asset. Pipework restrictions often go unnoticed until blockage occurs. A loss of a critical component could result in a plant and whole site stoppage due to the inability to process waste.

Chemical corrosion and degradation of equipment and components are also common problems that often go unmonitored.

Our Solutions.

Energy

Energy data can often be collected direct from the variable/fixed speed drives, when used. If no electrical consumption data is available, then energy meters or current transformers can be easily installed, which can pass data directly to RS Industria.

Operations

Water quality process data such as pH, Turbidity, Total Suspended solids (TSS), Dissolved Oxygen (DO) and Temperature levels, can be monitored directly from IoT instrumentation on the DAF system or directly from a PLC or control system. Where no input is currently recorded, hardwired signals can be extracted through IO gateways to minor existing control signals. This will provide valuable accurate operational recording as well as aid in problem solving.

Various flow rate data can also be extracted, and total volumes can be calculated, including chemical dosing rates.

Maintenance

Through tracking current and torque, changes in the electrical load can be used to indicate changes in the system. Using the additional process parameters, we can build a picture of how the asset performs from a reliability standpoint.

Additional protection of the motor and pump bearings can be added using a vibration sensor, thus monitoring mechanical stresses such as looseness, misalignment, impeller wear and cavitation.

Pressure analysis can indicate blockages or valve malfunctions.

Your Benefits.

Energy

The site can now quantify the energy costs of pumps, compressors, flocculators and augers, including highlighting wasted energy from over-operation (running without purpose). The data also enables pump and system efficiency to be monitored.

Operations

Enable increased efficiency with better management and reduction of chemical usage for coagulants and other aids which are used to meet effluent quality compliance levels.

Data trending of water quality can inform the site when to dose additional chemicals or dilute tanks with less contaminated influent.

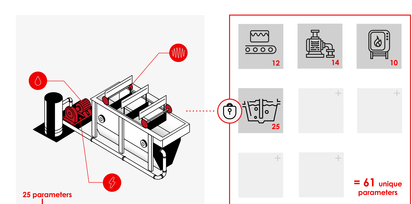
Remote monitoring of assets improves staff productivity as well as highlighting problems early.

Maintenance

Monitoring reduces the risk of unplanned failure, so removes the potential for secondary damage as well as the cost of replacement components. Better data enables the site to move from reactive maintenance to planned maintenance, so reducing downtime of the mechanical equipment. If vibration data is collected, the site can determine the lubrication status of assets.

Monitoring also enables chemical compositions to be controlled within a low-corrosive range, increasing longevity of equipment within the DAF System.

Modular Framework.



Start Simple, Grow Smart.

Modular and Secure

RS Industria is a modular system, providing an advanced, robust and cyber-secure framework into which any number of assets can be connected. This cloud-based system provides the following:

- **Asset Dashboards** – Designed for the specific asset type being monitored.
- **Functional Dashboards** – Displaying Energy, Utilities, Compliance or Uptime for multiple assets, individual production lines or site-wide – all in one place.
- **Rules & Alerts** – Notifications and Warnings sent by SMS or email – or to the mobile app.
- **Mobile App** – Real-time data display and alerts – Putting the data in the hands of those who need it, where they need it, when they need it.

Multi-Purpose Data.

Data Integration

As RS Industria integrates data from multiple sources, the system can re-purpose and combine data to extend the scope for asset insight.

Data Options	Energy	Operations	Maintenance
Voltage	✓	✓	✓
Current	✓	✓	✓
Torque	✓	✓	✓
Runtime	✓	✓	✓
Start/Stop		✓	✓
Fault/Operating Mode		✓	✓
Pressure		✓	✓
Flow Rates		✓	✓
Volume		✓	✓
Temperature		✓	✓
pH		✓	✓
Total Dissolved Solids (TDS)		✓	✓
Conductivity		✓	✓
Turbidity (NTU)		✓	✓
Dissolved Oxygen (DO)		✓	✓
Dissolved Organic Carbon (DOC)		✓	✓
Total Suspended Solids (TSS)		✓	✓
Chemical Oxygen Demand (COD)		✓	✓
Total Organic Carbon (TOC)		✓	✓
Valve Status		✓	✓
Filter Condition		✓	✓
Vibration-based			
Bearing Damage Indicator[1]			✓
Lubrication Warning Indicator[2]			✓
Mechanical Stress Indicator			✓
Ultra-sound based			
Auger Screw Bearing			✓
Primary Parameters	4	17	4
Re-purposed Parameters	0	4	21

Data Integration

As RS Industria integrates data from multiple sources, the system can re-purpose and combine data to extend the scope for asset insight.

For example, monitoring electrical drive voltages and current enables the system to calculate torque.

All three of these of these variables can be used to not only better understand the energy usage of an electrical drive, but also its physical condition and whether it is operating outside its normal parameters.

High current and torque might indicate a bearing problem, a conveyor belt sticking or a batch of ingredients with the wrong viscosity.

1. **Bearing Damage Indicator** – Using frequencies from selected areas of the spectrum to rapidly identify when a bearing is being damaged, long before such damage is evident, or a failure occurs.
2. **Lubrication Failure Indicator** – this value uses specific frequencies to warn if a bearing is insufficiently lubricated, whether the lubricant is manually or automatically delivered.

These indicators can be further enhanced by using the operating data to provide context such as variable loading.

Multi-Purpose data offers significant benefits over the use of dedicated single-purpose monitoring systems:

- **Single point of integrated data** – enables comparison between different variables, potentially offering greater insight
- **Context-sensitive alerts** – take account of normal operational variances to avoid false alarms

Gain Asset Insight Now

Find out how we can help lower energy usage, enhance reliability and improve operational performance: in a way that is simple, fast and affordable.

1

Book Requirements Review

Review your requirements with one of our consultants. We'll help you prepare for the next step in the process, which is a detailed discussion with one of our solution design engineers. To book a Requirements Review, **click this link.**

2

Browse Our website

To find out more details including:
- Real-world case studies
- Use-cases like this one
- Product videos

...and more. Visit our website to see what is possible with RS Industria.

https://www.rs-industria.com

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