

The Spectral Absorption Coefficient (SAC) in the influent of industrial wastewater treatment plant for dairies and milk processing factories

Advantages

- **Direct measurement of the change in organic load**
- **Rapid response time**
- **No sample preparation**
- **No reagents**
- **sc100™ controller with two sensor inputs**
- **sc1000™ controller with eight sensor inputs**

Background

The wastewater outlets from milk processing plants are subject to legal and technical requirements. If a dairy discharges into municipal sewers, the local discharge limits must be observed. If a company operates a wastewater pre-treatment plant or employs complete treatment, it is particularly important to ensure that wastewater quality is good during operation. This means an even feed of quality and quantity.

Organic load peaks must be detected and controlled early for an operator to be able to react correctly. Wastewater discharges with peak loads beyond the rated limits of the plant will result in operational problems during wastewater pre-treatment, or during complete treatment. For this reason, continuous assessment of the quality of the wastewater is necessary. This assessment can be made by measuring the Spectral Absorption Coefficient (SAC), a direct measurement of dissolved organics.

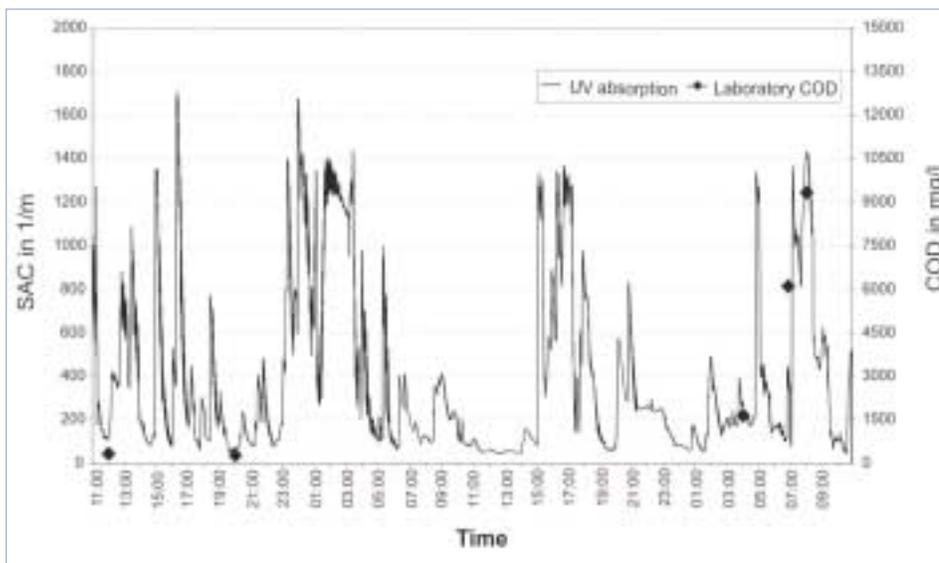


Fig 1: SAC curve with laboratory results for the COD

Case Study

During the processing of milk and dairy products, wastewater enters the drains as well as the wastewater treatment plant feed. Fast changes in the wastewater load (particularly high peak loads) create major problems for the wastewater treatment plant. This causes a potential risk of an overload and a degradation in the treatment performance. The SAC curve covers a period of 48 hours and includes laboratory results for the COD measured in parallel.

For operational reasons, only random samples or mixed samples can be taken and analyzed in the laboratory to determine the COD. However, the continuous measurement of the SAC enables all peak loads to be measured without gaps, making it possible to react specifically and automatically to results.

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Using the continuous measurement it is also possible to control a gate that separates the wastewater with a high load from water with a low load. Water with a high load is stored temporarily in a storage tank [Fig. 2], and from there it can be fed to the wastewater tank in small amounts to balance the load. The result is a level load to the wastewater treatment plant (municipal or run by the company).

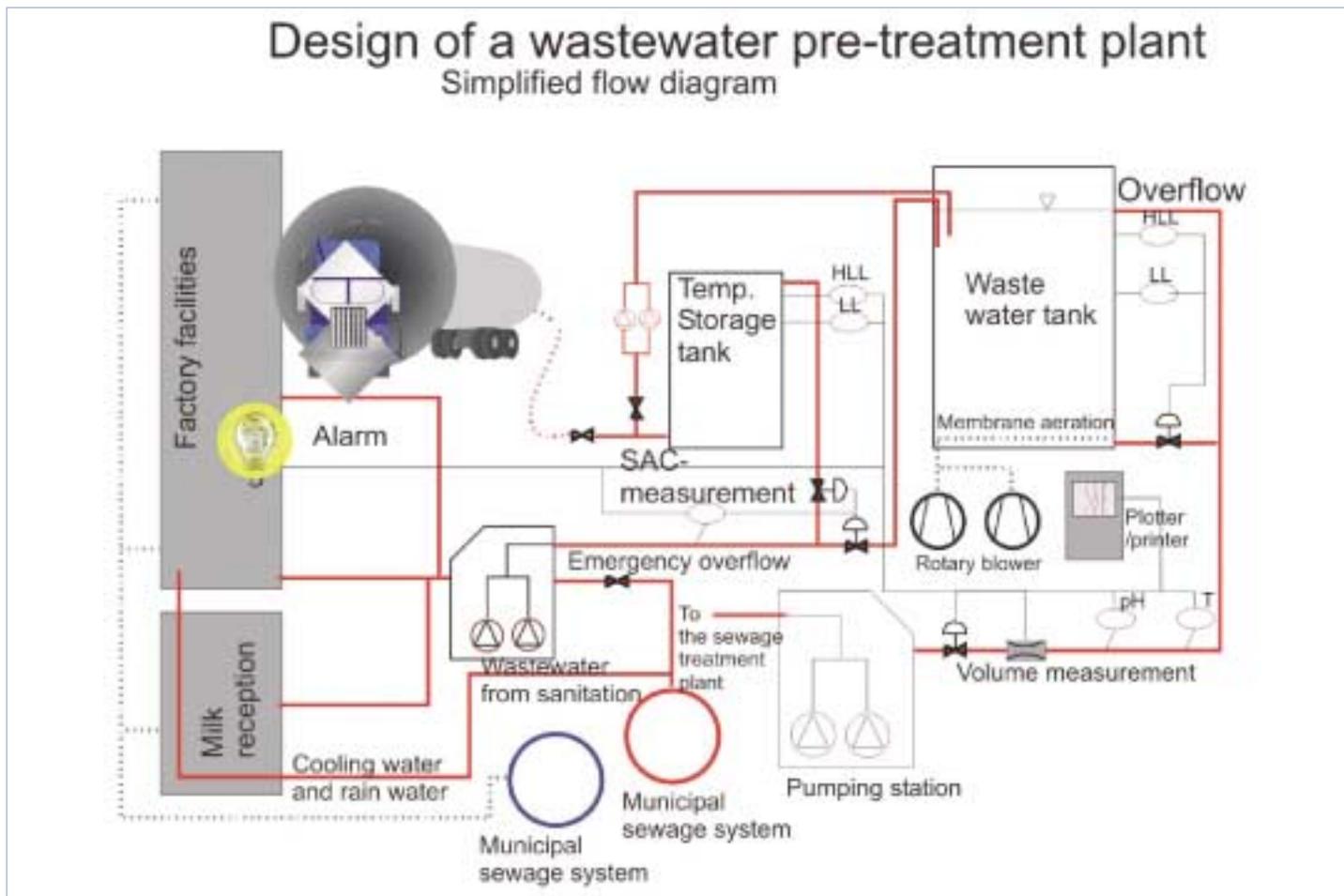


Fig 2: Scheme for a wastewater treatment plant in a dairy.

Functional Description and Measuring Principle

The on-line UVAS sc sensor measures the UV absorption of the wastewater instantly. The measured value, the Spectral Absorption Coefficient (SAC), is a total parameter for the measurement of the dissolved organic substances. The probe is immersed directly in the medium or used in the flow through cell, eliminating the need to prepare samples. An integrated self-cleaning wiper prevents biological growth, and the measuring interval can be adjusted to suit special requirements.

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Process Instruments Used

The UVAS sc is suitable for the measurement of the SAC 254, which represents a total parameter for dissolved organic substances in accordance with DIN 38404. The UVAS plus sc is based on a UV absorption measurement and determines the SAC by physical means only. The evaluation is performed using the sc100 or sc1000 display units.



sc100™ Digital Controller

This universal controller for wall, pipe or switch installation has splash-proof connectors for two digital sensors in any combination of parameters. Communications using RS485/MODBUS® or RS232/MODBUS® protocols or the wireless infrared port are available.



sc1000™ Digital Controller

This universal controller has a portable display module for operation and a probe module with splash-proof connectors for up to eight digital sc sensors. Network together multiple probe modules to meet almost any application's needs. The system is modularly configured to suit customer-specific requirements and can be expanded with further measuring points, sensors, inputs and outputs as well as bus interfaces (MODBUS® and PROFIBUS DP).



UVAS sc Sensor

This precise, self-cleaning process probe performs continuous measurement of the dissolved organic substances (SAC) in water. Measurement takes place directly in the medium or in the flow through cell, without reagents or the need to take samples. The UVAS sc Sensor provides high accuracy and the high resolution of the measured values. In drinking water a layer thickness of 50 mm is used to achieve the highest resolution measurement of $0.01 - 60 \text{ m}^{-1}$. The measuring cycle can be set between one to 30 minutes.

To find out more about this or any Hach product including current price information, technical support, and ordering assistance, contact the Hach office or distributor serving your area.

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