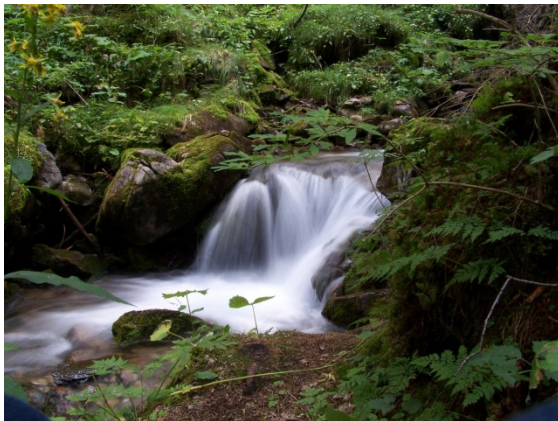


Application Report

Turbidity for Flocculant Dosing

The water available at the inlet of a Water Treatment Plant originates from different sources: ground water, rivers, lakes, wells. Disregarding other contaminants, this raw water may have a varying content of solids (turbidity).



Picture 1: Spring in the Alpine region

Especially in the case of surface water, turbidities ranging from some FNU to several hundred FNU can occur depending on the season and/or the weather conditions. This circumstance is taken into account in the treatment of that water.

One of the first treatment steps is the sedimentation of solids. This is accelerated by the addition of flocculants. Flocculants are substances which are able to agglomerate extremely small particles (< 1µm) to form larger and heavier particles (macro-flakes). These particles quickly sink to the bottom of the sedimentation tank and can thus be separated from the water.

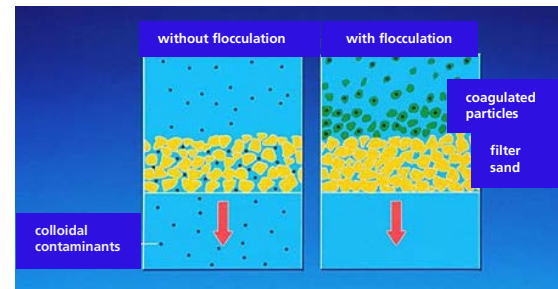
The most customary flocculants are aluminium sulphate $Al_2(SO_4)_3$, iron chloride $FeCl_2$ or milk of lime $Ca(OH)_2$.

Benefits

Sedimentation is the first coarse filtration of the treatment process. As a result of this process step, considerably fewer solids are fed to the subsequent filtration and the filters need fewer cleaning processes (filter backwashing).

Typical application

At the water inlet, flocculants are added. Very often the flow rate of the water is determined and the amount of flocculants is adjusted accordingly; 20-30mg/l of flocculants is a typical dosage.



Picture 2: Function of flocculation

Instead of static dosage, an AquaScat HT/WTM can be used to dose the flocculants in relation to the actual turbidity. This can optimize the consumption of flocculants.



Picture 3: AquaScat WTM / HT

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Cost-benefit analysis

The deployment of an instrument which can precisely measure any possible turbidity can be calculated as follows:

Process data:

The following data are indicative values. It is necessary to ask for the parameters of the individual water supplier and to incorporate them in the calculation correspondingly.

- S: savings in €/year
- C: costs of the flocculants (200 €/1000 kg)
- Arw: amount of raw water to be treated in m³ (1 mio) per year
- Af: currently used amount of flocculants per litre water (25 mg/l)
- R: estimated reduction of the costs of the procurement of flocculants (15%)

Calculation of the savings S (per year):

$$\begin{aligned} S (\text{€}) &= \text{Arw} \times \text{Af} \times \text{C} \times \text{R} \\ &= (1'000'000 \times 1'000) \times 25/1'000 \text{mg/l} \\ &\quad \times 0.2/1'000 \text{ €/mg} \times 15/100\% \\ &= 750 \text{ €} \end{aligned}$$

The exact amount saved can only be determined in the course of time and essentially depends on the actual turbidity and the amount of water to be treated. Investment in an AquaScat pays off after a number of years.

Products

SIGRIST products and configuration:

- AquaScat 2 HT, p/n 118994 (alternatively: all other models)
- Checking unit for AquaScat 2 HT/WTM, p/n 116708
- Optionally: products for level control and deaeration described in the document „Deaeration Concept with Level Control“ (RepWeb -> AquaScat -> Sales tools)

Parameter settings

- Check installation in accordance with RepWeb -> AquaScat -> Documentation -> Drawings -> Mounting proposal
- Adjust water flow
- Determine threshold value for preliminary alarm and alarm together with the customer
- Correlate dosage of the flocculants with analogue output

Alternative methods

- Fixed, volume dependent adjustment of the dosage

Advantages of the SIGRIST AquaScat HT/WTM

» Customer benefits

- Free-fall concept, the water does not contact the optics
 - » No falsifying of the measured values and no drift because of window soiling
 - » Very long maintenance interval
 - » Metals such as manganese, iron etc. will not soil optics
- Adjustment with secondary turbidity standard
 - » Allows recalibration without Formazin
 - » Buying, storing and managing Formazin is no longer necessary
- The design of the instrument and the materials used allow lowest basic stray light
 - » A low zero drift guarantees long-term stability
- Touch screen with colour display
 - » The display of measured values, graphics or information can be selected
 - » Data storage of the last 32 days