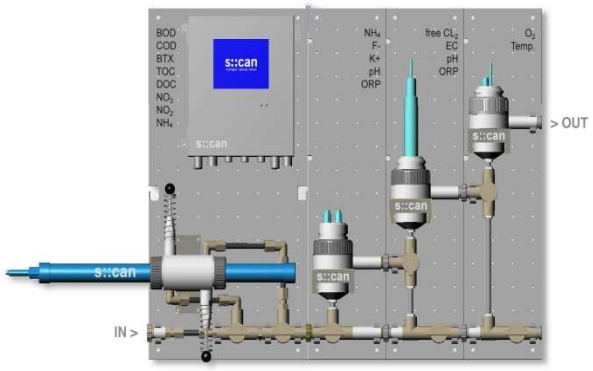
ECM Solutions for Drinking Water Systems

Analytic solutions for drinking water systems help to increase effectivity of the water treatment process and increase safety of drinking water networks.

Typical drinking water treatment plants consist from a pre-treatment, coagulant dosing, sedimentation or other particle removal, filtration, disinfection and from a distribution network.

Input monitoring of the drinking water treatment plants is usually performed by TOC, T/pH, alcality, colour and turbidity monitoring system. An automatic sampler must be provided as well. A spectrometric system in combination with electrodes is an ideal tool for this job.



Turbidity of water is removed by dosing of coagulant. These are sticky molecules speeding up sedimentation of suspended particles. Proper coagulant dosing is determined in laboratories using jar methods, zeta potential instruments or automatic.

Once optimal coagulant dosing has been determined this can be kept stabile by online instrumentation for dosing of coagulants. The best method is streaming current monitoring. Streaming current monitors are providing a sort of mechanical ionization of particles. There is a dramatic difference between potential of in water suspended solids and of the coagulants. Once optimal ratio estimated by the lab is fixed, the streaming current monitors are controlling coagulant dosing to keep this ratio stabile.

Turbidity and flow monitors on input allow pre-control of coagulant dosing. In cases of sudden increase or decrease of flow or turbidity early reaction of the dosing can avoid oscillation of the dosing loop.

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After the sedimentation iron or aluminium analyzers are used (depends on what coagulant or floculant applied). This is an additional control of the proper coagulant dosing.

Filtration system is to provide decrease of particle pollution to drinking water quality. The filtration system is monitored by turbidity analyzers.

Next and final stage of the treatment process is disinfection. This means application of UV energy generating ozone or chlorine or chlorine dioxide generators or combination of these methods. Analyzers of ozone, free and total chlorine and / or chlorine dioxide must be applied to achieve desired level of disinfection. Concentration of the disinfection agent must be certainly properly monitored.

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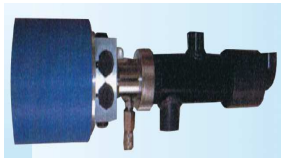
Distribution network of drinking water systems is long and complicated and leakages can cause a dramatic problem. This is why it is important to monitor water quality and especially level of free and total chlorine, directly in the critical places of the pipeline system. Because of lack of infrastructure and constrained spatial conditions the instruments must fit right into the pipe sustaining the line pressure and conditions, requesting no maintenance and allowing long time battery operation with GPRS / GSM data transmission. Besides of free and total chlorine, temperature, pressure and flow, turbidity, colour, pH, ORP, conductivity, fluorides and sometimes also other ions, must be monitored.



Drinking water safety is a growing issue. Problems can be caused by improper disinfection, industrial accidents and unfortunately also by terrorist actions. Laboratory cultivation takes too long time. There are two instrumentation methods available.

The first one is application of spectrometric systems. A spectrometric analyzer is monitoring spectral absorption in 200 – 750 nm range. Almost all of the problematic agents would cause a characteristic absorption in UV spectra. Problem is that we don't know what pollutant we can expect. This is why a qualitative system called ana::larm can be successfully applied.

Application of the system starts with the learning period, during which the analytic system is memorizing normal range of deviations of the spectral absorption on respective site. After that in real operation, the systems looks for deviations of spectral derivation exceeding the normal spectral absorption. The alarms can be categorized to up to 8 classes, characterised by common chemical features. The system reacts instantly and has already many successful applications.

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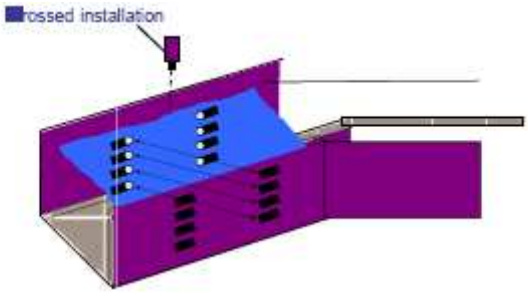
Another method for online monitoring of toxicity is VibrioTox. This online analyzer is a Bioassay based on the well established Microtox laboratory procedure considered to be a standardised toxicity test. The procedure employs bioluminescent Vibrio fischeri a test organism. The reduction in intensity of light emitted from the bacteria is measured. The change in light output is related to toxicity.
In case of ground water sources for drinking water treatment iron and manganese. This must be removed in mineral base by pumping air into the ground water. An analytic system must care for sub-limit levels.

Flow monitoring is essence of process control. New generation of clamp-on flow meters and are optimal for monitoring of water and sludge flow in tubes.For accurate open channel flow monitoring multilevel ultrasonic Instruments are representing the best available solution.



For simple open channel monitoring problem channel bottom or side mounted Doppler effect based devices offer a cost effective solution.

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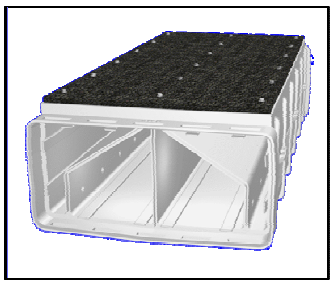
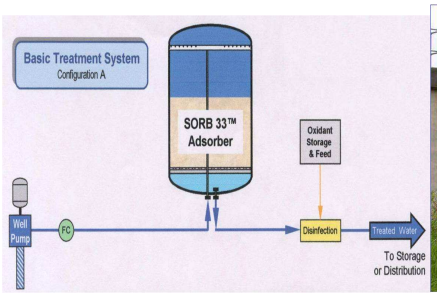
Special solutions for drinking water treatment are sand filter bottom solutions and special arsenic removal absorbers.





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