QSENZ
water- en gasanalyse

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SMART
CLEANER

INTRODUCTION

Every industrial company has its own water intake used for cooling, process, flushing and consumption. This automatically results in a return water flow that has a different water quality than the water intake. For water intake, several sources exist, but drinking water or surface water are most commonly used. Especially here in the Netherlands, drinking water has an excellent quality with very limited variability. The water quality of our surface water has improved a lot over recent years. However, a recent Dutch report of an Environmental case study*, demonstrated that less than 1% of the main rivers and lakes meet the European standards for water quality. Moreover, the water quality is changing rapidly due to climate change and increased pollution from medicines and drugs. How can we be confident we use water of the appropriate quality and how can we assure the effluent meets the set criteria? How can we provide consistent and reliable data?

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ONLINE MEASUREMENTS

Usually sum parameters such as COD, TOC, BOD or SAC are determined to quantify the organic load of water. Additionally, parameters like nitrate, nitrite, HS and BTeX are very interesting to measure. At many locations, daily samples are analysed to report or to monitor the quality of the intake and effluent water. These samples cover the regulatory requirements but are less useful for controlling the quality of process water or water intake. By using sensors, near-continious in-situ data is available. With the s::can in-situ spectrophotometer (spectro::lyser), measurements are taken automatically every 30 seconds. The s::can spectrometer probe records the complete absorbance spectrum between 190 and 720 nm (UV-Vis) or 190-390 nm (UV) resolving it into 256 wavelengths. Using the information contained in this spectrometric fingerprint, it is possible to monitor multiple parameters simulta-neously and at the same time, compensate the measured spectrum for the interference of non-dissolved substances.

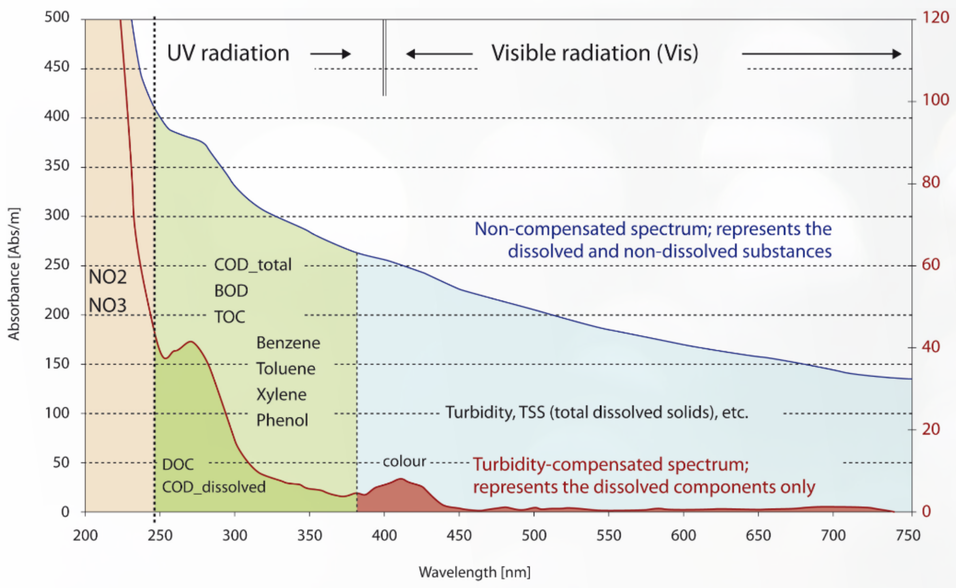

***FIGURE 1:** UV-Vis absorption spectra*

CONCLUSIONS

- The ATEX and/or Titanium s::can spectro::lyser makes continuous, realtime in-situ measurements in industrial applications possible
- In combination with the Qsenz Smart Cleaner, the sensor will provide reliable data for several months without the need for manual cleaning in almost all applications
- Applying sensors can reduce chemical requirements, optimize processes, and can provide an early warning system for changes in water quality that could otherwise lead to production failures
- Applying sensors can provide numerous savings, for example by protection from product losses, effluent optimisation, water intake treatment, etc.

INDUSTRIAL APPLICATIONS

Since the introduction of the spectro::lyser in 2000, the sensor has been applied in various drink or communal waste water applications. With the recent introduction of a Titanium version and the ATEX approval certificate, this sensor can now be applied in industrial applications as well. New specific algorithms have been developed to apply the sensor in such new industrial applications. References are available for Breweries, Dairy plants?, Slaughterhouses, Paper mills, Gelatine factories/processing plant? And many more.

RELIABLE DATA

Reliable data relies on proper calibration and clean sensors. Every sensor contains its own special algorithm, related to the specific application. Only as single calibration to the local circumstances is needed, provided that the water matrix does not change. The main cause for unreliable data is contamination of the sensor's analytical window. Common cleaning procedures such as using air, wipers or ultrasonic based cleaning are often not sufficient for industrial applications. In cooperation with Nijhuis Industries, Qsenz developed a smart cleaning device, the Smart Cleaner. This Smart Cleaner ingeniously combines several cleaning solutions. The Smart Cleaner has been tested in a red meat slaughterhouse. Such waste water contains a high concentration of fat and other contaminants. Before using the Smart Cleaner, the sensor was blocked within days and needed manual cleaning. By installing the Smart Cleaner, the manual cleaning frequency was reduced to less than four times per year. The subsequent consistent production of reliable and continuous data made it possible for Nijhuis to optimize their dosing and obtains savings of approximately 25 % in the use of coagulant and polymer.

RESULTS/ DISCUSSION

Figure 3 shows the results obtained by the sensor measuring COD load in the Slaughterhouse effluent after two months of autonomous operation.

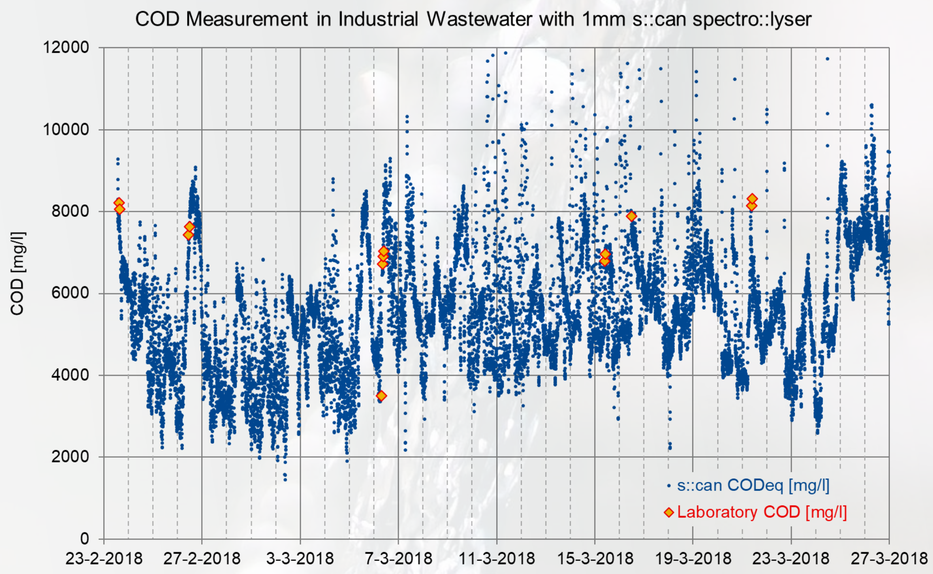

***FIGURE 3:** Online COD analysis results with a sepctro::lyser in combination with a Smart Cleaner compared to laboratory analysis results*

With a network of sensors as shown in figure x, complete monitoring of chemical waer polution can be obtained. All data can be transferred to a local Scada system or Qsenz cloud solution. Dedicated software will automatically compare the data against set criteria and will instanteaneously provide a warning or alarm when deviations in quality are recognized.