AUTOMATIC DEMINERALIZED WATER QUALITY CONTROL: SILICA

KEM ONE COMPANY

Kem one is a French company, whose industrial activities are located in the South of France and Spain. The headquarter is located in Lyon and the company have 8 different factories (7 in France and 1 in Spain). It's factory and business could be mainly encompassed in 2 different divisions: chlorochemicals and PVC.
Benefiting from nearly 100 years' experience in chlorochemicals and more than 70 years in vinyl products, KEM ONE has become in the third largest PVC producer in Europe.

FOS SUR MER PLANT

By electrolysis of salt, the Fos-sur-Mer plant produces chlorine, soda and hydrogen. The chlorine obtained is consumed on site to produce vinyl chloride monomer (VCM), by reaction with ethylene. About half of the VCM produced is then delivered to the KEM ONE site at Berre (Bouches-du-Rhône); the rest is shipped by barge to the Saint-Fons site (Rhône), where it is transformed into PVC
The plant has a cationic resin and an anionic resin that removes the ions from the softened water. When they reach saturation, it is silica the first compound to pass through the resins. To avoid polluting the demineralized water buffer tank with silica and other ions, the engineers programmed a threshold at 100 ppb which automatically triggers the regeneration of the resins. During this period, KEM ONE uses the buffer tank to supply the whole site with demineralized water. This is the reason why a reliable and accurate silica online measurement is so important for the plant: **to do not pollute any industrial process with the demineralized water used optimizing the resin regeneration**.

Instran online analyser®

The Instran online analyser is an analyser that allows the concentration of various parameters to be monitored over time, including ammonium, nitrate or nitrite, with a frequency of 10 to 15 minutes depending on the parameter in question.
The equipment's specific cleaning systems allow it to deal with dirty water from wastewater treatment plants, without affecting the measurements with cross-interferences in subsequent analyses or obstructing the fluid circulation systems. Its simple design means that plant operators quickly become familiar with the equipment and its maintenance is very low, reducing the inconvenience caused by analyser maintenance. All these features make the Instran a unique analyser on the market with exceptional performance for the control of nitrogen components in wastewater treatment plants and its consequent economic savings, as well as complying with current legislation.

Silica Instran®

Because only the -form of the silico-molybdic acid is formed the method has a fairly good sensitivity at the lower end as required by power plants and the electronics industry to ensure that the water is pure. The new formulation

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of Reagent #1 also speeds up the time required for the complete reaction. Moreover, its low reagent consumption per analysis reduces the operative cost and the time to prepare them.

KEM ONE EXPERIENCE & FEEDBACK WITH INSTRAN

Concerning the analyzer, **it is very user-friendly**, the injection principle is original but precise. The different steps are mentioned during the analysis and it is **very appreciable** compared to the "black boxes" sold by other manufacturers which inform us about nothing but the result.

The different tests we have carried out, in parallel with the old analyzer and then with standards prepared by our Laboratory, we have shown that the analyzer **was very accurate and very repeatable.**

About maintenance, it is **simple to realize with slow frequencies**. The main part of the analyzer is the syringe and it is only in contact with demineralized water.

Points of vigilance:

The injection nozzle got clogged once. We have enlarged the nozzle and since then no clogging. It is strongly recommended to put the analyzer in an air-pressurized cabinet to avoid corrosion on the syringe.

Experimental results

This analyzer gives us complete satisfaction and ANAEL is very reactive and very competent to answer all our questions.

INSTRAN					LABORATORY
Test 1 [ppm]	**Test 2 [ppm]**	**Test 3 [ppm]**	**Test 4 [ppm]**	**Average [ppm]**	**Value [ppm]**
141,0	143,6	143,7	145,2	**143,38**	146
96,2	97,3	96,7	98,9	**97,28**	96
73,8	73,9	74,7	76,7	**74,78**	74
44,0	45,2	44,7	44,9	**44,70**	48
19,6	20,1	19,7	19,9	**19,83**	24
7,1	6,4	6,1	6,3	**6,48**	8

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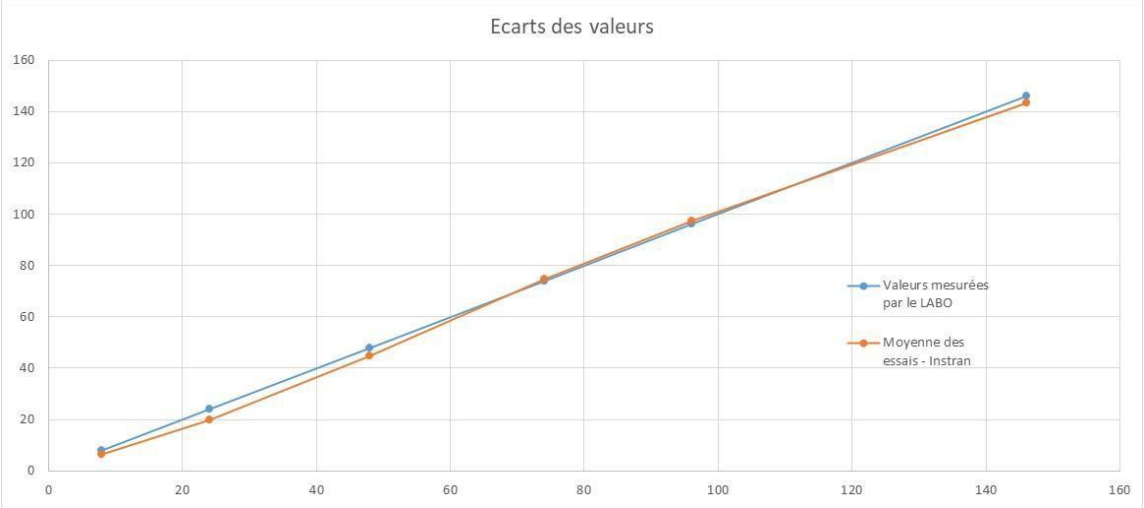

Figure 1. Plot provided by KEM ONE

Future steps

The first silica Instran was installed in December 2021 and after one year experience, appreciating the reliability and accuracy provided which permits to be sure that the demineralized water is not polluted and optimize the resin regeneration, a new silica analyzer has been purchased for January 2023.

Conclusions

«This analyzer gives us complete satisfaction and ANAEL is very reactive and very competent to answer all our questions.» KEM ONE

ACKNOWLEDGES

From Instrumentacion Analitica SA, we want to express our gratitude to **KEM ONE** to share the information about their industry process and its real experience with Instran.

In the same way, we also want to express thanks to our French distributor, **ANAEL**, for its praiseworthy tasks with Instran and clients. Instran reputation achieved in France would not be possible without its work.

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