

## 1. What are the necessary maintenance activities for my online analytical instrumentation?

In general, the maintenance requirements for online analytical instrumentation are similar to the requirements for the laboratory analytical instrumentation which is familiar to many wastewater professionals. Both types of instrumentation require cleaning, calibration, and replenishment. It is a mistake, however, to assume the same specific procedures for both types of instrumentation. Online analytical instrumentation is designed to be rugged and simple to use to facilitate long-term monitoring. For example, process water and a soft brush are all that is needed to clean many sensors.

Calibration is not a requirement for many sensors which have a factory calibration but a user calibration may fine-tune performance. Ammonium and nitrate sensors based on ion selective electrode (ISE) technology are not free from calibration requirements but may be calibrated in situ without the sensors being removed from the process. Consumables include sensor caps for DO probes and electrodes for ISE sensors which are replaced only after months or years of use.

## 2. Is it necessary to clean my sensors?

A clean sensor is essential for getting reliable measurements and there is no substitute for manual cleaning. The cleaning frequency varies with the application but it is best to be proactive. If you are waiting until you notice errors in the measurement, you have waited too long! A good rule of thumb to start is weekly. You can gradually increase the interval until you notice errors but many customers find weekly cleaning to be convenient and not overly burdensome and so never try to extend the interval. Of course, it

may also be necessary to clean more frequently and in those cases, supplemental automatic cleaning, e.g. air cleaning, may help to extend the cleaning interval.

## 3. How can I tell if my sensors are fouled?

It can be difficult to tell when measurement errors are caused by fouling. Visual inspection of a sensor which is covered in a thick layer of sludge is pretty strong evidence. However, in some cases, minor fouling may be evident but not interfere with the measurement. In other cases, measurement errors can occur in the absence of obvious fouling. From above the (waste-) water, the usual

symptom of a fouled sensor is higher, lower, or noisier measurements than usual. In extreme cases, measurements may flat-line at one end of the measurement range or throw out-of-range error codes. However, other cases are more subtle requiring inspection of long-term trends which show gradual drift of the measured value higher or lower.

## 4. How should I clean my sensors?

Sensors should be cleaned in a way which removes external fouling from the electrodes without removing or damaging sensor coatings, membranes, or optical windows. The probe body can be wiped clean with soap and water being careful not to dunk or immerse the sensing element in the soapy water. A soft cloth or soft bristle brush and process water is safe for removing bulk contamination from all sensing elements but you can overdo it. Clean tap water or DI water is not needed and can even damage ISE-style sensors. On the other hand, detergent, ethyl alcohol and dilute acid can be used on sealed optical windows on TSS and UV-Vis sensors. All persons responsible for cleaning should read and understand owner's manuals and manufacturer's guidance.

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Manual cleaning of a UV probe is recommended every 5 to 7 days

# FAQs - Cleaning, Calibration and Replenishment of Online Analytical Instrumentation for Wastewater



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## 5 - How do I know when it is time to replace my DO sensor cap or ISE electrode?

The signs of normal aging and depletion of caps and electrodes can be very subtle. Implausible values after an extended period of satisfactory operation is one symptom in which case the normal reaction is to perform a calibration. Inability to achieve a successful calibration or matrix adjustment or progressively shorter intervals between calibrations may mean that the time for replacement is near. Of course, by their nature, optical DO probes, particularly online versions, are very stable long term so the fact that a calibration is required at all may indicate the sensor cap should be replaced immediately. Defective or damaged DO sensor caps and ISE electrodes should also be replaced immediately. For example, visible defects such as scratches or gouges are obvious signs that a DO sensor cap should be replaced. A defective cap or electrode which fails prematurely should be replaced by the manufacturer under warranty. Optical DO sensor caps are usually warrantied for a minimum of 2 years and can be expected to last 3 to 5 years. A typical lifetime for ISE electrodes is 3 to 6 months although not all manufacturers offer a warranty. Ammonium and nitrate probes which are part of the IQ SensorNet are warrantied for 12 months.

## 6) What is the shelf life for sensor electrodes and caps?

The usable lifetime of DO sensor caps and ISE electrodes is not appreciably diminished on the shelf so long as they are properly stored in the original packaging. However, manufacturer's warranties are finite\*, and the clock starts ticking from the date of delivery. Therefore, we recommend that analytical instrumentation and consumables not be delivered until they are ready to be put into the sample in the case of commissioning of a new facility or process. On the other hand, it is a good idea to be prepared especially for sensors which are critical for efficient process control. So, for maintaining reliability for an existing process monitoring system, plan to order replacements at intervals not longer than the warranty period.

*\*The warranty period is 2 years for IQ SensorNet FDO sensor caps, 6 months for SensoLyt electrodes, and 12 months for AmmoLyt, NitraLyt, and VARiON electrodes.*



Cleaning the VARiON probe with a soft brush

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