

**When is the cheapest Process Analyzer  
not the best choice?**

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## **When is the cheapest process analyzer not the best choice?**

### **1. When low maintenance is essential.**

Process analyzers are usually located at or near the process, frequently at remote locations where maintenance personnel must be scheduled to visit. Because cheap analyzers usually leave out the self test and self correction features found in more expensive analyzers, maintenance personnel must be scheduled to manually inspect the system every few days. The cheap analyzers typically use ion selective electrodes for detection. These electrodes contain delicate membranes and are filled with a reference solution. Both the membrane and the reference solution require periodic replacement and careful observation to assure that fouling or rupture has not occurred. The electrode itself must be replaced periodically. Reagents and standards need to be replenished at regular intervals. (How often will depend on the frequency of analysis.) All of this requires time. Some users of cheap analyzers report spending a minimum of one hour per system, once or twice per week. If the site is remote, add travel time. ChemScan Process Analyzers require only a monthly visit to top off DI water and cleaning solutions. Self diagnostics can be set to send an alarm message if unscheduled maintenance is required.

### **2. When personal service is welcome.**

Cheap analyzers are typically sold directly out of a catalog, without any personal service for installation assistance, initial calibration or training. These systems come with a general installation and operation manual and an 800 number for assistance. Warranty service requires the operator to either return the entire system to the factory for repair or to determine the problem, disassemble the system and make their own repairs. ChemScan Process Analyzers are sold with services included, including design assistance up front to properly apply the product to the site, on site installation assistance and adjustment, initial calibration on site by a factory representative and “hands on” training for operation and maintenance. Warranty service starts with on site maintenance training, telephone support for minor issues, next day FedX parts service and site visits by a factory representative for major issues. ChemScan can do this because they rarely have major issues.

### **3. When interference is a concern.**

The two types of cheap analyzers most frequently encountered are based on ion selective electrode detection and on one or two wavelength photometric detection. Each parameter to be detected will have its own analysis procedure. Nitrate ion electrodes, for example, require the use of high and low standards and still have known interferences with nitrite, chloride, carbonate and bicarbonate. Two wavelength photometric nitrate analysis has interferences from dissolved metals, organics, chlorine and turbidity. ChemScan nitrate analysis uses no reagents and up to 30 wavelengths of information to automatically compensate for turbidity and background sample chemistry.

### **4. When a fast response is needed.**

Process analyzers are used to track changes in process chemistry, most often to signal an alarm condition and to provide an output signal that can be used to make process adjustments. For some applications, especially where public health is a concern, these analyzers must be able to provide a response to a change as soon as the change can be sensed. Cheap analyzers may require up to 20 minutes for each analysis if reagents are used. ChemScan can perform a new primary analysis every few seconds and can perform a new secondary analysis every few minutes.

## **5. When multiple parameters are being monitored.**

Cheap analyzers can detect only one parameter and can monitor only one sample point. Some cheap analyzers will package multiple ion electrodes into a common sample chamber (which will require additional reagents and double the maintenance on the electrodes) or will use a common electrode to detect multiple parameters (requiring elaborate sample conditioning and additional reagents.) The total analysis time may be unacceptable for these arrangements, since multiple steps are usually required and long reaction times are the norm. Most of the cheap analyzers will require multiple units for multiple parameters, which will substantially increase operation and maintenance expense. ChemScan Process Analyzers have several models that were specifically designed for multiple parameter analysis, using some combination of primary and secondary methods and a common flow cell. These ChemScan models will require less than five minutes to analyze a suite of four or more parameters.

## **6. When multiple sample lines are being monitored.**

Cheap analyzers can detect only one parameter and can monitor only one sample point. Some cheap analyzers will offer an external sample line manifold option, at additional cost. Where multiple analyzers must be used to monitor multiple parameters, plumbing connections and data communications may be unacceptably complex, especially for multiple sample line installations. Some suppliers require an external multiple line manifold for each analyzer. All ChemScan Process Analyzers are manufactured with internal manifolds to support multiple sample line connections, with only a small charge for an additional valve to activate each additional line. ChemScan Data communication modules are also built to accommodate additional outputs and alarms, as required for each application.

## **7. When the measured parameter is highly variable.**

Cheap ion electrode analyzers cannot respond quickly to changes in concentration for a measured parameter because time is required for electrode equilibration. This is the time that is required for a change in sample concentration to induce a stable change in the reference solution that can be accurately measured by the electrode. In samples where the concentration of the parameter to be measured is always changing, the consequence of equilibration lag is either a longer period of time between analysis intervals or unstable analyzer operation. Neither alternative is very appealing when process control is the objective. ChemScan does not use ion specific electrodes for analysis. There is no equilibration or reaction time lag when primary multiple wavelength analysis is used.

## **8. When sample fouling is an issue.**

Ion electrode analyzers cannot operate if the membrane is fouled due to biological or chemical deposits, preventing the sample from altering the reference solution. Two wavelength photometric analyzers cannot operate if the flow cell is fouled. The deposits on the surface of the flow cell windows will cause more light to be absorbed than was attributable to the concentration of the measured parameter within the sample cell. Cheap analyzers offer no mechanism for automatically cleaning the membrane or the flow cell, and offer no mechanism to measure and adjust for fouling. This is an issue in all types of waters, including potable water and ground water, where calcium carbonate fouling is a frequent problem. All ChemScan Process Analyzers offer automatic zeroing and cleaning plus self test features that automatically measure and adjust errors attributable to cell fouling. A maintenance alarm can be initiated if the analyzer is not able to automatically zero and clean to acceptable levels.

## **9. When the true cost of ownership has not been considered.**

The true cost of an analyzer is not just the purchase price, but the total cost to purchase, operate and maintain the analyzer over a given period of time. Cheap analyzers start to look very expensive when the cost of reagents, standards, electrodes and service work is tabulated over a five or ten year period. Some analyzers that cost under \$10,000 may require as much as \$5,000 per year for operation and maintenance. (A substantial fraction of this recurring cost is the service labor by owner personnel, which is a cost that is often overlooked during an evaluation.) It is no accident that the same suppliers that are willing to sell an analyzer for less than \$10,000 are also in the business of selling the monthly consumables and maintenance supplies for the analyzer. ChemScan is not in the reagent business.

### **10. When public health or safety is at risk.**

If the unthinkable occurs, a few dollars saved on the purchase price for an analyzer that was expected to provide reliable analysis and alarms will not seem to be a very prudent decision. Sure, cheap analyzers will always be available - but what are you willing to risk for a savings of a few dollars?