



WHAT, NO PUMPS !!

There is no disputing the fact that for on-line analysis of components in both potable and wastewater that the colorimetric techniques present the most reliable method of measuring the trace levels (ppb concentrations) of these components in real time.

This has been obvious from the number of companies offering such analysers, Hach-Lange, Metrohm (Applicon), Galvanic (Tytronics), Swan, etc all have become leaders in this field. All, without exception, require maintenance especially on the pumps which are used for supplying the reagents. Some use peristaltic pumps which require the peristaltic tubing to be replaced on a regular basis. Others use, for higher accuracy of the addition of the reagents, fluid metering pumps which are rather expensive. The Fluid Metering Pump, highly favoured on account of the precision, does require the seals to be set every three months and replaced on a yearly basis. The FMI pump is expensive because the shaft drive is individually ground to fit a pump and because of this precision grinding the pump shafts are not interchangeable.

When it was first suggested that a syringe could replace all the pumps on such analysers the reaction was – it cannot be done – but it has! The natural reaction is that the syringe would be contaminated by the various reagents and sample being dosed in to the reaction chamber. THIS IS NOT SO!!! The syringe is only ever filled with de-ionised water. There is a small “buffering” coil between the syringe and the valves which are opened and closed to enable the reagents and sample to be withdrawn from the source and dosed into the reaction vessel in the required sequence. A simple method of hydrostatic suction and pressure is used to control the delivery of sample and reagents.

The INSTRAN, as the process analyser is called, is available as an ISE analyser and as a process colorimeter. The ISE unit uses the SKA (Standard Known Addition) method for most measurements, especially when measuring the lower levels. The process photometric (colorimetric) analyser uses single wavelength LEDs for low power consumption and long life. Correction for turbidity and background colour of the sample is fully compensated by taking a measurement of



the transmission either immediately prior to the addition or after the addition of the first non-complex forming reagent. The term process photometer is preferred as the unit may be used for the measurement of low levels of chloride and sulphate by the measurement of the resulting turbidity formed on formation of the silver chloride or barium sulphate.



The measurements using ISE electrodes are somewhat limited as many ISE are not as specific as would be desired. The major applications are sodium, fluoride, cyanide, ammonia and nitrate.

The range of the photometric method of analysis is almost limitless as many reagents which are specific for a particular component. This has been especially true over the past 10 years where many reagents showing greater specificity and greater sensitivity have been developed and made commercially available.

The standard INSTRAN is on a 316SS panel for mounting in general purpose areas. The panel may be mounted in a cabinet to meet IP or NEMA standards and mounting in an IP-65 (NEMA-4X) enclosure with a suitable EXPO purge unit to meet either Zone 1 or Zone 2 requirements.



A simple external sample system may be required for the analysis of dirty wastewater process streams. The analysis of the water in aeration tanks, where sampling is made using a grinding pump, requires a small cyclone filter to remove the larger solid particles and provide a relatively clean (with only fines present) sample stream. The INSTRAN has a Turbo-Wash sequence in which any settled solids in the bottom of the reaction vessel are “thrown out” by the rapidly spinning stir bar.

The measurement using the colorimetric version of the INSTRAN is almost limitless and if not mentioned here does not mean that the component cannot be measured using this unit.



The following are but a few examples of the typical measurements:

Aluminium	Ferrous Iron
Boron	Total Iron
Chloride, ppb to low ppm levels	Manganese
Free Chlorine	Nickel
Total available Chlorine	Phosphate
Chromium(VI)	Selenium
Total Chromium	Silica
Cobalt	Sulphate, ppb to low ppm levels
Copper	Sulphide
Hardness in brine	Zinc
Low levels of hardness in ultrapure water	

It will, indeed, from the above lists be appreciated that the range of capability of the INSTRAN pump-less process analyser is very extensive.

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