

Continuous, On-Line Monitoring for Optimal Fluoride Levels



Model A15/82

Fluoride Monitor

Fast, Reliable Fluoride Monitoring

Fluoride is widely added to drinking water systems to help prevent tooth decay. It is normally added in the form of liquid hydrofluorosalic acid, which can be easily handled and applied using standard metering pumps. While the fluoridation process is often controlled by simple flow proportional feed, monitoring of final fluoride concentrations is useful in providing an alarm in the case of overfeed problems. Optimum fluoride levels of around 1 PPM are safe, but control system problems resulting in concentrations above 2 PPM are considered excessive and need to be detected as early as possible. Loss of chemical feed can also be detected quickly and reliably with on-line fluoride monitoring.

ATI's Model A15/82 Fluoride Monitor provides continuous measurement of free fluoride concentration in potable water. The system employs a fluoride sensitive ion selective electrode (ISE), which provides reliable measurements down to 0.1 PPM and as high as 1000 PPM. A chemistry module provides sample conditioning for the sensor, and the measured fluoride concentration is displayed on a separate electronics module that also provides alarm and analog output functions.

Operation

Fluoride ISE sensors measure F^- ion in solution the same way that a pH sensor measures hydrogen ions. A lanthanum fluoride crystal on the tip of the sensor develops a voltage that is proportional to fluoride ion activity. An integral reference electrode is used as a comparator to measure the developed voltage, with the measurement made at a differential input amplifier. Since the activity of fluoride ions in solution is a function of pH and ionic strength, a small amount of buffer solution is added to the measured sample. This creates a stable condition in which the concentration of fluoride ion and the activity of fluoride ion are directly proportional.

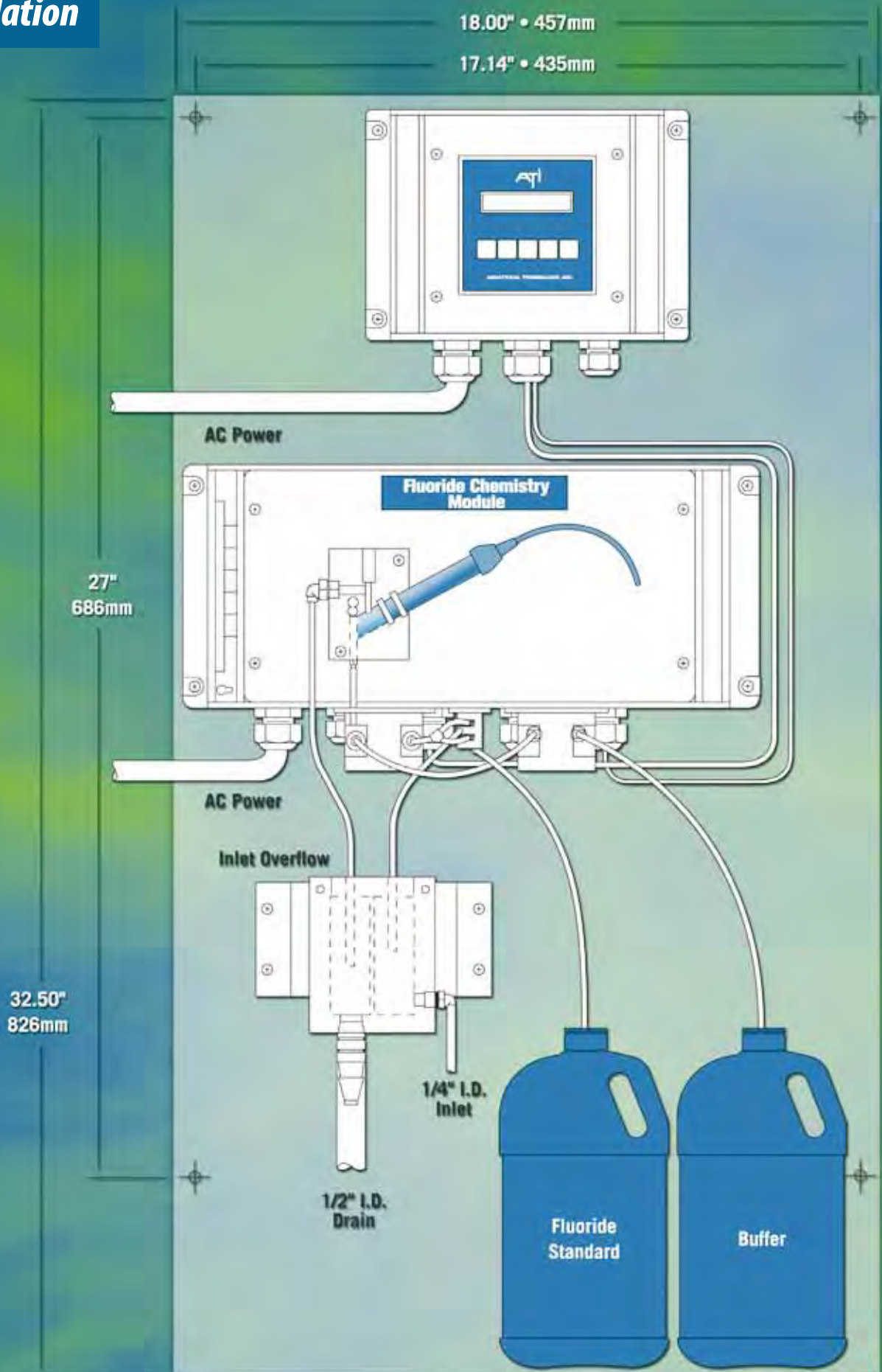
In operation, a small amount of sample is pumped into the system and mixed with the buffer solution. The treated sample then flows to a chamber where the combination fluoride ISE is mounted. The continuous flow of sample is measured in this chamber with changes in fluoride concentration immediately reflected at the monitor. The sample chamber drains back to the waste side of the sample inlet overflow chamber.

The A15/82 Fluoride Monitor requires very little maintenance. One gallon of buffer will operate the system for approximately 45 days. The system also performs an automatic calibration routine to correct for electrode "zero"



drift. The fluoride standard is automatically pumped into the chemistry module and the analyzer zero is automatically adjusted. The frequency of this calibration is user-selectable from every 1 to 999 hours. Calibration standards are easily mixed from a stock solution provided with the unit, and the buffer is prepared using common vinegar.

Typical Installation



Model A15/82 Fluoride Monitor Specifications

Electronic Monitor		Chemistry Module	
Range:	0-1.00 PPM minimum, 0-1000 PPM maximum	Fluoride Sensor:	Fluoride ion selective electrode with integral reference
Accuracy:	± 5% of span	Sensor Cable:	10 feet standard
Repeatability:	± 2% of span	Response Time:	T ₉₀ = 90 seconds
Drift:	< 0.1 PPM per month	Sample Pump:	Internal tubing pump, 5 cc./min.
Display:	16 character alphanumeric backlit LCD	Buffer Pump:	Internal tubing pump, 0.05 cc/min.
Control Relays:	Two SPDT relays, 5A @ 220 VAC resistive. Programmable deadband and time delay.	Measurement Chamber:	Cast acrylic
Control Mode:	On/Off with variable deadband and time delay	Temperature Limits:	0-50° C.
Alarm Output:	Independent alarm relay (SPDT) with dual setpoint.	Recommended Sample Rate:	2-10 GPH at inlet overflow Assembly
Analog Output:	Isolated 4-20 mA, 600 ohm maximum load. Programmable output span. Output may be inverted.	Sample Inlet:	1/4" I.D. hose barb
Operating Conditions:	0-50° C., 0-95% R.H. non-condensing.	Sample Drain:	1/2" I.D. hose barb
Power:	110/220 VAC ±10%, 50/60 Hz.	Power:	120 VAC, 60 Hz., 220 VAC, 50 Hz. Optional
Enclosure:	Panel mount standard, NEMA 4X wall mount optional.		

Ordering Information: Model A15/82 - C - D Monitor

Suffix C - Enclosure
 1 - Panel Mount
 2 - NEMA 4X Wall Mount

Suffix D - Power
 1 - 120 VAC, 60 Hz.
 2 - 220 VAC, 50 Hz.

Accessories

09-0028 Buffer, 1 gallon
 63-0057 Spare fluoride electrode

Note: Unit supplied with sample inlet overflow, 500 cc. of 100 PPM fluoride standard, and 1 gallon of buffer.

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