

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.

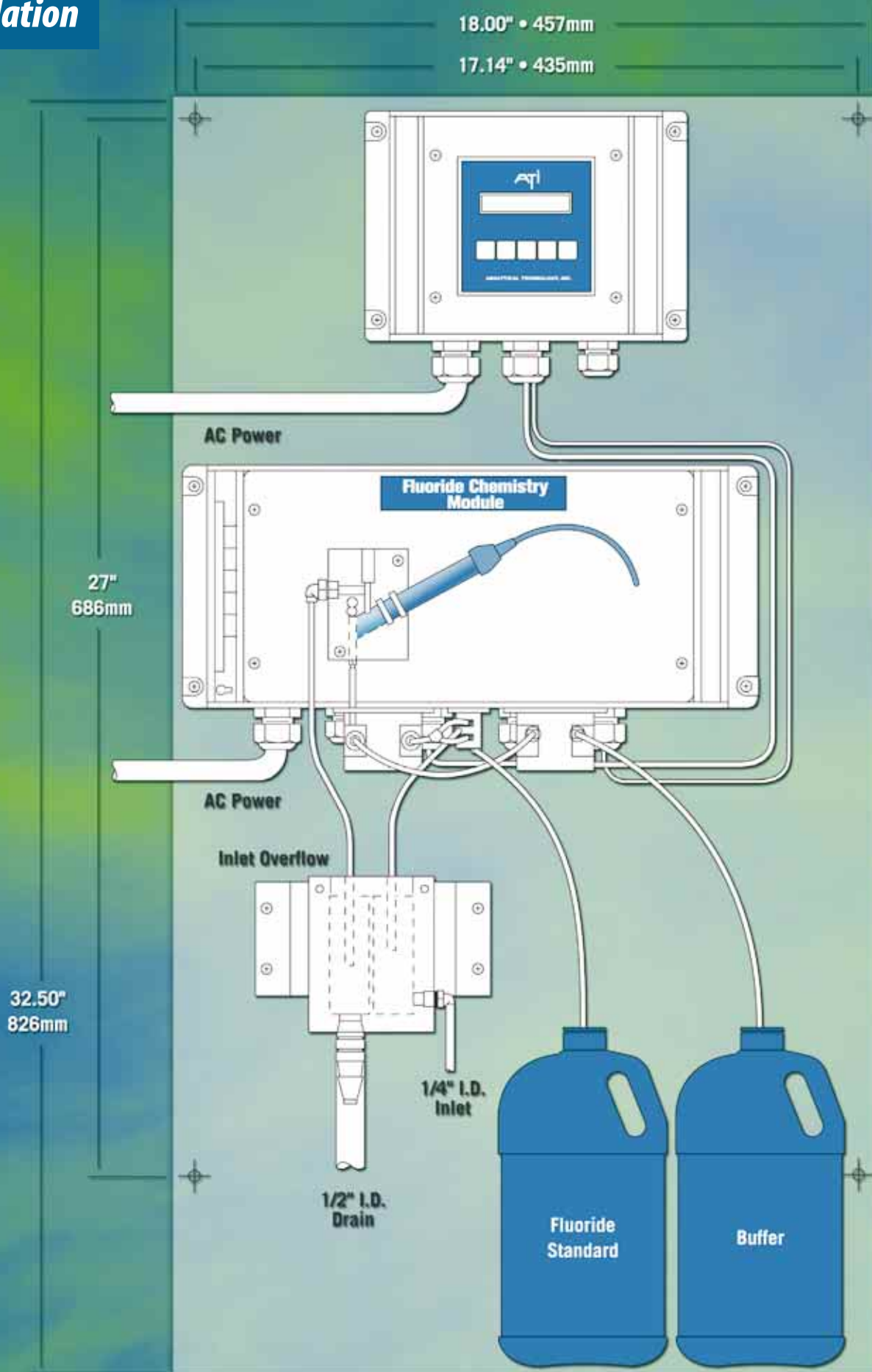
In operation, a small amount of sample is pumped into the system and mixed with the buffer solution. The treated sample then flows to a chamber where the combination fluoride ISE is mounted. The continuous flow of sample is measured in this chamber with changes in fluoride concentration immediately reflected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

Range:	0-1.00 PPM minimum, 0-1000 PPM maximum
Accuracy:	± 5% of span
Repeatability:	± 2% of span
Drift:	< 0.1 PPM per month
Display:	16 character alphanumeric backlit LCD
Control Relays:	Two SPDT relays, 5A @ 220 VAC resistive. Programmable deadband and time delay.
Control Mode:	On/Off with variable deadband and time delay
Alarm Output:	Independent alarm relay (SPDT) with dual setpoint.
Analog Output:	Isolated 4-20 mA, 600 ohm maximum load. Programmable output span. Output may be inverted.
Operating Conditions:	0-50° C., 0-95% R.H. non-condensing.
Power:	110/220 VAC ±10%, 50/60 Hz.
Enclosure:	Panel mount standard, NEMA 4X wall mount optional.

Chemistry Module

Fluoride Sensor:	Fluoride ion selective electrode with integral reference
Sensor Cable:	10 feet standard
Response Time:	T ₉₀ = 90 seconds
Sample Pump:	Internal tubing pump, 5 cc./min.
Buffer Pump:	Internal tubing pump, 0.05 cc/min.
Measurement Chamber:	Cast acrylic
Temperature Limits:	0-50° C.
Recommended Sample Rate:	2-10 GPH at inlet overflow Assembly
Sample Inlet:	1/4" I.D. hose barb
Sample Drain:	1/2" I.D. hose barb
Power:	120 VAC, 60 Hz., 220 VAC, 50 Hz. 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.

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

Accessories

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



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