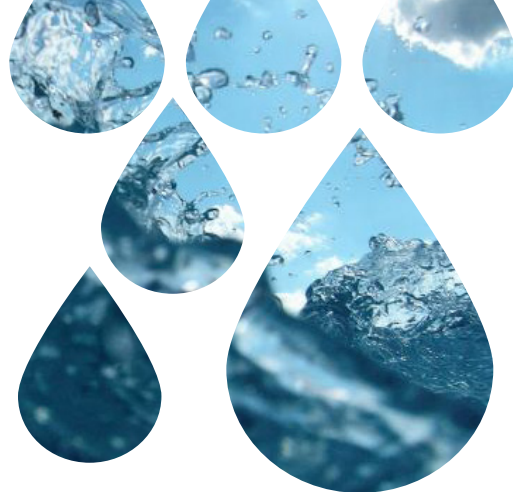


# AmmoniaMonitor

## Model Q46N



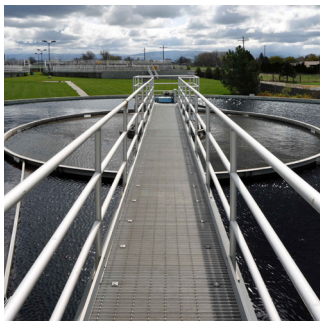
On-Line monitoring of Ammonia in water is of increasing importance due to the increased emphasis on nutrient reduction in lakes, streams, and estuaries. Unfortunately, simple direct measuring sensors have not proven sufficiently reliable, and rather complicated systems have been developed to address the measurement problem. These systems can be used but require substantial maintenance and are expensive to purchase. ATI has developed a new approach to on-line monitoring of ammonia that is easier to operate and less expensive than competitive systems, but with the reliability you need.

- Fast response time for real time ammonia measurement
- Simple chemical system uses inexpensive reagents
- Display of Free Ammonia, Monochloramine, and Total Ammonia for chloramination systems
- Automatic response verification for ammonia breakthrough applications
- Multiple digital communication options: Profibus, Modbus, or Ethernet

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## APPLICATIONS



Chloraminated Potable Water



Wastewater Effluent



Potable Water Intake



Ammonia Chillers



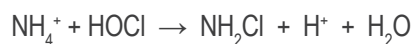
Aquariums



Fish Farms

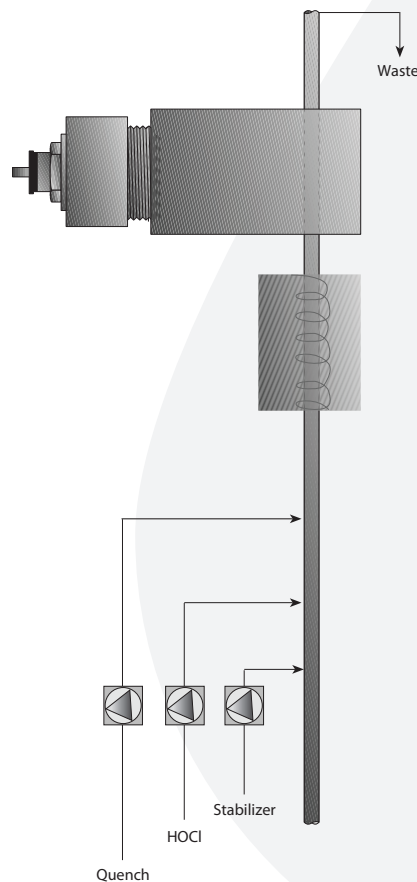
## OPERATION

Ammonia measurement is accomplished by the addition of three reagents, each of which is fed using a multichannel peristaltic pump. A stabilizer chemical is injected first to stop calcium precipitation in the tubing. After that, a solution containing free chlorine is injected which results in the conversion of ammonia to monochloramine.



The third reagent added quenches the above reaction by removing the excess free chlorine. This ensures that free ammonia in the sample stream is converted to monochloramine, and dichloramine formation does not occur.

Once chloramine formation is complete, the sample is temperature stabilized and pumped to a flowcell containing a special amperometric membraned sensor. This sensor measures the monochloramine formed in the chemical system and produces a highly linear output that is amplified and displayed in the monitor.





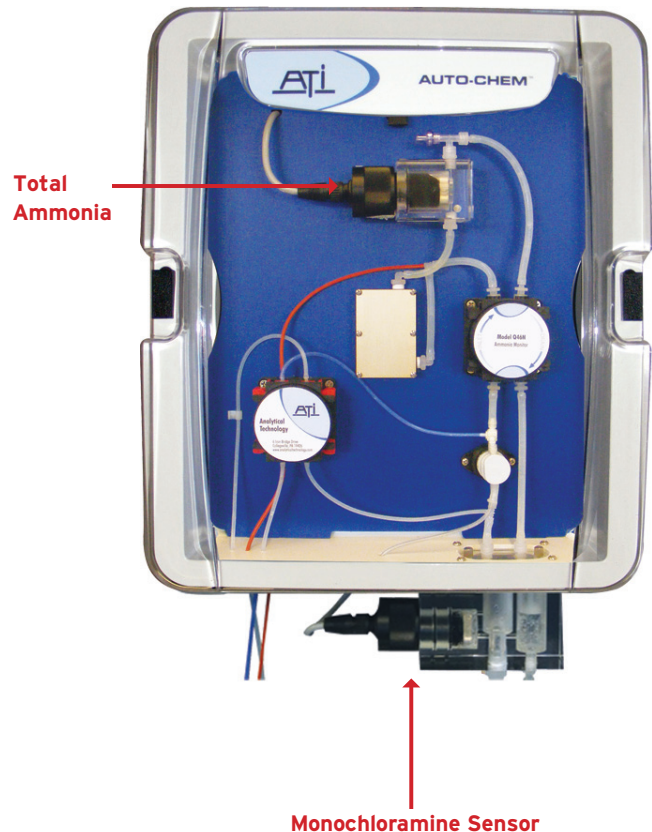
## CHLORAMINATION SYSTEM MONITORING

Chloramination in potable water treatment has become common, especially in utilities with large distribution systems. The use of chloramines to reduce disinfection by-products and to provide disinfectant protection throughout a large pipe network has proven useful but does present potential water quality problems if not controlled properly.

A carefully controlled chloramination system will result in the conversion of all free chlorine to monochloramine with only a slight excess of ammonia. This excess ammonia, called “free ammonia”, should be kept as low as possible to avoid the formation of nitrites and nitrates in the distribution system.

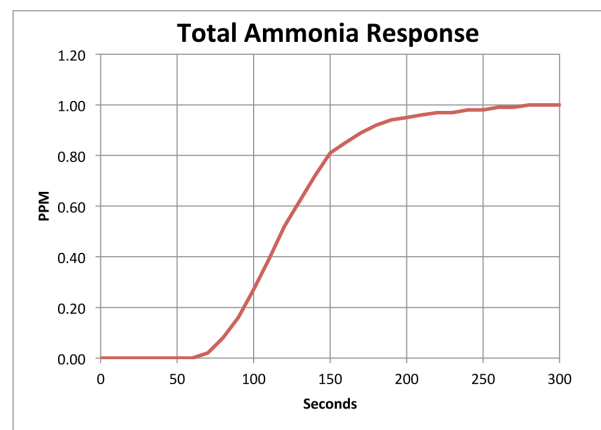
Minimizing the free ammonia concentration requires the accurate measurement of free chlorine to pace the ammonia addition, and also requires an accurate measurement of residual free ammonia. A special version of the Q46N Ammonia Monitor provides the capability of monitoring free ammonia by continuously measuring both total ammonia and monochloramine concentrations. Free ammonia concentration is then derived from these values.

Two sensors integrated into the Auto-Chem chemistry system provide the required measurements. A sensor located in the inlet assembly measures monochloramine concentration in the chloraminated water. After addition of reagents, a second sensor measures the total ammonia concentration. The electronic monitor subtracts the monochloramine ammonia from the total ammonia and displays the free ammonia value.



## AMMONIA RESPONSE VERIFICATION

Total ammonia monitors are frequently used in applications where ammonia is not normally present. Under normal operating conditions, refrigeration systems utilizing ammonia chillers have no ammonia in the process water. An ammonia monitor would display 0 PPM until a leak occurs. The Q46N Total Ammonia Monitor provides an automatic response verification system that confirms that the system is functioning properly. At user programmed intervals, a 1 PPM ammonia solution is introduced into the sample stream and the response is monitored to confirm the system is functioning properly. Outputs and alarms are inhibited during the test and an alarm is generated if the unit fails to respond. This system is not used for applications where ammonia is normally present but is very useful for ammonia breakthrough applications.



Typical System Response Time

# Q46N SPECIFICATIONS

## ELECTRONIC MONITOR

<b>Measurement</b>	Total Ammonia (as $\text{NH}_3$ or $\text{NH}_3\text{-N}$ ) Free Ammonia, Monochloramine (as $\text{NH}_2\text{Cl}$ or $\text{NH}_2\text{Cl-N}$ )
<b>Display Range</b>	0 – 5.00 PPM for Total Ammonia 0 – 10.00 for Monochloramine (Free Ammonia Systems only)
<b>Response Time</b>	90% in 180 seconds
<b>Accuracy</b>	$\pm 0.05$ PPM or 2% of Full Scale
<b>Sensitivity</b>	0.01 PPM
<b>Zero Stability</b>	$\pm 0.01$ PPM per month
<b>Electronic Linearity</b>	$\pm 0.5\%$
<b>Span Drift</b>	Generally less than 5% per month (Application dependent)
<b>Analog Outputs</b>	Two Isolated 4-20 mA, 575 ohms max. (TNH3 Systems) Three Isolated 4-20 mA, 575 ohms max. (FNH3 Systems)
<b>Power</b>	100-240 $\pm 10\%$ VAC, 50/60 Hz., 5 VA max.
<b>Relays</b>	Three SPDT, contacts rated 6 amp @ 250 VAC, 5 amp @ 24 VDC
<b>Digital Output</b>	Options for Profibus-DP, Modbus-RTU or TCP/IP, or Ethernet-IP
<b>Display</b>	4 digit, 0.75" numeric LCD with 12 character second line, LED back light
<b>Enclosure</b>	NEMA 4X (IP-66) Polycarbonate, V-0 flammability
<b>Operating Temp.</b>	Electronics: -40-60° C
<b>Auto-Verification</b>	Programmable from 1-999 hours (Total $\text{NH}_3$ Only)

## CHEMISTRY MODULE

<b>Ammonia Sensor</b>	Amperometric Membraned Sensor
<b>Interconnect Cable</b>	10 ft. (3 m) standard, 100 ft. (30 m) maximum
<b>Sample Pump</b>	Peristaltic Pump, 13 cc./min.
<b>Reagent Pump</b>	Peristaltic Pump, 0.1 cc./min.
<b>Reagent Usage</b>	25 days per gallon (3.8 L)
<b>Inlet Sample Flow Rate</b>	1-10 GPH (60-600 cc/min) at Inlet Overflow Assembly
<b>Sample Inlet</b>	1/4" I.D. Hose Barb
<b>Sample Drain</b>	1/2" I.D. Hose Barb
<b>Power</b>	120 VAC or 240 VAC, 50/60 Hz., 60 VA Maximum
<b>Operating Temp.</b>	2-45° C
<b>Size</b>	15.2" H x 13.2" W x 7.1" D (386 x 335 x 180 mm)
<b>Weight</b>	17 lbs. (7.7 Kg.)

## ORDERING INFORMATION

Model Q46N-A-B-C Ammonia Monitoring System

### Suffix A - Measurement

- 1 - Total Ammonia Only
- 2 - Free Ammonia, Monochloramine & Total Ammonia

### Suffix B - Power

- 1 - 120 VAC, 50/60 Hz.
- 2 - 230 VAC, 50/60 Hz.

### Suffix C - Digital Output

- 1 - None
- 2 - Profibus-DP
- 3 - Modbus-RTU
- 4 - Ethernet-IP
- 5 - Modbus-TCP/IP

## ACCESSORIES

- 07-0100** Universal Junction Box, NEMA 4X
- 31-0027** 9-c Sensor interconnect cable, max. 100 ft.
- 05-0094** Panel mount bracket kit
- 47-0005** 2" U-bolt, 304 SS
- 09-0074** Ammonia Reagent A Buffer, 1 Pkg.
- 09-0075** Ammonia Reagent C Stabilizer, 1 Pkg.
- 51-0066** Hydrogen Peroxide, 27%, 500 cc bottle (drop shipped, US only)

## NOTE:

Each system is supplied complete with Monitor, chemistry module, reagent bottle brackets, reagent pickup tubing assemblies, and spare parts kit. A 20 ft. cable is provided for connection of the sensor inside the chemistry module to the Q46N monitor. Note that Free Ammonia systems (suffix A2) have three 4-20 mA outputs.



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