

Highly Sensitive Turbidity Measurement, Unmatched Zero Stability



ISO and US EPA Compliant Sensors

Model A15/76

Turbidity Monitor

For Reliable, Low Range Turbidity Measurement

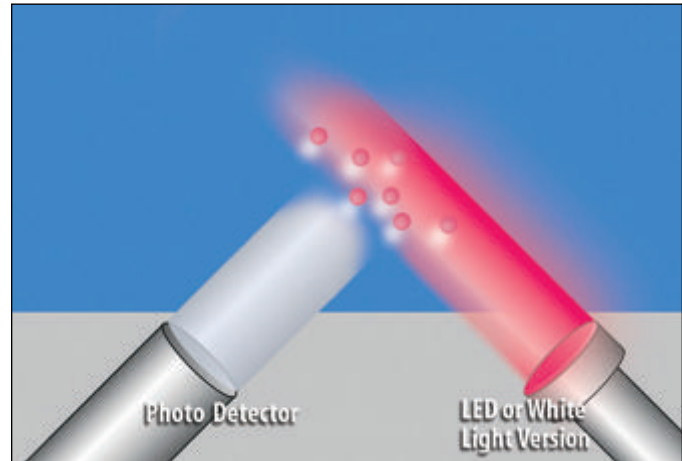
Turbidity is a general indicator of the optical clarity of water, and is defined as the amount of light scattered from particles in solution. In practice, a light beam is directed into a water sample and a photo detector measures the light scattered at 90 degrees to the incident light beam. While other scatter angles are possible, the 90-degree measurement angle has become the standard for turbidity measurement in most water systems. It is used as a relative indicator of the amount of suspended solids in solution, and is measured in virtually all drinking water systems. It is also used in industrial water treatment systems as an indicator of product water quality.

ATI's Model A15/76 Turbidity Monitor is designed to meet the needs of both municipal drinking water systems and industrial water treatment for reliable, low-range turbidity measurement. Using an infrared light source and a 90 degree scatter measurement, the system provides high sensitivity measurement with unmatched zero stability. Turbidity measurements down to 0.001 NTU or as high as 4000 NTU can be measured with the same monitor, eliminating the need for separate high and low range instruments.

Turbidity Sensor

The turbidity sensor used in the A15/76 monitor is a planer sensor with the light source and photo detector mounted on a flat face. Lenses in front of the light source direct the beam of light at a 45-degree angle into the sample. Another lens in front of the photodetector collects the 90 degree scattered light and directs it to the detector. The signal generated by the detector is amplified inside the sensor for transmission to the display unit. Periodic pulsing of the light source allows the sensor zero to be adjusted automatically for improved stability in low-range applications.

Turbidity sensors are available for measurement in a pressurized flowcell or for direct submersion in open tanks. A 1-1/2" flow T assembly is also available for direct in-line measurements. The flowcell is required for very low measurements (0-4 NTU), while the submersion unit may be used for higher turbidity applications such as wastewater effluent or raw water.



Cross-section of turbidity sensor, showing interaction of light beam and photo detector.



Left: Turbidity Sensor

Below: Close-up of sensor face.

Sensor Flowcell

Air bubbles are a common problem in many turbidity systems. ATI's turbidity sensor is designed to operate under pressure to eliminate the sample degassing that often causes air bubble errors. Sample pressure is not dropped until the sample exits the measuring chamber, resulting in more reliable measurements. The turbidity electronics unit is a compact panel-mount instrument providing an LCD display of turbidity value, as well as indication of alarm status and instrument diagnostics. For stand-alone applications, a NEMA 4X wall-mount enclosure is available.

Turbidity Monitor

The monitor provides display of turbidity over a variety of operating ranges. The minimum display range of 0-4 NTU provides resolution down to 0.001 NTU and is suitable for almost any final filter monitoring application. Ranges of 0-40 or 0-400 NTU are available for raw water or clarifier effluent monitoring. A 0-4000 NTU range may be used for very high turbidity applications such as river water monitoring. In addition, the monitor may be calibrated for suspended solids measurements, with ranges from 0-10 mg/l up to 0-10,000 mg/l.

Standard turbidity systems provide a variety of outputs. Two programmable alarms with SPDT alarm relays are included, as well as an isolated 4-20 mA output. The analog output may be programmed for full-scale outputs as low as 0-0.2 NTU, and can be inverted if desired. Alarm and output information can be displayed on the LCD at the push of a button, and the alarm relays can be activated manually for test purposes when needed.

A15/76 monitors also provide sensor diagnostic functions to warn of condition that cause inaccurate or invalid readings. The sensor is continuously monitored for optical fouling, and will display an alarm message when the sensor requires cleaning. In addition, the sensor will detect the lack of water in the flowcell and provide a "dry cell" when an air interface is detected. These alarm conditions will cause a third alarm relay to activate, which can be used to indicate these conditions remotely.

Automatic Sensor Cleaning

Because turbidity measurement is often required in wastewater effluents and other applications where sensor fouling can be a major problem, ATI offers a special turbidity unit, the D15/76 system, that uses an "air-blast" sensor cleaning system that automatically cleans the sensor as often as necessary to maintain reliable measurements. This system is used only for submersion applications only, and all air supply components required for the cleaning process are supplied in the NEMA 4X monitor package.



NEMA 4X Monitor



Sensor Flowcell



Auto-Clean Turbidity Monitor

Model A15/76 Turbidity Monitor Specifications

Range:	4/400 NTU (0-4.000, 0-40.00, 0-400.0) 40/4000 NTU (0-40.00, 0-400.0, 0-4000) 9/999 mg/l (or PPM) SiO ₂ (0-9.999, 0-99.99, 0-999.9) 99/9999 mg/l (or PPM) SiO ₂ (0-99.99, 0-999.9, 0-9999) Auto-ranging over 3 decades of concentration	Analog Output:	Isolated 4-20 mA, 600 ohm maximum load. Output range user set.
Accuracy:	± 5% of reading or ± 0.02 NTU, whichever is greater, on 40/400 scale ± 10% of reading or ± 2 NTU, whichever is greater, on 400/4000 scale	Operating Conditions:	-20° to +55° C., 0-95% R.H. non-condensing.
Linearity:	0.1% of F.S.	Power:	110/220 VAC ±10%, 50/60 Hz.
Display:	16 character alphanumeric backlit LCD	Enclosure:	Panel mount standard NEMA 4X wall mount optional (standard for Auto-Clean model)
Control Relays:	Two SPDT relays, 5A @ 220 VAC resistive. Programmable deadband and time delay.	Sensor Range:	0-4000 NTU
Control Mode:	On/Off	Measurement angle:	90-degree scatter (nephelometric)
Alarm Relay:	Independent SPDT relay, 5A @ 220 VAC resistive. Programmable for actuation on high/low values or control failure. Also indicates dry cell condition, fouled sensor, or high ambient light	Response Time:	95% in 10 seconds
		Sensor Power:	± 12 VDC supplied by monitor, pre-amplifier in sensor head
		Sensor Temp. Limit:	0 - 50° C.
		Sensor Pressure Limit:	0 - 100 PSIG
		Connections:	7-conductor sensor cable, 30 feet standard, 350 feet maximum
		Sensor Materials:	Delrin body, Acrylic optical windows
		Flowcell Materials:	PVC
		Flowcell Connections:	4 mm tube fittings (black tubing supplied)
		Flowcell Pressure:	0-100 PSIG
		Flowcell Temperature:	0-60° C

Ordering Information: Model A15/76 - A - B - C Turbidity Monitor Model D15/76 - E - F - G - H Auto-Clean Turbidity Monitor

Suffix A - Sensor Type	Suffix E - Enclosure
1 - IR LED	1 - Panel Mount
2 - White Light (US EPA)	2 - NEMA 4X Wall Mount
Suffix B - Enclosure	Suffix F - Sensor Type
1 - Panel Mount	1 - Submersible sensor
2 - NEMA 4X Wall Mount	Suffix G - Power
Suffix C - Sensor Type	1 - 120 VAC
1 - Submersible sensor	2 - 230 VAC
2 - Flow sensor with standard flowcell assembly	Suffix H - Enclosure Heater
	1 - None
	2 - Heater and thermostat

Options	
00-0930	Monitor pipe mounting bracket kit
00-0624	Submersion sensor swivel bracket assembly
31-0038	7 conductor interconnect cable sensor (300 ft. maximum)
00-0726	Junction box (for extended sensor cable)
45-0043	Auto-Clean sensor mounting adaptor



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