

# New Turbidity Technology from HANNA

HANNA's new HI 98703 and HI 93414 utilize an EPA compliant tungsten light source and state-of-the-art optical system that allow consistently reliable and accurate measurements of turbidity and free/total chlorine. Users will appreciate this accuracy particularly at very low turbidity levels. HI 93414 meets the requirements of EPA and Standard Methods for Turbidity and Colorimetric Chlorine Measurements.

Turbidity is measured up to 1000 NTU and free or total chlorine measurements can be made in the 0.00 to 5.00 mg/L

(ppm) range. To meet EPA reporting requirements these instruments have an EPA compliance reading mode. Depending on the measured sample and required accuracy, users can select normal measurement, continuous measurement or signal averaging.

Both models feature Hanna's new Tag Identification System (T.I.S.) which allows users to record the time and place at unlimited specific measurement locations. Logged data can be downloaded through either USB or RS 232.

Reliable performance of the instrument is validated using HANNA's exclusive CAL CHECK™ system and our ready-made, NIST traceable chlorine standards. For turbidity, a two, three or four-point calibration is available using pre-set or user defined standards. Frequent calibration isn't necessary as the system compensates for variations in intensity of the light source. The instruments' Good Laboratory Practice functions allow traceability of calibration conditions including the time, date and last calibration points.

**HI98703** EPA Compliant Turbidity Meter

**HI93414** EPA Compliant Turbidity and Chlorine Meter

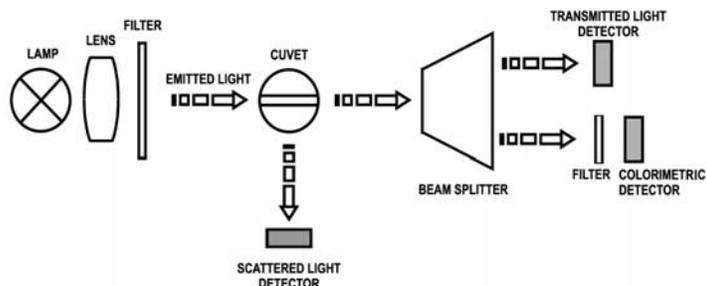




## Turbidity

Turbidity of water is an optical property that causes light to be scattered rather than transmitted. The scattering of light that passes through a liquid is primarily caused by suspended solids. Higher turbidity means greater amounts of scattered light. No solution will have zero turbidity because even the molecules in a very pure fluid scatter light to a certain degree. The USEPA Method 180.1 specifies the key parameters for optical systems to measure drinking, saline and surface water turbidity in a 0 to 40 NTU range, using the nephelometric method.

HI 98703 and HI 93414 are designed to meet or exceed the criteria specified by the USEPA Method 180.1 and Standard Method 2130 B. Model HI 93414 is based on a state-of-the-art optical system that guarantees both high performance and reliable results: this optical system includes a tungsten filament lamp, a scattered light detector and a transmitted light detector.



The light beam that passes through a sample is scattered in all directions. The intensity and pattern of the scattered light is affected by many variables like wavelength of the incident light, particle size, shape, refractive index and color. The microprocessor of the instrument performs calculations using the signal that reaches the two detectors to display the NTU value. The optical system and measuring technique allow the compensation of lamp intensity fluctuations, minimizing the need of frequent calibration. The lower detection limit of a turbidimeter is determined by the so called "stray light". Stray light is the light detected by the sensors that is not caused by light scattering from suspended particles. The optical system of these instruments is designed to have very low stray light, providing accurate results for low turbidity samples every time.

## CAL CHECK™ Calibration Validation

When performing chlorine measurements, you need to know that the instrument you are using is right on. With HANNA's exclusive CAL CHECK™ feature you can now rest assured. Simply insert the factory calibrated standard of a known concentration and verify that your instrument is accurate.



**Peace of mind.**

With HANNA's exclusive CAL CHECK™ validation function users are able to verify the performance of the instrument at any time. Taking just a few short steps, the validation procedure is user friendly and ensures that the meter is properly calibrated. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary. All instruments are factory calibrated and the electronic and optical design minimizes the need for frequent calibration.

## T.I.S. Tag Identification System

HANNA's exclusive T.I.S.—Tag Identification System simplifies test logging while retaining the management versatility users need to search, filter and export data. The system, designed for scientific and industrial applications, helps verify that samples have truly been taken at pre-established locations during safety audits and inspections.

T.I.S. is easy to install and operate. Just place the iButton® tags near your sampling sites that need to be regularly checked. Use these instruments to take measurements and memorize the test results by pressing the Log-on-Demand key. Then, the instrument will ask for the tag identification. These meters identify and authenticate logged data by storing the iButton® serial number, time and date stamp by simply touching the iButton® with the matching connector on the instruments. The number of tags that can be installed is unlimited, and each tag has a unique identification code. The management power of T.I.S. is utilized on the PC with



our HI 92000 Windows® compatible application software. Once the test data is downloaded to the PC, users can sort or filter all collected test data using different criteria such as specific sampling location, parameter, date and time intervals or fixed range to filter measured values. The data can be plotted in a graph, exported to other common Windows® applications or printed for reporting purposes. It is easy to add new tags later on to increase an already existing database. Each time the PC software recognizes a new tag, it will ask for a description of the new sampling location.

HANNA's T.I.S. system is the new revolution in simple and organized data management.



# HI 98703 EPA Compliant Turbidity Meter

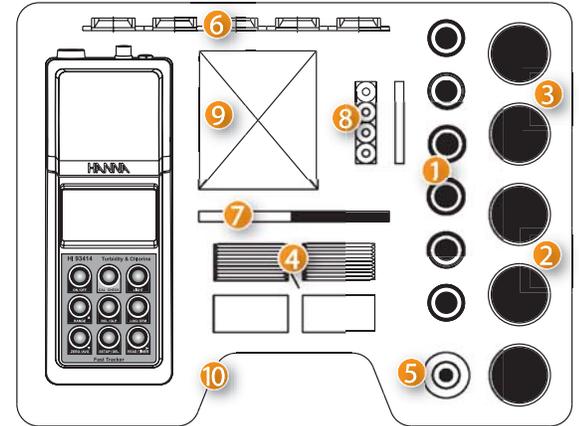
# HI 93414 EPA Compliant Turbidity and Chlorine Meter

## SPECIFICATIONS

| Turbidity (HI 93414 & HI 98703)         |   |
|---|---|
| Range                                   | 0.00 to 9.99; 10.0 to 99.9 and 100 to 1000 NTU  |
| Range Selection                         | Automatic   |
| Resolution                              | 0.01 NTU from 0.00 to 9.99 NTU; 0.1 NTU from 10.0 to 99.9 NTU; 1 NTU from 100 to 1000 NTU   |
| Accuracy                                | ±2% of reading plus 0.02 NTU  |
| Repeatability                           | ±1% of reading or 0.02 NTU, whichever is greater  |
| Stray Light                             | < 0.02 NTU  |
| Typical EMC Deviation                   | ±0.05 NTU   |
| Light Detector                          | Silicon Photocell   |
| Method                                  | Ratio Nephelometric Method (90°), ratio of scattered and transmitted light; Adaptation of the USEPA Method 180.1 and Standard Method 2130 B.        |
| Measuring mode                          | Normal, Average, Continuous   |
| Turbidity Standards                     | 1, 10, 100 and 750 NTU  |
| Calibration                             | Two, three or four-point calibration  |
| Free and Total Chlorine (HI 93414 only) |   |
| Range                                   | Free Cl <sub>2</sub> 0.00 to 5.00 mg/L; Total Cl <sub>2</sub> 0.00 to 5.00 mg/L   |
| Resolution                              | 0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 above 3.50 mg/L  |
| Accuracy                                | ±0.02 mg/L @ 1.00 mg/L  |
| Typical EMC Deviation                   | ±0.02 mg/L  |
| Detector                                | Silicon photocell with 525 nm narrow band interference filters  |
| Method                                  | Adaptation of the USEPA Method 330.5 and Standard Method 4500-Cl G. The reaction between chlorine and DPD reagent causes a pink tint in the sample. |
| Standards                               | 1 mg/L free chlorine, 1 mg/L total chlorine   |
| Calibration                             | One-point calibration   |
| Common Specifications                   |   |
| Light Source                            | Tungsten filament lamp  |
| Lamp life                               | Greater than 100,000 readings   |
| Display                                 | 60 x 90 mm LCD with back light  |
| LOG Memory                              | 200 records   |
| Serial Interface                        | USB 1.1 or RS 232   |
| Environment                             | To 50°C (122°F); max 95% RH non-condensing  |
| Power Supply                            | (4) 1.5V AA alkaline batteries or AC adapter  |
| Auto-off                                | After 15 minutes of non-use   |
| Dimensions                              | 224 x 87 x 77 mm (8.8 x 3.4 x 3.0")   |
| Weight                                  | 512 g (18 oz.)  |

## ACCESSORIES

|   |  |
|---|--|
| HI 710005 Voltage adapter                   | HI 92000 Windows® compatible software        |
| HI 731318 Tissue for wiping cuvetts (4 pcs) | HI 920005 5 tag holders with tags            |
| HI 731331 Glass cuvetts (4 pcs)             | HI 920011 5 to 9 pin RS232 connection cable  |
| HI 740027P 1.5V AA battery (12 pcs)         | HI 93703-50 Cuvet cleaning solution (230 mL) |



## ORDERING INFORMATION

HI 93414 Portable Turbidity and Free/Total Chlorine & HI 98703 portable turbidity meters are supplied with

- ① Five sample cuvetts and caps
- ② Three calibration cuvetts for turbidimeter
- ③ Two calibration cuvetts for colorimeter\*
- ④ Reagent powder packets for free & total chlorine\*
- ⑤ Silicone oil
- ⑥ Five tag holders with tags (HI 920005)
- ⑦ Scissors
- ⑧ Batteries (4 pcs.)
- ⑨ AC adapter
- ⑩ Rugged carrying case

Instruction manual  
Quick reference guide  
Instrument quality certificate

\*HI 93414 only

Authorized Distributor

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