

# TL23 SERIES BENCHTOP TURBIDIMETER

## Applications

- Food and Beverage
- Pharmaceutical
- Chemical
- Power
- Metal and Mining
- Agriculture
- Wastewater



## Trusted measurement for high range turbidity applications; simplified.

The new TL23 Series laboratory turbidimeters blend trusted technology and improved features to simplify testing in the most demanding industrial and wastewater applications.

### Improved and intuitive design

The TL23 Series' large full color touch screen display and intuitive user interface accelerate setup, calibration and measurement. An easy interface and guided procedures give you confidence in your results.

### A smart device for more reliable measurements

The TL23 Series ensures stable readings and accurate analysis by capturing turbidity readings once the device detects sample stability. This quality step removes subjectivity and the need for repeated measurements.

### Easy to use. Easy to Be Right

The TL23 Series provides everything you need at your fingertips. With a USB port for easy data export, sample identification for traceability, and self-diagnostics for quality assurance, Hach® makes it easy to Be Right.



Be Right™

## Technical Data\*

| Model              | TL2300 EPA  | TL2350 EPA   |
|--------------------|---|--|
| Measurement Method | Nephelometric   |  |
| Regulatory         | Meets EPA Method 180.1  | Meets EPA Method 180.1   |
| Display            | 17.8 mm (7 in.) color touch screen  |  |
| Light Source       | Tungsten filament lamp  | Tungsten filament lamp   |
| Units              | NTU and EBC   | NTU, EBC, Abs (absorbance), %T (% transmittance) and mg/L  |
| Range              | NTU (Ratio on): 0 - 4000<br>NTU (Ratio off): 0 - 40<br>EBC (Ratio on): 0 - 980<br>EBC (Ratio off): 0 - 9.8  | NTU (Ratio on):<br>0 - 10000 auto decimal<br>NTU (Ratio off): 0 - 40<br>EBC (Ratio on):<br>0 - 2450 auto decimal<br>EBC (Ratio off): 0 - 9.8<br>Absorbance (auto range):<br>0 - 1.0<br>Transmittance (%):<br>1.0 - 100<br>Degree (mg/L): 1 - 100 |
| Accuracy           | Ratio on: $\pm 2\%$ of reading plus 0.01 NTU from 0 - 1000 NTU, $\pm 5\%$ of reading from 1000 - 4000 NTU based on formazin primary standard<br>Ratio off: $\pm 2\%$ of reading plus 0.01 NTU from 0 - 40 NTU | Ratio on: $\pm 2\%$ of reading plus 0.01 NTU from 0 - 1000 NTU, $\pm 5\%$ of reading from 1000 - 4000 NTU $\pm 10\%$ of reading from 4000 - 10000 NTU<br>Ratio off: $\pm 2\%$ of reading plus 0.01 NTU from 0 - 40 NTU                           |
| Absorbance         |   | Absorbance: $\pm 0.01$ Abs from 0 - 0.5 Abs at 455 nm, $\pm 2\%$ Abs from 0.5 - 1 Abs at 455 nm<br>Transmittance: 2% T from 10 - 100% T at 455 nm  |
| Resolution         | Turbidity: 0.001 NTU/EBC (on lowest range)  | Turbidity: 0.001 NTU/EBC<br>Absorbance: 0.001 Abs<br>Transmittance: 0.1% T   |
| Repeatability      | $\pm 1\%$ of reading or 0.01 NTU, whichever is greater (under reference conditions)   |  |
| Response Time      | Signal averaging off: 6.8 seconds / Signal averaging on:<br>14 seconds (when 10 measurements are used to calculate the average)   |  |

| Model                            | TL2300 EPA   | TL2350 EPA   |
|----------------------------------|--|--|
| <b>Stabilization Time</b>        | Ratio on:<br>30 minutes after start-up<br><br>Ratio off:<br>60 minutes after start-up  | Ratio on:<br>30 minutes after start-up<br><br>Ratio off:<br>60 minutes after start-up        |
| <b>Reading Modes</b>             | Single, continuous, Rapidly Settling Turbidity™, signal averaging on or off, ratio on or off   | Single, continuous, Rapidly Settling Turbidity™, signal averaging on or off, ratio on or off |
| <b>Communication</b>             | USB  |  |
| <b>Interface</b>                 | 2 USB-A ports for USB flash drive, external printer, keyboard and barcode scanner  |  |
| <b>Data Logging</b>              | 2000 total logs, includes reading log, verification log and calibration log  |  |
| <b>Air Purge</b>                 | Dry nitrogen or instrument grade air (ANSI MC 11.1, 1975)<br><br>0.1 scfm at 69 kPa (10 psig); 138 kPa (20 psig) max<br><br>Hose barb connection for 1/8-inch tubing               |  |
| <b>Sample Cell Compatibility</b> | Round cells 95 x 25 mm (3.74 x 1 in.) borosilicate glass with rubber-lined screw caps<br><br>Note: Smaller sample cells (less than 25 mm) can be used when a cell adapter is used. |  |
| <b>Sample Requirements</b>       | 25 mm sample cell: 20 mL minimum<br><br>0 to 70 °C (32 to 158 °F)  |  |
| <b>Certifications</b>            | CE, KC, RCM  |  |
| <b>Power Requirements</b>        | 100 - 240 V AC, 50/60 Hz, 3.4 A  |  |

*\*Subject to change without notice.*

## Principle of Operation

TL2300 and TL2350 Turbidimeters: The optical system is comprised of a tungsten-filament lamp, lenses and apertures to focus the light, a 90° detector, forward-scatter light detector, a backscatter detector (TL2350 only) and a transmitted-light detector. The instrument permits turbidity measurements at less than 40 NTU to be performed using only the 90° scattered-light detector or from 4000 NTU (TL2300) to 10000 NTU (TL2350) using the complete set of detectors (Ratio Measurement). With the Ratio Measurement on, the instrument's microprocessor uses a mathematical calculation to ratio signal s from each detector. The benefits of using Ratio on for measurements include excellent linearity, calibration stability and the ability to measure turbidity in the presence of color.

TL2310 Turbidimeter: The optical system includes an 860 ±30 nm light emitting diode (LED) assembly and a 90° detector to monitor scattered light. The instrument measures turbidity up to 1000 FNU or NTU using the single 90° detector. The instrument does not utilize ratio measurements.

TL2360 Turbidimeter: The optical system includes an 860 ±30 nm light emitting diode (LED) assembly and a 90° detector to monitor scattered light, a forward-scatter light detector, a transmitted-light detector and a back-scatter light detector. The instrument measures turbidity up to 1000 units in FNU measurement mode using the ratio detectors. Attenuation measurements of up to 10000 FAU units can be made using a single transmitted detector. The instrument measures turbidity at less than 1000 NTU using only the 90° scattered-light detector or up to 10000 NTU using the complete set of detectors (ratio mode).

## Order Information

### Instruments

|                        |   |
|------------------------|---|
| <b>LPV444.99.00210</b> | TL2300 Tungsten Lamp Turbidimeter, EPA, 0 - 4000 NTU  |
| <b>LPV444.99.00120</b> | TL2310 LED Turbidimeter, ISO, 0 - 1000 NTU            |
| <b>LPV444.99.00310</b> | TL2350 Tungsten Lamp Turbidimeter, EPA, 0 - 10000 NTU |
| <b>LPV444.99.00320</b> | TL2360 LED Turbidimeter, ISO, 0 - 10000 NTU           |

### Replacement Parts

|                |  |
|----------------|--|
| <b>9647700</b> | Cover, lamp access                     |
| <b>9649100</b> | Dust cover                             |
| <b>9653500</b> | Color filter module for EPA compliance |
| <b>4708900</b> | Lamp replacement kit                   |
| <b>4707600</b> | Polishing cloth                        |
| <b>126936</b>  | Silicone oil                           |

### Accessories

|                |  |
|----------------|--|
| <b>2662110</b> | Stabcal® turbidity standards calibration kit, 100 mL bottles |
| <b>2662100</b> | Stabcal® turbidity standards calibration kit, 500 mL bottles |
| <b>246142</b>  | Formazin turbidity standard, 4000 NTU, 100 mL                |
| <b>246149</b>  | Formazin turbidity standard, 4000 NTU, 500 mL                |
| <b>4397500</b> | Test kit, sample degassing                                   |
| <b>4397510</b> | Test kit, sample filtration & degassing                      |
| <b>2723342</b> | Stabcal® turbidity standard, 0.10 NTU, 100 mL                |
| <b>2697942</b> | Stabcal® turbidity standard, 0.30 NTU, 100 mL                |
| <b>2698042</b> | Stabcal® turbidity standard, 0.50 NTU, 100 mL                |

### Service Packages

#### Start-up:

Instrument set up and basic end user training on general instrument operation and maintenance will be provided to help you get the best performance from your instrumentation from the first day you use it.

#### Service Agreement:

Hach offers a wide range of service coverage agreements designed to meet your needs. Choose Hach Service to help you maximize your measurement reliability and instrument uptime.

Contact us to learn more today.

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|---|----------------------------|
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