# Optical Measurement

Light

When light passes through a liquid, the amount of particles and color in solution will affect the light. Optical techniques measure solution characteristics by using a defined light source, passing the light through a sample, and then measuring the light that passes through the sample. Turbidimetric and colorimetric methods both involve measuring the resulting light intensity. They differ in that the light is attenuated by scattering in turbidimetry and by absorption in colorimetry.

Both determinations may use similar instrumentation. By employing different wavelengths of light and different optical configurations, we can optimize the system for determining the transmitted light of interest for a given analytical method.

Light source   Detector

Sample
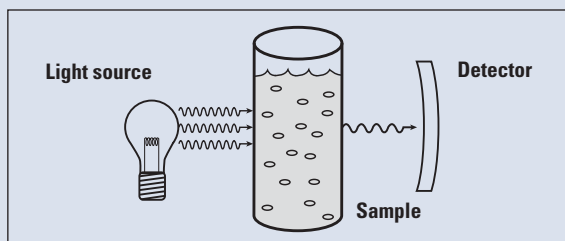
Turbidimetry

The cloudiness in a liquid caused by the presence of finely divided, suspended material is called "turbidity." Turbidity meters provide a means of quantifying this "cloudiness" by determining the reduction of light passing through a turbid solution and then comparing the results against a standard. In some applications, the clarity of solution is critical. In other applications the appearance of particles indicates bacterial growth. In either case, the turbidimeter provides process numerical data on the sample solution.

Colorimetry

The colorimetric method of chemical analysis involves the measurement of light absorption by colored solutions. While the differences in color development are visible to the human eye, visual determination is subject to user interpretation. Colorimeters eliminate the differences encountered with color comparitors to produce an exact numerical value—with greater resolution than can be achieved through comparitors. Colorimeters use the well-understood principals of wet chemistry to provide precise, repeatable analysis methods. For example, the standard DPD method for determining free and total chlorine is well accepted and approved by the US EPA.

Reagents and Accessories

Reliable reagents and standards ensure accurate measurement for turbidimeters and colorimeters

Turbidity Calibration Set

For use with the T-100 turbidity meter sold on page 61. Stable standards ensure accurate turbidity measurements.

Catalog number	Description	Included
WD-35635-52	Calibration set	60 each of primary calibration standard 0.02, 20.0, 100, and 800 NTU

Colorimeter Reagents

The pH reagent features a dropper bottle making it easy to repetitively provide the correct amount of reagent. The convenient foil packs are ideal for use in the field or in the lab. DPD reagents follow US EPA method 330.5 for wastewater, and Standard Method 4500-Cl G for drinking water.

Catalog number	Description	Included
WD-35645-60	pH reagent	Dropper bottle, for 50 tests
WD-35645-62	Cyanuric acid reagent	100 foil packs
WD-35645-64	Free-chlorine reagent DPD	100 foil packs
WD-35645-66	Total-chlorine reagent DPD	100 foil packs

Secondary Chlorine Standards

Verify performance of your C201, C301; or C401 colorimeters (see page 61).

Catalog number	Description	Included
WD-35645-70	Secondary standards	Set of four vials

Cuvettes

For use with the T-100 turbidity meter on page 61 and all colorimeters on page 62. High-quality borosilicate glass ensures good light transmittance. Indexing mark on each cuvette makes it easy to get repeatable results.

Catalog number	Description	Included
WD-35653-55	Cuvettes	Pack of three

Optical

T-100 Turbidity Meter

Completely waterproof—even the sample chamber

Waterproof and dustproof housing – IP67-rated waterproof housing allows operation in wet conditions ensuring durability, easy cleaning, and maintenance—it even floats!

Auto-ranging from 0 to 1000 NTU – Meter determines the sample's turbidity level and automatically adjusts to the appropriate measurement range—eliminating any guesswork

Simple, display-prompted push-button calibration – Pressing the "CAL" button initiates the quick and simple calibration procedure. The instrument automatically prompts the user for the next calibration standard.

Large, easy-to read display – Large, custom LCD shows readings with units of measure and user-friendly message codes that guide meter operation

Advanced power supply management – Measures over 1200 samples with a single set of batteries, delivering quick, stable results in less than six seconds. Also features auto-off function.

Sturdy carrying case with accessories – Compact case contains all items necessary for turbidity measurements and protects the meter when not in use. Items include the T-100 meter, four primary calibration standards, three borosilicate sample cuvettes with light shield caps, collection bottle, lint-free cloth, silicone oil, and batteries.

Index markings on the cuvettes make it easy to perform repeatable measurements.

Kit includes standards, sample vials, and a rugged carrying case.

Specifications

ISO9001:2008 CERTIFIED SUPPLIER   CE   **2** year warranty

Model	T-100 Turbidity meter
Range	0.01 to 19.99 NTU, 20.0 to 99.9 NTU, 100 to 1000 NTU
Resolution	0.01 NTU, 0.1 NTU, 1 NTU
Measurement method	ISO 7027 (DIN EN 27027) compliant nephelometric method (90°)
Accuracy	±2% of measurement from 0 to 500 NTU, ±3% of measurement from 501 to 1000 NTU
Repeatability	±0.01 NTU or ±1% of measurement, whichever is greater
Response time	<6 seconds for full-step change
Calibration standards	0.02 NTU, 20.0 NTU, 100 NTU, 800 NTU

Standardization: EPA-approved polymer-based primary standards

Light source: infrared-emitting diode (850 nm wavelength)

Light source life: >1,000,000 measurements

Detector: Silicon photovoltaic

Stray light: <0.02 NTU

Display: 4-digit, 14-segment customized LCD

Sample vials: borosilicate glass with screw caps, fill line, and indexing mark. 2"H x 1"dia (51 x 25 mm)

Sample volume: 10 mL (0.33 oz) minimum

Operating temperature range: 0 to 50°C (32 to 122°F)

Operating humidity: 0 to 90% RH, noncondensing at 30°C (86°F) range

Power: four AAA alkaline batteries (included), >1200 measurements

Enclosure: ABS plastic/IP67 rated

Dimensions (W x L x H)
Meter: 2¾" x 6⅛" x 1⅞" (6.8 x 15.5 x 4.6 cm)
Meter with case: 6½" x 14" x 4¼" (16.5 x 35.5 x 10.5 cm)

Weight
Meter: 7 oz (200 g); **Meter with case:** 2.75 lb (1.25 kg)

Ordering Information

Catalog number	Description	Included
WD-35635-05	T-100 turbidity meter	Meter, three empty cuvettes with light shield caps, collection bottle, lint-free cloth, silicone oil, batteries, and hard carrying case
WD-35635-00	T-100 turbidity meter kit	Meter, four primary calibration standards (0.02, 20.0, 100, and 800 NTU), three empty cuvettes with light shield caps, collection bottle, lint-free cloth, silicone oil, batteries, and hard carrying case

Accessories

WD-35635-52 Replacement calibration set, includes 4 x 60 mL bottles of 0.02, 20.0, 100, and 800 NTU standards
WD-35653-55 Replacement cuvettes, borosilicate glass. Pack of three

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