



Colorimetry

The measurement of a parameter whose concentration is proportional to the colour intensity with the help of added reagent.

About Colorimetric Measurement

Introduction to Colorimetry

Colorimetry is defined as the measurement of a parameter whose concentration is proportional (directly or inversely related) to color intensity after the addition of known volume of reagent(s).

Different chemical substances absorb different and varying visual light frequencies. Since the absorbance of a substance is proportional to its concentration i.e., a more concentrated solution gives a higher absorbance reading, therefore the concentration of a known solute can be measured using a colorimeter.

Eutech's latest range of handheld waterproof colorimeters measure chlorine (free and total), cyanuric acid, pH, chlorine dioxide, bromine and ozone. The applications include water analysis in swimming pools, spas, public utilities, industrial wastewater plants, municipal water, treated water, water conditioning systems and paper and pulp mills.

The effectiveness of the disinfectants used depends on your system's overall water chemistry, and not just on the disinfectants' concentrations alone. The following section provides a brief overview on the measurement of each parameter:

Bromine

Bromine is often used as a disinfectant in indoor or covered water systems. Due to lower volatility, bromine is more stable in water than chlorine. Compared to chlorine, the main advantages of bromine are reduced odour, and skin and eye irritation. In addition, bromine remains effective at high temperatures and its disinfecting efficiency is not affected by pH fluctuations. The disadvantages are that bromine is more expensive than chlorine and it cannot be stabilised for outdoor use.

Eutech's C 104 colorimeter measures bromine over the range of 0 ppm to 13.5 ppm.

Chlorine

Chlorine and chlorine-release compounds are frequently used as disinfectants in swimming pools, drinking water and other water treatment systems. Routine chlorination kills harmful micro-organisms. The disinfection efficiency is a direct function of the level of free chlorine in a system. Total chlorine is the sum of combined and free chlorine.

In applications where there is human contact with the water e.g. in swimming pools and spas, it is essential that the right amount of chlorine is present. Insufficient chlorine will decrease the disinfectant efficiency; while excess chlorine will cause skin and eye irritation and become a health hazard.

Eutech's C 401, C 301 and C 201 colorimeters measure free and total chlorine over the range of 0 mg/L to 6 mg/L.

Chlorine Dioxide

The use of chlorine dioxide as a disinfectant is seeing growth in many industrial applications. Unlike chlorine, chlorine dioxide remains a true gas dissolved in solution. The lack of any significant reaction of chlorine dioxide with water is partly responsible for its retaining its disinfecting effectiveness over a wide pH range. This property makes it a logical choice for cooling systems operated in the alkaline pH range, or cooling systems

with poor pH control. Other applications for chlorine dioxide include the food processing industry; the pulp and paper industries, and the potable water and waste treatment industries.

Eutech's C 103 colorimeter measures chlorine dioxide over the range of 0 ppm to 11.4 ppm.

Ozone

Ozone is one of the strongest and most rapid oxidisers and disinfectants available. Ozone does not require any stabiliser. It does not corrode nor cause scaling. In addition, ozone has no smell, does not cause skin nor eye irritation and does not pose a health hazard. Although more expensive than traditional disinfectants like chlorine and bromine, because it does not cause corrosion nor scaling, the long-term maintenance cost of a water system which uses ozone as a disinfectant may be reduced compared to using chlorine. Ozone is gaining popularity in top spas and certain swimming pools.

Eutech's C 105 colorimeter measures ozone over the range of 0 ppm to 4.1 ppm.

Cyanuric Acid

In applications where chlorine is used for disinfection, cyanuric acid is often present as a chlorine stabiliser. Low levels of cyanuric acid are beneficial as they prevent wastage of free chlorine by the sun's UV rays. High levels of cyanuric acid cause the chlorine to take a longer time to kill the micro-organisms. It is important to test your water sample to determine how much cyanuric acid should be added to maximise chlorine efficiency.

Eutech's C 401 and C 102 colorimeters measure cyanuric acid over the range of 5 ppm to 90 ppm.

pH

The pH value affects the amount of free chlorine that is formed, and therefore determines the effectiveness of chlorine as a disinfectant. As pH increases, the disinfecting power of chlorine decreases. High pH causes scaling of water surfaces, pipework and fittings; this may result in cloudy water. Low pH can corrode metals in pipework and fittings; this may cause metal oxides to stain water surfaces.

Eutech's C 401, C 301 and C 101 colorimeters measure pH over the range of 5.9 - 8.2.



<< Spa

>> Paper Mill



Fuss-free and easy to use with no need for pre-calibration! Eutech's range of colorimeter provides quality, highly-repeatable results in just three simple steps. Each colorimeter comes complete with reagents and sample vials in a rugged carrying case – convenient for testing in the field.



- Excellent test-to-test repeatability, auto-ranging and convenience with only one-vial-one-sachet per test
- Fuss-free meter operation with one-time blanking for all parameters and ranges and no pre-calibration required for chlorine and cyanuric acid
- No detachable parts, no flip covers – high quality customised vials fit perfectly into the sample vial
- Chlorine measurements are based on US EPA-approved DPD method
- Custom formulated high quality powder reagents provide excellent accuracy, repeatability and stability
- 100 % dustproof and waterproof to IP67 standards
- Advanced power management with more than 3000 tests per set of four new 'AAA' alkaline batteries and auto-off function



C401; C301; C201; C105; C104; C103; C102; C101 Colorimeters
Free & Total Chlorine/Cyanuric Acid/pH ; Free & Total Chlorine ; Ozone ; Bromine ; Chlorine Dioxide ; Cyanuric Acid ; pH

Three Easy Steps



Step 1: To blank the meter, place a vial of sample liquid into the meter's sample well. Press the 'ZERO' button. The meter flashes 'STDBY' while blanking is in progress and displays 'ZERO' to confirm that blanking is complete



Step 2: Add reagent into sample vial (according to the specified parameter test procedure). Secure vial in meter sample well











Step 3: Press 'READ/ENTER' to measure desired parameter

Applications

- Swimming pools • Spas • Public utilities
- Industrial wastewater plants • Municipal water • Treated water • Water conditioning systems • Paper and pulp mills

Colorimetry

Colorimeters Specifications
& Ordering Information

				Colorimeters								
				C 401	C 301	C 201	C 105	C 104	C 103	C 102	C 101	
Colorimeters Specifications	Range	Resolution	Accuracy									
	Chlorine, Free & Total	0 to 1.99 ppm 2.0 to 6.0 ppm	0.01 ppm 0.1 ppm	±0.02 ppm ±0.2 ppm	✓	✓	✓	-	-	-	-	-
	pH	5.9 to 8.2 pH	0.1 pH	±0.1 pH	✓	✓	-	-	-	-	-	✓
	Cyanuric Acid	5 to 90 ppm	1 ppm	±4 ppm	✓	-	-	-	-	-	✓	-
	Chlorine Dioxide	0 to 3.79 ppm 3.8 to 11.4 ppm	0.01 ppm 0.1 ppm	±0.02 ppm ±0.2 ppm	-	-	-	-	-	✓	-	-
	Bromine	0 to 4.49 ppm 4.5 to 13.5 ppm	0.02 ppm 0.2 ppm	±0.03 ppm ±0.3 ppm	-	-	-	-	✓	-	-	-
	Ozone	0 to 1.39 ppm 1.4 to 4.1 ppm	0.01 ppm 0.1 ppm	±0.02 ppm ±0.2 ppm	-	-	-	✓	-	-	-	-
Measurement Method	Photometric											
Light Source	Light emitting diode (LED)											
Wavelength	525 nm											
Detector	Silicon photodiode											
Absorbance Range	0 to 2.5 Abs											
Photometric Precision	±0.0015 Abs											
Cal. Points	User-selectable ; 1-point per colorimetric test											
LCD Display	4-digit 14-segments customised LCD with annunciators											
Sample Vials	Borosilicate glass with screw caps, fill line and indexing mark (height x diameter: 5.1 x 2.5 cm)											
Sample Required	10 ml (0.33 oz)											
Operating Temperature Range	0 to 50 °C / 32 to 122 °F											
Sample Temperature Range	0 to 50 °C / 32 to 122 °F											
Operating Humidity Range	0 to 90 % RH non-condensing at 30 °C											
Power	4 x 1.5 V 'AAA' alkaline batteries											
Battery Life	> 3000 tests											
Electromagnetic Compliance (EMC)	Emitted interference - EN 61326 Immunity to interference - EN 61326											
IP67	Yes											
Insulation Rating	Pollution degree 2											
Dimensions	Meter	15.5 x 6.8 x 4.6 cm ; 200 g										
(LxWxH); Weight	Boxed	35.5 x 16.5 x 10.5 cm ; 1170 g										

Colorimeters															
Item	Order Code	Part No.	Parameters						Accessories						
			Chlorine, Free & Total	pH	Cyanuric Acid	Chlorine Dioxide	Bromine	Ozone	Reagent (94X377001)	Reagent (94X377002)	Reagent (94X377003)	Reagent (94X377004)	Reagent (94X377005)	4 Sample Vials	Colorimeter Carry Case
C 401	ECC401	01X376906	•	•	•				•	•	•	•		•	•
C 301	ECC301	01X376905	•	•					•		•			•	•
C 201	ECC201	01X376904	•						•	•				•	•
C 101	ECC101	01X376902		•								•		•	•
C 102	ECC102	01X376903			•									•	•
C 103	ECC103	01X376915				•			•				•	•	•
C 104	ECC104	01X376916						•		•				•	•
C 105	ECC105	01X376917								•				•	•

Accessories			
Used With	Description	Order Code	Part No.
C 401 / C 301 / C 201 / C 103 / C 104 / C 105	Chlorine colour reference kit set	ECCLCOLORREF	01X274806
C 401 / C 301 / C 201	Free chlorine (DPD) reagent kit, pack of 100 pouches	94X377001	94X377001
C 401 / C 301 / C 201	Total chlorine (DPD) reagent kit, pack of 100 pouches	94X377002	94X377002
C 401 / C 301 / C 101	pH indicator (phenol red) reagent kit, 1 bottle	94X377004	94X377004
C 103	Chlorine dioxide (glycine) reagent kit, pack of 100 pouches	94X377005	94X377005
C 102	Cyanuric acid reagent kit, pack of 100 pouches	94X377003	94X377003