

Process Control Testing of Chlorine Dioxide in Sanitizing Solution and Wash Water

Introduction

Chlorine Dioxide (ClO_2) is frequently used to disinfect food products and the equipment and water used to process these products. ClO_2 offers several benefits as a disinfectant. It is a powerful antimicrobial agent. It is active over a broad pH range. It does not form halocarbons with organic compounds. And it is an effective odor neutralizer. ClO_2 is also difficult to handle. It is extremely unstable and highly explosive as a concentrated gas. And it decomposes quickly when exposed to sunlight. It must be generated at the use site, and carefully monitored to maintain safe and effective dosing.

DR300 Pocket Colorimeter and DPD chemistry

ClO_2 is approved by the USFDA for certain produce, meat, and seafood processes. Maximum residual concentrations vary according to application. Residual ClO_2 must be measured to ensure that the regulatory limits have not been exceeded. The easiest way to monitor ClO_2 residual is with the Hach® DR300 Pocket Colorimeter and DPD chemistry. ClO_2 oxidizes the DPD reagent to a magenta color which can be measured with a colorimeter. The intensity of the color is directly proportional to the concentration of the ClO_2 .

While the DPD chemistry is approved by the USEPA for measuring ClO_2 in drinking water, it is not approved by the USFDA for measuring ClO_2 in food manufacturing processes. Therefore, DPD can only be used for process control measurements where a quick gauge of the process conditions is all that is needed



The **DR300 Pocket Colorimeter** connects to **Claros™**, Hach's innovative Water Intelligence System, enabling you to seamlessly connect and manage instruments, data, and process – anywhere, anytime. The result is greater confidence in your data and improved efficiencies in your operations.

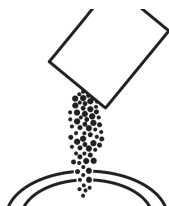
To unlock the full potential of **Claros**, insist on **Claros Enabled** instruments.

Find out more at hach.com/claros.

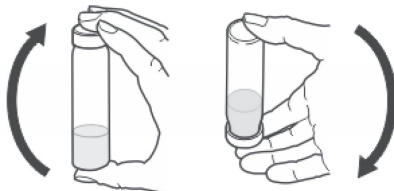
Hach DR300 Chlorine Dioxide Method

The Hach DR300 Chlorine Dioxide Method contains detailed analytical instructions. In general, the chlorine analysis is quite simple.

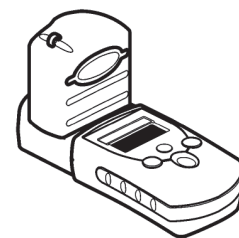
Add the **DPD reagent** to the sample



Mix



Read the sample color with the **DR300 Colorimeter**



Application: Process Control Testing of Chlorine Dioxide

In addition to the detailed steps in the method, follow these sampling and measurement practices to ensure the best data for every sample.

Pretreat the sample cell to remove any chlorine dioxide demand.

- Chlorine dioxide demand will result in a false low result.

Sample directly into the measuring cell.

- Sample bottles can introduce error through contamination or chlorine demand from the sample bottle itself. Sampling directly into the measuring cell eliminates these errors.

Rinse the sample cell several times with the flowing sample

- Rinsing the cell removes any detritus or residual from previous samples or standards.

Analyze the sample immediately.

- Chlorine is highly volatile. Analyze the sample immediately to ensure that data are representative.

Clean the sample cell with a wipe or cloth.

- Just as rinsing the cell with the sample cleans the inside of the cell, wiping off water droplets and smudges cleans the outside of the cell.

Rinse the cell with deionized water after each analysis.

- Rinsing the cell removes sample and reagents which may stain the cell or interfere with future measurements.

Store reagents properly.

- DPD can degrade at high temperature and humidity.

The US FDA has approved SM 4500-ClO₂ E for measurement of chlorine dioxide in 21 CFR 173.300. Measurements taken for regulatory compliance should be performed with this method. SM 4500-ClO₂ E involves multiple amperometric titrations and requires considerable analytical skill. The [Hach AT1000](#) titrator and chlorine dioxide/chlorite application pack can be used to follow SM 4500-ClO₂ E. The portable DR300 Colorimeter and benchtop AT1000 Titrator are excellent companions for complete chlorine dioxide treatment monitoring.



[AT1000 Autotitrator](#)

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