



## TCEQ REGULATORY GUIDANCE

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Water Supply Division

RG-563 • Revised October 2019

# Public Water System: How to Use Chlorine Dioxide

Chlorine dioxide ( $\text{ClO}_2$ ) is an extremely powerful oxidant that can be used to improve the aesthetic, chemical, and microbiological quality of drinking water. The proper use of  $\text{ClO}_2$  can reduce taste and odor complaints, improve iron and hydrogen sulfide concentrations, and improve the coagulation process at surface water treatment plants. It does not form halogenated disinfection by-products such as trihalomethanes and haloacetic acids and is a very effective disinfectant. However, elevated levels of  $\text{ClO}_2$  and its principal by-product, chlorite, can have their own adverse health effects. Consequently, the TCEQ has adopted the following guidance to ensure that only well-operated, high-efficiency  $\text{ClO}_2$  generators are utilized by public water systems.

## Chlorine Dioxide Exception Review

1. Before placing a chlorine dioxide generator into service, a Public Water System must submit an exception request to [PTRS@tceq.texas.gov](mailto:PTRS@tceq.texas.gov).

The exception request submittal must include:

- a. The name and specifications for the chlorine dioxide generator proposed for use;
- b. Information regarding other U.S. potable water installations of the proposed unit;
- c. Information on the operation and maintenance training program;
- d. The expected total applied dosage of chlorine dioxide and other disinfectants as well as the points of application for all disinfectants and the type and amount of residuals and by-products expected in the distribution system;
- e. Name and qualifications of the individual(s) expected to perform routine analytical efficiency testing. (Laboratory testing must be completed by a trained plant operator who holds a Class C or higher water works license);
- f. A description of the containment facilities for the sodium chlorite tanks. Containment facilities for a single container, multiple containers, or interconnected containers must be large enough to hold the maximum amount of chemical that can be stored with a minimum freeboard of six vertical inches or to hold 110% of the total volume of the container(s), whichever is less, as specified in 30 TAC 290.42(f)(1)(e)(ii)(1); and

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treatment plants utilizing ClO<sub>2</sub> lead to the same entry point, then the system will only have to fill out one ClO<sub>2</sub>MOR per month. If a system has multiple plants utilizing ClO<sub>2</sub> and the effluent from each plant flows to the distribution system through a different entry point, the system will need to complete a ClO<sub>2</sub>MOR for each entry point from each plant.

- b. Per the ClO<sub>2</sub>MOR instructions, the system must perform the following sampling for each entry point through which water containing chlorine dioxide flows:
  - i. The system must collect one sample per day from the point of entry (POE) to be analyzed for ClO<sub>2</sub>. If the ClO<sub>2</sub> residual exceeds 0.8 milligrams per liter (mg/L) or greater at the POE, the system must collect three samples from the distribution system to be analyzed for ClO<sub>2</sub>. The locations and timeframes for the collection of these samples can be found in the Summary of Additional Monitoring and Reporting Requirements for Public Water Systems Using Chlorine Dioxide. This document is included in the letters to systems granting exceptions for the use of chlorine dioxide.
  - ii. The system must collect one sample per day from the POE to be analyzed for chlorite. If the chlorite residual exceeds 1.0 mg/L at the POE, the system must collect three distribution samples within 24 hours and have them analyzed for chlorite. The locations for these sample collections can be found in the Summary of Additional Monitoring and Reporting Requirements for Public Water Systems Using Chlorine Dioxide.
  - iii. The system must also collect three samples in the distribution once a month to be analyzed for chlorite for every POE that supplies water treated with chlorine dioxide. One of these sample points must be near the first customer of a plant, at a location representative of the average residence time, and at a location representative of maximum residence time. These samples are known as a three-sample set and must be collected on the same day. The chlorite distribution samples should be collected on a day when chlorine dioxide is used in the treatment process.
5. The system must ensure water operators maintain a free chlorine residual of at least 0.2 mg/L or a chloramine residual of 0.5 mg/L (measured as total chlorine) in the far reaches of the distribution system at all times as specified in 30 TAC 290.46(d)(2). The chlorine dioxide residual of the water entering the distribution system must not exceed a maximum residual disinfectant level (MRDL) of 0.8 mg/L. The chlorite concentration residual of the water entering the distribution system must not exceed a MRDL of 1.0 mg/L.
6. The system must comply with the chlorine dioxide and chlorite monitoring requirements detailed in the *Summary of Additional Monitoring and Reporting Requirements for Public Water Systems Using Chlorine Dioxide* document.

7. The system must develop and submit a revised "Monitoring Plan" that includes the chlorine dioxide and chlorite monitoring locations as required in 30 TAC 290.121. Further information can be found in Regulatory Guidance (RG) 384 "[How to Develop a Monitoring Plan for a Public Water System](#)"<sup>4</sup>. Please submit an updated monitoring plan to [PDWS@tceq.texas.gov](mailto:PDWS@tceq.texas.gov).
8. The system must identify the location of the reduced-pressure zone backflow prevention assemblies to be installed on the potable water feed line(s) for the chlorine dioxide. Make-up water supply lines to chemical-feeder solution-mixing chambers shall be provided with an air gap or other acceptable backflow prevention device, as specified in 30 TAC 290.42(d)(2).
9. Amperometric titrators must be equipped with platinum-platinum electrodes as specified by the requirement in 30 TAC 290.110(d)(5).
10. The system shall ensure that the gas chlorination facility meets the applicable requirements listed in 30 TAC 290.42(e) and (f). All chemical storage and feed facilities must comply with 30 TAC 290.42(f).
11. All chemicals used in the generation of chlorine dioxide must conform to NSF International Standard 60 and be certified by a testing organization accredited by NSF as specified in 30 TAC 290.42(j).

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<sup>4</sup> [www.tceq.texas.gov/goto/rg-384](http://www.tceq.texas.gov/goto/rg-384)