

Municipal Drinking Water Treatment for Taste and Odor Control

Technical Brief

Technical Summary	Permanganate is used in systems treating surface water to aid in the control of off-flavor tastes and odors. Off-flavors are usually attributed to the presence of blue-green algae in the water supply. The oxidant has been found to be most effective in treating off-flavors described as fishy, septic, grassy, and cucumber. In many cases permanganate will compliment activated carbon and other treatment processes resulting in a cost-effective taste and odor control program.
Application	<p>To determine the Permanganate Value PV_t (where t is time), laboratory tests simulating plant conditions of time, the sequence of addition of other treatment chemicals, etc., are conducted. The procedure is described in Carus Form # 3353. This is the raw water permanganate demand in a given period of time. This value is used to calculate the feed rates needed.</p> <p>Permanganate is usually fed at the intake to take advantage of the time available in the raw water transmission line and to insure that all of the oxidant is used up prior to the addition of other treatment chemicals such as alum, chlorine, activated carbon, or iron salts. Control can be visual or can be monitored using residual permanganate analytical methods given in Standard Method 4500-KMnO₄.</p>
Chemistry	Taste & Odor Compounds + MnO ₄ ---> MnO ₂ + Odorless By-products
Dosage	Normal dosages to control tastes and odors will range between 0.5 and 2.5 mg/L KMnO ₄ depending on the degree of raw water contamination. The average dosage is ~1.0 mg/L KMnO ₄ .
Facility Requirements	Proper feed equipment specially designed to handle permanganate is recommended and available from Carus. The product must be put into solution before being introduced into the system. Operators should be trained to monitor permanganate residuals and to exercise proper safety precautions when handling the oxidant.
Benefits	Cost-effective taste and odor control programs include the application of permanganate to complement activated carbon and other control methods. In many cases the volume of carbon is substantially reduced as a result of permanganate pretreatment. Permanganate does not form trihalomethanes, and aids in the coagulation process.
References	<p>Suffet, I. H., Corado, A., Chou, D., McGuire, M. J., Butterworth, S., AWWA Taste and Odor Survey. <i>Jour. AWWA</i>, (April 1996)</p> <p>Ficek, K. J., Potassium Permanganate For Iron and Manganese Removal and Taste and Odor Control. <i>Water Treatment Plant Design For The Practicing Engineer</i>, Chap. 21, (R. L. Sanks, editor). Ann Arbor Sci. Publ., Ann Arbor, MI. (1978)</p> <p>Buffin, L. W., Hoehn, R. C., Dietrich, A. M., Rashash, D. M. C., Effectiveness of Chlorine, Chlorine Dioxide, and Permanganate for the Treatment of Cucumber, Grassy, and Fishy Odors in Water Supplies, AWWA WQTC, (1993)</p> <p>Young, E. D., Work Ethic Alive and Well, Approach Just Different. <i>Opflow AWWA</i>, Vol. 21 No. 2, (Feb 1995). <i>Carus Form CX #3060</i></p> <p>Standard Method 4500-KMnO₄ Potassium Permanganate, <i>Standard Methods for the Examination of Water and Wastewater</i>, 20th Edition, (1998). <i>Carus Form CX #3353</i></p>

For further information on CAIROX® potassium permanganate or CARUSOL® liquid permanganate product characteristics and availability, contact Carus Chemical Company at 1-800-435-6856.

CARUS CHEMICAL COMPANY

Other Applications

- Taste & Odor Control
- Iron & Manganese Removal

- Disinfection by-product Control
- Arsenic & Radium Control

Carus Value-Added

LABORATORY SUPPORT

Carus Chemical Company has technical assistance available to answer questions, evaluate treatment alternatives and perform laboratory testing. Our laboratory capabilities include; Feasibility Studies, Treatability Studies and Analytical Services.

FIELD SERVICES

As an integral part of our technical support, Carus provides extensive on-site treatment assistance. We offer full application services, including technical expertise, supervision, testing, and feed equipment design and installation in order to accomplish a successful evaluation and/or application.

EQUIPMENT SERVICES

Standard feeders are designed specifically for CAIROX[®] potassium permanganate. Various options and accessories are available to meet a wide range of applications. Custom-Engineered Feed Systems are complete, pre-engineered and pre-packaged systems. They provide efficient, dust-free methods of storing, mixing, and feeding CAIROX[®] potassium permanganate. System designs are customized to meet specific applications and customer needs.

CARUS CHEMICAL COMPANY

During its more than 90-year history, Carus' ongoing reliance on research and development, as well as its emphasis on technical support and customer service, have enabled the company to become the world leader in permanganate, manganese, oxidation, and base-metal catalyst technologies.



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