



TECHNICAL SUMMARY

Sulfides and other organic and inorganic compounds can form in the biosolids handling operation of a wastewater system due to anaerobic conditions. These gases can be released during the dewatering step causing the rotten egg odor of toxic hydrogen sulfide and other sewage related compounds. Sulfides can react with moisture in the atmosphere to form acids, that will corrode equipment. Aqueous solutions of permanganate will destroy the odors caused by hydrogen sulfide, mercaptans, amines, and other organic nitrogen and sulfur based compounds and prevent the formation of corrosive acids. The result is a safe, odor-free environment that minimizes corrosion due to sulfides. Permanganate will not oxidize ammonia.

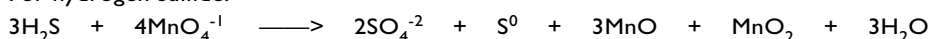
In the treatment of sanitary sewage, biosolids are separated from the liquid. These biosolids are concentrated and dewatered using filter presses, centrifuges, or other devices. Hydrogen sulfide is released during the dewatering operation.

APPLICATION

Hydrogen sulfide measurements are made around the dewatering equipment. Permanganate (1% to 20% solution) is then applied at a convenient point either into the biosolids holding tank or directly ahead of the solids transfer pumps. The reaction with sulfides is immediate. Feed rates are adjusted to adapt to changing conditions such as flow and temperature. The direct injection of aqueous permanganate solutions into the wastewater biosolids eliminates odors except ammonia.

CHEMISTRY

For hydrogen sulfide:



DOSAGE

For biosolids odor control, testing usually starts at 100 mg/L (8 lbs. permanganate per dry tons solids). The dosage is normally reduced to 4 to 6 lbs. permanganate per dry ton after the system is stabilized.

FACILITY REQUIREMENTS

To effectively introduce permanganate into the system, a pipe line injection tap must be assembled before polymer additions. Proper feed equipment is necessary. No other changes are needed. Operators should be properly trained to handle permanganate and be aware of safety and emergency procedures.

BENEFITS

Permanganate reacts rapidly with the functional groups of the odorous compounds, destroying the odor without having to fully mineralize (degrade) the compound. Dewatering improvements have been shown when permanganate is added to septic biosolids to eliminate hydrogen sulfide. In some cases the reduction in polymer is dramatic and offsets the cost of permanganate addition.

Employees are no longer subjected to toxic hydrogen sulfide and neighbor complaints about odors are reduced or completely eliminated.



REFERENCES

1. Pisarczyk, K. S., Rossi, L. A., Sludge Odor Control and Improved Dewatering with Potassium Permanganate, 55th Annual Conference of the Water Pollution Control Federation, St. Louis, Mo. (Oct 1982). Carus Form CX #4005
2. Ficek, K. J., Potassium Permanganate Controls Sewage Odors, (1980). Carus Form CX #4007
3. Staff, Permanganate Treatment Brings Odor Control Success, WATER/Engineering & Management. Carus Form CX #4009
4. Pope, R. J. , Weber, R. A., Odor Control With Chemicals, Operations Forum, Vol.II, No. 4, (April 1994). Carus Form CX #3760
5. Carus Chemical Company, the CAIROX® Solution System. Carus Form CX #4900 (1997)

OTHER APPLICATIONS

- Taste & odor control
- Iron & manganese removal
- Industrial wastewater treatment
- Arsenic & radium control

CARUS VALUE ADDED

LABORATORY SUPPORT

Carus Corporation 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 feeder systems are designed specifically for Carus products. 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. System designs are customized to meet specific applications and customer needs.

CARUS CORPORATION

During its more than 100-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.