THE SAFE USE AND HANDLING OF VIGOROX® WWT II WASTEWATER DISINFECTION TECHNOLOGY

VigorOx® WWT II Wastewater Disinfection Technology

Disinfection Forum
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VIGOROX® ® WWT II wastewater disinfection technology is a very effective technology for wastewater disinfection. Its combination of efficacy for microbial kill, ease of use and low impact on the environment make it an ideal choice as an alternative to chlorine disinfection. Like all strong oxidants, VIGOROX® WWT II requires an understanding of its safety and handling characteristics in order to insure the proper and safe use of the chemical. This Disinfection Forum describes the safe use and handling of VIGOROX® WWT II. Always refer to the material safety data sheet (MSDS) as the primary source of information regarding the properties of VIGOROX® WWT II and its relative safety and handling procedures.

VIGOROX® WWT II is an equilibrium solution of peracetic acid (PAA) (CAS No 79-21-0), hydrogen peroxide (CAS No 7722-84-1), acetic acid (CAS No 64-19-7) and water. Both peracetic acid and hydrogen peroxide are strong oxidants, and as a result, care must be taken in the handling, storage and use of the material. The solution is a clear liquid with a very pungent, vinegar-like odor. VIGOROX® WWT II contains 14.3% of active oxygen. It has a very low pH (< 1) as a neat liquid and is completely soluble in water. VIGOROX® WWT II is not flammable and will not burn. However, upon decomposition due to excessive heating in a fire, it will release oxygen, which will support combustion and can potentially intensify a fire.

Under NFPA (National Fire Protection Association) guidelines, peracetic acid is listed as:

Health Hazard	3
Flammability	1
Stability	2
Special hazards	OX

Three key guidelines to follow for the safe use and handling of VIGOROX® WWT II include:

- Personal exposure
- Contamination
- Confinement

PERSONAL EXPOSURE

The proper personal protective equipment (PPE) needs to be worn when there is potential contact with peracetic acid. This includes the use of chemical type goggles and/or a face shield, chemically resistant gloves, such as neoprene, and chemically resistant footwear and apron. Safety showers and eyewash stations are required in the vicinity of PAA handling systems.

- Peracetic acid is corrosive to the eyes and may cause severe damage, including blindness. If peracetic acid does come in contact with the eye, immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing with water for at least fifteen minutes. Seek immediate medical attention.
- Peracetic acid also is corrosive to the skin. If skin is exposed to peracetic acid, wash off immediately with plenty of soap and water for at least fifteen minutes and remove all contaminated clothing and shoes, and seek immediate medical attention.
- PAA can cause an irritation to the nose, throat and lungs if inhaled. Move to fresh air if inhaled. If not breathing, call 911 and provide artificial respiration.
- PAA should never be ingested and is harmful if swallowed. If ingested, seek immediate medical attention (call poison control center), rinse mouth, but do not induce vomiting. Drink one to two glasses of water.

For firefighting, VIGOROX® WWT II is listed as an organic peroxide: Class 4 – liquid under the uniform fire code. Firefighters should wear self-contained breathing apparatus and fight the fire from the maximum distance. Water should be used to extinguish the fire. Since PAA can liberate oxygen during a fire, chemical type extinguishers are not effective.

CONTAMINATION

The stability of VIGOROX® WWT II can be compromised by exposure to contamination. Contamination can lead to rapid decomposition of peracetic acid (common to all oxidants), resulting in heat generation and the formation of large volumes of oxygen, potentially causing over-pressurization in storage containers and feed lines. Contamination can be in the form of excess heat, metals, incompatible chemicals and dust / dirt. PAA should be kept away from heat and sources of ignition, such as steam pipes, radiant heaters, hot air vents or welding sparks. In addition, sources of metal ions and dust or dirt should be kept away from peracetic acid, and product should never be returned to the original vessel. PAA should not be stored next to incompatible materials, such as reducing agents, flammable materials, strong alkalis, metals and other strong oxidants. PAA should never be stored on wooden pallets.

If peracetic acid is accidently spilled, the following procedures should be followed:
- Stop the source of the spill / leak.
- Dike the spill if this can be done in a safe manner.
- Remove or shut-off all ignition sources.
- Remove combustible or flammable material from the area.
- Flush all contacted surfaces with water in an amount at least 20 volumes of water per volume of spilled PAA.
- Do not let undiluted PAA enter the sewer or confined spaces.
- Spill may be reportable to the appropriate regulatory agencies.
- May be neutralized by slowly adding 7.9 lbs of sodium bicarbonate per gallon of PAA. Check resulting pH to insure the pH is neutral.
- Call for assistance.

Containment systems are required in the event of a leak or a spill.
VIGOROX® WWT II should only come in contact with compatible materials. Check with Evonik for a complete list of compatible materials, and only PeroxyChem approved materials should be used in storage and delivery of the chemical. In general, compatible materials include: passivated stainless steel (304L and 316 L only), polyethylene (HDPE, LLDPE), Teflon, Kairez, PVC (short term exposure), PEEK (short term exposure) and Tygon (short term exposure). Carbon steel is prohibited. Exposure to incompatible materials may lead to rapid PAA decomposition and loss of containment.

CONFINEMENT

Peracetic acid solutions should never be confined. PAA will release oxygen over time due to natural, auto-decomposition. This may lead to a build-up of pressure within tanks and piping if the proper pressure-relief systems are not installed. As a result, breather vents, pressure-relief valves and other routine venting procedures are required. Please contact PeroxyChem for design specifications. In addition, during a rapid decomposition event, significant gas release and pressure build up can occur. Emergency venting provisions, such as pressure relief valves or rupture disks, should be incorporated. Injury or exposure to PAA may occur if the storage tanks and transport piping do not have adequate pressure relief installed. All PAA storage tanks need to be properly sized with the appropriate emergency relief vents.
VIGOROX® WWT II is a strong oxidizer that is a very effective wastewater disinfectant but the product must be handled with care. Attention to storage, handling and delivery are required for the safe use of VIGOROX® WWT II. Using the three guidelines, VIGOROX® WWT II can be used in a safe, consistent manner with low risk to plant personnel, while providing the effectiveness to meet your microbial kill requirements.

- Wear the appropriate PPE at all times to prevent personal exposure
- Do not contaminate
- Do not confine

REFERENCES

VIGOROX® WWT II wastewater disinfection technology MSDS. Contact Evonik or visit www.active-oxygens.evonik.com for a copy of the MSDS. Safety and Handling training is available from Evonik.

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