

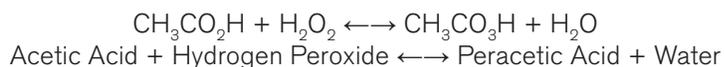


## PERACETIC ACID FOR INDUSTRIAL, OIL & GAS APPLICATIONS

### Introduction

Peracetic Acid (PAA) is an organic peroxide compound with the formula  $\text{CH}_3\text{CO}_3\text{H}$ . It is environmentally friendly as it hydrolyzes to acetic acid and hydrogen peroxide in water. It is a broad-spectrum biocide with a fast reaction time in minutes and leaves no harmful by-products.

Peracetic acid is a strong oxidant and disinfectant with oxidation potential higher than that of chlorine or chlorine dioxide. PAA is available in the form of equilibrium mixture which also contains hydrogen peroxide, acetic acid (vinegar) and water as shown by the following equation:



### Examples of Microbiological Control Applications

#### Sulfate Reducing Bacteria (SRB) Control

Broad spectrum control for sulfate-reducing and aerobic bacteria and does not interfere with other frac fluid chemistries. Environmentally safe alternative to chlorine and glutaraldehyde.

#### Frac Water Ponds

PAA has been shown to significantly reduce or eliminate Sulfate Reducing Bacteria and their byproduct hydrogen sulfide, eliminating sulfide odor, increasing worker safety, and protecting oilfield assets.

#### Wastewater Disinfection

Replaces chlorine, sodium hypochlorite, and is as a low-capital alternative to UV, chlorine dioxide and ozone. The PAA treatment decomposes into biodegradable components and does not create chlorinated compounds or harmful disinfection by-products.

#### Biofouling Control in Paper Machine White Water Circuits

Prevents microbial contamination in the recirculation water and removes slime.

### Peracetic Acid Benefits

- Highly effective microbial kill
- No formation of chlorinated disinfection by-products
- Stable in storage
- Environmentally friendly decomposition products
- Long shelf life (12 to 18 Months)
- Minimal pH and temperature dependence
- Safe and easy handling & storage

USP Technologies (USP) provides full service programs for PAA applications including chemical, equipment, and service.



## PAA Turn-key Equipment and Services

USP's turn-key PAA programs provide the highest level of safety, performance and operational reliability. Our equipment systems include design, fabrication, installation and ongoing maintenance.

### Dosing Module

- USP skid-mounted dosing modules are custom pre-wired, pre-piped, passivated and shop tested. Power and communications panels are included.
- USP Advanced Dosing Control accurately delivers PAA dose, accounting for variable flows and demand. This results in 15-45% savings versus typical flow pacing control.

### Peracetic Acid

- Available in bulk and totes, depending on the product grade and delivery location, in concentrations of 5%, 12%, 15% and 22%.

### Chemical Management

- USP's ChemWatch™ advanced controller provides real-time remote monitoring including dose rate verification, variance alarming, tank levels, leak detection and internet accessibility.

### Safety

- Safety shower, eyewash stations, and training for PAA and equipment orientation.

### Technical and Applications Services

- Maintenance of storage and dosing systems
- Preventative maintenance service visits
- PAA applications support, including optimization and monthly reports



USP's Peracetic Acid Bulk Equipment and Safety Station

## About USP Technologies

USP Technologies is the leading supplier of peroxygen-based technologies and services for environmental applications. We have been serving the water, wastewater and remediation markets for over 20 years and have offices and field service locations throughout North America. Our consultative approach to problem solving includes application assessment, technology selection and development of a tailored treatment approach. Our full service programs successfully integrate storage and dosing equipment systems, chemical supply, inventory and logistics management, and ongoing field and technical support. This approach provides cost-effective, "hands-off" solutions to our customers. USP Technologies also can provide access to experienced application partners for a turn-key program encompassing engineering, site characterization and technology selection, program implementation, execution and report generation.

## Getting Started

We look forward to supporting your treatment needs, whatever the scale of your requirements. To obtain a streamlined treatment solution tailored to your specific project, give us a call at (877) 346-4262.

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