



PRODUCT DATA

HYPOCHLOROUS ACID (HOCL)

Product Overview

Water Treatment/Biocide

- Non-hazardous chemical
- Replaces hydrogen peroxide treatment and is more efficient
- Doesn't increase Ph levels
- Chemical has 6.5 ph level
- Kills bacteria
- Degrades back to salt water

Scavenger for H₂S

- Non Hazmat
- Kills bacteria that generates the H₂S
- Replaces Triazine
- Use with clean water to pump down and shut in well, or mix chemical with water for an acid wash and shut well in



PRODUCT DATA

HYPOCHLOROUS ACID (HOCL)

O&G Organic Solutions, LLC produces and distributes a hypochlorous acid (HOCL) product called D.O.D. HOCL is the most effective and environmentally friendly solution to disinfect fracing water and prevent groundwater contamination. This pH neutral biocide is safe to use, and it will not harm the ground water, land or employees.

HOCL is derived from salt, water and electricity. It is one of nature's oldest and most reliable disinfectants. It is also a naturally occurring chemical that is produced by our own white blood cells to fight off pathogens. Outside of the body, it is produced with an anolyte generator.



Physical Properties:

Molar Mass: 52.46 g/mol

Molecular Formula: HOCL

Appearance: Colorless aqueous solution

Solubility: Complete in water

Odor: Mild chlorine odor

Chemical pH: 6.5 ± 0.5

FAC: 500 ppm

Customer Need:

Oil and gas operators need capable and reliable biocides. This green chemistry, non-toxic biocide is a massive benefit to the Environmental, Health, and Safety of our operations.

Hypochlorous acid is one of the most effective known biocides. The chemical structure is HOCL and it is produced by the human immune system to kill invasive organisms and fight infection.

Hypochlorous Acid is a safe and powerful biocide that kills the microbes within milliseconds of contact.



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Suggested Applications

Frac Water

For typical water treatment of water from non-potable water sources, mix 5 US gallons of D.O.D. with 995 US gallons of frac water to 2.5 ppm FAC or alternatively add enough D.O.D. to obtain a 0.1-0.5 ppm FAC residual after biocide load burden to mitigate and retard the growth of non-public health microorganisms such as anaerobic bacteria, aerobic bacteria and sulfate reducing bacteria to protect fracturing fluids, polymers and gels.

Sour Wells

For typical well treatment, slug dose 168 US gallons at 500 ppm FAC of D.O.D., or alternatively 42- 420 gallons depending upon well parameters and conditions, into the well bore on a daily or weekly or monthly basis to maintain control of unwanted odors and non-public health microorganisms, reduce hydrogen sulfide gas and restore well integrity.

Produced Waters

For typical produced water and flow back water treatment, mix 21 US gallons of D.O.D. with 979 US gallons of produced water to 10.5 ppm FAC or alternatively add enough D.O.D. to obtain a 0.5 ppm FAC residual in the produced or flow back water after biocide load burden to retard the growth of non-public health microorganisms.

Heater Treaters, Hydrocarbon Storage Facilities & Gas Storage Wells

For typical storage facility treatment, mix 126 gallons of D.O.D. at 500 ppm FAC or alternatively add enough D.O.D. [this product] to obtain a 0.5 ppm FAC residual into the water phase of the mixed hydrocarbon/water system to retard the growth of non-public health microorganisms, control unwanted odors and the formation of hydrogen sulfide, and reduce corrosion of the storage tanks.

Water Flood Injection Water

For typical water flood injection water treatment, mix 21 US gallons of D.O.D. with 979 US gallons of injection water to 10.5 ppm FAC or alternatively add enough D.O.D. to obtain a 0.1-0.5 ppm FAC residual to retard the growth of non-public health microorganisms and control slime in pipelines.

Oil and Gas Transmission Lines

For typical transmission line treatment, slug dose 42-420 US gallons at 500 ppm FAC of D.O.D. into the transmission line on a daily or weekly basis to control unwanted non-public health microorganisms, such as SRB's, reduce microbiologically influenced corrosion (MIC) and remove the slime and associated sessile bacteria which can degrade pipeline integrity.



TEST DATA

Royalty Energy Development, LLC

Application Date: June 16, 2022

On June 16, 2022 we applied 660 gallons HOCL to 130 barrels of water to be used as flush fluid for a 4,000 gallon HCL acid job completed June 17, 2022 on the Yale 21-3H API# 3512523887 located near Maud, Oklahoma. Prior to treatment H₂S was captured at the sales meter ranging from 25 ppm to 30 ppm that was being treated by 15 gallons of H₂S scavenger per day in order to sell residue gas to the purchaser below their field standard of 3 ppm.

After completion of the acid treatment with HOCL flush on June 17, 2022, the Yale 21-3H was shut in for 24 hours. Upon resuming production on June 18, 2022, H₂S was undetectable and has remained so today's date 2/24/2023. The treatment has resulted in over \$20,000 in chemical savings to date. Pictures below show the location with the jobs and current readings of H₂S on location.



HOCL loaded into this water transport on 6/16/22, used as flush fluid on 6/17/22.



Additional monitoring of H₂S 5 months post treatment 11/18/22 still undetectable H₂S.



TEST DATA

Supreme Chemical Test – June 5th in New Mexico

Test: Frac and comparison of two well in the same formation and pad locations within 1000 yards of each other.

Results: On June 5th, 2023, two separate wells within the same formation were tested with two different biocide treatment processes. This test was performed to realize the efficacy of each product and the cost savings or overrun of each.

1st well – HOCL @ .5 gpt total of 4000 gallons used.

2nd well – Glutaraldehyde (Gluquant 12:3) @ .25 gpt total of 2000 gallons used.

At drill out the samples came back identical. Both products were used as a general biocide used during fracking operations and customer stated results were identical as far as effectiveness in killing unknown bacteria. Cost differential was unknown due to the overuse of HOCL. They would attest to the effectiveness of the product and the inherent safety to their personal. They will continue to experiment by decreasing the amount of HOCL until it meets the current usage of Glutaraldehyde.



TEST DATA

Contango H₂S mitigation Project – June 30th Drumright, Oklahoma

Test: H₂S mitigation for personnel safety at well pad site.

Results: On June 30th, 2023, a biocide test was performed for H₂S mitigation on one - high acid content - well. Meter readings at the beginning measured at 5000 ppm (H₂S). 330 gallons of HOCL were added directly into the wellbore with no added pressure. The well was then shut in for a period of 24 hours and the H₂S again tested. It had dropped to 5 ppm in 24 hours. Subsequently, at the 48 hours mark the well measured 5 ppm. Over the next few days the results of H₂S were as follows: (this well produced 2000 bbls of water per day for 50 bbls of production)

day 3 – 40 ppm day 5 – 200 ppm day 7 – 2000 ppm
day 4 – 80 ppm day 6 – 800 ppm day 8 – 5000 ppm

Recommendations:

Another trial whereby an acid and squeeze job be performed to push HOCL into the formation to possibly flush out hanging bacteria that causes the formation of H₂S. Also, a continuous treatment of this well and the associated wells nearby utilizing a metered drip into the backside of the wellbore at approximately 7 – 10 gallons per week. This would further mitigate H₂S production. Triazene and other chemicals have been used unsuccessfully in different tests. The primary reason for the use of H₂S scavengers is for personnel safety, though the client saw the benefits of increased production days to the sales line. These field tests are ongoing.