

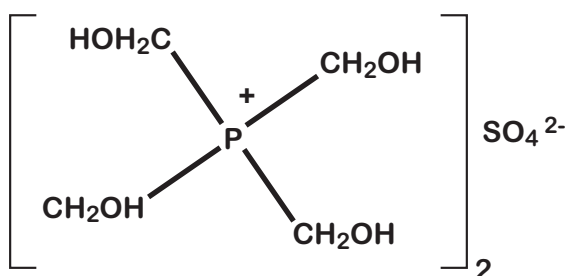


## AQUCAR™ THPS 75 Water Treatment Microbiocide Antimicrobial for Industrial Water Treatment Applications

### General

AQUCAR™ THPS 75 Water Treatment Microbiocide is a broad-spectrum biocide developed to inhibit the growth of algae, bacteria, yeasts and fungi in process waters used in various industrial applications. AQUCAR THPS 75 Water Treatment Microbiocide is effective in both acid and alkaline environments. It is especially effective against sulfate-reducing bacteria (SRB) which are particularly troublesome in enhanced oil recovery operations, such as injection water treatment, top-side systems, pipeline protection and storage. AQUCAR THPS 75 Water Treatment Microbiocide is a 75% w/w aqueous solution of tetrakis(hydroxymethyl) phosphonium sulfate.

### Structural Formula



THPS tetrakis(hydroxymethyl) phosphonium sulfate

### Physical Properties and Composition

The following are typical physical properties of AQUCAR THPS 75 Water Treatment Microbiocide; **they are not to be considered as product specifications.**

Appearance:	Clear, colorless to pale yellow liquid
pH (@ 0.1% in water, 25°C):	3.0 - 5.0
Solubility in water (20°C):	Miscible
Viscosity (20°C):	39mPs
Specific Gravity (25°C):	1.37 - 1.39
Total P content :	11.6 - 11.8

#### Composition:

THPS	75%
Water	Approximately 25%

### Special Features and Benefits

- Inhibits microbial growth in enhanced oil recovery systems, industrial recirculating cooling waters and non-food contact paper manufacturing
- Broad spectrum biocide against a range of algae (blue-green, green and other types such as yellow-green, brown and mustard algae), and bacteria, especially sulfate reducing bacteria (SRB)
- Miscible in all proportions with every type of water, including seawater
- Is readily deactivated under controlled conditions
- No organic solvents / aqueous formulation
- Outstanding chemical stability and good compatibility with most water treatment chemicals

## Antimicrobial Activity

AQUCAR™ THPS 75 Water Treatment Microbiocide is a broad spectrum biocide that is highly effective at controlling sulfate reducing bacteria (SRBs), as demonstrated in the following data.

### Efficacy vs. Sea Water SRB

Biocide (ppm a.i.)	Log Reduction In (hours)		
	1	2	4
THPS, 25	3	3	3
THPS, 50	3	5	7
THPS, 100	7	8	8

Total SRB count in Control = 10<sup>8</sup>

### Efficacy vs. Produced Water SRB

Biocide (ppm a.i.)	Log Reduction In (hours)		
	1	2	4
THPS, 25	0	3	5
THPS, 50	5	3	6
THPS, 100	5	8	8

Total SRB count in Control = 10<sup>8</sup>

## Applications/ Directions for Use

The primary use for AQUCAR THPS 75 Water Treatment Microbiocide is controlling microbial growth in oil field applications such as injection water systems, drilling muds, packer fluids, completion and workover fluids. The unique mechanism of action of THPS enables it to not only kill microorganisms but also reduce hydrogen sulfide concentrations and dissolve iron sulfide.

AQUCAR THPS 75 Water Treatment Microbiocide is very suitable for protecting against microbial contamination in water treatment applications such as industrial cooling water, paper and paperboard manufacturing. However, it must not be used in the manufacture of paper and paperboard products that may come in contact with food.

Recommended use levels are included in the table below. Use this product in a manner consistent with its product information and labeling.

Product	AQUCAR THPS 75
<b>For enhanced oil recovery systems</b>	
<b>Injection Water Treatment</b>	
<b>Shock dose (initial dose)</b>	93 to 350 ppm
• Add for 2 to 6 hours	
<b>Maintenance dose (weekly or as needed to maintain control)</b>	14 to 98 ppm
• Add for 2 to 6 hours	
<b>Continuous dose</b>	14 to 67 ppm
<b>Oil and Gas Pipelines</b>	
<b>Shock dose (initial dose)</b>	93 to 350 ppm
• Add for 2 to 6 hours	
<b>Continuous dose</b>	14 to 100 ppm
<b>Drilling Mud, Packer Fluids, Completion &amp; Workover Fluids</b>	
<b>Shock dose (based on severity of contamination)</b>	33 to 1400 ppm
<b>Gas Storage Wells &amp; Well Systems</b>	
<i>Individual injection wells should be treated at the same application rates and in the same manner as described under Injection Water.</i>	
<i>Individual drips to produce sufficient concentration when diluted by the water present in the drip (repeat as needed to maintain control)</i>	
	33 to 133 ppm

<b>Well Remediation Operations</b> <b>Shut-in Treatment (at least 6 hours)</b>	13.3 to 40%
<b>Hydrotesting</b> <b>Slug Dose</b> to produce a concentration in the test water (depending on water quality and test duration)	67 to 667 ppm
<b>Pipeline Pigging and Scraping Operation</b> <b>Slug Dose</b> to produce a concentration at the discharge point or pig trap (depending on water quality and test duration)	0.007 to 0.07%
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<b>For cooling tower waters</b> <b>Shock dose (initial dose)</b> for heavily fouled systems or at start-up or where the build up of biomass is apparent:	20 to 48 ppm
<ul style="list-style-type: none"> <li>• Clean heavily fouled systems before starting treatment</li> <li>• Add of AQUCAR™ THPS 75 Water Treatment Microbiocide at a point (such as water basin, box etc) in the distribution system that will lead to rapid distribution</li> <li>• Repeat 2 - 3 times each week until fouling is under control</li> </ul>	
<b>Maintenance dose (after initial treatment)</b>	
<ul style="list-style-type: none"> <li>• Add AQUCAR THPS 75 Water Treatment Microbiocide weekly</li> <li>• Based on 4-7 days turnover/blow down for water in system</li> <li>• For systems with higher turnover of water (1-3 days) use two to three times per week</li> </ul>	12 to 24 ppm
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<b>For paper mill waters</b> <b>Maintenance dose with intermittent addition</b>	27 to 104 ppm
<ul style="list-style-type: none"> <li>• Clean heavily fouled systems before starting treatment</li> </ul>	
<b>Maintenance dose with continuous addition</b>	20 to 67 ppm
<ul style="list-style-type: none"> <li>• Clean heavily fouled systems before starting treatment</li> </ul>	

## Storage, Spill Cleanup and Disposal Guidance

Store AQUCAR THPS 75 Water Treatment Microbiocide in a cool dry area away from direct sunlight and heat to avoid deterioration. Avoid temperatures above 160°C (320°F). The active ingredient (THPS) decomposes at elevated temperatures with generation of gas which can cause pressure buildup in closed systems. Ensure that storage conditions are in conformance with applicable legal, fire, insurance and government requirements.

## Disposal of Excess Product

If excess AQUCAR THPS 75 Water Treatment Microbiocide cannot be used according to use instructions, it must be sent to an approved waste disposal facility. Because disposal regulations can vary by location, the regulatory authority for waste disposal in your location will need to be contacted for guidance. Do not dispose of this product by dumping into lakes, streams, ponds, estuaries, oceans, sewers, ditches, or into soil at any time. Dispose of unused product and contaminated soils as permitted by applicable government requirements.

## Disposal of Product Containers

Containers should be triple rinsed with water (or equivalent) and sent to an approved waste handling facility for disposal. Send waste liquid from cleaning of used containers to an approved waste handling facility.

## Spill Handling

Prompt and cautious attention to drips, splashes and spills is important to reduce the potential for unnecessary exposure to AQUCAR THPS 75 Water Treatment Microbiocide. Avoiding container punctures and mishandling of containers are important elements in preventing spills. Storing containers in contained areas and use of spill containment pallets will control the size of potential spills. A spill response plan should be in place to address both small and large spills. The plan should include instructions for easy access to personal protective equipment (PPE) and specific equipment for cleaning up the spill.

## General guidance for spill cleanup

Immediate actions:

- Have people leave the affected area immediately
- A person familiar with your spill response plan should lead the cleanup
- Do not re-enter the area without designated spill response personal protective equipment which should be assigned based on the hazards of THPS and protection below the occupational exposure limit ( 2 mg/m<sup>3</sup> – 8 hour time weighted average)

General Clean Up Procedure:

- Cover the spill with appropriate inert material such as clay, sand or Vermiculite.
- Collect material in appropriate container, rinse the remaining residue with water using additional absorbent to collect the waste. Repeat as needed until all spilled material and residue has been collected. Deactivate large spills prior to collection. Small spills may be deactivated after collection.
- Once collected, close containers and label for transit to an approved waste disposal facility.

## Chemical Deactivation

The active ingredient in AQUICAR™ THPS 75 Water Treatment Microbicide can be deactivated with alkaline sodium bisulfite.

- Use 1.36 Kg (3 pounds) of sodium bisulfite (100% basis) to each 2.2 Kg (1 pound) of AQUICAR THPS 75 Water Treatment Microbicide to ensure complete deactivation.

The rate of deactivation is pH dependent. Higher pH conditions will accelerate the formation of sulfite from bisulfite and trihydroxymethyl phosphine (THP) from THPS. THP will react with sulfite through a series of electrochemical redox reactions. The stoichiometric ratio is approximately 6 moles of sodium bisulfite to each mole of THPS.

## Product Stewardship

Dow Biocides encourages its customers to review their applications of Dow Biocides products from the standpoint of human health and environmental quality. To help ensure that Dow Biocides products are not used in ways for which they are not intended or tested, Dow Biocides personnel are willing to assist customers in dealing with ecological and product safety considerations. Contact your representative if you need any assistance or information. When considering the use of any Dow product in a particular application, review the latest Safety Data Sheet and country-specific product label to ensure the intended use is within the scope of approved uses and can be accomplished safely. Before handling any of the products mentioned in the text, obtain available product safety information and take necessary steps to ensure safety of use.

For further information visit our website:

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