

Sodium *Omadine*^{®*} 10% Aqueous Solution Industrial Fungicide and Bactericide “Sumpside” For Use in Metalworking Fluids

All types of aqueous based coolants are susceptible to contamination from bacteria, yeast, and mold. Regardless of the type of coolant, bacteria are the most frequently detected microbes in used coolant.

Fungi (yeast and mold), while usually present, are not as easily detected by conventional methods, because the filamentous mycelial forms of mold tend to accumulate in machine crevices, in piping, on sump walls, gear boxes and other solid surfaces. Routine attempts to completely eliminate bacteria through continual use (and sometimes overuse) of bactericides alone usually result in conditions that encourage the growth of yeast and mold.

Heavy fungal contamination can often require both mechanical and chemical treatment. Dumping, cleaning and recharging fluids are costly procedures. Moreover, in today's regulatory climate, disposal of used fluid can be expensive.

Therefore, it is important that the routine treatment of a system includes a fungicide, as well as a bactericide, to ensure longer system life and savings on replacement, cleaning, and disposal costs. Sodium *Omadine* aqueous solution has a long history of use as a highly active, broad-spectrum antimicrobial agent that, when used at recommended concentrations, can help to prevent and minimize problems associated with fungal contamination in metalworking fluids. Sodium *Omadine* 10% aqueous solution, herein also referred to as “Sumpside”, has been developed especially for tankside addition. Its lower concentration makes it easier to measure correct doses for smaller sumps.

Sumpside is registered with the United States Environmental Protection Agency (US EPA Reg. No. 1258-1213) under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), for use in metalworking, cutting, cooling and lubricating concentrates and end-use fluids. If you are considering another use, please consult with Arch Chemicals. It is a violation of Federal law to use an antimicrobial agent in an application for which it does not have EPA registration.

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In the *Chemical Abstracts Registry* Sodium *Omadine* fungicide and bactericide is listed as:

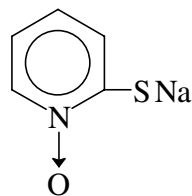
2-pyridinethiol-1-oxide, sodium salt
(CAS No. 3811-73-2)

Sodium *Omadine* fungicide and bactericide is a derivative of pyrithione. Pyrithione is known by any of several names:

2-mercaptopyridine-N-oxide
1-hydroxypyridine-2-thione
2-pyridinethiol-1-oxide (CAS No. 1121-31-9)
1-hydroxy-2(1H)-pyridinethione
(CAS No. 1121-30-8)

The sodium derivative is a salt, the structural formula is found below.

sodium 2-pyridinethiol-1-oxide (C₅H₄NOSNa)



Product Specifications

Sodium 2-pyridinethiol-1-oxide (%)	10-12
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Properties

Unless otherwise noted, the following chemical properties refer to the commercial product and are typical values, not specifications.

Molecular Weight (solid)	149.2
Minimum Assay (%)	10
Color	amber
Odor	mild
Specific Gravity @ 25°C	1.06
Density (lb./gal)	8.8
Solubility in water	complete
Melting Point, (solid decomposes)	250°C

Antimicrobial Activity

To control fungi in a diluted fluid, field data indicate that a dose of 640 to 1000 ppm of Sumpside is usually required. Although not generally recommended, studies indicate that Sumpside can effectively control bacteria in some semi-synthetic and synthetic metalworking fluids at a minimum dose of 4000 ppm. The EPA maximum registered end-use level is 5000 ppm. Different use and contamination conditions may require different levels of Sumpside. While Sumpside is compatible with most metalworking fluids, both physical and chemical compatibility testing is recommended.

Chemical Reactivity

Oxidizing agents such as peroxides and hypohalites will convert pyrrithione first to dipyrithione (2,2'-dithiobis-pyridine-1, 1'-dioxide; CAS No. 3696-28-4), and finally to pyrrithione sulfinic or sulfonic acid. Both are inactive microbiologically.

Strong reducing agents will react with the N-oxide group of pyrrithione to give 2-mercaptopyridine or its derivatives. These, too, are less active microbiologically than the parent compounds.

At times the addition of Sumpside to aqueous systems may result in a blue color. This is caused by the reaction of ferric ions with sodium 2-pyridinethiol-1-oxide to form iron tris (2-pyridinethiol-1-oxide), a highly colored water insoluble compound. If iron tris (2-pyridinethiol-1-oxide) is a problem, Arch Chemicals can offer formulation assistance in preventing its formation.

pH Stability

Sumpside can be used over the pH range from 4.5 to 9.5. Below pH 4.5, the sodium salt is in equilibrium with free pyrrithione. Pyrrithione is active microbiologically, but is very unstable in the presence of light or oxygen. Above pH 9.5, the sodium salt slowly converts to the sodium salt of pyrrithione sulfinic acid.

Light Stability

Sumpside will gradually degrade when exposed to light, depending on the nature of the formulation. Formulations containing Sumpside should be packaged in brown or opaque containers unless tests have shown that photodegradation is not a problem.

Analytical Methods

Analytical procedures and standard spectra will be supplied on request.

Titrimetric: the mercapto group on the pyrrithione molecule can be determined by oxidizing it with iodine.

Ultraviolet spectrophotometric: this method can be used when there are no interfering substances in the formulation. Sodium pyrrithione absorbs at 248, 290 and 345 nm in methanol and at 243, 281 and 322 nm in water. With 1-cm cells, the detectable limit is 0.5-1.0 ppm.

Infrared spectrophotometric: this method can be used to qualitatively identify the various pyrrithione derivatives.

Polarographic: methods have been developed for use with some formulations. The half-wave potential for the pyrrithione ion in 0.5M sodium hydroxide is about 0.30 volts versus S.C.E. (Standard Calomel Electrode).

Liquid chromatographic: two methods have been developed to measure Sumpside in metalworking fluids. Both methods utilize reverse phase high-pressure liquid chromatography (HPLC) coupled with UV detection. The first method measures total active pyrrithione as sodium 2-pyridinethiol-1-oxide (sodium *Omadine* product); 2,2'-dithiobis-pyridine-1,1'-dioxide (*Omadine* disulfide product); and 2-pyridinethiol-1-oxide, ferric complex as 2-pyridinesulfonic acid after oxidation of the sample with hydrogen peroxide. The second method measures 2-pyridinethiol-1-oxide, sodium salt following derivatization with 7-chloro-4-nitrobenzo-2-oxa-1,3-diazole (NBD-C1).



Directions for Use

TO INHIBIT THE GROWTH OF FUNGI AND BACTERIA IN AQUEOUS METALWORKING, CUTTING, COOLING AND LUBRICATING FLUIDS: Add up to 5000 parts per million (0.5% v/v) of Sumpside to the diluted fluid (5.0 gals per 1000 gals).

When adding fresh diluted fluid to compensate for dragout or other losses, add Sumpside to make-up fluid according to the above directions. Frequent checks (at least once per week) of the bacterial and fungal population in the system should be made using standard microbiological plate count procedures or any of the commercial "dip-stick" type devices. When the bacterial count reaches 10^7 and/or the fungal count reaches 10^3 organisms per milliliter, add additional Sumpside according to the above directions.

The fluid should be checked at least once per day with a refractometer (or other suitable means) to determine if water loss by evaporation has occurred. Make-up water should be added daily to compensate for such losses. The fluid should be monitored at least once per week (depending on the metalworking operation involved) for the following: tramp oil, pH, odor, oil droplet size, and anticorrosion properties. If any of these parameters is outside the specifications established for the system in question, they should be brought up to specifications by the addition of suitable additives or the fluid should be discarded and replaced after cleaning the system. Add Sumpside to the fresh fluid according to the above directions.

Contaminated fluid systems should be cleaned prior to the addition of Sumpside. Drain the system, clean with a cleaner designed for this purpose, rinse with water, and refill with fresh fluid. Sumpside may be added to the fluid at the time it is prepared (diluted) or to the reservoir (sump) containing the fluid after it is put into use. If it is added to the reservoir, the fluid should be circulated after addition to ensure mixing.

TO INHIBIT THE GROWTH OF FUNGI AND BACTERIA IN AQUEOUS METALWORKING, CUTTING, COOLING AND LUBRICATING CONCENTRATES: Add an amount that will give up to 5000 ppm in the diluted fluid.

The amount required in the concentrate will depend on the end use dilution. For example: If the desired level of Sumpside in the diluted fluid is 800 ppm, and the end use dilution of the fluid is 5%, then a 1.6% concentration of Sumpside is required in the concentrate ($800 \text{ ppm} / 0.05 = 16,000 \text{ ppm}$ or 1.6%).

For More Information

Technical Service

Technical service is available to facilitate further use of Arch Chemicals biocides. If you have a specific question, or need further information, please write or call Biocides Technical Service, Arch Chemicals Inc., Biocides, 350 Knotter Drive, Cheshire, CT 06410, U.S.A. (203) 271-4000 or FAX (203) 271-4050. Your Arch Chemicals Sales Representative can also be contacted directly. Sales office telephone numbers, addresses, and facsimile numbers are listed at the end of this document.

How to Order

If you would like to inquire about an existing order, place an order, ask about product availability, or order a sample please contact the nearest Arch Chemicals Sales Office. Sales office telephone numbers, addresses, and facsimile numbers are listed at the end of this document.

Packaging

Sodium *Omadine* 10% aqueous solution, "Sumpside" is available from Rochester, NY in 10 lb., 4 x 10 lb. bottle cases, 60 lb. and 500 lb. high density polyethylene drums.

Visit our Web site

For additional information about this product, or other Arch Chemicals biocides products visit our web site at www.archbiocides.com



Technical Product Information

Treatment Products Biocides

Please refer to the Material Safety Data Sheet (MSDS) for complete information on Storage and Handling, Toxicological Properties, Personal Protection, First Aid, Spill and Leak Procedures, and Waste Disposal. To order an MSDS, call your nearest Arch Chemicals sales office listed below or the MSDS Control Group at (800) 511-MSDS. Before using or handling this product, the MSDS should be thoroughly reviewed.

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Sales Office

U. S. A. – Arch Chemicals, Inc., Biocides
350 Knotter Drive, P.O. Box 586, Cheshire, CT 06410

Phone: (800) 344 -9168

FAX: (203) 271-4060

* Arch Chemicals, Inc. 501 Merritt 7 Norwalk CT 06856-5204