

KATHON™ 893 MW Biocide
Metalworking Fluid Fungicide for Water-Based Cutting Fluids

Description

Soluble, synthetic, and semi-synthetic metalworking fluids or coolants provide an excellent environment for the growth of various microorganisms, including bacteria, mold, and yeast. If allowed to grow, these organisms can have detrimental effects on the fluids. For example, bacteria, which can grow very quickly, can destroy the integrity of the fluid by discoloration, destroying lubricity characteristics, and causing emulsions to split. Bacteria can also reduce the pH of the fluid, which can promote corrosion. Some forms of bacteria have objectionable odors. Fungi typically grow more slowly than bacteria, but can form large masses which clog filters and lines and in some cases lead to system shutdown; fungi also generate foul odors and can cause corrosion. The increased use of synthetic fluids over the past few years has led to an even greater need for the enhanced fungal control that KATHON 893 MW biocide can provide.

For Tankside and Concentrate

KATHON 893 MW is a broad-spectrum fungicide that has been recommended and widely used for tankside control of fungi in metalworking central systems. KATHON 893 MW is also an effective fungicide for use in many metalworking fluid concentrates with the appropriate stabilizer package. Due to the wide variations in metalworking fluid formulations, laboratory or small-scale tests are recommended to evaluate KATHON 893 MW in use-dilution and concentrate metalworking fluids before they are commercialized.

KATHON 893 MW is a highly effective, industrial fungicide that exhibits excellent fungistatic and fungicidal activity against fungi, including yeasts and mold, and Gram-Positive bacteria, and limited activity against Gram-Negative bacteria. Commonly known as octhilinone, 2-n-octyl-4-isothiazolin-3-one is the active ingredient of KATHON 893 MW. It is supplied as a 45 percent active liquid in propylene glycol.

The information in this brochure has been compiled to familiarize the reader with KATHON 893 MW technology, to communicate the tremendous benefits of this product, and to provide directions for safe and efficient use of the product. By following the precautions outlined in this brochure, on the product label, and on the Rohm and Haas Material Safety Data Sheet, KATHON 893 MW can be safely handled.

Key Features & Benefits

Table 1

The many advantages of protecting your metalworking fluids with KATHON 893 MW fungicide include:

Features	Benefits
Highly effective microbicide	Extends metalworking fluid life, reduces downtime, reduces makeup fluid use and reduces fluid disposal costs
Broad spectrum activity	Kills fungi and prevents the return of slime caused by fungal microorganisms, eliminates clogged lines and filters and musty odors caused by fungi
Patented combinations of KATHON 886 MW or KORDEK™ LX5000 biocides with KATHON 893 MW	Synergistic combinations that enhance the already wide spectrum of bioactivity. Enhanced activity present even if KATHON 893 MW is added in the concentrate and KATHON 886 MW added tankside
Good temperature and pH stability	Works well in a variety of metalworking conditions up to 60°C (140°F) and pH 10
Highly soluble in water and does not foam	Easy to dose
Provides long lasting fungal control	Cost effective versus competitive tankside treatments
Fast acting	Quickly controls growth and activity of odor-causing fungi
Effective at low use rates and biodegradable	Better for the environment

Does not contain, release
or generate formaldehyde

Not subject to concern about formaldehyde,
a known carcinogen

Directions for Use

Method of Addition

KATHON 893 MW biocide should be directly dispensed into metalworking fluid concentrates or use-dilution metalworking fluids using a metering pump or other point-of-use device where possible and uniformly dispersed throughout the fluid.

Fluid Concentrate

KATHON 893 MW should be added to metalworking fluid concentrates at a level that ensures the final use-dilution fluid will contain 55 to 167 ppm of product (25 to 75 ppm active ingredient). KATHON 893 MW stability in a given concentrate should be determined prior to commercialization. Contact your Rohm and Haas sales representative for assistance in selecting one of several recommended stabilizers to enhance the performance and compatibility of KATHON 893 MW in your metalworking fluid concentrate.

Use-Dilution Fluid

We highly recommend grossly contaminated systems be cleaned before treatment is begun.

Initial Dose: For a noticeably fouled system, add 0.47 to 1.44 lbs (7 to 21 fl oz) of KATHON 893 MW per 1,000 gallons of fluid. This will provide 25 to 75 ppm active ingredient. Repeat until control is achieved.

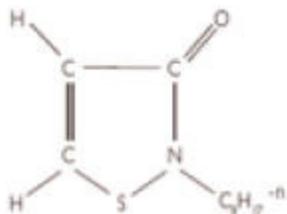
Subsequent Dose: For maintenance of a non-fouled system, add 0.09 to 0.58 lbs (1.3 to 8.6 fl oz) of KATHON 893 MW per 1,000 gallons of fluid every four weeks. This will provide 5 to 30 ppm active ingredient. A higher dose range and/or increased frequency of treatment may be required, depending upon the rate of dilution of the preservative with the makeup fluid, the nature and severity of contamination, level of control required, filtration effectiveness, system design, etc.

Structural & Physical Properties

The chemical structure of 2-n-octyl-4-isothiazolin-3-one, the active ingredient of KATHON 893 MW is presented below.

KATHON 893 MW Contains:

2-n-octyl-4-isothiazolin-3-one	45% minimum
Propylene glycol (inert)	50% minimum



The chemical structure of 2-n-octyl-4-isothiazolin-3-one, the active ingredient of KATHON 893 MW, is presented below.

Table 2
Typical Physical Properties

These properties are typical but do not constitute specifications.

Appearance	Clear liquid
Color	Pale yellow to amber
Odor	Mildly sweet
Specific Gravity @ 24°C	1.03
Flash Point, °C (Pensky Martens Closed Cup)	93
Viscosity Brookfield @ 20°C, cps	40
Melting Point, °C	-40
Boiling Point, °C	188
Vapor Pressure, Active Ingredient @ 25°C	3.7 x 10 ⁻⁵ torr

Solubility

The solubility data provided below were determined at ambient temperatures (20 to 25°C). The solubility and stability of the active ingredient may be affected when the temperature is lowered to 0°C or increased to 60°C.

- KATHON 893 MW is soluble in methanol, ethanol, propylene glycol, acetone, ethyl ether, ethyl acetate, chloroform, butyl Cellosolve, corn oil, and mineral oil.
- The solubility of KATHON 893 MW in toluene is 25% w/v.
- The solubility of KATHON 893 MW in water at 25°C is 480 ppm (active ingredient), although this may be increased by using suitable surfactants and emulsifiers.
- KATHON 893 MW is insoluble in heptane.

Compatibility

In concentrate and use-dilution metalworking fluids, the compatibility of KATHON 893 MW biocide is concentration-dependent and varies from formulation to formulation. It is compatible with most metalworking fluid additives, including surfactants and amines. Compatibility with amines may vary by the type, concentration and pH. Strong reducing agents, such as sulfides, mercaptans, bisulfites and metabisulfites, or strong oxidizing agents, such as hypochlorites, may affect the efficacy of KATHON 893 MW. Laboratory or small-scale tests are recommended in order to evaluate KATHON 893 MW compatibility in use-dilution or concentrate metalworking fluids prior to commercialization.

KATHON 893 MW is compatible with most other metalworking fluid biocides, including KATHON 886 MW and KATHON CC (methylchlorosiothiazolone), KORDEK LX5000 (methylisothiazolone), ROCIMA™ BT 2S biocides (benzisothiazolone), triazine and formaldehyde-releasers, IPBC (iodopropynylbutylcarbamate) and sodium Pyrrithione.

Stability

In-Use Stability: KATHON 893 MW has excellent stability in end use dilutions of metalworking fluids. It is stable over a wide pH range (4-10) in water and in metalworking fluid systems.

Concentrate Stability: KATHON 893 MW stability, in metalworking fluid concentrates, is variable. We recommend checking stability and performance before commercialization of products. Rohm and Haas has several recommended stabilizers to improve stability and compatibility in many types of concentrates.

Storage Stability: In general, the storage stability of the KATHON 893 MW product is excellent. The shelf life of the product is nominally one year at 25°C. It is strongly recommended, however, that both the stability and compatibility of KATHON 893 MW in metalworking fluid formulations or systems be thoroughly examined before commercialization.



Recommended Use Practices

General Practices When Using KATHON Biocides

- Know the size of your system and dose at the recommended use levels.
- To improve performance and longevity, add KATHON 893 MW on the clean side of the filters. It may be necessary to occasionally add KATHON 893 MW to the dirty side of the filters if large populations of microorganisms are detected there.
- Minimize contamination:
 - Eliminate or minimize dead spots
 - Disconnect unused portions of the system
 - Do not throw trash in sumps
- Always remember to triple rinse (or equivalent) empty containers to avoid incidental contact.
- Post placard with safety information and deactivation protocol near biocide handling area.

Maximizing the performance of KATHON 893 MW

Additional guidelines for maximizing the performance of KATHON 893 MW are as follows:

- KATHON 893 MW stability and performance is improved with lower pH. Whenever possible, maintain the pH of system below pH 9.2. Lower pH also makes amines and amine-containing compounds less aggressive.
- For systems with pH greater than 9.5, we strongly recommend determination of biological efficacy and chemical stability prior to use.
- Avoid adding highly basic additives (alkaline materials with pH of 10-12) immediately prior to or after adding KATHON 893 MW to your system. If a highly basic additive must be added, allow sufficient time (at least 30 minutes) between additions. Minimize levels of diethanolamine (DEA) in your system. If possible use 99% triethanolamine (TEA) or monoethanolamine (MEA) instead of DEA, and use these at as low a level as possible.
- Always add KATHON 893 MW directly to the metalworking fluid sump. Never use KATHON 893 MW in a spray bottle.
- Avoid charging KATHON 893 MW in high temperature zones, since increasing temperatures accelerate other degradation effects. Ideally, add KATHON 893 MW to the fluid below 60°C (140°F).
- Avoid adding KATHON 893 MW and incompatible corrosion inhibitors directly to the tank at the same time.

Performance Information

How Does KATHON 893 MW Biocide Work?

KATHON 893 MW utilizes a two-step mechanism involving rapid growth inhibition leading to a loss of cell viability. Growth inhibition is the result of rapid disruption of the central metabolic pathways of the cell by inhibition of several specific enzymes, including dehydrogenases. The critical enzymes which are affected are associated with the Krebs cycle, nutrient metabolism and energy generation.

The key physiological activities that are rapidly inhibited in microbial cells are respiration (oxygen consumption), energy generation (ATP synthesis), and growth (assimilation). Many of these key enzymes are present in both aerobic and anaerobic microorganisms, which explains why KATHON 893 MW is such a broad spectrum biocide.

Inhibition of cellular activity and growth is rapid (within minutes), whereas cell death (cidal activity) is observed after several hours' contact. In general, the higher the concentration of biocide, the shorter the contact time required for more complete kill.

Cell death results from the progressive loss of protein thiols in the cell from one of multiple pathways. As cell metabolism is disrupted, free radicals are produced which also results in cell death. This unique mechanism results in the broad spectrum of activity of KATHON 893 MW, low use levels for microbial control, and difficulty in attaining resistance by mutation. See technical bulletin (CS-632) for more detailed information.

How Rapidly Does KATHON 893 MW Work?

Within minutes after addition of KATHON 893 MW to a metalworking fluid sump, the metabolic activity of the microorganisms in the system shuts down. This includes cellular respiration (oxygen uptake), growth, energy generation, and nutrient uptake. The microorganisms, although still alive, are no longer able to reproduce or metabolize metalworking fluid components. After 24 to 48 hours of contact with a lethal dose of the biocide, most of the microorganisms have been killed.

How Long Does KATHON 893 MW Last?

KATHON 893 MW has excellent in-use stability and generally retains its antimicrobial efficacy in metalworking fluid systems for 2 to 4 weeks. Variables such as degree of fluid contamination, effectiveness of the filtration system, system turnover time, compatibility between the microbicide and the metalworking fluid components, and other system additives involved, can affect the life of the microbicide in a system.

Is KATHON 893 MW Effective in Reducing Fungal Biofilms?

YES. KATHON 893 MW has been shown to reduce microbial fouling and prevent biofilm development in metalworking fluid systems. The benefits of reduced fungal biofouling include improved system performance, reduced filter plugging, reduced biocorrosion, and improved microbial control.

Is KATHON 893 MW Effective When Used in Concentrates?

YES. KATHON 893 MW may be used in certain fluid concentrates to provide efficacy in the final use dilutions. Although KATHON 893 MW stability may not be suitable for all concentrates, we have had success with the biocide alone or in combination with one of our recommended stabilizers.

How Can I Improve KATHON 893 MW Stability in Concentrates?

We recommend testing KATHON 893 MW in concentrates prior to commercialization. Rohm and Haas technical staff can assist you in formulating products. We have years of experience and a range of recommended stabilizers to prolong the lifetime and improve compatibility of KATHON 893 MW in concentrates. Contact your sales representative for assistance.

Efficacy Data

Anti-Microbial Properties of KATHON 893 MW

Initial determinations of the efficacy of any biocidal product are made via minimum inhibitory concentration (MIC) measurements. The MIC test yields valuable information about the product's inherent antimicrobial efficacy and spectrum of activity.

The MIC for any product is the lowest level at which the active ingredient inhibits the growth of various microorganisms. This method is a useful tool for screening antimicrobial agents under standardized laboratory conditions, in nutrient-rich growth conditions. In interpreting the data, remember that low values correspond to high activity.

Table 3 indicates that KATHON 893 MW biocide possesses outstanding antimicrobial activity against a broad range of fungi (both yeasts and molds). KATHON 893 MW has very low MIC values for most of the fungi tested and there is no gap in the spectrum of activity among the organisms tested.

Table 3
Fungistatic Activity of KATHON 893 MW

Organism	ATCC Number (Strain)	MIC* in PPM Active Ingredient
<i>Alternaria dianthicola</i>	11782	1
<i>Aspergillus niger</i>	9642	8
<i>Aspergillus oryzae</i>	10196	2
<i>Aspergillus repens</i>	9294	2
<i>Aureobasidium pullulans</i>	9348	0.3
<i>Candida albicans (yeast)</i>	11651	2
<i>Chaetomium globosum</i>	6205	4
<i>Cladosporium resinae</i>	11274	0.5
<i>Lenzites lepideus</i>	12653	2
<i>Lenzites trabea</i>	11539	2
<i>Penicillium funiculosum</i>	9644	1
<i>Phoma glomerata</i>	6735	<1.0
<i>Phoma pigmentivora</i>	12569	2
<i>Rhizopus stolonifer</i>	10404	4
<i>Rhodotorula rubra (yeast)</i>	9449	4
<i>Saccharomyces cerevisiae (yeast)</i>	2601	1
<i>Trichophyton interdigitale (mentagrophytes)</i>	9533	<1.0

*Fungistatic minimum (MIC) are based on active ingredient (AI) as determined in twofold broth serial dilution tests.

The data are intended only to indicate the activity of KATHON 893 MW in an aqueous solution; they do not represent recommended use levels. Moreover, the microorganisms on the list are not all the ones involved in the deterioration of metalworking fluids.

Short-Term Study

KATHON 893 MW was evaluated as a tankside fungicide in a wide variety of metalworking fluids, including synthetics, semi-synthetics, and soluble-oil fluids. In a one-week eradication study described below, a total of 16 fluids from various manufacturers in the United States, Europe, and Japan were tested.

Table 4 provides test results for several of these fluids.

Table 4
Comparative Fungicidal activity of KATHON 893 MW and Sodium Pyrithione (one week eradication study)

Fungi, CFU/ml				
Biocide	Concentration (PPM Active)	Synthetic	Semi-Synthetic	Soluble-Oil
TIME ZERO		5,000	500	120,000
Control	None	45,000	1,000	15,000
	5	<1	25	13,000
	10	<1	20	11,000
	25	<1	<1	80
KATHON 893 MW	50	<1	<1	<1
	75	<1	<1	<1
	100	<1	<1	<1
	50	9,000	15	20,000
Sodium Pyrithione	100	4,000	20	10,000



Preparation of Individual Fungal Inoculum

Each fluid was diluted 50:1 with tap water, set up in a 1-liter (L) French square bottle, and inoculated with spore scrapings of various metalworking fluid fungal isolates. Each 1-L setup was constantly aerated to promote a fungal count of approximately 10³ to 10⁴. Thus, each fluid type developed a population that was adapted to growth in that particular medium.

Test Procedure

The actual test systems were run in volumes of 50 ml, which consisted of 40 ml of virgin metalworking fluid (generally diluted 20:1) and 10 ml of the adapted inoculum as described above. Prior to inoculation, the fluids containing fungal growth were blended for two minutes at high speed in a Waring blender. Most samples contained 0.5 g of iron filings. At time zero, the following active levels of KATHON 893 MW were added: 5 ppm, 10 ppm, 25 ppm, 50 ppm, 75 ppm, and 100 ppm. Additionally, samples were run containing 50 ppm and 100 ppm active sodium Pyrithione. Once fluids were dosed with biocide and inoculated, they were mechanically shaken for one week and plated on sabouraud dextrose agar.

Results

KATHON 893 MW biocide was completely effective in all fluids at levels ranging from 5 to 75 ppm active ingredient. In all but one of the fluids, it was effective at concentrations in the range of 5 to 50 ppm active ingredient. In synthetic fluids, which are prone to fungal growth, KATHON 893 MW was effective in the range of 5 to 10 ppm. Sodium Pyrithione was not very effective at recommended use levels of 50 to 100 ppm active ingredient.

Long-term Study

A long-term study was done to compare the fungicidal activity of KATHON 893 MW and sodium Pyrithione in a synthetic metalworking fluid, use-dilution 1:30. The concentration of KATHON 893 MW studied ranged from 10 to 75 ppm active ingredient and the concentration of sodium pyrithione ranged from 50 to 200 ppm active ingredient.

Test Procedure

The test samples were inoculated at zero time and again every two weeks with fungal inoculum isolated from naturally contaminated synthetic metalworking fluid and maintained in the same fluid employed in the test.

Results

Results, provided in Table 5, show that particularly high fungal counts were not achieved in the untreated control for this particular fluid (note: Due to the inherent mycelial clumping common to most fungal species when growing in liquid substrates, plate counts of colony-forming units carried out on the aliquots of the liquid are not always indicative of the degree of fungal contamination present). In spite of this, sodium Pyrithione allowed fungal survival at all levels at which it was tested. KATHON 893 MW, however, exhibited complete fungal control at significantly lower levels.

Table 5
Comparative Fungicidal Activity of KATHON 893 MW and Sodium Pyriithione in a Synthetic Metalworking Fluid (1:30)

Fungi, CFU/ml				
Biocide	Concentration (PPM Active)	2 Weeks	4 Weeks	6 Weeks
Control	None	500	6,900	7,000
	0	<10	<10	<10
KATHON 893 MW	25	<10	<10	<10
	50	<10	<10	<10
	75	<10	<10	<10
	50	30	20	460
Sodium	75	80	40	590
	100	120	40	340
	150	230	240	620
	200	130	50	600

Biocide Combination

There is usually a need to control both bacteria and fungi in metalworking fluid systems. Bacteria and fungi, however, are not always controlled by one biocide. For example, KATHON 886 MW is a broad-spectrum biocide that controls the growth of bacteria and fungi, including molds and yeast, in many metalworking fluid systems and therefore can usually be used alone. Some fluids, however, contain aggressive components which may decrease the stability of KATHON 886 MW and therefore reduce its efficacy for controlling microorganisms. If such fluids are especially prone to fungal growth, use of KATHON 893 MW in conjunction with KATHON 886 MW, KORDEK LX5000, or ROCIMA BT 2S biocides is recommended. These products are completely compatible and provide excellent cost performance.

KATHON 893 MW is also compatible with other bactericides, including triazine and formaldehyde releasers, and other fungicides. The use of KATHON 893 MW in the same system as KATHON 886 MW, KORDEK LX5000, and a number of other biocides are covered in several Rohm and Haas Company patents.

Field Trial Data

The efficacy of KATHON 893 MW biocide in a use-dilution synthetic metalworking fluid was evaluated under actual use conditions during a five-month field trial in a 200,000-gallon system. At the start of the trial, fungal mats covered the walls of the flumes and weirs of the system and filters which required constant maintenance to prevent clogging (see Figure 1). Fungal slime was also present on and around many of the machines supplied by the system. The bacterial population of the fluid was between 103 and 104 cfu/ml (colony-forming units per ml), and the fungal population was between 380 and 790 cfu/ml.

During the first 45 days of the trial, the level of KATHON 893 MW was maintained at approximately 25 ppm active ingredient. For the remaining 3 months of the trial, the level of KATHON 893 MW was maintained between 30 ppm and 10 ppm active ingredient.

The results of the trial showed that the regimen of KATHON 893 MW addition chosen provided essentially complete control of fungal organisms in the fluid itself and also destroyed the fungal organisms comprising the mats covering the walls of the flumes and weirs of the system. These fungal mats lost their integrity and gradually sloughed off the surfaces to which they were attached (see Figure 2). The microbial slime present on and around the machines also disappeared. The bacterial populations of the fluid remained in the range of 102 to 104 cfu/ml, throughout the trial. In addition, the amount of makeup fluid required to maintain the desired characteristics of the fluid was reduced significantly (42 percent) during the trial.

Figure 1: Dark-colored bioslime growing on the weirs and flumes of a metalworking fluid system.



Figure 2: The same metalworking fluid system after treatment with KATHON 893 MW.





Summary of Toxicological Information

Product in Use-Dilution Metalworking Fluids

At recommended levels of 5 to 75 ppm active ingredient (1.3-21 fl oz per 1,000 gallons of use-dilution metalworking fluids every 2-4 weeks), KATHON 893 MW is judged to be safe at use concentrations when used as directed.

Product When Formulated into Metalworking Fluid Concentrates

If KATHON 893 MW is incorporated into a metalworking fluid concentrate at levels greater than 250 ppm active ingredient, repeated contact with the concentrated metalworking fluid may cause an allergic skin reaction.

Therefore, when handling concentrated metalworking fluids containing greater than 250 ppm active ingredient KATHON 893 MW, individuals should wear protective clothing including impervious rubber gloves, an impervious apron and splash goggles.

Product as Supplied

Results of extensive animal toxicity and human sensitization/irritation studies indicate that KATHON 893 MW as supplied is a severe skin irritant, may cause burns to the skin, is corrosive to the eyes and may cause skin sensitization (allergic contact dermatitis). Therefore, contact with skin and eyes should be avoided. It is important that individuals who handle KATHON 893 MW in the concentrate form review the safety and handling procedures outlined in the next section of this brochure, as well as the product label and the Rohm and Haas Material Safety Data Sheet.

KATHON 893 MW Toxicity Profile

KATHON 893 MW is considered safe at recommended use levels. Based on assessment of extensive toxicological data, experts conclude that the active ingredient in KATHON 893 MW is:

- Non-genotoxic
- Non-carcinogenic
- Non-teratogenic

Biodegradation Studies

KATHON 893 MW biocide does not persist in the environment. Studies have been carried out using carbon 14 isotope-labeled KATHON 893 MW. In both river and pond water, at an active level of 0.1 ppm, 90% of the carbon 14 was eliminated after seven days. At higher concentrations of 0.5 ppm and 1.0 ppm, 14 days were required to reach the 90% degraded level. These studies showed that in aquatic environments, the active ingredient in KATHON 893 MW will undergo biodegradation. Microbial metabolism involves opening of the isothiazolone ring followed by oxidation of the organic carbon to CO₂. Additional studies have shown that the active ingredient in KATHON 893 MW is eliminated from waste treatment systems and has no significant impact on biological treatment efficiency.

First Aid

First Aid Measures

Eye Contact: FLUSH IMMEDIATELY with large amounts of water for at least 15 minutes. Hold eye open during the washing process so that the water may clear the chemical from the eye. Get prompt medical attention, but FLUSH EYES FIRST.

Skin Contact: WASH IMMEDIATELY the contacted area with plenty of soap and water and continue washing for at least 15 minutes AND get immediate medical attention.

Contact With Clothing: Remove contaminated clothing immediately. Decontaminate and separately and thoroughly launder clothes before you wear them again. Treat skin under splashed clothing as if it were contacted directly.

Inhalation: Remove subject immediately to fresh air. If not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Swallowing: Drink promptly a large quantity of milk, egg whites, gelatin solution, or, if these are not available, drink large quantities of water. Avoid alcohol. Get medical attention immediately.

Note To Physician: KATHON 893 MW is a corrosive material. To induce vomiting after swallowing may not be advisable. Possible mucosal damage may contraindicate the use of gastric lavage. There is no specific antidote for KATHON 893 MW. Medical treatment, therefore, is symptomatic and supportive and should follow the principles for treating any exposure to a chemical that is strongly irritating or even corrosive (depending on the concentration, amount, and duration of contact), and a potential skin sensitizer.



Safe Handling and Storage Procedures

Handling

The procedures used for handling concentrated biocide solutions are similar to those used for handling concentrated acids and alkalis. The purpose is to prevent all eye and skin contact, including inhalation of mists, and thereby prevent possible injury and sensitization.

Personnel handling KATHON 893 MW as supplied should always wear protective clothing, which includes chemical splash goggles, an impervious apron or rain suit, and impervious rubber gloves. We recommend that employees working with KATHON 893 MW as supplied thoroughly wash with soap and water at the end of a shift or prior to eating, drinking, smoking, or applying cosmetics. Special care should be taken to avoid contamination of surfaces or materials that may later be handled by unprotected personnel, for example, door and tap handles.

Storage

KATHON 893 MW is packaged in polyethylene or polyethylene-lined containers. It should not be stored in unlined metal containers since it is a corrosive material. Normal recommended storage temperatures are in the range of 10° to 25°C (50° to 80°F). Shelf life at ambient temperatures is nominally one year. Storage at >120°F for extended periods of time can result in degradation of the active ingredient.

Decontamination and Spill Procedures

Decontamination Solutions

KATHON 893 MW can be decontaminated with a 5% solution of sodium hypochlorite (NaOCl) containing 2-5% sodium bicarbonate (NaHCO₃). Solutions should be freshly prepared. Employees preparing or handling decontamination solutions should wear chemical splash goggles, an impervious apron or rain suit, and impervious rubber gloves.

Note: Do not use decontamination solution to treat skin, eyes or clothing which have come in contact with KATHON 893 MW.

Decontamination of Equipment

Equipment used in the handling of KATHON 893 MW biocide, such as mix tanks, lines, pumps, etc., must be decontaminated before carrying out maintenance or used for other service. To decontaminate this equipment, estimate the volume of KATHON 893 MW remaining in the well-drained system. Prepare 10 volumes of decontamination solution per volume of KATHON 893 MW (45%) and circulate the mixture throughout the equipment. Be certain that the KATHON 893 MW and decontamination solution mix well. Wait at least 30 minutes to ensure complete reaction. Drain and rinse with clean water or detergent solution. Decontamination solution runoffs should be drained to a chemical sewer unless prohibited by state or local regulations.

Drips, minor spills and exposed wet areas should be cleaned up promptly with the hypochlorite/bicarbonate mixture. Contaminated surfaces should be swabbed with decontamination solution and allowed to stand for 30 minutes before rinsing thoroughly with water. Decontaminated solutions should be drained to a chemical sewer unless prohibited by state or local regulations.

Note: Because of the high level of activity of KATHON 893 MW, a relatively small quantity could have a damaging impact on the effectiveness of waste treatment bio-systems. Laboratory or plant spills should be decontaminated with decontamination solution before being released to a biological waste treatment system.

Cleanup of Spills

Procedures provided in the Safe Handling Section should be followed when cleaning spills of KATHON 893 MW.

1. Wear impervious rubber gloves, chemical splash goggles, protective clothing and overshoes.
2. Dike and adsorb the spilled material on an inert solid, such as clay or vermiculite or with spill control pillows.
3. Transfer the adsorbent or pillows and surrounding surface soil into a pail or drum. This container should be no more than two-thirds full.
4. Treat the contents of the container with 10 volumes of decontamination solution per estimated volume of spilled KATHON 893 MW.
5. Treat the surrounding spill area with excess decontamination solution. Flush after a minimum of 30 minutes into a chemical sewer.
6. Do not discharge spills and cleaning runoffs into open bodies of water, because of a potential adverse impact on the environment.
7. Carefully remove the contaminated gloves and place them in the container (peel off the gloves by pulling on the outside of the glove sleeve turning them inside out as they are removed). After 48 hours, seal the container and dispose of it by landfilling in accordance with local, state, and federal regulations.

Analytical Information

Bulletin CS-561, which is available on request, contains methods for determining the presence of KATHON 893 MW's active ingredient in use dilution metalworking fluids by high performance liquid chromatography (HPLC). This bulletin also contains HPLC procedures for determining KATHON 886 MW active ingredients in use-dilution metalworking fluids.

Material Safety Data Sheets

Rohm and Haas Company maintains Material Safety Data Sheets for all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. We recommend that you obtain and review Material Safety Data Sheets for our products from your distributor or Rohm and Haas technical representative before using our products in your facility. We also suggest that you contact your supplier of other materials recommended for use with our product for appropriate health and safety precautions before using them.

Rohm and Haas Technical Support

Rohm and Haas Sales Service and Technical Service departments have over twenty-five years' experience evaluating KATHON biocides' performance in a variety of applications. In the area of metalworking fluids we can advise on determining KATHON biocide stability and efficacy in use-dilution as well as concentrate metalworking fluids, and we can make recommendations on how to evaluate the level and type of system contamination you may be experiencing. In addition, Rohm and Haas personnel can assist you with questions on KATHON biocides' toxicology, environmental issues, safe storage, handling and use. Finally, Rohm and Haas has available for your use a videotape on the safe use and handling of the family of KATHON and KORDEK biocides for the metalworking industry, including KATHON 893 MW, KATHON 886 MW and KORDEK LX5000 biocides.

For further information, contact your local Rohm and Haas KATHON biocide representative or contact the Rohm and Haas Company.

Shipping Information

KATHON 893 MW biocide 45% solution is available in 5-gallon pails (44 lbs), 30-gallon drums (44 lbs), and cartons (22 lbs) containing two 1-gallon jugs.

To obtain samples, technical assistance, a Material Safety Data Sheet (MSDS), or to have a technical representative call for an appointment, contact the nearest Rohm and Haas office.

EPA Registration

KATHON 893 MW is registered with the U.S. EPA (Environmental Protection Agency). The EPA registration number is 707-195.

Biocidal Product Directive Compliance

KATHON 893 MW is a biocidal product intended for use in accordance with Product Type 13 (Metalworking fluid preservatives) of the Biocidal Products Directive 98/8/EC (BPD).

CAUTION

Use biocides safely. Always read the label and product information before use.

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