

KATHON™ CG/ICP

KATHON™ CG/ICP II

Highly Effective Preservatives for Use in Household and Industrial Products

Why Choose KATHON CG/ICP Preservatives?

Rohm and Haas discovered the active ingredients of KATHON CG/ICP preservatives in the late 1960s. For more than 30 years we have driven the progress of isothiazolinone chemistry to meet your evolving needs. Our goal is to provide our customers with much more than a preservative.

Rohm and Haas is committed to both the isothiazolinone chemistry and the household and industrial products industry. We have extensive toxicological and environmental databases and internal expertise that have allowed KATHON CG/ICP preservatives to be registered with the U.S. EPA.

Many consumer and industrial products are susceptible to microbial contamination which can affect the appearance, odor, and performance of the products.

The preservatives' broad-spectrum activity, excellent physical and chemical compatibility and low toxicity at recommended use levels provide formulators with an economical, effective, and environmentally acceptable alternative to other commercial preservatives.

The information presented in this bulletin will help you evaluate KATHON CG/ICP and KATHON CG/ICP II preservatives. For further information on our products, please contact your local technical representative.

Choose the Best Preservative

What Makes KATHON CG/ICP the Best Preservatives?

- lowest dose
- broader spectrum of activity
- supplied as aqueous solutions readily incorporated into household/industrial formulations
- good compatibility with surfactants and emulsifiers, irrespective of their ionic nature
- effective over a broad pH range
- no color or odor imparted to household/industrial consumer products
- safe at recommended use levels
- environmentally acceptable
- rapidly biodegradable
- nonpersistent in the environment
- not bioaccumulating

Now Purer Than Ever!

The latest technology in our state of the art manufacturing facility at Bayport, Texas, has enabled us to provide you with an even purer version of KATHON CG/ICP preservatives with the same consistent quality. However, purity alone is not enough.

Choose the Best Service Package

In the current regulatory environment, where more and more data is required by regulatory authorities, it is important to choose not only the right preservative, but also the right supplier—one who can supply you with a high-purity product of consistent quality and the support that you need.

Rohm and Haas Has More Than 30 Years of Experience With Isothiazolinone Chemistry:

- regulatory data
- extensive toxicological database
- environmental fate database that is continually updated
- safe handling expertise that can help you in your manufacturing facilities
- technical expertise with isothiazolinone chemistry and product preservation in general
- more than 100 patents obtained since the 1960s

Physical and Chemical Properties

Chemical Identification

KATHON CG/ICP and KATHON CG/ICP II preservatives contain the same type and level of active ingredients (A.I.)—a mixture of two isothiazolinones identified by the IUPAC system of nomenclature as 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one.

The compositions of KATHON CG/ICP and KATHON CG/ICP II preservatives differ only in the level and type of salts they contain. Their preservative performance is identical. Typical compositions, as supplied, are presented in the table below.

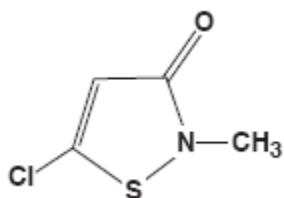
Typical Properties

Each KATHON CG/ICP preservative is a precise formulation of active ingredients and inert salts in aqueous solution. Every batch of KATHON CG/ICP preservative is manufactured to exact specifications and a certificate of analysis can be provided with each order.

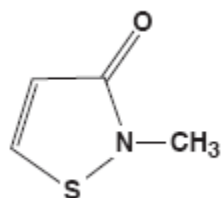
Miscibility

KATHON CG/ICP preservatives are totally miscible in water, lower alcohols and glycols and have low solubility in hydrocarbons.

Structural Formulas



Component 1 (MCI)
5-chloro-2-methyl-
4-isothiazolin-3-one
Empirical Formula:
 C_4H_4ClNOS



Component 2 (MI)
2-methyl-
4-isothiazolin-3-one
Empirical Formula:
 C_4H_5NOS

Chemical Composition

	CAS #	Empirical	Formula
Active Ingredients			
Methyl chloro isothiazolinone (MCI)	26172-55-4		C_4H_4ClNOS
Methyl isothiazolinone (MI)	2682-20-4		C_4H_5NOS
Inert Ingredients			
Magnesium chloride	7786-30-3		$MgCl_2$
Magnesium nitrate	10377-60-3		$Mg(NO_3)_2$
Cupric nitrate	10031-43-3		$Cu(NO_3)_2 \cdot 3H_2O$

Physical and Chemical Properties

These properties are typical but do not constitute specifications.

	KATHON CG/ICP	KATHON CG/ICP II
Active Ingredients		
5-chloro-2-methyl-4-isothiazolin-3-one	1.15%	1.15%
2-methyl-4-isothiazolin-3-one	0.35%	0.35%
Total	1.50%	1.50%

Inert Ingredients		
Magnesium salts	23.00%	2.80%
Cupric nitrate	—	0.15%
Water	75.50%	95.55%
Total	98.50%	98.50%

	KATHON CG/ICP	KATHON CG/ICP II
Appearance	clear liquid	clear liquid
Color	colorless to pale yellow	pale blue to pale green
Odor	mild	mild
Specific gravity @ 20°C	1.19	1.02
Density, lb/gal	9.9	8.4
pH, as supplied	1.5–3.0	2.5–4.5
Stability	Stable at least one year at ambient temperatures and at least six months at 50°C.	

Current Regulatory Status

KATHON CG/ICP and KATHON CG/ICP II are highly effective preservatives approved for use by the U.S. Environmental Protection Agency (EPA) in a wide variety of household and industrial products. The EPA registration numbers are: KATHON CG/ICP 707-166 and KATHON CG/ICP II 707-196. The products are also registered with:

- California Reg. No. 707-166AA
- Canada PCP No. 17726
- Japan MITI approved

Recommended Use Directions

The maximum recommended use level for KATHON CG/ICP preservatives is 0.15% by weight of product as supplied (22.5 parts per million active ingredients). Since the components of formulations vary considerably and may impact on the effect of preservatives, we urge each manufacturer to confirm the efficacy and stability of KATHON CG/ICP preservatives in use.

Suggested Applications

Typical applications for use include:

Cleaners and polishes, such as:

- all purpose cleaners
- floor and furniture polishes/waxes
- automotive washes, polishes and waxes

Laundry products, such as:

- liquid laundry detergents
- fabric softeners
- pre-spotters

Liquid detergents, such as:

- hand dishwashing detergents
- hand cleaners
- hand soaps

Miscellaneous:

- moist towelettes
- air fresheners
- moist sponges
- gel air fresheners

Raw materials and surfactants

Microbiological Properties

KATHON CG/ICP preservatives exhibit outstanding antimicrobial activity against gram-positive and gram-negative bacteria, yeasts and molds. The following table gives the minimum level in ppm of KATHON CG/ICP preservatives, as supplied and as active ingredients that inhibited the growth of various microorganisms in test tube cultures. The data demonstrate the broad activity of KATHON CG/ICP preservatives, but must not be taken as recommended use concentrations.

Minimum Inhibitory Concentrations (MICs) of KATHON CG/ICP Preservatives

Organism	ATCC No.	ppm (as supplied)	ppm (A.I.)
BACTERIA^a			
Gram-Positive			
<i>Bacillus cereus</i> var. <i>mycoides</i>	(R&H L5-83)	150	2
<i>Bacillus subtilis</i>	(R&H No. B2)	150	2
<i>Brevibacterium ammoniagenes</i>	6871	150	2
<i>Sarcina lutea</i>	9341	300	5
<i>Staphylococcus aureus</i>	6538	150	2
<i>Staphylococcus epidermidis</i>	155	150	2
<i>Streptococcus pyogenes</i>	624	600	9
Gram-Negative			
<i>Achromobacter parvulus</i>	4335	150	2
<i>Alcaligenes faecalis</i>	8750	150	2
<i>Enterobacter aerogenes</i>	3906	300	5
<i>Escherichia coli</i>	11229	300	5
<i>Flavobacterium suaveolens</i>	958	600	9
<i>Proteus vulgaris</i>	8427	300	5
<i>Pseudomonas aeruginosa</i>	15442	300	5
<i>Pseudomonas cepacia</i>	(Gibraltar 165)	50	0.75
<i>Pseudomonas fluorescens</i>	13525	150	2
<i>Pseudomonas oleoverans</i>	8062	300	5
<i>Salmonella typhosa</i>	6539	300	5
<i>Shigella sonnei</i>	9292	150	2
FUNGI^a			
<i>Aspergillus niger</i>	9642	600	9
<i>Aspergillus oryzae</i>	10196	300	5
<i>Chaetomium globosum</i>	6205	600	9
<i>Cladosporium resinae</i>	11274	300	5
<i>Gliocladium fimbriatum</i>	(QM7638)	600	9
<i>Mucor rouxii</i>	(R&H L5-83)	300	5
<i>Penicillium funiculosum</i>	9644	300	5
<i>Penicillium variable (glaucum)</i>	(U.S.D.A.)	150	2
<i>Phoma herbarium (pigmentivora)</i>	12569	150	2
<i>Pullularia (Aureobasidium) pullulans</i>	9348	300	5
<i>Rhizopus stolonifer</i>	10404	300	5
<i>Trichophyton mentagrophytes (interdigitale)</i>	9533	300	5
<i>Candida albicans (yeast)</i>	11651	300	5
<i>Rhototorula rubra (yeast)</i>	9449	150	2
<i>Saccharomyces cerevisiae (yeast)</i>	2601	150	2

^aBacteriostatic and fungistatic tests performed by serially diluting test compounds in trypticase soy broth and 1:100 inoculation with 24-hour broth cultures of test bacterium or yeast, or a fungal spore suspension prepared from 7- to 14-day culture slants washed with 7 ml deionized water. Minimum inhibitory concentration levels determined visually after 2 days' incubation at 37°C for bacteria and 7 days' incubation at 28 to 30°C for fungi.

Formulation Recommendations

Maximizing Stability

As with many chemicals, the stability of KATHON CG/ICP and KATHON CG/ICP II preservatives may be affected by various chemical or environmental conditions. Whether stability problems develop or not depends upon a product's formulation and the degree of destabilizing influence present. The following tips will help you optimize preservative stability in your product. It is recommended that the stability of KATHON CG/ICP and KATHON CG/ICP II preservatives be tested in specific product formulations before commercialization. Your evaluation should also consider the length of time preservation is needed.

High Temperature (above 60°C)

Avoid high temperatures for extended periods of time. KATHON CG/ICP and KATHON CG/ICP II preservatives are best added when the temperature is below 45°C. Figure 1 shows an example of how elevated storage temperatures can affect KATHON CG/ICP preservative stability.

High pH (above pH 8)

Some degradation of active ingredients may occur above pH 8. The degree of degradation experienced is highly dependent on the formulation components. Preservative degradation can be minimized by:

1. Lowering the pH below 8. Optimum pH values for long-term stability are 7 or lower. Figure 2 shows the effect of pH on KATHON CG/ICP preservative stability in deionized water.
2. Adding a divalent copper salt to the formulation at a level of copper equal to the level of KATHON preservative active ingredients. An example of the effect of copper on KATHON CG/ICP preservative stability in a liquid cleaner at pH 8 is shown in Figure 3.
3. When adjusting pH upward during manufacturing, it is best to use an alkali metal base (NaOH) rather than an amine base (NH₄OH, TEA, DEA, MEA). Figure 4 shows the effect of different bases on the stability of KATHON CG/ICP preservative in a polymeric raw material.

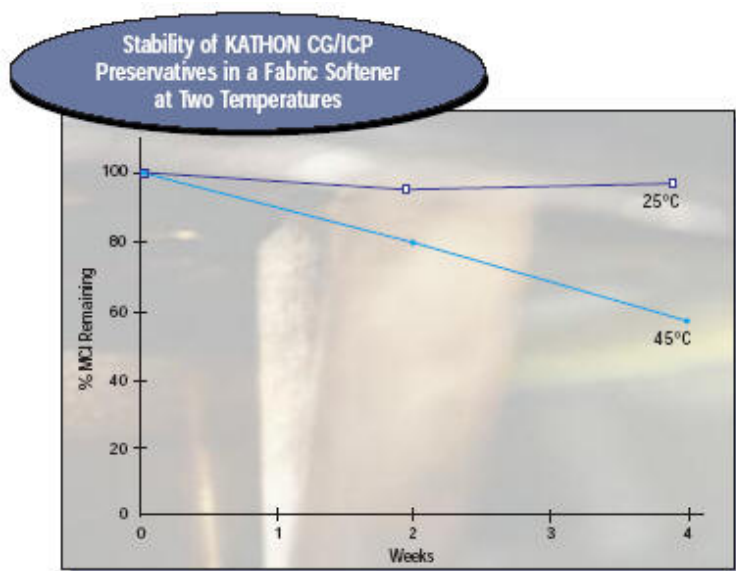


Figure 1

Stability of KATHON CG/ICP Preservatives at Various pHs and Temperatures

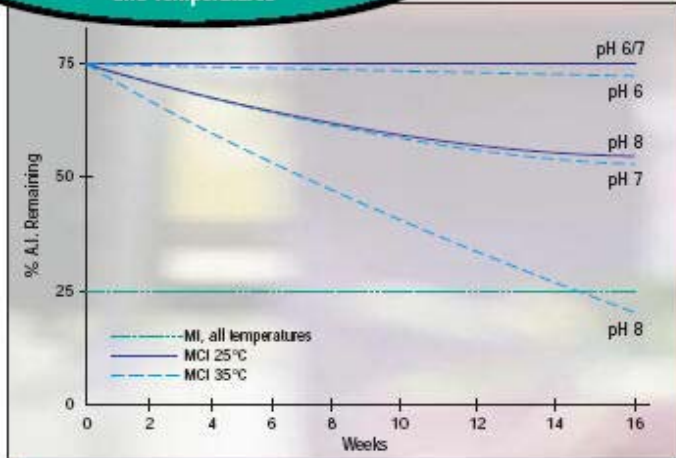


Figure 2

Stability of KATHON CG/ICP Preservative With and Without Copper in a Liquid Cleaner at 37°C

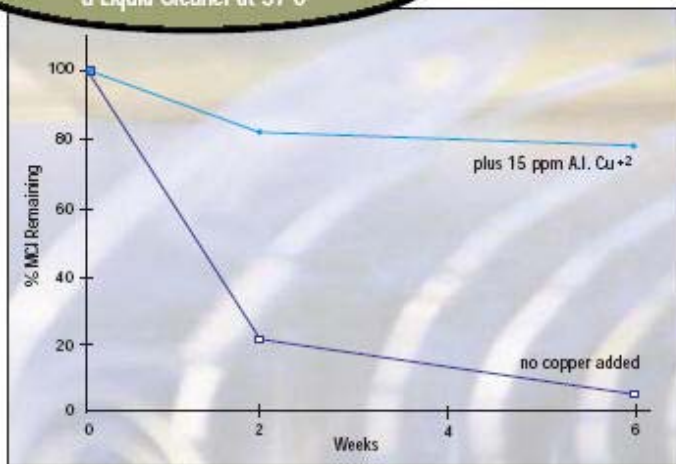


Figure 3

Effect of pH Adjusters on KATHON CG/ICP II Preservative Stability in a Polymeric Raw Material

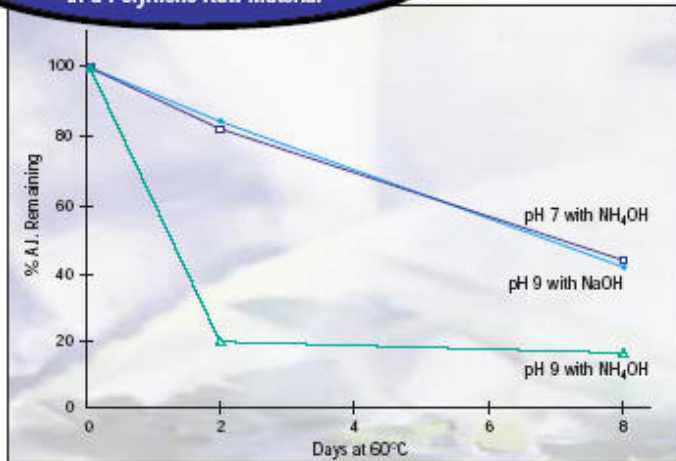


Figure 4

Reducing Agents/Oxidizing Agents/Nucleophiles

Under certain conditions, reducing agents (such as sulfite, bisulfite, sulfide, mercaptan), oxidizing agents (such as sodium hypochlorite, hydrogen peroxide), and nucleophiles (such as primary and secondary amines) can deactivate some or all of the active ingredients in KATHON CG/ICP and KATHON CG/ICP II preservatives.

The following suggestions will help prevent or reduce the severity of this reaction:

1. Remove the reducing agents or oxidizing agents by adding an appropriate level of oxidizing or reducing agent. Residual levels of such agents should be <25 ppm prior to the addition of the preservative. An example of removing a reducing agent (sulfite, in this case) and improving KATHON CG/ICP preservative stability in a surfactant is shown in Figure 5.
2. Avoid storage of product at elevated temperatures (see Figure 1).
3. Reduce the pH of the product to less than 8, if possible. Reducing the pH protonates amine nucleophiles and greatly reduces their reactivity with KATHON CG/ICP preservatives. Figure 6 shows the effects of pH and temperature on KATHON CG/ICP preservative stability.
4. Reduce or remove the nucleophiles present. While the stability of KATHON CG/ICP preservatives in the presence of nucleophiles may be improved by avoiding elevated temperatures and by reducing pH, it is also possible to improve stability by reducing nucleophile levels by using higher grade raw materials which contain lower levels of free amine, especially secondary amines. The effects of pH, temperature and raw material quality on stability in a laundry detergent are shown in Figure 7. Lower levels of DEA are present in 99% TEA versus 85% TEA. KATHON CG/ICP stability is significantly better in the laundry detergent formulated with the purer TEA grade.
5. Add copper salts to the formulation at a level equal to the level of KATHON preservative active ingredient (see Figure 3).
6. Increase the level of KATHON preservative to compensate for the low level of degradation.

For additional information concerning stability and for guidelines to test the compatibility of KATHON CG/ICP and KATHON CG/ICP II preservatives in your formulations, consult Rohm and Haas Technical Bulletins No. CS-596, "Stability in Surfactants," No. CS-607, "Determination of ppm Levels of KATHON CG/ICP by HPLC," or contact your Rohm and Haas Technical Representative.

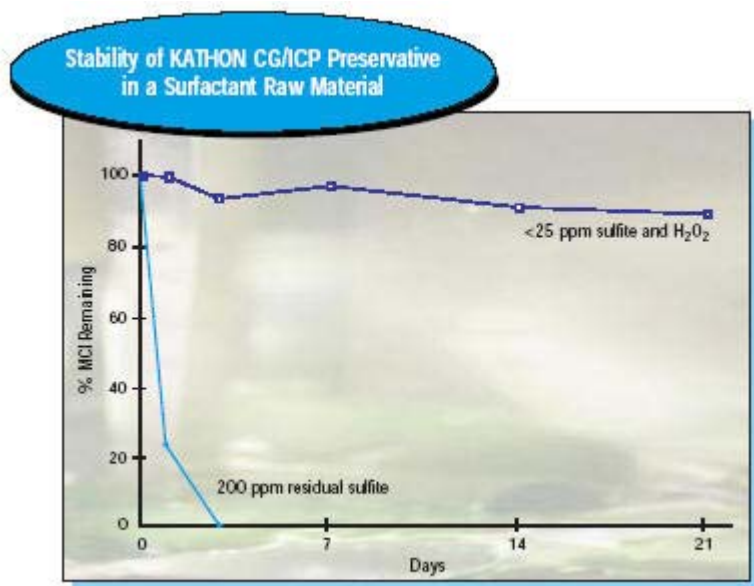


Figure 5

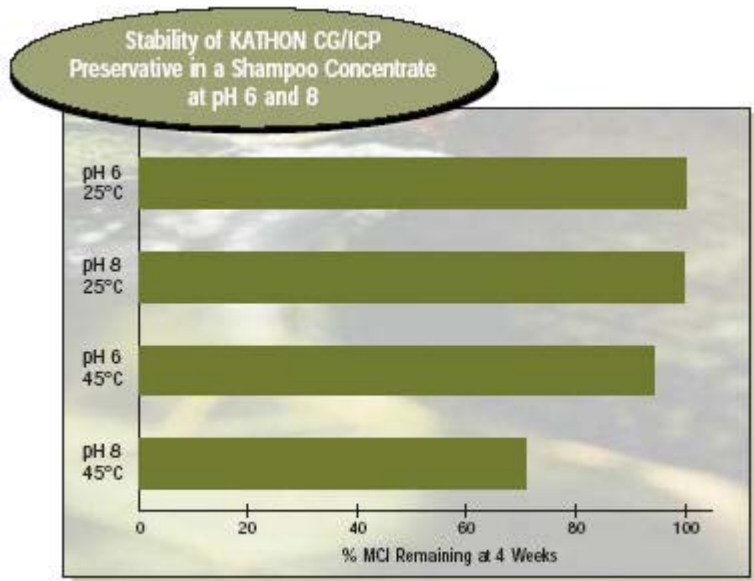


Figure 6

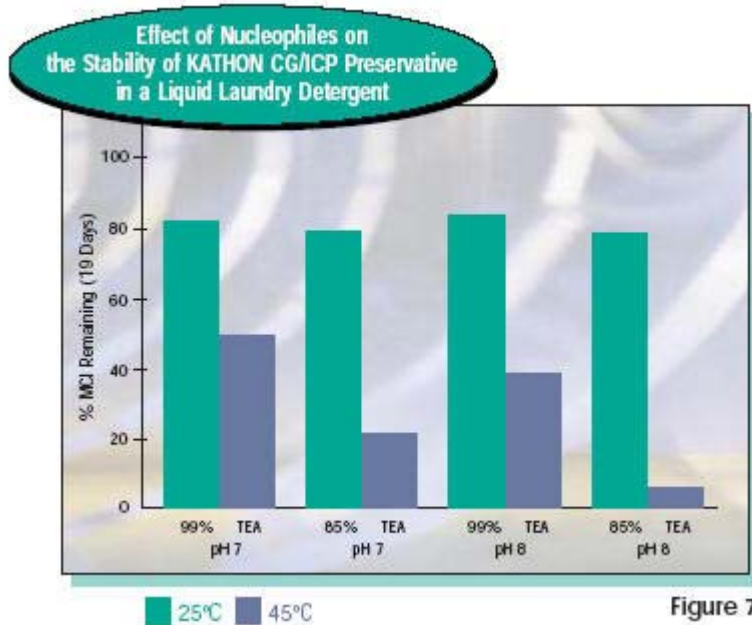


Figure 7

Compatibility with Other Preservatives

The compatibility of KATHON CG/ICP preservatives is excellent with other preservatives frequently used in household and industrial products. In addition, some preservatives, such as formaldehyde donors, can help stabilize KATHON CG/ICP in aggressive environments. More-detailed information can be obtained from your local technical representatives.

Efficacy in Household and Industrial Products

The microbiological performance of KATHON CG/ICP preservatives in most products is excellent. Long-term microbiological protection is obtained employing use levels up to 22.5 ppm active ingredients (0.15% product, as supplied, by weight). Typical use levels for most household and industrial products are in the range of 5 ppm to 10 ppm active ingredient. For each formulation, it is important to ensure stability of the active ingredients and assess the efficacy through a microbiological challenge test.

Rohm and Haas typically uses a 4-week challenge test with 2 inoculations of a mixed inoculum, coupled with an analysis of the active ingredients by High-Performance Liquid Chromatography (HPLC). More details of this procedure can be obtained from your nearest Rohm and Haas sales office.

Growth Rating Description for Tables 1–3

Growth Rating	Colony Forming Units/ml
0	< 10
T	10 to 100
1+	100 to 1,000
2+	1,000 to 10,000
3+	10,000 to 100,000
4+	>100,000
ND	Not Determined

Note: All data presented in the tables above for KATHON CG/ICP preservative also apply to KATHON CG/ICP II preservative.

Table 1: KATHON CG/CPI Preservative Evaluation in a Dishwashing Detergent

As Supplied ppm	Active Ingredient ppm	Growth Remaining After			
		2wks	4wks	6wks	8wks
0	0	3+	4+	4+	4+
400	6	0	0	0	0
600	9	0	0	0	0
1,000	15	0	0	0	0
1,500	22.5	0	0	0	0

Table 2: Preservation of a Heavy-Duty Liquid Detergent

As Supplied ppm	Active Ingredient ppm	Growth Remaining After		
		2wks	4wks	8wks
KATHON CG/ICP Preservatives				
0	0	3+	4+	4+
300	4.5	0	0	0
600	9	0	0	0
Formalin (37%)				
0	0	3+	4+	4+
2,700	1,000	3+	4+	4+

Table 3: KATHON CG/ICP Preservative Evaluation in a Fabric Softener

As Supplied ppm	Active Ingredient ppm	Growth Remaining After				
		2wks	4wks	6wks	8wks	10wks
0	0	4+	4+	4+	4+	4+
200	3	0	0	0	0	0
400	6	0	0	0	0	0

Analytical Procedures

High-Performance Liquid Chromatography (HPLC) analysis is the preferred method for determining low levels (0.01-0.15%) of KATHON CG/ICP preservatives.

This method can be used to determine KATHON CG/ICP preservatives levels in your formulations. If you require detailed information on HPLC methods, please contact your local Rohm and Haas sales office to request our bulletin "Determination of ppm Levels of KATHON CG/ICP by HPLC" CS-607.

Acute Toxicology

Oral LD ₅₀ (rat)	
<i>female</i>	2630 mg/kg (product as sold)
<i>male</i>	3350 mg/kg (product as sold)
Dermal LD ₅₀	>5000 mg/kg (product as sold)
Inhalation LC ₅₀ (rats) 4h	0.33 mg A.I./liter air
<i>nose only</i>	
Skin irritation	Corrosive (product as sold)
Eye irritation	Corrosive — severe corneal damage (product as sold)
Sensitization	Skin sensitizer (product as sold)

Toxicological Summary

The toxicology of the active ingredients in KATHON CG/ICP preservatives has been assessed in extensive clinical and nonclinical testing, including acute and chronic toxicity tests, genotoxicity and dermal sensitization studies. Results of these studies have demonstrated that KATHON CG/ICP preservatives do not present a mutagenic, carcinogenic, or teratogenic risk to humans.

Like all preservatives, at higher than recommended use-level concentrations, KATHON CG/ICP preservatives can cause contact dermatitis (skin irritation and or skin sensitization). The use of KATHON CG/ICP at recommended use levels is safe. This is supported by our extensive toxicological and clinical databases, our work with dermatologists worldwide, and more than 15 years' experience with safe use in a large number of household and industrial products worldwide.

For further details on the complete toxicological profile of KATHON CG/ICP preservatives, please contact the Rohm and Haas sales office.

Good Manufacturing Practices

A preservative is formulated into household and industrial products principally to protect the products from chance or occasional microbial challenge during production, storage and final customer use. It should not be expected to cope with severe contamination problems brought about by poor manufacturing practices. In the manufacturing plant, it is important that all potential sources of microbial contamination are identified and controlled.

Some of the important sources of microbial contamination include:

- raw materials
- water supplies
- poor housekeeping and plant design
- poor hygiene
- inadequate cleaning and sanitization protocols
- product reworking or recycling

Good manufacturing practices, backed up by regular and effective monitoring programs, are key factors in controlling microbial contamination. For further information, please see Rohm and Haas publication, "Preventing Microbial Contamination in Manufacturing" CS-626.

Environmental Information

Environmental Toxicity

Rohm and Haas has extensive freshwater and marine ecotoxicity and environmental fate databases with all the necessary studies to perform a state-of-the-art environmental risk assessment.

Degradation and Dissipation in the Environment

In a series of experiments, the modes and rates of dissipation and degradation in several ecosystems have been investigated, including:

- aquatic hydrolysis
- photolysis
- river water die-away studies
- activated sludge respiration inhibition
- bioaccumulation studies
- modes and rates of breakdown
- degradative pathways
- soil dissipation
- soil leaching
- dissipation in wastewater treatment plants

The above studies indicate that the active ingredients in KATHON CG/ICP preservatives degrade rapidly in the environment, producing harmless metabolites.

Environmental Risk Assessment

The risk associated with the use of a preservative depends not only on the hazard of the product, but also on the likelihood and extent of exposure. This can be established by performing an environmental risk assessment.

The environmental risk assessment using the results of the previously mentioned studies demonstrates that KATHON CG/ICP at normal use/dilution levels will have minimal environmental impact because of the following properties:

- high-performance product used at very low levels
- rapidly degraded to nontoxic, nonpersistent substances
- degradation does not produce chlorine or chlorinated organics
- does not affect the performance of wastewater treatment plants
- does not bioaccumulate

For more information, please contact your local Rohm and Haas sales office.

Safe Handling Guidelines

You can count on Rohm and Haas personnel to provide you with advice and assistance on the safe handling of KATHON CG/ICP preservatives in your plant. The following handling precautions should be observed with the product, as supplied:

PERSONAL PROTECTIVE EQUIPMENT

Material is CORROSIVE. Do not get in eyes, on skin, or on clothing.

Causes eye damage and skin burns. May cause allergic skin reaction. May be harmful if swallowed or absorbed through the skin. Keep away from children.

Wear appropriate safety gear when handling.

Wear goggles or safety glasses, face shield, and gloves (butyl rubber or nitrile) when handling. Avoid breathing vapor or mist. Avoid contamination of food. Do not take internally. Wash thoroughly after handling.

FIRST AID MEASURES

After contact with eyes:

FLUSH IMMEDIATELY with copious amounts of water for at least 15 minutes, with the eyes held open. Get prompt medical attention, but FLUSH FIRST.

After contact with skin:

FLUSH IMMEDIATELY with plenty of water for at least 15 minutes. Remove and launder contaminated clothing. Wash affected skin thoroughly with soap and water. Wash thoroughly even if no skin burns are present, since they may become apparent only after long contact time following inadequate washing.

If inhaled:

Remove casualty immediately to fresh air. If not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.

If ingested:

Dilute the ingested product by giving water to drink. Call a physician at once. Never give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: Corrosive material. Probable mucosal damage may contraindicate the use of gastric lavage. It is inadvisable to induce vomiting. Measures against circulatory shock, respiratory depression, and convulsions may be needed.

DISPOSAL OF SPILLED AND WASTE MATERIAL

KATHON CG/ICP preservatives, as supplied, are toxic to fish and wildlife. Spills and cleaning runoffs should not be discharged where they can drain into sewage treatment plants, lakes, streams, ponds, or other public waters. Follow the disposal methods given on the package label and observe all federal, state, and local regulations.

KATHON CG/ICP preservative-containing wastes must not be discharged into public waters or sewage treatment systems. Such wastes must be deactivated (see below) or adequately diluted before discharge into any public water or sewage treatment facility. When considering disposal of any waste, observe all federal, state, and local regulations.

DEACTIVATION — GENERAL

The active ingredients of KATHON CG/ICP preservatives are readily deactivated or degraded to nontoxic components by the addition of a solution of 5% sodium hypochlorite (household bleach) and 5% sodium bicarbonate. Deactivation is typically accomplished by adding household bleach to the 3 quart fill mark on a 1 gallon plastic container containing 1/3 of a lb. (150 grams) of sodium bicarbonate. Close the container securely and shake well for 1 minute.

Scoop the absorbed spilled material into an empty 5 gallon plastic pail. Estimate the volume of remaining spilled material. Apply 10 times the volume of deactivation solution per volume of spilled material remaining. The deactivation solution should remain in contact with KATHON CG/ICP preservatives for at least 30 minutes. The actual deactivation reaction takes place in much less time, but the added time ensures that the reaction goes to completion. Aqueous waste properly treated with deactivation solution can be discharged to the chemical sewer, if in accordance with federal, state, and local procedures, permits, and regulations.

The deactivation solution should be prepared fresh as needed since it gradually loses its effectiveness. Personnel making up or handling deactivation solutions should wear goggles or face shield, rubber apron, full-length butyl rubber or nitrile gloves, and a half facepiece respirator with organic vapor/acid gas cartridge and dust/mist prefilter (e.g., N-95 or higher efficiency, in the presence of oil mist use R-95, P-95, or higher efficiency).

DEACTIVATION — PREPARATION OF EQUIPMENT FOR MAINTENANCE

Mixing vessels, lines, and pumps, and other equipment containing residues of KATHON CG/ICP preservatives must be deactivated before carrying out maintenance or repair work or using for other service. Drips, spills, and exposed wet areas and valves should be cleaned up promptly with deactivation solution. To deactivate the surfaces of equipment, swab with deactivation solution, wait 30 minutes for the reaction to subside, and rinse thoroughly with clean water. Rinse tools, pails, funnels, and lines with water. To determine the amount of deactivation solution needed for cleanup, estimate the volume of KATHON CG/ICP preservative solution remaining in a well-drained system of vessels, lines, and pumps, and make up and charge 10 volumes of deactivation solution per volume of preservative solution. Then add more water to provide thorough mixing and contact throughout the equipment. Circulate the mixture through the system, allowing a reaction period of about 30 minutes, then drain and rinse with clean water or detergent solution. Drain to a municipal or chemical sewer if in accordance with federal, state, and local regulations.

DEACTIVATION — CLEANUP OF SPILLS

Personnel cleaning up spills should wear appropriate protective clothing. This should include a rubber apron or impervious jacket, impervious full-length butyl rubber or nitrile gloves, footwear, chemical splash goggles, and a half facepiece respirator with organic vapor/acid gas cartridge and dust/mist prefilter.

Spilled material should be diked and absorbed on a spill control pillow or onto an inert solid such as clay or vermiculite. Shovel the absorbent and the soil beneath it to a depth sufficient to remove all preservative into a pail or drum. This material should then be disposed of in accordance with federal, state, and local regulations; our recommended method of disposal is incineration. Any residual KATHON CG/ICP preservatives remaining on the spill site should then be treated with deactivation solution. A weight ratio of ten parts deactivation solution to one part KATHON CG/ICP should be used for this treatment. After allowing 30 minutes contact time, rinse the area with copious amounts of water, and flush to the sewer, if in accordance with federal, state, and local regulations. For details, please request publication "KATHON CG/ICP Spill Clean-Up and Deactivation Procedure," CS-649.

Note: Do not add deactivation solution to the waste pail.

Reference

The following can be obtained by contacting your local Rohm and Haas Technical Representative:

- **CS-607** High-Performance Liquid Chromatographic Determination of ppm Levels of KATHON CG/ICP Preservatives
- **CS-596** Stability in Surfactants
- **CS-606** The Environmental Fate of KATHON CG/ICP preservatives
- **CS-632** KATHON Preservatives—Mechanism of Action
- **CS-626** Preventing Microbial Contamination in Manufacturing
- **CS-649** Spill Clean-Up and Deactivation Procedure.

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