

ACCEPTED

Sub 11, 1969

UNDER THE FEDERAL INSECTICIDE
FUNGICIDE AND RODENTICIDE ACT
FOR ECONOMIC POISON REGISTER-
ED UNDER NO. 1537-113

DIRECTIONS

1. GENERAL: Prior to sanitation or disinfection, clean all surfaces with a suitable detergent and rinse thoroughly with potable water. Consult your Cento Technical Sales Engineer regarding the specific detergent needed for each particular application. Follow the recommendation of your local Health Department regarding sanitation and disinfection of surfaces.

2. SANITATION OF EATING AND COOKING UTENSILS: Immerse in solution of 1 oz. concentrate per 3 gallons of water. Rinse with potable water. Air dry. Do not towel.

3. SANITATION AND DISINFECTION IN PUBLIC ROOMS, HOSPITALS AND HOMES: Apply a solution of 2 oz. concentrate in 3 gallons of water. Disinfect surfaces difficult to clean or contagious disease areas with a solution of 4 oz. concentrate in 3 gallons of water.

4. SANITATION OF MEAT PACKAGING AND FOOD PROCESSING EQUIPMENT: Scrub surface with solution of 1 oz. concentrate in 3 gallons of water. Flush surface with potable water before re-use. For surface difficult to clean such as meat cutting boards, use 4 oz. concentrate to 3 gallons of water.

H-68

Comment

CENTO FORMULA "F" Disinfectant, Sanitizer, Concentrate

Active Ingredients	7.5%
n-alkyl (50% C ₁₄ , 40% C ₁₂ , 10% C ₁₀) dimethyl benzyl ammonium chlorides	
Inert Ingredients	92.5%
Phenol Coefficients	
Staphylococcus aureus	52
Salmonella typhosa	34

CAUTION Keep out of Reach of Children

Harmful if swallowed. May cause skin irritation or damage to the eyes. Avoid contact with skin and eyes. In case of contact, flush with plenty of water. If irritation persists, get medical attention. Avoid contamination of food. Do not mix with soap or anionic synthetic detergents.

This product fulfills the criteria of Appendix F, the Grade "A" Pasteurized Milk Ordinance, 1965 recommendation of the United States Public Health Service in waters up to 550 ppm (32 grains per gallon) of hardness when tested by method as outlined by Chambers.

USDA Reg. No. 1537-113

NET CONTENTS ___ GALLONS

LS-12

5. SANITATION OF DAIRY EQUIPMENT: Immerse in solution of 1 oz. concentrate to 3 gallons of water. Milk cans and other equipment should be air dried. This same concentration is recommended for flank and udder washing prior to milking.

6. SANITATION AND DISINFECTION OF FABRICS: Agitate in a solution containing 1-1/3 oz. concentrate per gallon of water to disinfect linen and clothing. To render diapers and other linens bacteriostatic and to retard development of ammonia, immerse in solution of 1-1/3 oz. concentrate per 10 pounds of cloth.

7. MOLD CONTROL ON CEILINGS AND WALLS IN FOOD PLANTS: Spray or sponge surface with solution of 1-1/3 oz. concentrate per gallon water.

8. COLD DISINFECTION OF SURGICAL INSTRUMENTS: Clean thoroughly to remove all adhering blood and serous oxidate, then immerse in solution of 1-1/3 oz. concentrate per gallon of water for 10 minutes. Add one tablespoon sodium nitrate per gallon of solution as a corrosion inhibitor.

9. DISINFECTANT OF BEAUTY PARLOR AND BARBER SHOP EQUIPMENT: Soak combs, brushes, razors, etc., for 10 minutes in solution of 1-1/3 oz. concentrate per gallon of water.



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CHEMICAL COMPANY

ATLANTA, GEORGIA

BRANCHES IN PRINCIPAL CITIES



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3. SANITATION AND DISINFECTION IN PUBLIC ROOMS, HOSPITALS AND HOMES: Apply a solution of 2 oz. concentrate in 3 gallons of water. Disinfect surfaces difficult to clean or contagious disease areas with a solution of 4 oz. concentrate in 3 gallons of water.

4. SANITATION OF MEAT PACKAGING AND FOOD PROCESSING EQUIPMENT: Scrub surface with solution of 1 oz. concentrate in 3 gallons of water. Flush surface with potable water before re-use. For surface difficult to clean such as meat cutting boards, use 4 oz. concentrate to 3 gallons of water.

H-88

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CHEMICAL COMPANY

ATLANTA, GEORGIA

BRANCHES IN PRINCIPAL CITIES



ROHM AND HAAS COMPANY



AGRICULTURAL AND DOMESTIC CHEMICALS DEPARTMENT

HYAMINE 3500

Hyamine 3500 is a selected blend of alkyl dimethyl benzyl ammonium chloride, chosen because of exceptional microbicidal effectiveness in hard water. Two forms of Hyamine 3500 are available-- a 50 percent aqueous solution, and an 80 percent concentrate in ethanol.

Hyamine 3500 is an effective bactericide useful as a disinfectant, sanitizer, and deodorant in liquid and powdered formulations where high germicidal activity in hard water is required. The anhydrous nature of the 80 percent concentrate suggests its use in systems which cannot tolerate water.

It has been demonstrated that the dodecyl (C₁₂), tetradecyl (C₁₄), and hexadecyl (C₁₆) dimethyl benzyl ammonium chlorides are the most active germicidal components of alkyl (C₈ to C₁₈) dimethyl benzyl ammonium chloride. The distribution of C₁₂, C₁₄, and C₁₆ is carefully controlled in the Hyamine products to insure excellent microbicidal activity and good physical properties.

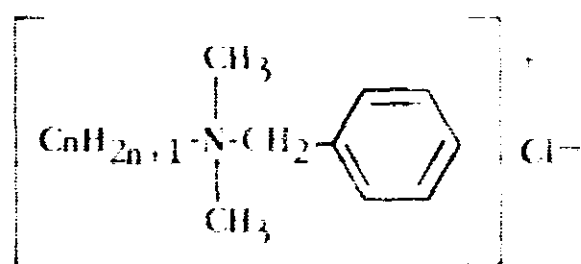
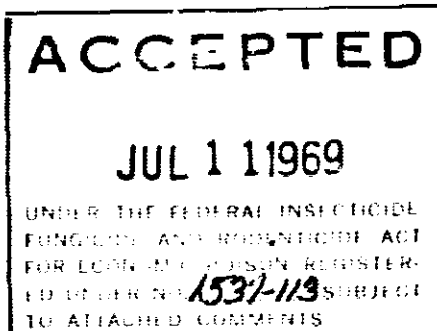
TYPICAL CHEMICAL & PHYSICAL PROPERTIES

Hyamine 3500 - 50% Aqueous

Hyamine 3500 - 80% Concentrate

Composition

Active Ingredient n-alkyl (50% C₁₄, 40% C₁₂, 10% C₁₆) dimethyl benzyl ammonium chloride.



The average molecular weight of the active ingredient is 358.

Inert Ingredients

10 percent water and 10 percent ethyl alcohol.

Ethyl alcohol.

Appearance

An almost water-white to pale yellow liquid with a mild odor. It congeals at low temperatures, becoming homogeneous on warming to room temperature.

A clear, straw-colored liquid with a mild, agreeable odor. It will crystallize after prolonged storage at low temperatures, but will return to a homogeneous liquid state when warmed.

Specific Gravity

0.96 at 20°C (80°F) per gallon

0.75 at 20°C (77°F) per gallon

Contd.

Hyamine 3500 - 50% Aqueous

Hyamine 3500 - 80% Concentrate

Viscosity

12 cps (25°C Brookfield No. 2 Spindle)

1200 cps (25°C Brookfield No. 2 Spindle)

Flash Point

Tag Open Cup
Tag Closed Cup

No flash up to or at 100°C
51°C

Slight flash at 121°C
13°C

Solubility

Miscible in all proportions with water, lower alcohols, and ketones.

Soluble in low molecular weight glycols, partially soluble (to percent) in aromatic hydrocarbons. It can be coupled into aliphatic hydrocarbons by a suitable solubilizing agent.

Warning

Hyamine 3500 like most organic compounds, should not be blended with strong oxidizing or reducing agents. Such mixtures may be explosive.

Compatibility

Physical and biological compatibilities have been determined for dilute aqueous solutions of Hyamine 3500.

BACTERICIDAL COMPATIBILITY

Compatible

Benzoic acid
Borax
Boric acid
Citric acid
Ethylene diamine tetra-acetic acid
Glycerol
Hydroxyacetic acid
Phosphoric acid
Pine oil
Sodium acid pyrophosphate
Sodium aluminate
Sodium bicarbonate
Sodium carbonate
Sodium metaborate
Sodium nitrate
Sodium sesquicarbonate
Stannic chloride
Tetrapotassium pyrophosphate
Trisodium phosphate
Urea

Partially Compatible

Barium chloride
Sodium chloride
Sodium gluconate
Sodium metasilicate
Sodium tripolyphosphate
Tetrasodium pyrophosphate

Incompatible

Ammonium chloride
Anionic detergents
Cadmium chloride
Disodium phosphate
Ferrous chloride
Lead chloride
Magnesium chloride
Manganous chloride
Monosodium phosphate
Potassium chloride
Soap
Sodium tetra meta pyrophosphate
Sodium tetraphosphate
Strontium chloride
Titanous chloride
Zinc chloride
Zinc sulfate

The bactericidal compatibilities were determined by a time survival type test against *Escherichia coli* in a synthetic hard water solution (400 ppm hardness) containing 1 part active Hyamine 3500 to 8.5 parts additive. The salts contained in those solutions showing a killing time equal to, or in excess of, a similar solution of pure Hyamine 3500 were considered bactericidally compatible. A number of the salts listed as bactericidally incompatible may be compatible at lower concentrations than those employed.

PHYSICAL COMPATIBILITY

Additive	Appearance of Solution	Additive	Appearance of Solution
Ammonium chloride	Clear	Sodium chloride	Clear
Anionic detergents	Turbid	Sodium gluconate	Clear
Benzoic acid	Clear	Sodium metaborate	Clear
Borax	Clear	Sodium metasilicate	Turbid with ppt.
Citric acid	Clear	Sodium nitrite	Clear
Disodium phosphate	Turbid with ppt.	Sodium sesquicarbonate	Slightly turbid
Ferrous chloride	Clear	Sodium tetra meta pyrophosphate	Turbid with ppt.
Glycerol	Clear	Sodium tetraphosphate	Turbid
Hydroxyacetic acid	Clear	Sodium tripolyphosphate	Turbid with ppt.
Lead chloride	Turbid with ppt.	Stannic chloride	Turbid with ppt.
Magnesium chloride	Clear	Strontium chloride	Clear
Manganous chloride	Clear	Tetrapotassium pyrophosphate	Turbid with ppt.
Monosodium phosphate	Clear	Tetrasodium pyrophosphate	Turbid with ppt.
Phosphoric acid	Clear	Titanous chloride	Slightly turbid
Potassium chloride	Clear	Trisodium phosphate	Turbid with ppt.
Soap	Turbid	Urea	Clear
Sodium acid pyrophosphate	Turbid with ppt.	Versene	Clear
Sodium aluminate	Turbid with ppt.	Zinc chloride	Turbid
Sodium bicarbonate	Clear	Zinc sulfate	Turbid
Sodium carbonate	Slightly turbid		

The list of physical compatibilities was compiled from observation of the same solutions as mentioned above and merely indicates physical appearance. It should be remembered that these were hard water solutions and do not necessarily represent the appearance of a similar concentration of quaternary and additive in distilled water.

GERMICIDAL ACTIVITY IN HARD WATER

Interpretation 21 of the Regulations for the Enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act concerning labelling claims for germicides, disinfectants, and sanitizers recommended for use in hard water areas provides that such claims shall be based on tests conducted according to the method of Chambers (J. Milk & Food Tech., vol. 19, No. 7, (1956), pp. 183-187), employing a specified synthetic hard water. Subsequently, certain details of the procedure have been clarified by Ortenzio, (J. Ass'n. Off. Agr. Chem. 41, No. 3, (1958), pp. 541-548).

When evaluated according to the above procedure, a 200 ppm solution of Hyamine 3500 will kill 99.999 percent of the test organisms in 30 seconds in water containing up to 550 ppm (32 grains per gallon) hardness. Products which are recommended for milk and food utensil sanitization at a concentration of 200 ppm Hyamine 3500 may carry the following or a similar statement on the label, except for specially formulated detergent-sanitizers which may carry appropriately higher claims. In addition, lower or higher claims may be made for products recommended for use at lower or higher Hyamine 3500 concentrations.

"This product fulfills the criteria of Appendix F, Grade "A" Pasteurized Milk Ordinance, 1965 Recommendations of the U. S. Public Health Service in waters up to 550 ppm (32 grains per gallon) of hardness calculated as CaCO₃ when tested by the method outlined by Chambers."

Some states have adopted regulations requiring similar statements.

The standard sanitizing dilution for quaternaries is 200 ppm and this dilution is specified by law in some states for certain uses. However, at times it is desirable to use lower or higher concentrations of Hyamine 3500 in waters of varying hardness. The following table illustrates the hard water ceiling of various concentrations of Hyamine 3500.

Concentration of Hyamine 3500	Hard Water Ceiling
25 ppm	25 ppm hard water
30 ppm	50 ppm hard water
50 ppm	100 ppm hard water
100 ppm	250 ppm hard water
200 ppm	550 ppm hard water
300 ppm	900 ppm hard water

BIOLOGICAL PROPERTIES

Phenol Coefficients

Phenol coefficients of Hyamine 3500 were determined by the official A.O.A.C. procedure.

10 Minute Killing Dilution

Organism	Hyamine 3500	Phenol	Phenol Coefficient
Bacteria			
<i>Brucella abortus</i>	1-40,700	1-110	370
<i>Escherichia coli</i>	1-27,000	1-70	390
<i>Klebsiella pneumoniae</i>	1-25,000	1-90	278
<i>Lactobacillus casei</i>	1-105,000	1-100	1050
<i>Listeria monocytogenes</i>	1-72,000	1-100	720
<i>Mycobacterium smegmatis</i>	1-21,000	1-65	309
<i>Necassaria catarrhalis</i>	1-17,300	1-70	247
<i>Pasteurella multocida</i>	1-54,100	1-110	492
<i>Proteus vulgaris</i>	1-12,000	1-70	171
<i>Pseudomonas aeruginosa</i> PRD-10	1-14,000	1-70	200
<i>Salmonella gallinarum</i>	1-28,000	1-80	350
<i>Salmonella pullorum</i>	1-25,000	1-90	278
<i>Salmonella typhimurium</i>	1-20,000	1-70	285
<i>Salmonella scottmilleri</i>	1-60,000	1-95	630
<i>Salmonella typhosa</i>	1-15,000	1-90	166
<i>Shigella sonnei</i>	1-25,000	1-80	313
<i>Streptococcus aureus</i>	1-15,000	1-60	250
<i>Streptococcus faecalis</i>	1-150,000	1-70	2100
<i>Streptococcus faecalis</i> C-203	1-75,000	1-80	938
<i>Streptococcus lactis</i>	1-70,000	1-90	778
Fungi			
<i>Aspergillus niger</i>	1-50,000	1-100	500
<i>Penicillium glaucum</i>	1-25,000	1-100	250

Cameraman's Note
Poor Copy

Microbicidal-Microbiostatic Activity

The antibacterial effectiveness of Hyamine 3500 has been measured by an empirical broth dilution procedure in which the highest dilutions capable of inhibiting growth for 48 hours, thereby stopping and killing all organisms in 24 hours (microbicidal) are determined.

Organism	Microbicidal	Microbiostatic
<i>Aerobacter aerogenes</i>	1-32,000	1-64,000
<i>Bacillus cereus, var. mycoides</i>	-	1-2,000,000
<i>Bacillus subtilis</i>	-	1-2,000,000
<i>Brevibacterium ammoniagenes</i>	-	1-2,000,000
<i>Brucella abortus</i>	1-1,000,000	1-2,000,000
<i>Klebsiella pneumoniae</i>	1-32,000	1-64,000
<i>Lactobacillus casei</i>	1-200,000	1-200,000
<i>Monilia albicans</i>	1-800,000	1-800,000
<i>Penicillium luteum</i>	1-800	1-1600
<i>Penicillium notatum</i>	1-3200	1-3200
<i>Pityrosporum ovale</i>	1-400,000	1-800,000
<i>Proteus vulgaris</i>	1-16,000	1-16,000
<i>Pseudomonas aeruginosa PRD-10</i>	1-8,000	1-8,000
<i>Saccharomyces cerevisiae</i>	1-200,000	1-100,000
<i>Salmonella choleraesuis</i>	1-60,000	1-60,000
<i>Salmonella gallinarum</i>	1-64,000	1-64,000
<i>Salmonella pullorum</i>	1-32,000	1-32,000
<i>Salmonella schottmuelleri</i>	1-16,000	1-64,000
<i>Salmonella typhimurium</i>	1-32,000	1-64,000
<i>Salmonella typhosa</i>	1-125,000	1-250,000
<i>Shigella sonnei</i>	1-32,000	1-32,000
<i>Staphylococcus aureus</i>	1-250,000	1-1,000,000
<i>Streptococcus pyogenes C-203</i>	1-100,000	1-100,000
<i>Streptococcus viridans</i>	1-400,000	1-800,000
<i>Trichophyton interdigitale</i>	1-40,000	1-80,000

These data show that Hyamine 3500 possesses a broad spectrum of effectiveness against a variety of both Gram-positive and Gram-negative organisms.

A.O.A.C. USE DILUTION

The A.O.A.C. Use Dilution Confirmation Procedure is employed to determine the maximum dilution effective for use as a disinfectant following cleaning. The effective dilutions are:

<i>Salmonella choleraesuis</i>	1-2000
<i>Staphylococcus aureus</i>	1-2000
<i>Pseudomonas aeruginosa PRD-10</i>	1-1250

Note: All dilutions shown above, and the phenol coefficient values, are based on 100 percent active ingredient. Phenol coefficients for a 10 percent solution, for example, would be one tenth the above values.

TOXICITY

Subacute oral toxicity has been determined by feeding Hyamine 3500 in concentration of 0.1 to 1.0 percent, to albino rats for three months. There was no significant effect on mortality, weight gain, or feed consumption. No gross pathological changes were observed at autopsy except for a mild distension of the cecum. This reaction is characteristic of feeding high levels of quaternary ammonium compounds. The blood picture was normal.

TOXICITY (Continued)

The acute toxicity of Hyamine 3500 has been determined on several species of animals administered by various routes. The following table gives the LD₅₀ of Hyamine 3500 in milligrams per kilogram of body weight.

Route	Animal	LD ₅₀ mg/kg
Oral	Albino rats	447 ± 10
Oral	Albino rabbits	496 ± 70
Oral	Dogs	about 500
Intravenous	Albino rats	31 ± 2.4

CAUTION

KEEP OUT OF REACH OF CHILDREN. Hyamine germicide concentrate may cause skin irritation or damage to the eyes. Harmful if swallowed. Avoid contact with skin and eyes. Do not take internally. In case of contact, flush immediately with plenty of water. For eyes, flush immediately with plenty of water and get immediate medical attention. Avoid contamination of food.

SURFACE TENSION

Surface Tension and Interfacial Tension Data
Figures in Dynes per Centimeter

	Hyamine 3500 Active Concentration			
	1.0%	0.1%	0.01%	0.001%
Surface Tension	33	54	40	52
Interfacial Tension*	0.4	0.6	2.4	0.9

* Interfacial Tension vs. Atreol No. 9. All data via Cenco-DeNagy Tensiometer at 25°C.

APPLICATIONS

Hyamine 3500 is an effective germicide, deodorant, and algicide. It is available in both liquid and powdered formulations. Hyamine 3500 80 percent Concentrate may also be used in hydrolytic liquid products.

Hyamine 3500 is suggested as the active ingredient in disinfectants and cleaners for use in homes, farms, hospitals, institutions, dairies, food processing and packaging plants, and in rail and transportation vehicles, algicides and slimeicides for swimming pools, reservoirs, and farm ponds.

The undiluted concentrate form of Hyamine 3500 is also recommended for use in commercial sanitizers, impregnation on air filters, and other applications where a high concentration is required.

FORMULATIONS

	Liquid Sanitizers			Liquid Acid Detergent-Sanitizers
	#201	#202	#203	#303*
Hyamine 3500 (active)	10%	10.0%	10.0%	10%
Triton X-100	-	2.5%	-	-
Triton N-101	-	-	2.5%	-
Triton X-114	-	-	-	10%
Organic sequestrant	-	0.1 - 0.25%	15.0%**	-
Phosphoric acid	-	-	-	34%
Water	Balance	Balance	Balance	Balance
Hard water ceiling, ppm	550	350	500	900

Suggestions on formulation, and advice on labelling will be promptly supplied if you will write or phone one of these offices:

ROHM AND HAAS COMPANY
Independence Mall West
Philadelphia, Pa. 19105

ROHM AND HAAS COMPANY
1920 So. Tubeway Ave.
Los Angeles, California 90032

ROHM AND HAAS COMPANY
5750 W. Jarvis Avenue
Chicago (Niles), Illinois 60648

ROHM AND HAAS COMPANY
350 Fifth Avenue
New York, New York 10001

ROHM AND HAAS COMPANY
4324 Main Street
Kansas City, Missouri 64111

ROHM AND HAAS COMPANY
2150 Franklin Street
Oakland, California 94612

ROHM AND HAAS COMPANY
1990 E. Sunrise Blvd.,
Ft. Lauderdale, Florida 33304

ROHM AND HAAS COMPANY
P. O. Box 28
LeRoy, New York 14482

ROHM AND HAAS COMPANY
422 Miller Building
Yakima, Washington 98901

ROHM AND HAAS COMPANY
4120 S. W. Freeway
Houston, Texas 77027

ROHM AND HAAS COMPANY
Cooper Parkway Office Bldg.
Pennsauken, New Jersey 08109

* This formulation exhibits a pH of 2.6 at use dilution.
** NTA-Na3, Hampshire Chemical Co., Nashua, N. H.

In neutral or alkaline liquid sanitizers, organic sequestrants such as tetrasodium ethylene diamine tetra-acetate are suggested to maintain clarity when tap or well waters are used for preparation of the concentrates. The addition of a small amount of Triton X-100 improves drainage from surfaces.

Powdered Detergent-Sanitizers

	#210	#212	#214
Hyamine 3500 (active)	5 parts	5 parts	5 parts
Triton X-100	5 "	5 "	5 "
Soda ash	35 "	35 "	25 "
Sodium bicarbonate	10 "	- "	- "
Sodium tripolyphosphate	40 "	50 "	60 "
Hard water ceiling, ppm	1,000	1,150	1,150

Note: The water and ethanol in the Hyamine 3500 will be adsorbed onto the soda ash.

Suggested formulations for a wide field of applications are given in other Rohm and Haas technical bulletins.

FEDERAL REGISTRATION

When shipped in interstate commerce, microbriocidal formulations must be registered with the U.S. Department of Agriculture. Applications for registration must be accompanied by five copies of your proposed label, and should be sent to the Pesticide Registration Section, Pesticide Registration Division, U.S. Department of Agriculture, Washington, D. C. To expedite handling of your application, refer to USDA File No. 707-63, stating that the active ingredient in your product is 40% active Haas Hyamine 3500.

Rohm and Haas Company has prepared specimen labels for typical formulation suggestions for use with Hyamine 3500. These labels, approved by USDA, may be used as guides in preparing final labels.

HYAMINE and TRITON are trademarks Reg. U.S. Pat. Off. and in principal foreign countries.

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without warranty, its conditions and methods of use of our products are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale. Suggestions for use of our products should not be understood as recommendations that they be used in violation of any patents.