

(Name) is: Economical
Efficient
Stable

ALGAECIDE

(Left Panel)

(Sample Label)
for a 10% product

(Name) is compatible with all swimming pool chemicals and is non-injurious to metal, paint, plastic, and tile.
(Name), when used as directed, will improve the appearance and cleanliness of the pool or water cooling systems.
(Name) prevents unsightly growths of algae.
(Name) may be stored for prolonged periods of time without losing its effectiveness or strength.
(Name) requires no special equipment for treating water. May be added directly to the pool in any spot or added to the water-circulation equipment.

(Name of Product)
E.P.A. Reg. No.
Concentrated Algaecide

ALGAECIDE

(Center Panel)

(Name) for Control of Algae and Algal Slime Growth in Swimming Pools and Water Cooling Systems.
Active Ingredient: (Refer to Page 3 of this Bulletin for)
Inert Ingredient: (Ingredient Instructions and Options)

DANGER (See table page 3)

KEEP OUT OF REACH OF CHILDREN (See table page 3)

Causes severe eye and skin damage. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

CAUTION (See table page 3)

This product is toxic to fish. Do not discharge treated effluent into lakes, streams or ponds.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse. If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or, if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN:

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

Keep from Freezing

Net Contents

(Name)
(Address)

ALGAECIDE

(Right Panel)

Directions for Use in Swimming Pools

Initial Application (original filling): One gallon (Name) to each 50,000 gallons of water or ratio thereof.
Continued Application: One quart (Name) in 50,000 gallons of water every 3-5 days or as needed to maintain 2 ppm active. Quaternary Test Kits are available for this use.
Booster Application: One quart (Name) in 50,000 gallons after a heavy or prolonged rainfall or when there is a heavy bathing load.

THE ABOVE DIRECTIONS SHOULD BE FOLLOWED EVEN WHEN THE POOL IS NOT IN USE.

Directions for Use in Water Cooling Systems

Initial Application: 26 to 52 fluid ounces (20 to 40 ppm on an active quaternary basis) per 1000 gallons of contained water.
Subsequent Application: 7 to 20 fluid ounces (5 to 15 ppm on an active quaternary basis) per 1000 gallons of contained water.

THE ABOVE DIRECTIONS ARE TO BE FOLLOWED TWICE WEEKLY OR AS NEEDED.

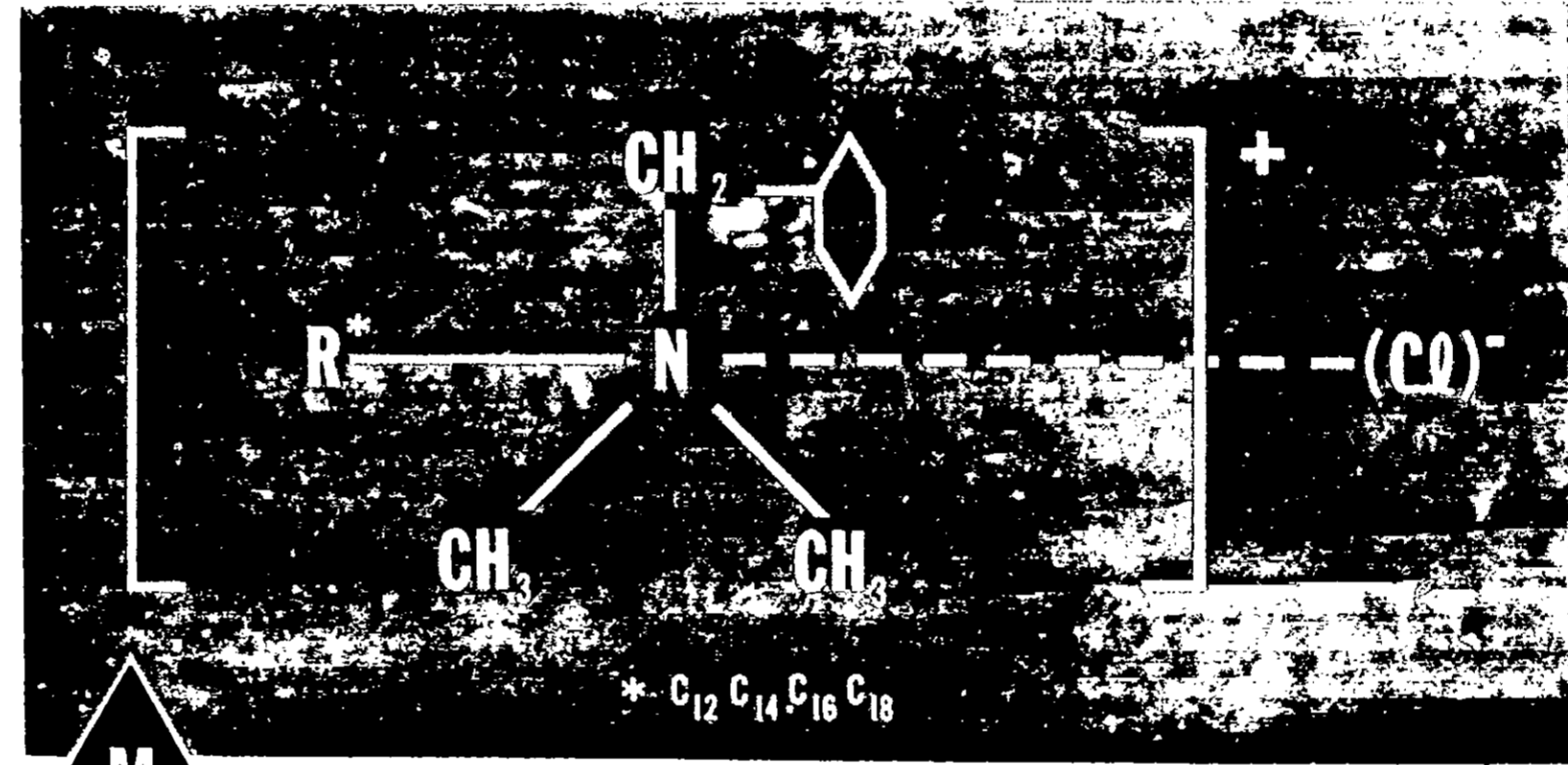
If algae growth is noticeable, clean system. When heavy algae growth is present, system will have to be cleaned manually.

All of these pages are Accepted with Comments

ACCEPTED
APR 24 1972
UNDER THE FEDERAL INSECTICIDE FUNGICIDE AND RODENTICIDE ACT FOR ECONOMIC POISON REGISTERED UNDER NO. 10374-1 SUBJECT TO ATTACHED COMMENTS.

MAQUATS

Quaternary ammonium compounds



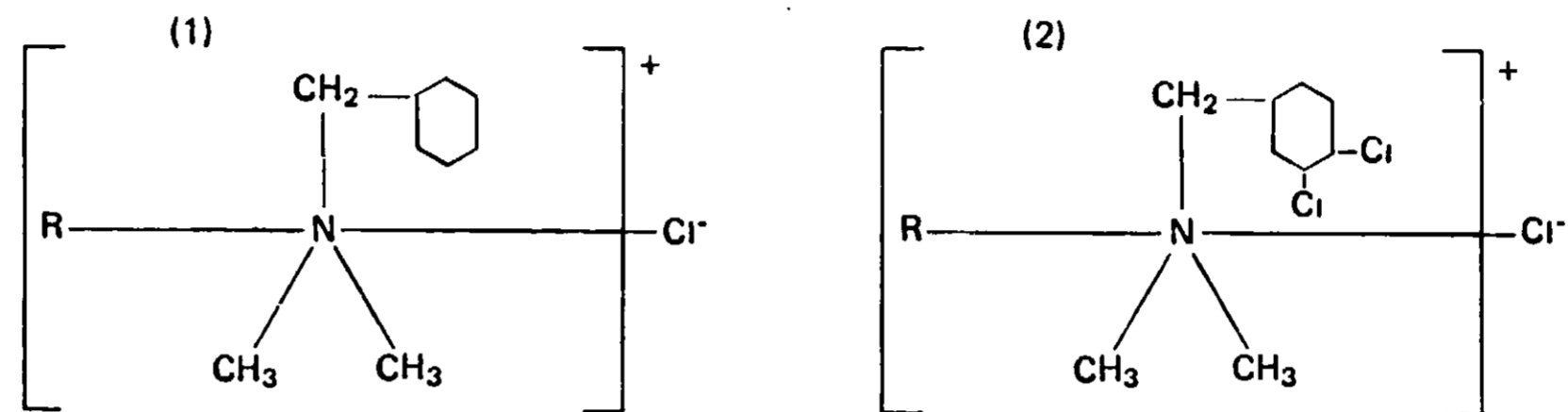
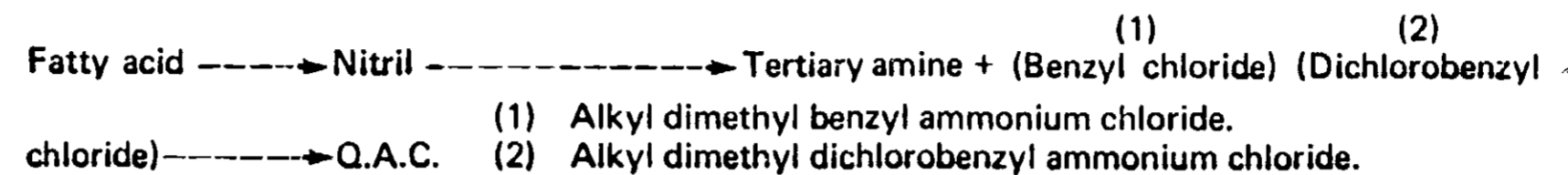
The Maquats are a selected group of quaternary ammonium compounds covering a wide range of products and properties. They have proven themselves exceptional microbicidal agents when used as disinfectants, sanitizers, deodorants, germicides and algaecides.

The dodecyl (C₁₂), tetradecyl (C₁₄), and the hexadecyl (C₁₆) have been the most effective germicidal components of the alkyl radical. The Maquats are manufactured from these select alkyl groups to give the highest microbicidal activity along with the finest physical properties.

We at Mason Chemical Company believe our progress and growth depend upon our finding ways to do that "something extra" for our customers. You will find us pleased to discuss any problems or projects which will help you make your product line more successful.

INTRODUCTION:

The Maquats are quaternary ammonium compounds manufactured by Mason Chemical Company of Chicago, Illinois. These products are characterized by a halide ion and a cationic nitrogen atom with four covalent carbon-nitrogen bonds. The nitrogen atom is attached to at least one long chain hydrocarbon radical. The straight chain radical ranges from C_8H_{17} to $C_{18}H_{37}$ and is derived from coconut fatty acid. To illustrate:



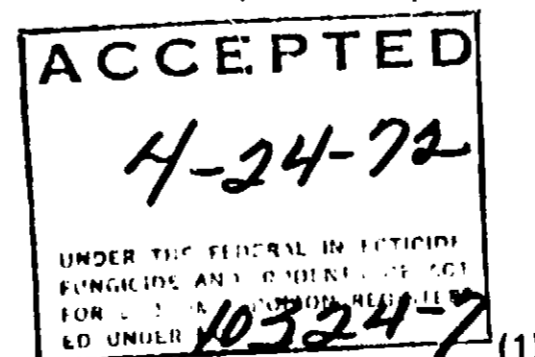
This chemical structure gives these compounds high germicidal activity because of the well balanced cation (lipophilic) and anion (hydrophilic) group. The quaternary molecule is such that it gives excellent wetting and penetration action which enables it to kill microorganisms in areas inaccessible to other germicides.

PHYSICAL AND CHEMICAL PROPERTIES

The Maquats are all liquids and are extremely stable: They will maintain their stability over a wide range of temperatures and storage conditions. Maquats are readily soluble in water and most polar solvents and insoluble in non-polar solvents.

They are compatible with many organic compounds, acids, alkalis and organic salts. Complete solubility and compatibility data is available from Mason Chemical Co. on a wide range of products. Maquats are incompatible with soap and anionic surface active agents.

The biological properties of these products are increased as you raise the temperature and pH of the product. All quaternaries will lose some of their effectiveness if the pH falls below 5. The Maquats maintain their bacteriological properties in waters up to and including 1100 ppm of hardness depending on the product selected. Maquats have been tested according to the latest bacteriological test methods and the results are reported on the specification page. The A.O.A.C. Use Dilution Test is basic in determining the efficacy of the product as an environmental disinfectant. The applications for use of these Maquats are varied and include the following industries: Food, beverage, dairy, swimming pool, secondary oil recovery, paper, textile, aerosol, and many others. Mason Chemical Company will be pleased to suggest specific formulations on any applications where a quaternary ammonium compound may be contemplated.



MAQUAT SPECIFICATIONS

PRODUCT	LC 12S (1)	MC 1416 (E) (1)	MC 1412 (E) (1)	DLC 1214 (7)	MQ-2525	SC-18
Active Ingredient(s)	Alkyl dimethyl benzyl ammonium chloride-Isopropanol	Alkyl dimethyl benzyl ammonium chloride-Isopropanol (Ethanol)	Alkyl dimethyl benzyl ammonium chloride-Isopropanol (Ethanol)	(2) Alkyl dimethyl dichlorobenzyl ammonium chloride	Alkyl dimethyl benzyl ammonium chloride (A) Alkyl dimethyl ethylbenzyl ammonium chloride (B) (Isopropanol)	Stearyl dimethyl benzyl ammonium chloride
Inert Ingredient(s)	Water	Water	Water	Water	Water	Water - Alcohol
% Active	50% - 80% (20%) (3)	50% - 80% (20%) (3)	50% - 80% (20%) (3)	50% - 80%	25%A - 40%A - (20%) (3) 25%B - 40%B - --- 50% ---	25%
% Inert	50% - ---	50% - ---	50% - ---	50% - 20%	---	75%
Alkyl Group Distribution (4)	C ₁₂ , C ₁₄ , C ₁₆ & C ₁₈	5, 60, 30 & 5	40, 50, 10 & ---	61, 23, 11 & 5	A) 5, 60, 30 & 5 B) 50, 30, 17 & 3	--- 5 & 95
Average Molecular Weight	360	380	358	425	384	424
Color A.P.H.A. (Max)	100	100	100	100	100	100
Physical Form	Liquid	Liquid	Liquid	Liquid	Liquid	Paste
pH (10% Sol.)	7 - 8	7 - 8	7 - 8	7 - 8	7 - 8	3 - 4
Weight/Gal.	8.2 - 7.8	8.2 - 7.8	8.4 - 8.0	8.4 - 8.0	8.2	7.9
Standard Container	55 gal. Liquipak	55 gal. Liquipak	55 gal. Liquipak	55 gal. Liquipak	55 gal. Liquipak	55 gal. Liquipak
Gross - Net - Tare	50% 464-440-24 80% 449-425-24	464-440-24 449-425-24	464-440-24 449-425-24	464-440-24 449-425-24	464-440-24 449-425-24	464-440-24

BIOLOGICAL PROPERTIES (100% ACTIVE QUATERNARY BASIS)

USE DILUTIONS A.O.A.C.

Staphylococcus aureus ATCC - 6538	400 ppm (5)	400 ppm	400 ppm	400 ppm	400 ppm
Salmonella choleraesuis ATCC - 10708	400 ppm (5)	400 ppm	400 ppm	400 ppm	400 ppm
Pseudomonas aeruginosa ATCC - 15422	1400 ppm	1400 ppm	1200 ppm	---	800 ppm

PHENOL COEFFICIENTS A.O.A.C. (6)

Killing Dilutions Average Values	LC 12S	MC 1416 (E)	MC 1412 (E)	DLC 1214	MQ-2525
Staphylococcus aureus	1:39905 P.C. 614	1:42850 P.C. 659	1:47600 P.C. 666	1:53500 P.C. 764	1:41600 P.C. 538
Salmonella typhosa ATCC - 6539	1:39905 P.C. 443	1:42850 P.C. 476	1:59500 P.C. 661	1:74400 P.C. 783	1:41600 P.C. 594
Escherichia coli ATCC - 11229	1:47600 P.C. 680	1:27450 P.C. 392	1:42850 P.C. 612	1:44340 P.C. 633	1:31300 P.C. 447

HARD WATER TOLERANCE (CaCO₃)

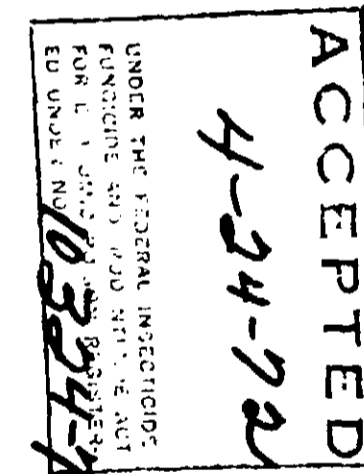
at 200 ppm of compound Chambers Test A.O.A.C. 99.999% Kill in 30 sec.	LC 12S	MC 1416 (E)	MC 1412 (E)	DLC 1214	MQ-2525
Staphylococcus aureus	300 ppm, 18 grain	550 ppm, 32 grain	550 ppm, 32 grain	1100 ppm, 64 grain	850 ppm, 50 grain
Escherichia coli	300 ppm, 18 grain	550 ppm, 32 grain	550 ppm, 32 grain	1100 ppm, 64 grain	850 ppm, 50 grain

ACTIVITY AGAINST ALGAE

Chlorella pyrenoidosa	2	2	2	4	17
Algaestatic ppm	5	5	5	5	16
Fungicidal ppm	3	8	6	4	17
E.P.A. Reg. No. 10024 - 50%	3	8	6	4	17
80%	2	9 (E) 13	7 (E) 14	5	16

- (1) Meets all requirements of U.S.P. Benzalkonium Chloride.
- (2) Not effective against Pseudomonas aeruginosa at the disinfecting concentration providing 400 ppm active quaternary.
- (3) Represents 20% Isopropanol or 20% Ethanol when designated (E)
- (4) Alkyl group distribution ± 10%
- (5) 400 ppm = 1:2500

- (6) Phenol Resistance
S. aureus 1:65
S. typhosa 1:90
E. coli 1:70
- (7) CAUTION: Be sure to rinse with potable water all surfaces coming in contact with food after applying a sanitizing rinse.



(2)

LABELLING:

The Environmental Protection Agency, under the Insecticide, Fungicide, and Rodenticide Act, regulates the movement of "economic poisons" in interstate commerce. These include products that contain quaternary ammonium compounds (Maquats) intended for use as germicides, disinfectants, or sanitizers, on inanimate objects or surfaces. Most states have enacted similar legislation to regulate intra-state commerce. Generally, these states comply with Federal registration. Some maintain their own jurisdiction. In executing the law, the Federal as well as the State Agencies require registration of labels proposed for such products. In pharmaceutical and cosmetic applications, clearance should be obtained from the Food and Drug Administration, Federal Department of Health, Education and Welfare.

In order to register a product, a single copy of PR9-199 (Application for Registration of Economic Poisons) must accompany quintuplicate (5) typewritten copies of the proposed label. These are sent to:

Director Registration Section
 Environmental Protection Agency
 Pesticides Regulation Division
 12th and Independence Avenue
 Washington, D. C. 20250

Please refer to our Environmental Protection Agency registration number when registering a product with the above agency. The correct registration number is listed under each product on our MAQUAT specification page.

The Environmental Protection Agency registration number must be listed on every label for a quaternary-based compound making a germicidal, algaecidal, or sanitizer, claim. It is also necessary that the signal words "DANGER", "CAUTION" and "KEEP OUT OF REACH OF CHILDREN" be in the required point type based on the size of the label. The following table will serve as a guide for the type-size requirements on various sized labels:

Size of Label on Front Panel in Square Inches	"Danger" & "Caution" Words as Required Minimum Type Size all Capitals	"Keep Out of Reach of Children" as Required
5 and under	6 point	6 point
above 5 to 10	10 point	6 point
above 10 to 15	12 point	8 point
above 15 to 30	14 point	10 point
over 30	18 point	12 point

ACCEPTED
 4-24-72
 UNDER THE FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT
 REGISTRATION NUMBER 103224-1

The ingredients, directions for use, and precautions for handling should be listed on the label. In listing the active ingredients, proper and most exacting identification is required. With quaternaries, the high- molecular weight alkyl group must be identified with a listing of the individual components either with percentages or in their order of dominance.

- Option (1) The actual percentages of the major alkyl groups present in the descending order of magnitude, i.e., alkyl (60% C₁₄, 30% C₁₆, 5% C₁₂, 5% C₈-C₁₈) dimethyl benzyl ammonium chlorides, or
- Option (2) Each alkyl group in the descending order of magnitude only, i.e., alkyl (C₁₄, C₁₆, C₁₂ and related groups from C₈ - C₁₈) dimethyl benzyl ammonium chlorides.

If Option (1) is selected, then only the total percentage of the inert ingredient without any chemical description need be listed: otherwise if Option (2) is selected, then the inert ingredients must be identified.

Whenever unusual claims are made, they will require substantiation with laboratory or field test data. The Environmental Protection Agency also makes a sharp distinction in the various terms used to denote the degree or extent of germicidal activity. Knowledge of these will assist in the preparation of an acceptable label.

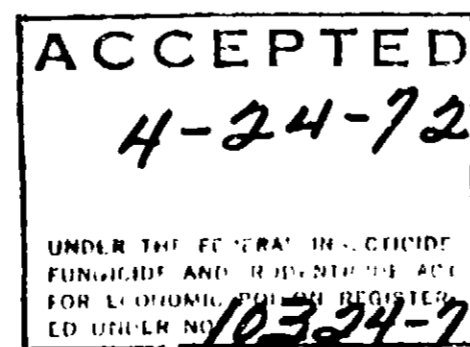
- Sterilizer:** Must kill all living microorganisms when used as directed.
- Germicide and Disinfectant:** Must kill all of a given species of microorganisms except resistant sporeformers
- Fungicide:** Must kill all of a given species of fungi.
- Sanitizer:** Must reduce bacterial count to a safe level in accordance with public health standards or to stated significant level where no standards have been set.
- Antiseptic:** Covers preparations intended solely for use on living tissue either as a germicide or bacteriostat.
- Algaecide:** Must kill algae.
- Algaestat:** For the control of algae.
- Bacteriostat:** Inhibits the growth of bacteria.

A basic knowledge of the type and strain of the microorganisms used in testing is helpful. The table below gives some of the more common types. A list of the test methods used are also reported below.

MICROORGANISM	MORPHOLOGY	TEST METHODS
Staphylococcus aureus	Gram + Cocci	A.O.A.C. Use Dilution Confirmation Test
Salmonella choleraesuis	Gram - Rod	
Salmonella typhosa	Gram - Rod	A.O.A.C. Phenol Coefficient Test Method
Escherichia coli	Gram - Rod	A.O.A.C. Germicidal and Detergent Sanitizer Official Method (Hard Water)
Pseudomonas aeruginosa	Gram - Rod	

After the label has been reviewed for compliance with the Act, the company submitting the label will be notified of any changes or deficiencies. Mason Chemical Company will be pleased to prepare or advise customers or prospective customers on all labelling procedures, Federal or State.

The following are two representative sample labels of a germicide and algaecide.



(Sample Label)
for a 10% product

GERMICIDE

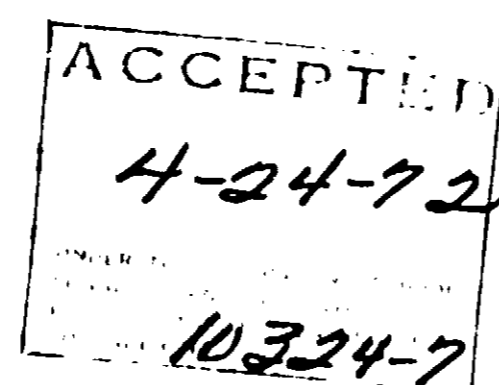
(Left Panel)

Recommended Use Dilution

5 - 10 ppm:	Control of microorganisms in secondary oil recovery.
50 - 100 ppm:	Sanitizer for poultry drinking water.
200 ppm:	Sanitization of equipment, dishes, appliances, glassware, utensils in dairy, beverage, food processing, food manufacturing, food dispensing plants, etc. General deodorization due to bacterial decay.
400 ppm:	Disinfection of food storage bins, refrigeration, etc. Sanitization of garbage pails and porous surfaces. Sanitary maintenance of walls, floors, etc. Disinfection and sanitary maintenance of smooth nonporous surfaces. Terminal disinfection.
1400 ppm:	Instrument disinfection.

Preparation of Use Dilution

ppm of active quaternary	For 10% Dilution	Conc. % active quaternary	Fl. oz. per gals.
5	1:20,000	0.0005	1 oz./160 gals.
10	1:10,000	0.001	1 oz./ 80 gals.
100	1: 1,000	0.01	0.5 oz./ 4 gals.
200	1: 500	0.02	1 oz./ 4 gals.
400	1: 250	0.04	2 oz./ 4 gals.
1000	1: 100	0.1	5 oz./ 4 gals.



(Sample Label)
for a 10% product

GERMICIDE

(Center Panel)

(Name of Product)

E. P. A. Reg. No.

Concentrated

Germicide - Sanitizer - Disinfectant

Active Ingredient: (Refer to page 3 of this Bulletin for)

Inert Ingredient: (Ingredient Instructions and Options)

DANGER (See table page 3)

KEEP OUT OF REACH OF CHILDREN (See table page 3)

Corrosive. Causes severe eye and skin damage. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

CAUTION (See table page 3)

Discontinue use of the product as a poultry water sanitizer when treating the flock with drugs such as vaccines, sulfonamides, or sulfaquinolone.

FIRST AID

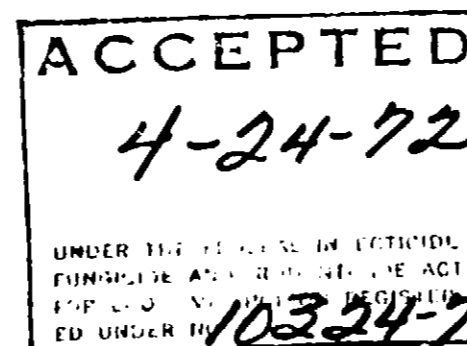
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse. If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or, if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

Keep from Freezing

Net Contents



(Name)

(Address)

(6)

(Sample Label)
for a 10% product

GERMICIDE

(Right Panel)

Directions for Use

(Name) is a quaternary ammonium compound which may be used with compatible alkaline builders and sequestering agents. In dairy and food equipment applications, an exposure period of at least two minutes should be maintained when the temperature of the solution is at least 75°F and the pH of the solution is 6.0 or higher.

Sanitization

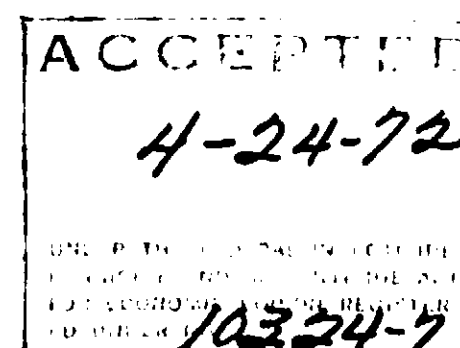
Clean with suitable detergent, rinse. Immerse food equipment and utensils in a solution containing 200 ppm of active quaternary. Where infectious germs may be present, rinse or immerse in a disinfecting solution containing 400 ppm or more of active quaternary after sanitizing as directed.

Instrument Disinfection

Preclean in suitable detergent removing adhering blood and serous exudates. Immerse in solution containing 1400 ppm of active quaternary.

For Dairy and Restaurant Use

(Name) fulfills the criteria of Appendix F of the Grade "A" Pasteurized Milk Ordinance 1965. Recommendations of the U. S. Public Health Service in waters up to ppm hardness calculated as CaCO₃ when tested by the A.O.A.C. Germicidal and Detergent Sanitizers – Official Method.



(7)

(Name) is: Economical
Efficient
Stable

ALGAECIDE
(Left Panel)

(Sample Label)
for a 10% product

(Name) is compatible with all swimming pool chemicals and is non-injurious to metal, paint, plastic, and tile.
(Name), when used as directed, will improve the appearance and cleanliness of the pool or water cooling systems.
(Name) prevents unsightly growths of algae.
(Name) may be stored for prolonged periods of time without losing its effectiveness or strength.
(Name) requires no special equipment for treating water. May be added directly to the pool in any spot or added to the water-circulation equipment.

(Name of Product)
E.P.A. Reg. No.
Concentrated Algacide

ALGAECIDE
(Center Panel)

(Name) for Control of Algae and Algal Slime Growth in Swimming Pools and Water Cooling Systems.
Active Ingredient: (Refer to Page 3 of this Bulletin for)
Inert Ingredient: (Ingredient Instructions and Options)

DANGER (See table page 3)
KEEP OUT OF REACH OF CHILDREN (See table page 3)
Causes severe eye and skin damage. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

CAUTION (See table page 3)
This product is toxic to fish. Do not discharge treated effluent into lakes, streams or ponds.

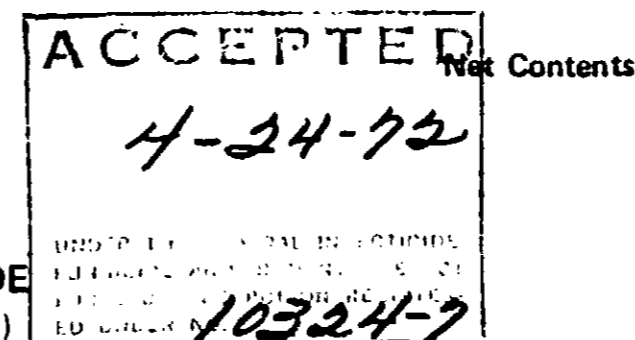
FIRST AID
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse. If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or, if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN:
Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

Keep from Freezing

(Name)
(Address)

ALGAECIDE
(Right Panel)



Directions for Use in Swimming Pools

Initial Application (original filling): One gallon (Name) to each 50,000 gallons of water or ratio thereof.
Continued Application: One quart (Name) in 50,000 gallons of water every 3-5 days or as needed to maintain 2 ppm active. Quaternary Test Kits are available for this use.
Booster Application: One quart (Name) in 50,000 gallons after a heavy or prolonged rainfall or when there is a heavy bathing load.

THE ABOVE DIRECTIONS SHOULD BE FOLLOWED EVEN WHEN THE POOL IS NOT IN USE.

Directions for Use in Water Cooling Systems

Initial Application: 26 to 52 fluid ounces (20 to 40 ppm on an active quaternary basis) per 1000 gallons of contained water.
Subsequent Application: 7 to 20 fluid ounces (5 to 15 ppm on an active quaternary basis) per 1000 gallons of contained water.

THE ABOVE DIRECTIONS ARE TO BE FOLLOWED TWICE WEEKLY OR AS NEEDED.

If algae growth is noticeable, clean system. When heavy algae growth is present, system will have to be cleaned manually.

(Name) : Economical
Efficient
Stable

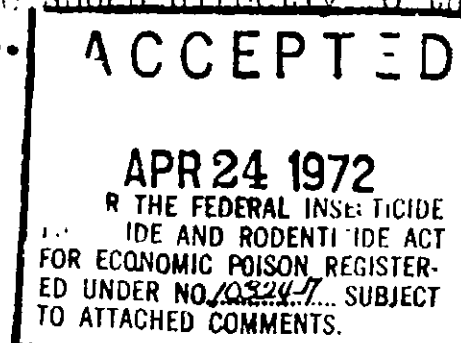
ALGAEICIDE
(Left Panel)

(Sample Brand)
for a 10% product
Inquat MC-1412

- (Name) is compatible with all swimming pool chemicals and is non-injurious to metal, paint, plastic, and tile.
- (Name), when used as directed, will improve the appearance and cleanliness of the pool or water cooling systems.
- (Name) prevents unsightly growths of algae.
- (Name) may be stored for prolonged periods of time without losing its effectiveness or strength.
- (Name) requires no special equipment for treating water. May be added directly to the pool in any spot or added to the water-circulation equipment.

(name of Product)
E.P.A. Reg. No.
Concentrated Algaeicide

ALGAEICIDE
(Center Panel)



- (Name) for Control of Algae and Algal Slime Growth in Swimming Pools and Water Cooling Systems.
- Active Ingredient: (Refer to page 3 of this Bulletin for)
- Inert Ingredient: (Ingredient Instructions and Options)

DANGER (See table page 3)

KEEP OUT OF REACH OF CHILDREN (See table page 3)

Causes severe eye and skin damage. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

CAUTION (See table page 3)

This product is toxic to fish. Do not discharge treated effluent into lakes, streams or ponds.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse. If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or, if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN:

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

KEEP FROM FREEZING

NET CONTENTS

ALGAEICIDE
(Right Panel)

Directions for Use in Swimming Pools

If algae growth is observed add 1 gallon (NAME) algaeicide for 20,000 gallons of water, to kill and control the algae most commonly found in swimming pools.

When existing growth is dead and algae are withered, clean the pool, draining and refilling, if necessary. Then add 1 gallon (NAME) algaeicide per 50,000 gallons of water.

If algae growth is absent, use 1 gallon of (NAME) algaeicide for each 50,000 gallons of water.

Add 1 gallon of (NAME) algaeicide every 5 - 7 days, or as needed to maintain 2-3 ppm. See service manual for test kit.

THE ABOVE DIRECTIONS SHOULD BE FOLLOWED EVEN WHEN THE POOL IS NOT IN USE.

LABELLING

The Environmental Protection Agency, under the Insecticide, Fungicide, and Rodenticide Act, regulates the movement of certain chemicals in interstate commerce. These include products that contain quaternary ammonium compounds intended for use as germicides, disinfectants, or sanitizers. The immediate objectives of this part of the Act are to require Federal registration of interstate commerce, generally, and to comply with Federal registration. Some maintain their own registration systems, and the Federal Agency, as the State Agencies require registration of labels proposed for use in interstate commerce. The label is a critical application of the Act. The Act is enforced by the Federal Agency, and the State Agencies. The Act is enforced by the Federal Agency, and the State Agencies.

Labels for registration must be prepared in accordance with the requirements of the Environmental Protection Agency, and must be submitted to the Agency for review and approval. The label must be prepared in accordance with the requirements of the Environmental Protection Agency, and must be submitted to the Agency for review and approval.

Labels for Registration must be prepared in accordance with the requirements of the Environmental Protection Agency, and must be submitted to the Agency for review and approval. The label must be prepared in accordance with the requirements of the Environmental Protection Agency, and must be submitted to the Agency for review and approval.

Please refer to our Environmental Protection Agency registration number when registering a product with the major agency. The correct registration number is stated on our label or on our MAQUAT specification page.

The Environmental Protection Agency registration number must be listed on every label for a quaternary based compound, germicide, fungicide, or sanitizer claim. It is also necessary that the signal words "DANGER", "CAUTION" and "KEEP OUT OF REACH OF CHILDREN" be in the required point type based on the size of the label. The following table will serve as a guide for the type size requirements on various sized labels.

Size of Label on Front Panel in Square Inches	"Danger" & "Caution" Words as Required Minimum Type Size all Capitals	Keep Out of Reach of Children as Required
4-24-72 5 to 10	8 point	8 point
above 10 to 15	10 point	8 point
above 15 to 25	12 point	8 point
above 25 to 35	14 point	10 point
over 35	18 point	12 point

The ingredients, directions for use, and precautions for use should be listed on the label. In listing the active ingredients, proper and most exact identification is required. With quaternaries, the high molecular weight alkyl group must be identified with a listing of the individual components either with percentages or in their order of dominance.

- Option (1) - The actual percentages of the major alkyl groups present in the descending order of magnitude, i.e. alkyl (60 - C₁₂ - 30 - C₁₄ - 5 - C₁₆ - 5 - C₁₈ - 15) dimethyl benzyl trimethyl ammonium chlorides, or
- Option (2) - Each alkyl group in the descending order of amount, identify each alkyl (C₁₂, C₁₄, C₁₆, C₁₈) and related group (dimethyl benzyl trimethyl ammonium chlorides).

If Option (1) is selected, then only the total percentage of the most ingredient without any chemical description need be listed; otherwise if Option (2) is selected, then the most ingredients need be identified.

Whenever unusual claims are made, they will require substantiation with laboratory or field test data. The Environmental Protection Agency also makes a sharp distinction in the various terms used to denote the degree or extent of germicidal activity. Knowledge of these will assist in the preparation of an acceptable label.

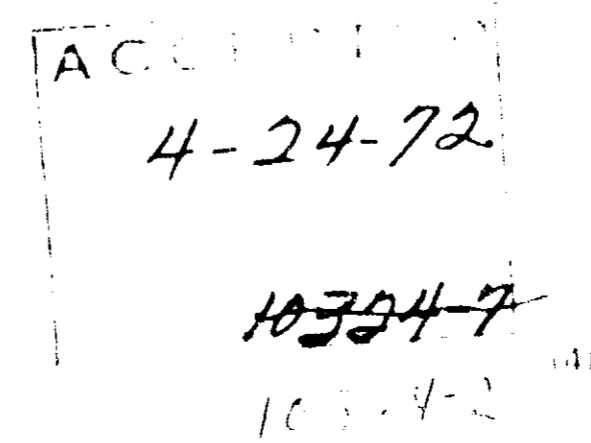
- Sterilizer:** Must kill all living microorganisms when used as directed.
- Germicide and Disinfectant:** Must kill all of a given species of microorganisms, except resistant spore-formers.
- Fungicide:** Must kill all of a given species of fungi.
- Sanitizer:** Must reduce bacterial count to a safe level in accordance with public health standards or to stated significant level where no standards have been set.
- Antiseptic:** Covers preparations intended solely for use on living tissue either as a germicide or bacteriostat.
- Algaecide:** Must kill algae.
- Algaestat:** For the control of algae.
- Bacteriostat:** Inhibits the growth of bacteria.

A basic knowledge of the type and strain of the microorganisms used in testing is helpful. The table below gives some of the more common types. A list of the test methods used are also reported below.

MICROORGANISM	MORPHOLOGY	TEST METHODS
Staphylococcus aureus	Gram + Cocci	A.O.A.C. Use Dilution Confirmation Test
Salmonella choleraesuis	Gram - Rod	
Salmonella typhosa	Gram - Rod	A.O.A.C. Phenol Coefficient Test Method
Escherichia coli	Gram - Rod	A.O.A.C. Germicidal and Detergent Sanitizer Official Method (Hard Water)
Pseudomonas aeruginosa	Gram - Rod	

After the label has been reviewed for compliance with the Act, the company submitting the label will be notified of any changes or deficiencies. Mason Chemical Company will be pleased to prepare or advise customers or prospective customers on all labelling procedures, Federal or State.

The following are two representative sample labels of a germicide and algaecide:



(Sample Label)
for a 10% product

(Sample Label)
for a 10% product

GERMICIDE

(Left Page)

Recommended Use Dilution

5 - 10 ppm	Control of microorganisms in secondary oil recovery.
50 - 100 ppm	Sanitizer for poultry drinking water.
200 ppm	Sanitization of equipment, dishes, appliances, glassware, utensils in dairy, beverage, food processing, food manufacturing, food dispensing plants, etc. General deodorization due to bacterial decay.
400 ppm	Disinfection of food storage bins, refrigeration, etc. Sanitization of garbage pails and porous surfaces. Sanitary maintenance of walls, floors, etc. Disinfection and sanitary maintenance of smooth nonporous surfaces. Terminal disinfection.
1400 ppm	Instrument disinfection.

Preparation of Use Dilution

ppm of active quaternary	For 10% Dilution	Conc. % active quaternary	Fl. oz. per gals.
5	1 : 20,000	0.0005	1 oz. : 160 gals.
10	1 : 10,000	0.001	1 oz. : 80 gals.
100	1 : 1,000	0.01	0.5 oz. : 4 gals.
200	1 : 500	0.02	1 oz. : 4 gals.
400	1 : 250	0.04	2 oz. : 4 gals.
1000	1 : 100	0.1	5 oz. : 4 gals.

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GERMICIDE

(Right Page)

(Name of Product)

E. P. A. Reg. No.

Concentrated

Germicide - Sanitizer - Disinfectant

Active Ingredient: (Refer to page 3 of this Bulletin for)

Inert Ingredient: (Ingredient Instructions and Options)

DANGER (See table page 3)

KEEP OUT OF REACH OF CHILDREN (See table page 3)

Corrosive. Causes severe eye and skin damage. Do not get in eyes, on skin, or on clothing. Wear goggles of face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

CAUTION (See table page 3)

Discontinue use of the product as a poultry water sanitizer when treating the flock with drugs such as vaccines, sulfonamides, or sulfaquinoxaline.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eye contact, call a physician. Remove and wash contaminated clothing before reuse. If swallowed, drink **promptly** a large quantity of milk, egg whites, gelatin solution or, if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

Keep from Freezing

Net Contents

(Name)

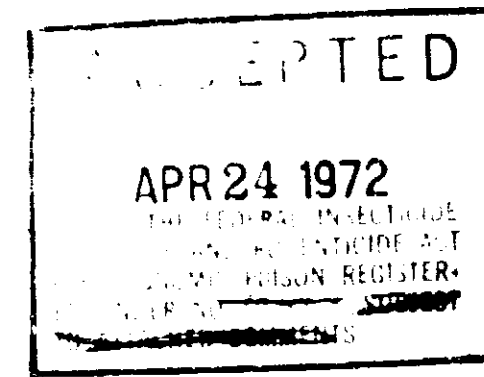
(Address)

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10324-7

(Sample Label)
for a 10% product



GERMICIDE

(Right Panel)

Directions for Use

Name is a quaternary ammonium compound which may be used with compatible alkaline builders and sequestering agents. In dairy and food equipment applications, an exposure period of at least two minutes should be maintained when the temperature of the solution is at least 75°F and the pH of the solution is 6.0 or higher.

Sanitization

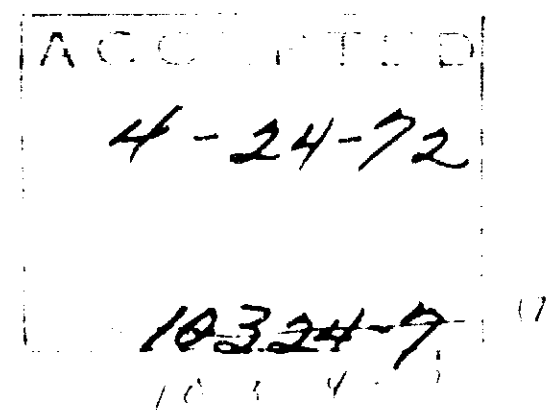
Clean with suitable detergent, rinse. Immerse food equipment and utensils in a solution containing 200 ppm of active quaternary. Where infectious germs may be present, rinse or immerse in a disinfecting solution containing 400 ppm or more of active quaternary after sanitizing as directed.

Instrument Disinfection

Preclean in suitable detergent removing adhering blood and serous exudates. Immerse in solution containing 1400 ppm of active quaternary.

For Dairy and Restaurant Use

Name fulfills the criteria of Appendix F of the Grade "A" Pasteurized Milk Ordinance 1965. Recommendations of the U. S. Public Health Service in waters up to _____ ppm hardness calculated as CaCO₃ when tested by the A. O. A. C. Germicidal and Detergent Sanitizers - Official Method.



MAQUATS

Quaternary ammonium compounds



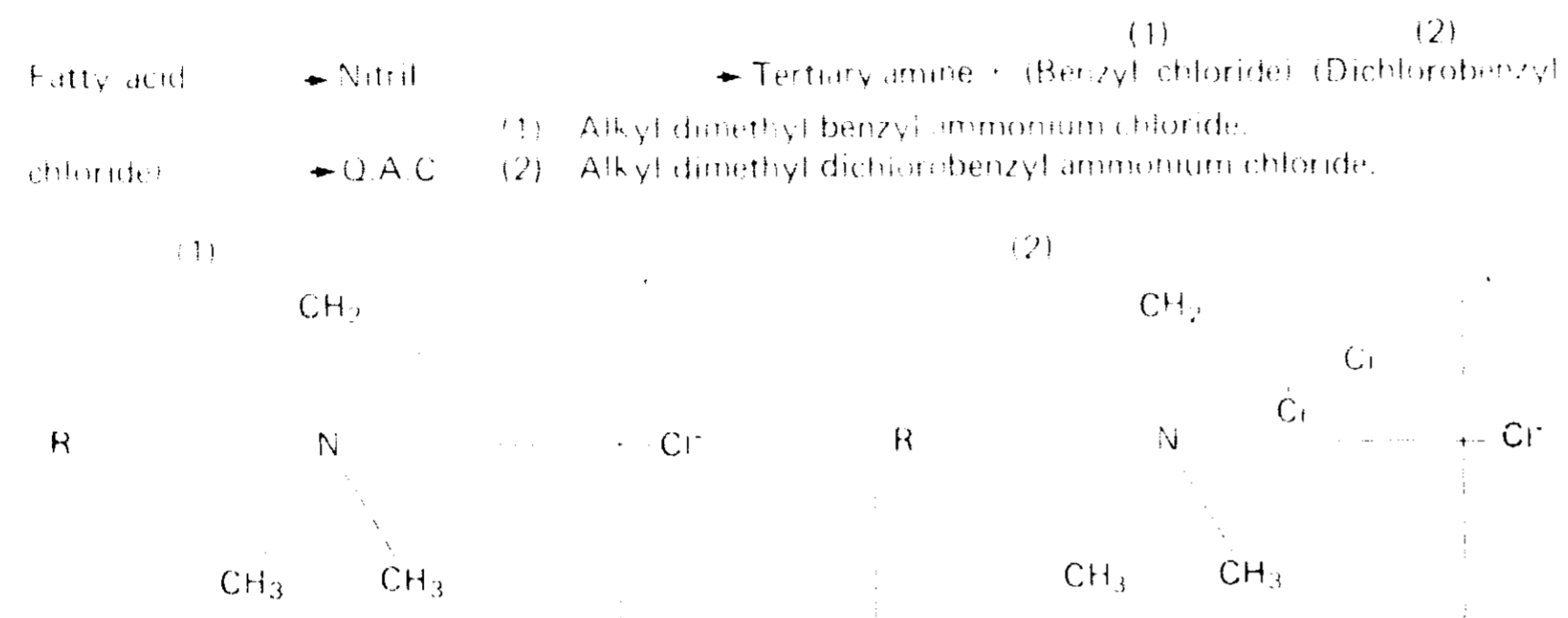
The Maquats are a selected group of quaternary ammonium compounds covering a wide range of products and properties. They have proven themselves exceptional microbicidal agents when used as disinfectants, sanitizers, deodorants, germicides and algaecides.

The dodecyl (C₁₂), tetradecyl (C₁₄) and the hexadecyl (C₁₆) have been the most effective germicidal components of the alkyl radical. The Maquats are manufactured from these select alkyl groups to give the highest microbicidal activity, along with the finest physical properties.

We at Mason Chemical Company believe our progress and growth depend upon our finding ways to do that "something extra" for our customers. You will find us pleased to discuss any problems or projects which will help you make your product line more successful.

INTRODUCTION:

The Maquats are quaternary ammonium compounds manufactured by Mason Chemical Company of Chicago, Illinois. These products are characterized by a halide ion and a cationic nitrogen atom with four covalent carbon-nitrogen bonds. The nitrogen atom is attached to at least one long chain hydrocarbon radical. The straight chain radical ranges from C_8H_{17} to $C_{18}H_{37}$ and is derived from coconut fatty acid. To illustrate:



This chemical structure gives these compounds high germicidal activity because of the well balanced cation (lipophilic) and anion (hydrophilic) group. The quaternary molecule is such that it gives excellent wetting and penetration action which enables it to kill microorganisms in areas inaccessible to other germicides.

PHYSICAL AND CHEMICAL PROPERTIES

The Maquats are all liquids and are extremely stable. They will maintain their stability over a wide range of temperatures and storage conditions. Maquats are readily soluble in water and most polar solvents and insoluble in non polar solvents.

They are compatible with many organic compounds, acids, alkalis and organic salts. Complete solubility and compatibility data is available from Mason Chemical Co. on a wide range of products. Maquats are incompatible with soap and anionic surface active agents.

The biological properties of these products are increased as you raise the temperature and pH of the product. All quaternaries will lose some of their effectiveness if the pH falls below 5. The Maquats maintain their bacteriological properties in waters up to and including 1100 ppm of hardness depending on the product selected. Maquats have been tested according to the latest bacteriological test methods and the results are reported on the specification page. The A.O.A.C. Use Dilution Test is basic in determining the efficacy of the product as an environmental disinfectant. The applications for use of these Maquats are varied and include the following industries. Food, beverage, dairy, swimming pool, secondary oil recovery, paper, textile, aerosol, and many others. Mason Chemical Company will be pleased to suggest specific formulations on any applications where a quaternary ammonium compound may be contemplated.

ACCEPTED
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10324-9 (1)
10324-2

MAQUAT SPECIFICATIONS

PRODUCT	LC 12S (1)	MC 1416 (E) (1)	MC 1412 (E) (1)	DLC 1214 (7)	MQ-2525	SC 18
Active Ingredient(s)	Alkyl dimethyl benzyl ammonium chloride-Isopropanol	Alkyl dimethyl benzyl ammonium chloride-Isopropanol (Ethanol)	Alkyl dimethyl benzyl ammonium chloride-Isopropanol (Ethanol)	(2) Alkyl dimethyl dichlorobenzyl ammonium chloride	Alkyl dimethyl benzyl ammonium chloride (A) Alkyl dimethyl ethylbenzyl ammonium chloride (B) (Isopropanol)	Stearyl dimethyl benzyl ammonium chloride
Inert Ingredient(s)	Water	Water	Water	Water	Water	Water Alcohol
% Active	50% - 80% (20%) (3)	50% - 80% (20%) (3)	50% - 80% (20%) (3)	50% - 80%	25%A - 40%A - (20%) (3) 25%B - 40%B - 50%	25%
% Inert	50%	50%	50%	50% - 20%		75%
Alkyl Group Distribution (4)	C ₁₂ , C ₁₄ , C ₁₆ & C ₁₈				A) 5, 60, 30 & 5 B) 50, 30, 17 & 3	
Average Molecular Weight	360	380	358	425	384	424
Color A.P.H.A. (Max)	100	100	100	100	100	100
Physical Form	Liquid	Liquid	Liquid	Liquid	Liquid	Paste
pH (10% Sol.)	7 - 8	7 - 8	7 - 8	7 - 8	7 - 8	3 - 4
Weight/Gal.	8.2 - 7.8	8.2 - 7.8	8.4 - 8.0	8.4 - 8.0	8.2	7.9
Standard Container	55 gal. Liquipak	55 gal. Liquipak	55 gal. Liquipak	55 gal. Liquipak	55 gal. Liquipak	55 gal. Liquipak
Gross - Net - Tare	50% 80%					
	464-440-24 449-425-24	464-440-24 449-425-24	464-440-24 449-425-24	464-440-24 449-425-24	464-440-24 449-425-24	464-440-24

BIOLOGICAL PROPERTIES (100% ACTIVE QUATERNARY BASIS)

USE DILUTIONS A.O.A.C.

Staphylococcus aureus ATCC - 6538	400 ppm (5)	400 ppm	400 ppm	400 ppm	400 ppm	400 ppm
Salmonella choleraesuis ATCC - 10708	400 ppm (5)	400 ppm	400 ppm	400 ppm	400 ppm	400 ppm
Pseudomonas aeruginosa ATCC - 15422	1400 ppm	1400 ppm	1200 ppm	---	800 ppm	

PHENOL COEFFICIENTS A.O.A.C. (6)

Killing Dilutions	Average Values					
Staphylococcus aureus	1:39905 P.C. 614	1:42850 P.C. 659	1:47600 P.C. 666	1:53500 P.C. 764	1:41600 P.C. 538	
Salmonella typhosa ATCC - 6539	1:39905 P.C. 443	1:42850 P.C. 476	1:59500 P.C. 661	1:74400 P.C. 783	1:41600 P.C. 594	
Escherichia coli ATCC - 11229	1:47600 P.C. 680	1:27450 P.C. 392	1:42850 P.C. 612	1:44340 P.C. 633	1:31300 P.C. 447	

HARD WATER TOLERANCE (CaCO₃)

at 200 ppm of compound	Chambers Test A.O.A.C.	59.999% Kill in 30 sec.				
Staphylococcus aureus	300 ppm 18 grain	550 ppm 32 grain	550 ppm 32 grain	1100 ppm 64 grain	850 ppm 50 grain	
Escherichia coli	300 ppm 18 grain	550 ppm 32 grain	550 ppm 32 grain	1100 ppm 64 grain	850 ppm 50 grain	

ACTIVITY AGAINST ALGAE

Chlorella pyrenoidosa						
Algastatic ppm	2	2	2			
Algacidal ppm	5	5	5			
F.P. # Reg. No. 10324	50%	8	6	4	17	
	80%	2	9 (E) 13	7 (E) 14	5	16

(1) Meets all requirements of U.S.P. Benzalkonium Chloride.

(2) Not effective against Pseudomonas aeruginosa at the disinfecting concentration providing 400 ppm active quaternary.

(3) Represents 20% Isopropanol or 20% Ethanol when designated (E)

(4) Alkyl group distribution ± 10%

(5) 400 ppm 1:2500

(6) Phenol Resistance

S. aureus 1:65

S. typhosa 1:90

E. coli 1:70

(7) CAUTION: Be sure to rinse with potable water all surfaces coming in contact with food after applying a sanitizing rinse.

(2)

10324-7
10324-22

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(Name) is compatible with all swimming pool chemicals and is non-injurious to metal, paint, plastic, and tile.
(Name), when used as directed, will improve the appearance and cleanliness of the pool or water cooling systems.
(Name) prevents unsightly growths of algae.
(Name) may be stored for prolonged periods of time without losing its effectiveness or strength.
(Name) requires no special equipment for treating water. May be added directly to the pool in any spot or added to the water circulation equipment.

(Name of Product):
E.P.A. Reg. No.
Concentrated Algacide:

ALGAECIDE
(Center Panel)

(Name) for Control of Algae and Algal Slime Growth in Swimming Pools and Water Cooling Systems.
Active Ingredient: (Refer to Page 3 of this Bulletin for)
Inert Ingredient: (Ingredient Instructions and Option.)

DANGER (See table page 3)
KEEP OUT OF REACH OF CHILDREN (See table page 3)

Causes severe eye and skin damage. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

CAUTION (See table page 3)

This product is toxic to fish. Do not discharge treated effluent into lakes, streams or ponds.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before reuse. If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or, if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN:

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

Keep from Freezing

(Name)
(Address)

ALGAECIDE
(Right Panel)

Directions for Use in Swimming Pools

Initial Application (original filling): One gallon (Name) to each 50,000 gallons of water or ratio thereof. 10324-2
Continued Application: One quart (Name) in 50,000 gallons of water every 3-5 days or as needed to maintain 2 ppm active. Quaternary Test Kits are available for this use.
Booster Application: One quart (Name) in 50,000 gallons after a heavy or prolonged rainfall or when there is a heavy bathing load.

THE ABOVE DIRECTIONS SHOULD BE FOLLOWED EVEN WHEN THE POOL IS NOT IN USE.

Directions for Use in Water Cooling Systems

Initial Application: 26 to 52 fluid ounces (20 to 40 ppm on an active quaternary basis) per 1000 gallons of contained water.
Subsequent Application: 7 to 20 fluid ounces (5 to 15 ppm on an active quaternary basis) per 1000 gallons of contained water.

THE ABOVE DIRECTIONS ARE TO BE FOLLOWED TWICE WEEKLY OR AS NEEDED.

If algae growth is noticeable clean system. When heavy algae growth is present system will have to be cleaned manually.

