

# LONZA

## PRODUCT INFORMATION

**ACCEPTED**

MAR 11 1981

U.S. Dept. of Agriculture, Pesticide, and Fertilizer Act, approved, for the pesticide registered under EPA Reg. No. 6836-54

## BARDAC 2050 BARDAC 2080

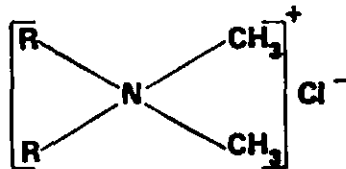
### INTRODUCTION

Bardac 2050/2080, a mixture of octyl decyl, dioctyl, and didecyl dimethyl ammonium chlorides represent a class of germicidally active quaternary ammonium compounds that is radically different from the traditional alkyl benzyl type of quaternary. The Bardac "twin chain" type of structure has produced quaternary germicides with greatly improved performance characteristics over quaternary products with a benzene ring structure. Made by Lonza patented process technology, the Bardac products, with their superior performance, have had significant impact on the germicide industry.

Newly enacted EPA requirements specify that products classified as one step cleaner/sanitizers be tested in the presence of a 5% organic soil factor. Properly formulated systems based on Bardac 2050/2080 are capable of meeting these requirements.

The Bardac quaternary products are dialkyl dimethyl ammonium chlorides in which two alkyl groups in the C<sub>8</sub> to C<sub>10</sub> range are attached directly to the nitrogen atom. These alkyl chains were found to maximize germicidal performance. Bardac 2050/2080 has the following chemical structure.

Where R = a mixture of octyl decyl, dioctyl, didecyl.



For EPA registration purposes, Bardac 2050 and Bardac 2080 are described as:

### Active Ingredients

	Bardac 2050	Bardac 2080
Octyl decyl dimethyl ammonium chloride	25.0%	40%
Dioctyl dimethyl ammonium chloride	12.5%	20%
Didecyl dimethyl ammonium chloride	12.5%	20%
Ethanol	10.0%	10%

### Inert Ingredients

Water	40.0%	10%
	100.0%	100%

### Physical Properties

Average Molecular Weight	332	332
Specific Gravity 25°C	0.925	0.887
Density (lbs./gallon)	7.71	7.41
EPA Registration Number	6836-52	6836-54
CAS Number	68424-95-3	



### GERMICIDAL ACTIVITY

The germicidal activity of Bardac 2050/2080 is substantiated by an extensive series of generally recognized microbiological tests including those required for EPA registration.

Standard laboratory evaluations indicate that Bardac 2050/2080 has superior over-all germicidal activity when compared to quaternaries with other structures. This activity is also exhibited under use conditions once considered detrimental to the performance of quaternaries. The following summarizes the advantages of Bardac 2050/2080.

- ... Superior organic soil tolerance.
- ... Broad spectrum biocidal activity against both gram positive and gram negative organisms.
- ... Better disinfectant performance at lower use concentrations.
- ... Greater hard water tolerance for sanitizing activity at lower use concentrations.
- ... Greater tolerance for anionic contaminants than previously possible.

### Disinfectant Activity Determined by AOAC Use-Dilution Tests

The minimum concentration of Bardac 2050/2080 required for effective disinfection is determined by the AOAC, 12th Edition, paragraph 4.007-4.011 (1975) procedure, commonly known as the Use-Dilution Test.

<u>Test Organism</u>	<u>ATCC Strain No.</u>	<u>Quaternary concentration on 100% active basis</u>
Staphylococcus aureus	6538	400 ppm
Salmonella choleraesuis	10708	400 ppm
Pseudomonas aeruginosa (PRD-10)	15442	700 ppm

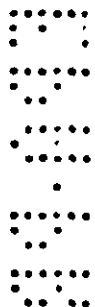
### Organic Matter Tolerance and Residual Anionic Tolerance Determined by the AOAC Use-Dilution Test

Bardac 2050/2080 will remain germicidal even in the presence of organic soils and anionic residues. This performance has been confirmed in the AOAC Use-Dilution Test (AOAC, 12th Edition, Paragraph 4.007 - 4.011 (1975)) against both Staph. aureus and Salmonella choleraesuis.

The EPA now requires that the AOAC Use-Dilution Test be modified to include 5% blood serum contamination when testing one-step cleaner/sanitizer systems.

The AOAC Use-Dilution Method was modified to include a 10% blood serum load to the test solution. 400 ppm of Bardac 2050/2080 was tested against Staph. aureus and Salmonella choleraesuis in the presence of this 10% serum load with no reduction in germicidal activity.

<u>Test Organism</u>	<u>Strain No.</u>	<u>Contaminant</u>	<u>Quaternary concentration on 100% active basis</u>
Staphylococcus aureus	6538	10% Blood Serum	400 ppm
Salmonella choleraesuis	10708	10% Blood Serum	400 ppm



Quaternaries, which are cationic surface active agents, are deactivated by anionic surface active agents with the formation of an insoluble cationic-anionic complex. The ability of Bardac 2050/2080 to maintain bactericidal activity in the presence of anionics is important because residual amounts of anionics are often present in hard surface disinfection applications. When Bardac 2050/2080 is evaluated at a concentration of 400 ppm (active) against Staphylococcus aureus and Salmonella choleraesuis in the presence of 200 ppm sodium lauryl sulfate, it passes the AOAC Use-Dilution test whereas other quaternaries fail.

<u>Test Organism</u>	<u>Strain No.</u>	<u>Contaminant</u>	<u>Quaternary concentration on 100% active basis</u>
Staphylococcus aureus	6538	200 ppm	400 ppm
Salmonella choleraesuis	10708	sodium lauryl sulfate	400 ppm

**Sanitizing Activity Determined by the AOAC Germicidal and Detergent Sanitizer Method**

The germicidal activity of quaternary products decreases in the presence of hard water. The hard water tolerance of Bardac 2050/2080 is measured by the AOAC Germicidal and Detergent Sanitizer Method, 12th Edition, paragraph 4.023-4.032 (1975), commonly called, the hard water tolerance test. Exposure of 100 million organisms of Escherichia Coli (#11229) to 150 ppm of Bardac 2050/2080 for 30 seconds at 25°C in 400 ppm of water hardness results in the required reduction of 99.999% of the bacteria.

<u>Test Organism</u>	<u>Concentration of Bardac 2050/2080 Required for 99.999% Reduction</u>	<u>Hard Water Ceiling</u>
Escherichia Coli #11229	150 ppm	400 ppm hard water
	200 ppm	800 ppm hard water

**Fungicidal Performance Determined by the AOAC Fungicidal Test**

<u>Bardac 2050/2080</u>	<u>Ten Minute Killing Dilution (100% Active)</u>
	<u>T. mentagrophytes #640</u>
Ten Minute Killing Dilution	1:800

**Phenol Coefficient as Determined by the AOAC Phenol Coefficient Test**

The phenol coefficient of a germicide is measured by its relative effectiveness in comparison to phenol. The bactericidal activity of Bardac 2050/2080 produces phenol coefficient results that surpass the alkyl benzyl quaternaries. The test protocol is AOAC 12th Edition, paragraph 4.001-4.006 (1975).

<u>Test Organism</u>	<u>ATCC Strain No.</u>	<u>Phenol Coefficient 100% active quaternary</u>
Staphylococcus aureus	6538	1000
Salmonella typhosa	6539	730

**Bactericidal Efficiency as Determined by the Minimum Inhibitory Concentration Test**

This tube-dilution test determines the minimum concentration of Bardac 2050/2080 which will reduce the bacterial count of a suspension by at least 99.999% from a level of 100 million organisms per ml. in 30 seconds at 25°C. The test method is a broth dilution test with 18 hour immersion at 37°C. Minimum inhibitory concentration test results indicate that Bardac 2050/2080 offers superior performance.

<u>Test Organism</u>	<u>Strain No.</u>	<u>Gram Stain</u>	<u>Minimum Inhibitory Concentration (100% active)</u>
Staphylococcus aureus	6538	+	0.5 ppm
Escherichia Coli	11229	-	5 ppm
Pseudomonas aeruginosa	15442	-	50 ppm
Proteus vulgaris	9920	-	50 ppm

**Fungi**

A. niger	16404		10 ppm
T. mentagrophytes	(SWRI) Enmons		10 ppm
C. albicans	10231		5 ppm

**Summary of Germicidal Activity**

The test data presented substantiates the over-all superior germicidal performance of Bardac 2050/2080.

**Applications**

The performance characteristics of Bardac 2050/2080 have been used to develop a series of disinfectants, sanitizers, and cleaners that are in commercial use in homes, hospitals, institutions, and commercial laundries. These systems range from simple dilutions to more complex blends of quaternaries, surfactants, and detergent builders.

**Summary of Applications and Recommended Use Levels**

<u>Application Areas</u>	<u>Recommended Use-Levels on 100% Active Basis</u>
General-Hospital Disinfection	400-700 ppm
Sanitizing	150 ppm
Water Treatment/Cooling Towers	5-20 ppm
Water Treatment/Secondary Oil Recovery	5-20 ppm
Laundry Bacteriostat/Sanitizer	175 ppm
Bacteriostat/Preservative/Fungicide	5-1000 ppm

**General and Hospital Disinfection**

A general purpose Disinfectant-Sanitizer-Fungicide-Deodorizer product may be produced by diluting Bardac 2050/2080 to 10% active level. This product will afford effective disinfection and/or sanitizing in hospitals, schools, homes, dairy, farm, and industrial areas when used at appropriate use dilutions. A sample label for a Disinfectant-Sanitizer-Fungicide-Deodorizer based on Bardac 2050/2080 is attached. It may be used as a guide in registering your product with the Environmental Protection Agency.

The following EPA registered formulations based on Bardac 2050/2080 are available as a technical service to the compounder for registration and manufacture:

<u>Formula</u>	<u>Application</u>	<u>Dilutions</u>
Formulation 68-16	Institutional and Hospital Strength Disinfectant Cleaner with Organic Soil Tolerance	1:64 2 oz./gal. 1:128 1 oz./gal.
Formulation 71-30	Heavy Duty Institutional Strength Disinfectant Cleaner with Organic Soil Tolerance	1:43 3 oz./gal.
Disinfectant - Sanitizer Solution	No-rinse sanitizing clearance from FDA	
Bacteriostat/Sanitizer	For commercial laundries	

**Sanitizing**

Bardac 2050/2080 has been cleared by the FDA, Federal Register, Section 178.101G, Food Additives, for sanitizing at a concentration of 150 ppm without the requirement of a potable water rinse. In addition, the use of this sanitizing solution is consistent with the current practices of the Grade "A" Pasteurized Milk Ordinance, 1978 Recommendations of the United States Public Health Service. The high hard water tolerance of Bardac 2050/2080 allows the use of a lower concentration (150 ppm use-level) at a hard water ceiling of 400 ppm. In contrast, the alkyl benzyl quaternaries when used as sanitizers must be used at 200 ppm. This lower use concentration for Bardac 2050/2080 results in a material saving of 25%.

### Laundry Bacteriostat/Sanitizer

Soiled and contaminated fabrics such as diapers, hospital and institutional linen, and athletic equipment are a major housekeeping concern not only in hospitals but in institutions, hotels, restaurants, and schools. Bardac 2050/2080 provides effective residual bacteriostatic and self-sanitizing protection for freshly laundered items. For residual bacteriostatic or self-sanitizing activity, conditions of high relative humidity or wet contamination are required. In commercial and institutional laundries, Bardac 2050/2080 should be added to the final rinse. Laundered fabric may also be treated by soaking in a solution of Bardac 2050/2080.

### Bacteriostat/Preservative/Fungicide

Bardac 2050/2080 is a highly effective broad spectrum bacteriostat for a variety of industrial applications where compatibility with a cationic material has been established. The actual use levels for the quaternary should be determined for each application.

### Wood Preservation

Recent work with the lumber industry indicates that Bardac 2050/2080 is an effective biocide in wood preservation.

## GENERAL INFORMATION

### Product Registration

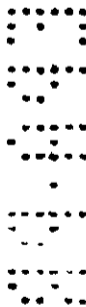
Biocides and products with biocidal claims require registration by the Environmental Protection Agency under the Federal Insecticide, Fungicide and Rodenticide Act. In addition, some state authorities require separate registration. The EPA NUMBERS FOR BARDAC 2050 AND BARDAC 2080 are 6836-52 and 6836-54 respectively, and may be referred to by consumers of this product. As a technical service, LONZA INC. provides advice on the registration of Bardac 2050/2080 based products.

### Safety and Handling

The toxicity of Bardac 2050/2080 is of the same order of magnitude as other commercial quaternaries. The oral LD<sub>50</sub> is 200 mg/kg in rats. Bardac 2050/2080 at an "as-is" concentration may be considered a primary skin and eye irritant.

### Handling

For detailed handling information consult the Bardac 2050/2080 Product Safety Data Sheet which is available on request.



**Sanitizing of Food Processing Equipment and other Hard Surfaces in Food Contact Locations.**

For sanitizing food processing equipment, dairy equipment, food utensils, dishes, silverware, glasses, sink tops, countertops, refrigerated storage and display equipment and other hard surfaces. No potable water rinse is required.

Wash and rinse all articles thoroughly, then apply a solution of ¼ oz. Bardac 20-10 in 4 gallons of water. (150 ppm active). Surfaces should remain wet for at least one minute followed by adequate draining and air drying. Fresh solution should be prepared daily or when use solution becomes visibly dirty. For mechanical application, use solution may not be reused for sanitizing applications.

Apply to sink tops, countertops, refrigerated storage and display equipment and other stationary hard surfaces by cloth or brush. No potable water rinse is required.

Dishes, silverware, glasses, cooking utensils and other similar size food processing equipment can be sanitized by immersion in a ¼ oz./4 gallon dilution of Bardac 20-10. No potable water rinse is required.

At ¼ oz./4 gallons, Bardac 20-10 fulfills the criteria of appendix F of the Grade "A" Pasteurized Milk Ordinances 1978 Recommendations of the U.S. Public Health Services in waters up to 400 ppm of hardness calculated as Ca CO<sub>3</sub> when evaluated by the AOAC Germicidal and Detergent Sanitizer Method against Escherichia coli and Staphylococcus aureus.

The udders, flanks, and teats of dairy cows can be sanitized by washing with a solution of ¼ oz. Bardac 20-10 in 4 gallons of warm water. No potable water rinse is required.

Use a fresh towel for each cow. Avoid contamination of sanitizing solution by dirt and soil. Do not dip used towel back into sanitizing solution. When solution becomes visibly dirty, discard and provide fresh solution.

**Precautionary Statements**

**Hazards to Humans and domestic animals**

**DANGER**

Keep out of reach of children. Corrosive. Causes eye damage and skin irritation. Do not get in eyes, on skin, or on clothing. Protect eyes and skin when handling. Harmful if swallowed. Avoid contamination of food.

**STORAGE AND DISPOSAL**

—DO NOT CONTAMINATE WATER, FOOD, OR FEED BY STORAGE OR DISPOSAL.

—OPEN DUMPING IS PROHIBITED.

—DO NOT REUSE EMPTY CONTAINER

**PESTICIDE DISPOSAL**

PESTICIDE OR RINSATE THAT CANNOT BE USED OR CHEMICALLY REPROCESSED SHOULD BE DISPOSED OF IN A LANDFILL APPROVED FOR PESTICIDES OR BURIED IN A SAFE PLACE AWAY FROM WATER SUPPLIES.

**CONTAINER DISPOSAL**

TRIPLE RINSE (OR EQUIVALENT) AND DISPOSE IN AN INCINERATOR OR LANDFILL APPROVED FOR PESTICIDE CONTAINERS, OR BURY IN A SAFE PLACE.

**GENERAL**

CONSULT FEDERAL, STATE OR LOCAL DISPOSAL AUTHORITIES FOR APPROVED ALTERNATIVE PROCEDURES SUCH AS LIMITED OPEN BURNING.

**BARDAC 20-10**

Disinfectant-Sanitizer  
Fungicide Deodorizer  
with Organic Tolerance  
for Hospital, Institutional, Industrial,  
School, Dairy and Other Farm Use

**Active Ingredients**

Octyl decyl dimethyl ammonium chloride	5.0%
Didecyl dimethyl ammonium chloride	2.5%
Diocetyl dimethyl ammonium chloride	2.5%

**Inert Ingredients**

90.0%  
100.0%

KEEP OUT OF REACH OF CHILDREN

**DANGER**

**Statement of Practical Treatment**

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.

SEE LEFT PANEL FOR  
ADDITIONAL PRECAUTIONARY STATEMENTS

**EPA Registration No. 6836-65**

**EPA Establishment No. 6836-IL-1**

**Net Contents**

Manufactured By:

**LON INC. • 22-10 Route 208 • Fair Lawn, N.J. 07410**

**Directions for Use  
GENERAL CLASSIFICATION**

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Apply Bardac 20-10 with a cloth, mop or mechanical spray device. When applied with a mechanical spray device, surface must be sprayed until thoroughly wetted. Treated surfaces must remain wet for 10 minutes. Fresh solution should be prepared daily or when the use solution becomes visibly dirty.

**Disinfection in Hospitals, Nursing Homes and Other Health Care Institutions**

For disinfecting floors, walls, countertops, bathing areas, lavatories, bedframes, tables, chairs, garbage pails and other hard non-porous surfaces.

Add 3½ oz. Bardac 20-10 to 4 gallons water. Apply to previously cleaned hard surface with mop or cloth.

At this use-level, Bardac 20-10 is effective against Pseudomonas aeruginosa when evaluated by the AOAC Use-Dilution Test.

Bardac 20-10 is effective against Staphylococcus aureus and Salmonella choleraesuis even in the presence of organic soil and residual anionic detergents when used at 3 oz./5.5 gallons.

**Disinfectant in Institutions, Industry, and Schools**

For disinfecting floors, walls, bedframes, countertops, tables, chairs, garbage pails, bathroom fixtures and other hard surfaces.

Add 3 oz. of Bardac 20-10 to 5.5 gallons of water. Apply to previously cleaned hard surface with mop or cloth.

**Disinfection of Barber Tools**

Precleaned barber tools (such as combs, brushes, razors, and scissors) can be disinfected by immersing in a ½-oz./gallon solution of Bardac 20-10.

**Disinfection of Poultry Equipment, Animal Quarters and Kennels.**

Poultry brooders, watering founts, feeding equipment and other animal quarters (such as stalls and kennel areas) can be disinfected after thorough cleaning by applying a solution of 3½ oz. Bardac 20-10 to 4 gallons of water with a mop, cloth or brush. Small utensils should be immersed in this solution.

Prior to disinfection, all poultry, other animals and their feeds must be removed from the premises. This includes emptying all troughs, racks and other feeding and watering appliances. Remove all litter and droppings from floors, walls and other surfaces occupied or traversed by poultry or other animals.

After disinfection, ventilate buildings, coops and other closed spaces. Do not house poultry, or other animals, or employ equipment until treatment has been absorbed, set or dried.

All treated equipment that will contact feed or drinking water must be rinsed with potable water before reuse.