



ACCEPTED

OCTOBER 16, 1972

UNDER THE FEDERAL INSECTICIDE  
FUNGICIDE AND RODENTICIDE ACT  
FOR ECONOMIC POISON REGISTERED  
ED UNDER NO. 1488-33

# BUSAN<sup>®</sup> 77

Patents issued or pending in the U. S. A. and other countries

## COMPOSITION

Active ingredient

Poly[oxyethylene dimethyliminio(ethylene

dimethyliminio(ethylene dichloride)] ..... 60.0 percent

Inert ingredient ..... 40.0 percent

Weight of active ingredient per gallon = 5.8 pounds

## APPLICATIONS

Busan 77 is used to control algae, bacteria, and fungi in recirculating commercial and industrial water cooling towers. Prior to its use, systems must be cleaned to remove algal growth, microbiological slime, and other deposits. An initial slug addition of 0.9 to 2.2 fluid ounces of Busan 77 per 1,000 gallons of water, to provide a concentration of 8 to 20 parts per million of Busan 77 based on the total weight of water in the system, is recommended. Repeat initial dosage until control is evident. Subsequent slug additions of 0.22 to 2.2 fluid ounces of Busan 77 per 1,000 gallons of water (2 to 20 parts per million of Busan 77) should be employed every 2 to 5 days or as needed. The frequency of addition depends upon the relative amount of bleed-off and the severity of the microbiological problem. Slug additions should be made in the sump of water cooling towers.

Busan 77 is also employed to control algae, bacteria, and fungi in fresh water for use in industrial processes and complete instructions for this use are included in the Product Data sheet for Busan 77.

## CAUTION

KEEP OUT OF THE REACH OF CHILDREN

Harmful if swallowed. Do not get in eyes. Avoid contact with skin. In case of contact, flush with plenty of water for at least 15 minutes. If eye irritation persists, get medical attention. Avoid contamination of food.  
This product is toxic to fish. Do not add treated effluent to lakes, streams, or ponds.

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This product is toxic to fish. Do not add treated effluent to lakes, streams, or ponds. Do not contaminate water by cleaning of equipment or disposal of wastes. Use only as directed on label.

Do not reuse empty drum. Return drum to conditioner or destroy by perforating or crushing and burying in a safe place.

**MANUFACTURED BY**  
**BUCKMAN LABORATORIES, INC.**  
**MEMPHIS, TENN. 38108, U.S.A.**

EPA REG. NO. 1445-55-AA

10-8-77



# PRODUCT DATA

January 1, 1979

## BUSAN 77

*polymeric cationic microbicide concentrate*

### A BROAD SPECTRUM MICROBICIDE CONCENTRATE

Busan 77 is a polymeric cationic microbicide concentrate that may be diluted with water to prepare ready-to-use microbicides of any desired concentration. It is also suitable for use in large industrial operations without dilution. It is especially effective in controlling algae, non-bacteria, and other slime-forming microorganisms that contribute to the biological fouling of cooling towers, heat exchangers, air wash systems, and other industrial fresh water systems.

Busan 77 can be used in both acid and alkaline systems, and, unlike some microbicides, it does not cause foam. Busan 77 is non-volatile and thus is not lost by evaporation. Busan 77 is composed of materials that have been allowed for use in the manufacture of paper and paperboard under U.S. Food and Drug Administration Regulation 121.2526.

### PRODUCT CHARACTERISTICS

Busan 77 is a water-soluble liquid packed in 250 kg (550 lb.) net weight lined, nonreturnable steel drums with bungs. It can be stored and handled in stainless steel, aluminum, copper, and most plastic materials of construction. The composition and some of the physical properties of Busan 77 are as follows:

#### Active ingredients:

Polyoxyethylene dimethylammonochloride

dimethylammonochloride chloride  $\text{C}_{12}\text{H}_{27}\text{N}_2\text{Cl}_3$  100 percent

Inert ingredients: water-soluble organic acids, organic salts, and organic solvents 10 percent

Density at 25°C (77°F): 1.05 g/cm<sup>3</sup> (105 lb./cu. ft.) (approximate)

Approximate weight per gallon: 8.75 lb. (approximate)

Approximate volume per gallon: 0.95 cu. ft. (approximate)

Approximate volume per pound: 0.11 cu. ft. (approximate)

Freezing point: 12 to 14°C (54 to 57°F) (approximate)

pH of 100 parts per million in distilled water: 4.5 to 5.5 (approximate)

Busan 77 is moderately toxic by ingestion and by skin contact. It is not expected to be a carcinogen, irritant, or sensitizer, and it is not expected to be a mutagen. However, as with any chemical product, it should be handled with care and should not be used in food or feed. It should be stored in a cool, dry place, and it should be kept away from children and pets.

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#### PRODUCT CHARACTERISTICS

Busan 77 is a water soluble liquid packed in 230 (2) 508 lb. net weight lined, nonreturnable steel drums with bung, or in one-ton and handled in stainless steel, aluminum, copper, and most plastic materials of construction. The composition and some of the physical properties of Busan 77 are as follows:

##### Active ingredients:

Poly[oxyethylene dimethylimino ethylene

dimethylimino ethylene dichloride] ..... 60 percent

Inert ingredients ..... 40 percent

Density at 25 °C (77 °F) ..... 1.15 g. per ml.

Approximate weight per U.S. gallon ..... 9.6 lb.

Approximate volume per kilogram ..... 870 ml.

Approximate volume per pound ..... 390 ml.

Flashpoint by Tagliabue open cup method ..... Above 135 °C (275 °F)

pH of 100 parts per million in distilled water ..... 6

Busan 77 is moderately toxic by ingestion in single doses, but 24 hour patch tests with the concentrated material on both male and female human subjects showed no sign of skin irritation or sensitization. However, as a general precaution workmen handling the product should avoid contact with the skin and eyes, avoid contamination of food, and observe other precautions shown on the label.

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## APPLICATIONS

Busan 77 is a concentrate that may be diluted to any desired concentration to prepare ready to use microbicides, and it also is suitable for use in large industrial operations without dilution. For microbicides prepared by dilution of Busan 77 with water, the amounts employed for different applications will, of course, depend upon the concentrations of active ingredients in the final product. Busan 77 and dilutions of this product can be fed into systems by means of chemical metering pumps or can be dispensed in suitable measuring containers. In the following all references to the amounts used for different applications are based on concentrated Busan 77 containing 60 percent of active ingredients and the use of this product for microorganism control in systems which do not contain high concentrations of adsorbents such as wood pulp. Such adsorbents reduce the microorganism control effectiveness of Busan 77. However, the use of this product for the treatment of pulp and paper mill fresh water can make an important contribution to slime control. Its action on microorganisms entering the system in the fresh water controls the growth of slime and algae in fresh water pipes, on fresh water sprays, and on pulp and paper machine parts contacted by fresh water. There also is a reduction in the amount of slime growth in the system as a whole because of the reduction in microbiological contamination that may normally be introduced by the fresh water.

### Cooling Water Systems

As a general rule, it is recommended that before treatment of a cooling water system with Busan 77 is begun, the system should be cleaned thoroughly to remove all old algal growths, microbiological slime, and other deposits. The system then should be drained, flushed, and refilled with fresh water and regular treatment with Busan 77 initiated.

To control the growth of algae and other microorganisms on cooling towers, heat exchangers, and other parts of recirculating cooling water systems, Busan 77 is used at concentrations of 2 to 20 parts per million. To treat recirculating systems, an initial addition of 8 to 20 parts per million, based on the total weight of water in the system, is recommended. Subsequent additions of 2 to 20 parts per million should be made with a frequency depending upon the relative amount of blowdown or bleedoff and the severity of the biological fouling problem. Busan 77 can also be added continuously to maintain a concentration of 2 to 20 parts per million in the system. The concentration required in the makeup water will be equal to the concentration to be maintained in the system divided by the cycles of concentration.

### Industrial Fresh Water Systems

Busan 77 can be used to inhibit the growth of algae, bacteria, and fungi in many types of industrial fresh water systems. Prior to its use, the system should be thoroughly cleaned mechanically or with a hot cleaning solution or both. A cleaning solution suitable for most systems can be prepared by adding 7.5 kg. of caustic soda (sodium hydroxide) and 1 liter of Busperse 47 to each cubic meter of water (60 lb. of caustic soda and 1 U.S. gallon of Busperse 47 to each 1000 U.S. gallons of water). After the system has been cleaned and flushed with fresh water, periodic or continuous additions of 0.5 to 5 parts per million should be made as required to maintain effective control of microorganisms.

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