

BIOBAN P-1487[®]

ANTIMICROBIAL AGENT

ACTIVE INGREDIENTS:

4-(2-Nitrobutyl)morpholine 70% by wt
 4,4'-(2-Ethyl-2-nitrotrimethylene)dimorpholine 20% by wt

INERT INGREDIENTS 10% by wt

TOTAL 100%

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS

DANGER

CAUSES SEVERE EYE DAMAGE AND SKIN BURNS.
 MAY CAUSE ALLERGIC SKIN REACTION.
 HARMFUL OR FATAL IF SWALLOWED OR ABSORBED
 THROUGH THE SKIN.

Do not get in eyes, on skin, on clothing.
 Causes skin sensitization.
 Wear goggles or face shield and rubber gloves when handling.
 Wash thoroughly after handling.
 Avoid breathing vapor or mist.
 Avoid contamination of food.
 Do not take internally.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and wildlife. Do not discharge into lakes, streams, ponds, or public waters, unless in accordance with an NPDES permit. For guidance contact your Regional Office of the EPA. Do not contaminate waters by cleaning of equipment or disposal of waste.

International Minerals & Chemical Corporation assumes no responsibility when this product is not used in accordance with the instructions and information contained on this label.

KEEP OUT OF REACH OF CHILDREN

DANGER

STATEMENT OF PRACTICAL TREATMENT

27-30

IF IN EYES Flush with plenty of water for at least 15 minutes. Call a physician immediately.
IF ON SKIN Wash thoroughly with soap and water. Remove and wash contaminated clothing before reuse.
IF INHALED Remove immediately to fresh air. If not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
IF SWALLOWED Do not induce vomiting. Drink promptly a large quantity of milk, egg whites or 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 convulsions may be needed.

SEE SIDE PANEL AND TECHNICAL BULLETIN FOR
 ADDITIONAL PRECAUTIONS AND OTHER INFORMATION

EPA REG NO 271-30AA

C-201F-D
 Printed in U.S.A.



**INTERNATIONAL MINERALS
 & CHEMICAL CORPORATION**

NP DIVISION
 666 Garland Place
 Des Plaines, Ill. 60016

DIRECTIONS FOR USE

GENERAL CLASSIFICATION

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

STORAGE AND DISPOSAL

STORAGE: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

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. Triple rinse (or equivalent) all containers. Dispose of containers in landfill approved for pesticide containers, or bury in a safe place. Consult federal, state, or local disposal authorities for approved alternative procedures.

FOR USE IN METALWORKING FLUIDS

To control the growth of microorganisms in the fluid.

In concentrates. BIOBAN P-1487 is soluble in organic solvents and may be incorporated by the manufacturer in the cutting-fluid concentrate. It normally will be stable in such concentrates as long as the pH is maintained above 6. However, long-term stability tests should be carried out by the manufacturer on his specific formulations to ensure that the concentrate does not contain ingredients incompatible with BIOBAN P-1487 stability. The amount to be incorporated will depend on the dilution factor recommended to be used when the concentrate is diluted for use. For efficient bacteriostatic activity, a concentration of 1000 ppm in the diluted fluid is suggested.

In diluted fluid. An initial concentration of 1000 ppm of BIOBAN P-1487 is normally sufficient to control gross microbial contamination of freshly diluted metalworking fluids for a period of several weeks at ambient temperatures. The degree of control is influenced by the composition of the metalworking fluid, the pH, the conditions of use, and other factors. Under conditions of severe microbial contamination, a concentration of BIOBAN P-1487 as high as 3000 ppm may be required temporarily.

Maintenance dosage. Periodic addition of BIOBAN P-1487 to the metalworking fluid will extend its activity in controlling gross microbial contamination after the initial charge. Additions of 100 ppm to 200 ppm of BIOBAN P-1487 at weekly intervals usually are recommended.

Note. Transitory eye irritation can occur from exposure to vapors produced during the use of metalworking fluids containing BIOBAN P-1487. Should eye irritation occur, further exposure should be prevented by vacating the area or by using protective goggles.

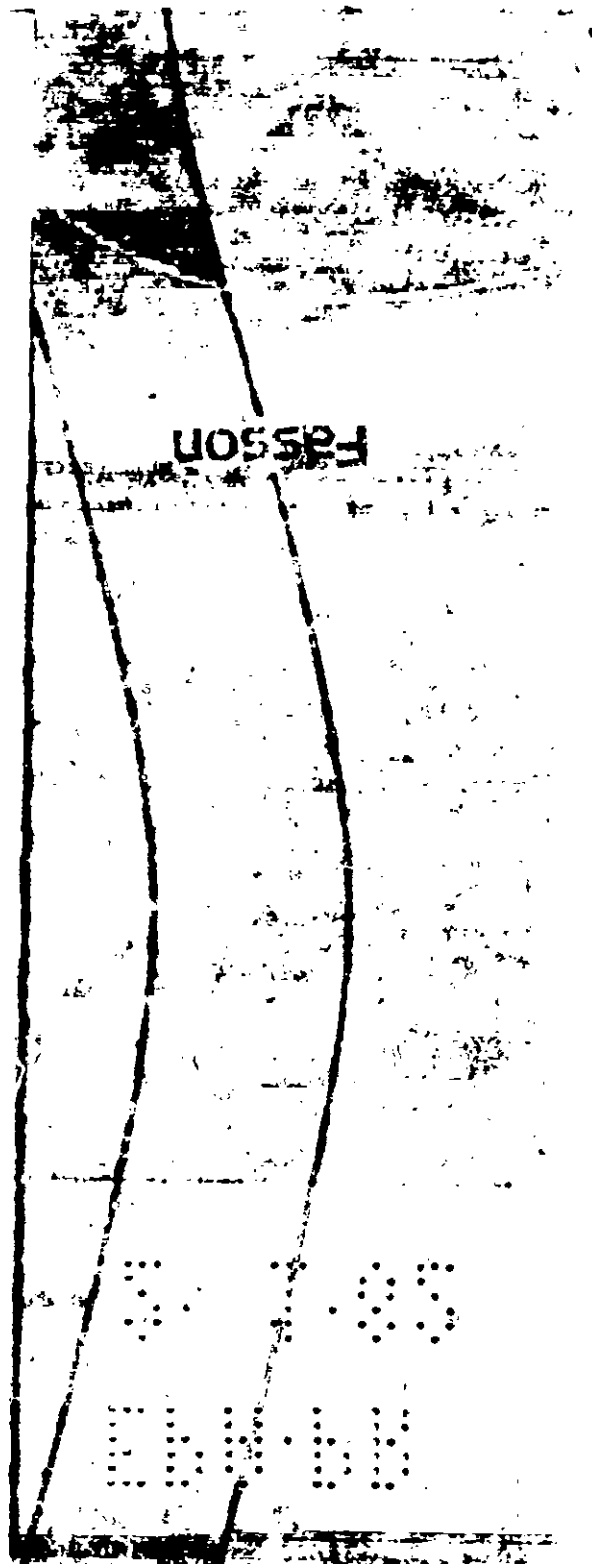
FOR USE IN HYDROCARBON PRESERVATION

To control the growth of problem microorganisms associated with the fuel.

In general use. Add BIOBAN P-1487 to storage tanks or fuel tanks for control of microbial growth in diesel oil, fuel oil, gasoline, or kerosene. Treatment may be performed by slug dosage or by intermittent metering to attain a concentration of 500-1000 ppm of BIOBAN P-1487.

For storage above water. Add 1 gallon of BIOBAN P-1487 to each 1000 gallons of water in the bulk storage system to achieve a concentration of approximately 1000 ppm. To facilitate mixing, dissolve each gallon of BIOBAN P-1487 in 100 gallons of water and add this solution directly to the water phase in the tank with minimal agitation.

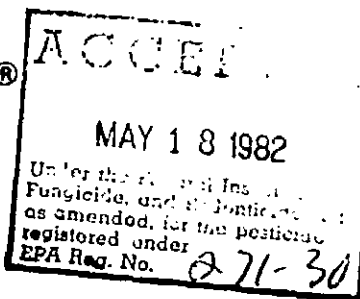
For storage in tanks without intentional water. Add 0.5-1 gallon of BIOBAN P-1487 directly to each 1000 gallons of hydrocarbon in the system to obtain a concentration of approximately 500-1000 ppm.



NP TECHNICAL DATA SHEET

NP SERIES, TDS No. 19

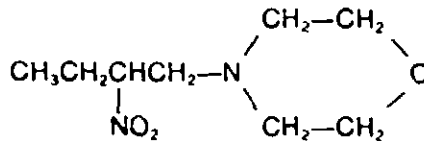
BIOBAN P-1487® ANTIMICROBIAL AGENT



BIOBAN P-1487 is a potent agent to inhibit bacterial growth. It is recommended for those situations requiring oil solubility, yet it also is effective in aqueous systems. BIOBAN P-1487 consists of a mixture of two active chemicals having both nitro and amino groups in the same molecule:

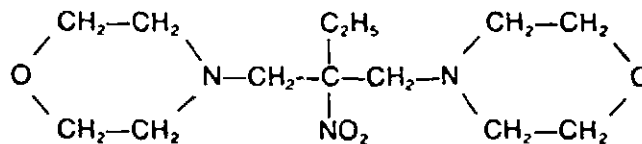
(I) 4-(2-nitrobutyl)morpholine

CAS Registry Number 2224-44-4



(II) 4,4'-(2-ethyl-2-nitrotrimethylene)-
dimorpholine

CAS Registry Number 1854-23-5



Compound I is normally a liquid; pure compound II is a solid melting above ambient temperature. The ratio of the two components is chosen so that BIOBAN P-1487 will remain a liquid at temperatures above 0°C. BIOBAN P-1487 is only moderately soluble in water; the saturated solution is slightly alkaline. BIOBAN P-1487 is soluble in most organic solvents, including aliphatic hydrocarbons.

Other products of the NP Division are recommended for their effectiveness as bacteriostatic agents in an aqueous environment. These include TRIS NITRO® brand of tris(hydroxymethyl) nitromethane described in NP Technical Data Sheet No. 5; and 2-nitro-2-ethyl-1,3-propanediol (NEPD) and 2-nitro-2-methyl-1,3-propanediol (NMPD), described in NP Technical Data Sheet No. 15. BIOBAN® CS-1135 preservative is described in NP Technical Data Sheet No. 24.

International Minerals & Chemical Corporation
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Suggested Uses in Metalworking Fluids

Metalworking fluids usually are formulated as oil-based concentrates. When placed in use, these concentrates are diluted with water to yield the oil-water emulsion which is circulated to the various machines. These emulsions are subject to gross microbial contamination under use conditions. Such contamination provides opportunity for operator infection, as well as adversely affecting emulsion stability and causing equipment corrosion by undesirable decomposition products.

In laboratory tests, representative metalworking-fluid emulsions and the BIOBAN P-1487 additive were placed in a continuous circulating system containing iron chips to simulate industrial use conditions. The system was inoculated initially and at weekly intervals thereafter with a heavily contaminated metalworking-oil emulsion. In such tests most oil-based fluid emulsions containing 1000 ppm of BIOBAN P-1487 resist gross microbial contamination for at least six weeks. At a BIOBAN P-1487 concentration of 500 ppm the effectiveness lasts for from two to four weeks. In similar laboratory tests, 200 ppm or 100 ppm of BIOBAN P-1487 introduced at weekly intervals usually is effective in controlling gross microbial contamination over a period of several weeks at ambient temperatures.

Representative oil-based metalworking-fluid concentrates containing 2.5% concentration of BIOBAN P-1487 were stored for two months at 50°C or for one year at ambient temperatures. Emulsions prepared from most of these concentrates still resisted gross microbial contamination for at least six weeks when tested in the circulating system as above. Specific formulations of metalworking-fluid concentrates must be examined to determine their individual stability with BIOBAN P-1487 under storage conditions. Likewise, emulsions prepared from these concentrates should be tested for the most practical concentration of BIOBAN P-1487 to control microbial contamination and to render them noncorrosive.

Suggested Use for Hydrocarbon Preservation

Petroleum hydrocarbons, such as crude oil, lubricating oil, diesel fuel, or heating oil, are often stored in intimate contact with water under such conditions that microorganisms can thrive. Such microbial growth, if unchecked, can produce dense masses capable of clogging filters, pumps, and vital engine parts. Microbes also release organic acids which can accelerate corrosion of metals and result in equipment failure.

BIOBAN P-1487 at 500-1000 ppm has been found to be effective against microorganisms isolated from contaminated hydrocarbons. In a test simulating a typical holding tank environment, 500 ppm of BIOBAN P-1487 in the oil was sufficient to produce total kill in 48 hours of a bacterial culture isolated from contaminated oil from a ship's oil sump. Further testing at 500 ppm and 1000 ppm of BIOBAN P-1487 in No. 2 diesel fuel has confirmed that BIOBAN P-1487 has no deleterious effect on fuel performance or engine emissions.

For proper protection of hydrocarbons to be stored over water, 1000 ppm of BIOBAN P-1487 should be incorporated into the water phase. For example, a large storage tank containing 1000 gallons of tramp water will require about 1 gallon of BIOBAN P-1487. Dissolve this amount of BIOBAN P-1487 in 100 gallons of water and add directly to the water phase in the tank.

For protection of hydrocarbons which are subject to contamination with water only from condensation inside tanks or other inadvertent sources, 500-1000 ppm of BIOBAN P-1487 may be readily incorporated directly into the hydrocarbon.

Activity in Inhibiting Microbial Growth

BIOBAN P-1487 is intended for use in slightly acidic or alkaline solutions, i.e., at a pH of 6.0 or above. Loss of effectiveness may occur at pH below 6. The antimicrobial activity of BIOBAN P-1487 against a number of representative organisms was determined using standard streak plating, test tube serial dilution, and automated microtiter systems with the results as shown below.

Organism	Minimum Inhibitory Concentration of BIOBAN P-1487
<i>Staphylococcus aureus</i>	100-500 ppm
<i>Streptococcus fecalis</i>	100-500
<i>Streptococcus hemolyticus</i>	100-500
<i>Escherichia coli</i>	100-500
<i>Pasteurella pseudotuberculosis</i>	10-100
<i>Pseudomonas aeruginosa</i>	100-500
<i>Bacillus subtilis</i>	500-1000
<i>Plectonema boryanum</i>	2-4
<i>Oscillatoria prolifera</i>	4-9
<i>Chlorella pyrenoidosa</i>	1
<i>Anabaena flos-aquae</i>	<16
<i>Selenastrum capricornutum</i>	<16
<i>Nitzschia closterium</i>	<16
<i>Candida albicans</i>	16-32
<i>Penicillium levitum</i>	125-250
<i>Aspergillus niger</i>	125-250
<i>Fusarium species</i>	500-1000
<i>Aureobasidium pullulans</i>	2000
<i>Cephalosporium species</i>	1000-2000

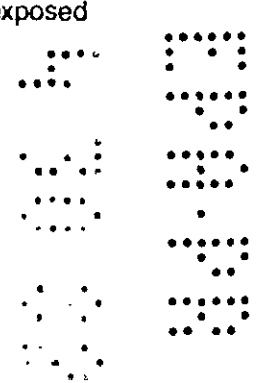
Toxicity

BIOBAN P-1487 is a high-boiling liquid with low vapor pressure at ambient temperature. Avoid breathing mists which contain BIOBAN P-1487, or vapors from BIOBAN P-1487 at elevated temperature.

BIOBAN P-1487 is harmful if swallowed; do not induce vomiting. Have patient drink large quantities of fluid, and call a physician. The acute oral LD₅₀ for rats is in the range 310-455 mg/kg. Oral ingestion is accompanied by inflammation of the intestinal tract and labored respiration.

Undiluted BIOBAN P-1487 is highly irritating to the skin or eyes on prolonged contact. Workers who handle undiluted BIOBAN P-1487 should use face and eye protection, wear gloves and other protective clothing to prevent skin contact with the liquid, and wash thoroughly after handling. In case of contact, immediately remove contaminated clothing and shoes and flush skin or eyes with copious quantities of water for at least 15 minutes. Get medical attention if the eyes are involved. Wash contaminated clothing before reuse; discard contaminated shoes.

BIOBAN P-1487 may cause allergic skin reaction. Tests were conducted on panels of 100 human volunteers at use dilutions in water and in a typical metalworking fluid. A definitive sensitization reaction was produced in only 3 subjects exposed to 0.1% BIOBAN P-1487 in water. No sensitization was evident in the panel exposed to the metalworking fluid which contained 0.666% BIOBAN P-1487 in the concentrate. Potential for sensitization can be mitigated substantially by keeping skin contact with BIOBAN P-1487 at a minimum. In case of contact, wash the exposed skin immediately with soap and water.



**Typical Properties of
BIOBAN P-1487**

Neutral equivalent as a base . 170-177
 Nitrogen content (by Dumas) 14.5-15.5% by wt
 Color (max.) 5 Gardner
 Flash point, Tag closed cup .. >200°F
 Freezing point (approx.) -2°C
 Boiling point at 1 atm >200°C
 Vapor pressure at 90°C <100 mm Hg
 Viscosity at 20°C ~40 cp
 Specific gravity 1.1
 Weight per U.S. gallon
 at 68°F 9.15 lb
 Refractive index, n_D at 20°C . 1.472
 Solubility in water at 20°C ... 1.1 g/100 mL
 at 50°C ... 1.4 g/100 mL
 pH of saturated aqueous
 solution 7.5 ± 0.5

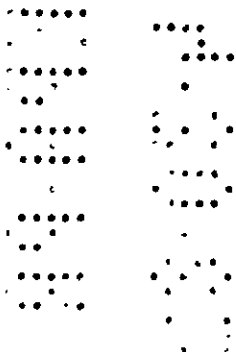
Storage and Handling

BIOBAN P-1487 can be shipped and stored in ordinary steel containers. While there may be some darkening on prolonged storage, this does not impair its bacteriostatic activity. Do not subject to pH below 6, or decomposition of the BIOBAN P-1487 will occur.

BIOBAN P-1487 can be stored at normal ambient temperature without phase change. Should crystallization occur because of extreme cooling, the product can be liquefied by immersing the drum in warm water.

Shipping Containers

	Net weight
5-gallon drum	42 lb
55-gallon drum	450 lb



The manufacturer assumes no responsibility when this product is not used in accordance with the instructions and information contained hereon.

HB:

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Facsimile Label for BIOBAN P-1487

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ANTIMICROBIAL AGENT

ACTIVE INGREDIENTS	
4-(2-Nitrobutyl)morpholine	70% by wt
4,4'-(2-Ethyl-2-nitrotrimethylene)dimorpholine	20% by wt
INERT INGREDIENTS	
	10% by wt
TOTAL	100%

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS

DANGER

CAUSES SEVERE EYE DAMAGE AND SKIN BURNS
MAY CAUSE ALLERGIC SKIN REACTION
HARMFUL OR FATAL IF SWALLOWED OR ABSORBED
THROUGH THE SKIN

Do not get in eyes, on skin, on clothing
Causes skin sensitization
Wear goggles or face shield and rubber gloves when handling
Wash thoroughly after handling
Avoid breathing vapor or mist
Avoid contamination of food
Do not take internally

ENVIRONMENTAL HAZARDS

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KEEP OUT OF REACH OF CHILDREN

DANGER

STATEMENT OF PRACTICAL TREATMENT

IF IN EYES: Flush with plenty of water for at least 15 minutes. Call a physician immediately.
IF ON SKIN: Wash thoroughly with soap and water. Remove and wash contaminated clothing before reuse.
IF INHALED: Remove immediately to fresh air. If not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
IF SWALLOWED: Do not induce vomiting. Drink promptly a large quantity of milk, egg whites, or 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 convulsions may be needed.

SEE SIDE PANEL AND TECHNICAL BULLETIN FOR ADDITIONAL PRECAUTIONS AND OTHER INFORMATION

EPA REG. NO. 771-306A

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INTERNATIONAL MINERALS & CHEMICAL CORPORATION

MP DIVISION
666 Garland Place
Des Plaines, Ill. 60016

DIRECTIONS FOR USE

GENERAL CLASSIFICATION

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

STORAGE AND DISPOSAL

STORAGE: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

DISPOSAL: Pesticide or residue 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, triple rinse (or equivalent) all containers. Dispose of containers in landfill approved for pesticide containers, or bury in a safe place. Consult Federal, state, or local disposal authorities for approved alternative procedures.

FOR USE IN METALWORKING FLUIDS

To control the growth of microorganisms in the fluid

In concentrates, BioBAN P-1487 is soluble in organic solvents and may be incorporated by the manufacturer in the cutting fluid concentrate. It normally will be stable in such concentrates as long as the pH is maintained above 6. However, long term stability tests should be carried out by the manufacturer on his specific formulations to ensure that the concentrate does not contain ingredients incompatible with BioBAN P-1487 stability. The amount to be incorporated will depend on the dilution factor recommended to be used when the concentrate is diluted for use. For efficient bacteriostatic activity, a concentration of 1000 ppm in the diluted fluid is suggested.

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Note: Transitory eye irritation can occur from exposure to vapors produced during the use of metalworking fluids containing BioBAN P-1487. Should eye irritation occur, further exposure should be prevented by vacating the area or by using protective goggles.

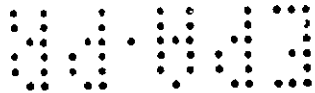
FOR USE IN HYDROCARBON PRESERVATION

To control the growth of problem microorganisms associated with the fuel

In general use: Add BioBAN P-1487 to storage tanks or fuel tanks for control of microbial growth in diesel or fuel oil, gas, or kerosene. Treatment may be performed by using dosage or by intermittent metering to obtain a concentration of 500-1000 ppm of BioBAN P-1487.

For storage above water: Add 1 gallon of BioBAN P-1487 to each 1000 gallons of water in the bulk storage system to achieve a concentration of approximately 1000 ppm. To facilitate mixing, dissolve each gallon of BioBAN P-1487 in 100 gallons of water and add this solution directly to the water phase in the tank with minimal agitation.

For storage in tanks without interstitial water: Add 0.5 gallon of BioBAN P-1487 directly to each 1000 gallons of hydrocarbon in the system to obtain a concentration of approximately 500-1000 ppm.



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INTERNATIONAL MINERALS
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NP
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