

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

22 SEP 1988

Dennis K. Prober  
 Van Waters & Rogers, Inc.  
 Subsidiary of UNIVAC  
 2256 Junction Avenue  
 San Jose, CA 95131

Subject: Methyl Bromide Registration Standard  
 NAMCO Pathofume 57/43  
 EPA Registration No. 550-129  
 Your Application of June 27, 1988

Dear Mr. Prober:

Your submission has been reviewed and found to be acceptable for the product listed above.

Enclosed for this product is stamped, approved labeling. Incorporate the following comment and submit five copies of finished printed labeling for our records.

Under "Disposal" revise "Pesticide wastes are acutely hazardous." to "Pesticide wastes are toxic."

You are reminded that an application manual must be provided to applicators who use this product. You should contact one of your suppliers and have them provide you with their approved application manual for distribution.

Sincerely,

*[Signature]*  
 Jeff Kempter  
 Product Manager (32)  
 Antimicrobial Program Branch  
 Registration Division (TS-767C)

Enclosure

TS-767C:PB:WFrancis:wcf:Rm.711:557-6909:9-21-88

CONCURRENCES

SYMBOL							
SURNAME							
DATE							

# COMPLETE CYLINDER LABEL

## RESTRICTED USE PESTICIDE DUE TO ACUTE TOXICITY

For retail sale to and use only by CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION, and only for those uses covered by the CERTIFIED APPLICATOR'S CERTIFICATION.



PRECAUTIONAL USUARIO: Si usted no lee Ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

# NAMCO®

## Pathofume 57/43

For use as a pre-plant soil fumigant. Use in structures is limited to soil treatment in greenhouses.

ACTIVE INGREDIENTS: Methyl bromide . . . . . 57%  
Chloropicrin . . . . . 43%  
This product weighs 14.2 pounds per gallon.

**KEEP OUT REACH OF CHILDREN, IRRESPONSIBLE PERSONS AND PETS**

**DANGER** **POISON** **PELIGRO**

In all cases of over-exposure, get medical attention immediately. Take person to a doctor or emergency treatment facility.

**STATEMENT OF PRACTICAL TREATMENT**

**IF INHALED:** Remove exposed person from contaminated area. Keep warm. Make sure person can breathe freely. If breathing has stopped, give artificial respiration. Do not give anything by mouth to an unconscious person. If not unconscious, flush mouth out with water.

**IF ON SKIN:** Immediately remove contaminated clothing, shoes, and any other item on skin. Wash contaminated skin area thoroughly with soap and water.

**IF IN EYES:** Hold eyes open and flush with a steady, gentle stream of water for at least 15 minutes.

**NOTE TO PHYSICIAN:** Early symptoms of overexposure are dizziness, headache, nausea and vomiting, weakness and collapse. Lung edema may develop in 2 to 48 hours after exposure. Accompanied by cardiac irregularities, these effects are the usual cause of death. Repeated over-exposure can result in blurred vision, staggering gait, and mental confusion with probable recovery after a period of no exposure. Blood bromide levels suggest this occurrence, but not the degree of exposure. Treatment is symptomatic. See the product MSDS for additional information.

Formulated by

**Van Waters & Rogers Inc.**  
subsidiary of UNIVAR  
Seattle, WA 98104



EPA Reg. No. 550-129  
EPA Est. No. 550-CA-1

GROSS WT	TARE WT	NET WT

### PRECAUTIONARY STATEMENT

#### HAZARDS TO HUMANS AND DOMESTIC ANIMALS

#### DANGER

Extremely hazardous liquid and vapor under pressure. Do not breathe or cause serious acute illness or delayed lung, nerve or brain injury. Do not get on skin or eye injury which may have a delayed onset. Do not get liquid on clothing.

This product contains chloropicrin which may be irritating to the upper respiratory tract, causing irritation to the eyes, producing watering. If these symptoms occur, flush immediately.

**RESPIRATORY PROTECTION:** Under normal conditions of use, no respiratory protection is required. However, the following information regarding respiratory protection is required: If these concentrations are exceeded at any time, or the conditions in the fumigation area must wear a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air supplied by BA respirator or evacuate the area. If there is any time respiratory protection is required. Because there is a possibility of leak, the SPILL AND LEAK PROCEDURES under STORAGE, HANDLING, and DISPOSAL must be understood and followed.

**PROTECTIVE CLOTHING:** Methyl bromide and chloropicrin may be irritating to the skin. Wear loose, long sleeved shirts, long trousers and socks. Do not wear jewelry, gloves or other respiratory protection is not required; wear a full face shield for eye protection. After exposure, immediately remove clothing, shoes and socks. Clothing until thoroughly decontaminated by airing and washing. Do not reuse clothing until decontaminated and should be disposed of properly.

**POSTING OR PLACARDING REQUIREMENT:** The applicator must post the fumigated area with signs bearing, in English and Spanish:

1. The signal word DANGER/PELIGRO and the skull and cross bones symbol.
2. The statement, "Area under fumigation, DO NOT ENTER, NO ENTRADA."
3. The date of fumigation.
4. Name of fumigant used, i.e., methyl bromide with chloropicrin.
5. Name, address, and telephone number of the applicator.
6. Additional information required by local, state or federal regulatory agency. Only a certified applicator or someone under his/her supervision may enter the fumigation area. The methyl bromide concentration shall be less than 10 ppm.

**ENVIRONMENTAL HAZARDS:** This product is toxic to water life. Do not discharge into lakes, streams, ponds, rivers, oceans, or public water supply systems and do not discharge into the ground. Do not discharge into sewer systems without obtaining the necessary treatment plant authority. State Water Board or Regional Office of the EPA.

**PHYSICAL HAZARDS:** Contents under pressure. Do not store in open flame or in incinerator. Containers may contain residues above 13%.

**CHEMICAL HAZARDS:** This product is not inflammable. There is no data on the toxicity of this product to fish and other aquatic life. This product will liberate toxic and corrosive gases. The use of this product with alkali metals will result in the liberation of toxic gases, and possibly, severe corrosion of containers and equipment made of these materials.

### DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with the label directions. This fumigant is a highly hazardous material and should be used only for the purposes and in the manner specified on the label. All persons working with this fumigant must be knowledgeable about the use of required respirator equipment and detector devices, emergency procedures, and the fumigant. This product is to be used only for pre-plant soil fumigation. Extreme caution should be taken when fumigating next to fields with adjacent buildings inhabited by humans or animals.

**Conditions of Sale and Warranty**  
The conditions of sale and warranty are set forth in the separate document which is attached to this product. It is the responsibility of the purchaser to read and understand the conditions of sale and warranty. The conditions of sale and warranty are set forth in the separate document which is attached to this product. It is the responsibility of the purchaser to read and understand the conditions of sale and warranty. The conditions of sale and warranty are set forth in the separate document which is attached to this product. It is the responsibility of the purchaser to read and understand the conditions of sale and warranty.

**Residues and Tolerances**  
This product contains methyl bromide and chloropicrin. The residue tolerance for methyl bromide is 0.1 ppm and for chloropicrin is 0.1 ppm. The residue tolerance for methyl bromide is 0.1 ppm and for chloropicrin is 0.1 ppm. The residue tolerance for methyl bromide is 0.1 ppm and for chloropicrin is 0.1 ppm. The residue tolerance for methyl bromide is 0.1 ppm and for chloropicrin is 0.1 ppm.

**A. Tarpaulin Methods for Field, Nursery, Turf, & Seed or Transplant Bed Soils:**

1. **Overall Application:** Treat the soil with a closed type applicator having the ches spaced no more than 12 inches apart and spacing the fumigant to a depth of 6 to 10 inches below the soil surface. The soil surface must be covered immediately after treatment with a polyethylene film having equipment or by sealing roller or subsoiler and covered with 20 minutes with polyethylene film or other suitable cover. Consult appropriate Rate-Exposure Table for proper rate of application and exposure period.
2. **Row or bed applications:** Apply the fumigant rate to the area actually treated (i.e., the area delineated by the fumigant). Consult the appropriate Rate-Exposure Table for treatment rates and exposure periods. The one or more rows per foot spaced not more than 12 inches apart, depending upon the area to be treated. Treat the soil with a closed type applicator having the ches spaced no more than 12 inches apart and spacing the fumigant to a depth of 6 to 10 inches below the soil surface. The soil surface must be covered immediately after treatment with polyethylene film having equipment or by sealing with a roller or subsoiler and covered within 20 minutes with polyethylene film or other suitable cover.

At the end of the exposure period remove tarpaulin and average for at least two weeks before planting out transplants or seedling plant parts. Crops must be planted after 90 days following the exposure period. If the fumigant remains in the soil at the end of the exposure period, the soil must be aerated. Where polyethylene film is to be utilized as a soil cover, removal is accomplished by mowing or other means. The film remaining appropriate in this report, be pulled.

**B. Special Instructions for Greenhouse Soil Fumigation:**

The use of methyl bromide and chloropicrin fumigants in greenhouses presents a particular hazard to humans and plants. The fumigant must be dispersed in the greenhouse uniformly. In the responsibility of the operator, during the use of the fumigant, the operator must wear a respirator and safety glasses. Before the fumigant application, the operator must check the operation of the fumigant and the proper timing of all personnel involved in the fumigation. The operator must take the use of safety equipment, to protect all persons from the area of the fumigant and to protect the equipment to prevent personnel injury.

Two persons should be in the greenhouse during the fumigation. One person should be in the fumigant, and the other person should be in the greenhouse. Two persons should be in the greenhouse during the fumigation. One person should be in the fumigant, and the other person should be in the greenhouse. Two persons should be in the greenhouse during the fumigation. One person should be in the fumigant, and the other person should be in the greenhouse.

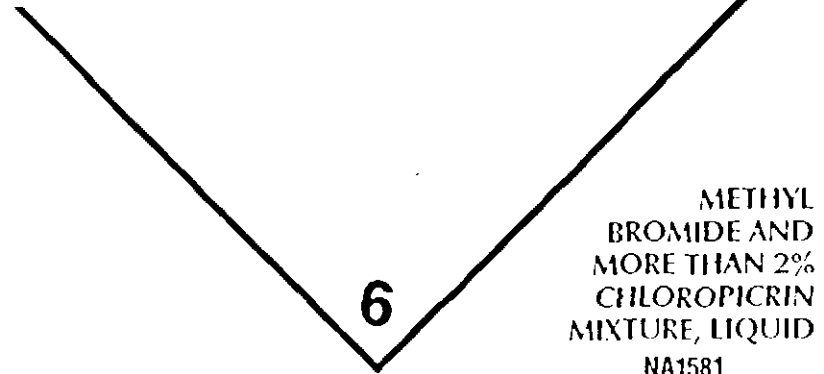
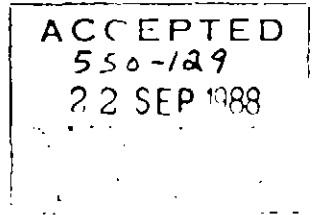
Fumigation of greenhouses should be done by either chemical or physical means. If the fumigant is applied by chemical means, the operator should wear a respirator and safety glasses. Before the fumigant application, the operator must check the operation of the fumigant and the proper timing of all personnel involved in the fumigation. The operator must take the use of safety equipment, to protect all persons from the area of the fumigant and to protect the equipment to prevent personnel injury.

During the fumigation, the operator should be in the greenhouse. Two persons should be in the greenhouse during the fumigation. One person should be in the fumigant, and the other person should be in the greenhouse. Two persons should be in the greenhouse during the fumigation. One person should be in the fumigant, and the other person should be in the greenhouse.

**Aeration and Reentry:** After the fumigation, the operator should be in the greenhouse. Two persons should be in the greenhouse during the fumigation. One person should be in the fumigant, and the other person should be in the greenhouse. Two persons should be in the greenhouse during the fumigation. One person should be in the fumigant, and the other person should be in the greenhouse.

**C. Special Instructions for Florida Citrus:**

Preparation of citrus groves for fumigation should be done by either chemical or physical means. If the fumigant is applied by chemical means, the operator should wear a respirator and safety glasses. Before the fumigant application, the operator must check the operation of the fumigant and the proper timing of all personnel involved in the fumigation. The operator must take the use of safety equipment, to protect all persons from the area of the fumigant and to protect the equipment to prevent personnel injury.



**METHYL BROMIDE AND MORE THAN 2% CHLOROPICRIN MIXTURE, LIQUID NA1581**

**NAMCO Pathofume 77-41 Rate-Exposure Table**

PLANT SPECIES	Application Method	Rate (lb/1000 sq ft)	Exposure Period (days)
1. Citrus (to be planted)	a. Fumigation (pre-planting)	1.0 to 1.5	14 to 21
	b. Fumigation (post-planting)	1.0 to 1.5	14 to 21
2. Citrus (to be planted)	a. Fumigation (pre-planting)	1.0 to 1.5	14 to 21
	b. Fumigation (post-planting)	1.0 to 1.5	14 to 21
3. Citrus (to be planted)	a. Fumigation (pre-planting)	1.0 to 1.5	14 to 21
	b. Fumigation (post-planting)	1.0 to 1.5	14 to 21

1. Use the higher rates in the table if the soil is very sandy.
2. Apply the fumigant in the evening or at night, if possible, to reduce the risk of fire.
3. Do not apply the fumigant to citrus groves that have been planted in the last 24 months.
4. Do not apply the fumigant to citrus groves that have been planted in the last 24 months.
5. Do not apply the fumigant to citrus groves that have been planted in the last 24 months.
6. Do not apply the fumigant to citrus groves that have been planted in the last 24 months.

The Methyl Bromide Detector is a device which is used to detect the presence of methyl bromide in the air. It is used to ensure that the fumigant is not present in the air at a level that is dangerous to humans. The detector is used in greenhouses and other enclosed spaces where fumigation is being used.

PLANT SPECIES	Application Method	Rate (lb/1000 sq ft)	Exposure Period (days)
1. Citrus (to be planted)	a. Fumigation (pre-planting)	1.0 to 1.5	14 to 21
	b. Fumigation (post-planting)	1.0 to 1.5	14 to 21
2. Citrus (to be planted)	a. Fumigation (pre-planting)	1.0 to 1.5	14 to 21
	b. Fumigation (post-planting)	1.0 to 1.5	14 to 21
3. Citrus (to be planted)	a. Fumigation (pre-planting)	1.0 to 1.5	14 to 21
	b. Fumigation (post-planting)	1.0 to 1.5	14 to 21

**BEST AVAILABLE COPY**

CYLINDER LABEL W/ PRODUCT BULLETIN

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**NAMCO®**

**Pathofume 57/43**

For use as a pre-plant soil fumigant. Use in structures is limited to soil treatment in greenhouses.

ACTIVE INGREDIENTS: Methyl bromide . . . . . 57%  
Chloropicrin . . . . . 43%  
This product weighs 14.2 pounds per gallon.

KEEP OUT REACH OF CHILDREN, IRRESPONSIBLE PERSONS AND PETS

**DANGER POISON PELIGRO**

In all cases of over-exposure, get medical attention immediately. Take person to a doctor or emergency treatment facility.

**STATEMENT OF PRACTICAL TREATMENT**

**IF INHALED** Remove exposed person from contaminated area as quickly as possible. Move person to clean air. The best method of breathing is to breathe through a cloth or paper towel. Do not give anything by mouth to an unconscious person. If a doctor is not available, mouth-to-mouth with water.

**IF ON SKIN** Remove clothing worn contaminated. If strong dizziness or other symptoms occur, Wash exposed areas thoroughly with soap and water.

**IF IN EYES** Flush eyes open and flush with a steady gentle stream of water for at least 15 minutes.

**NOTE TO PHYSICIAN:** Early symptoms of over-exposure are dizziness, headache, nausea and vomiting, weakness and collapse. Long edema may develop in 2 to 48 hours after exposure, accompanied by certain irregularities. These effects are the result of injury to the respiratory system. Over-exposure can result in blurred vision, staggering gait, and loss of consciousness. Symptoms occur even after a period of no exposure. Food for medicinal purposes of this nature is not recommended. Treatment is symptomatic. See the product MSDS for additional information.

Formulated by

**Van Waters & Rogers Inc.**  
subsidiary of UNIVAR

1000 W. WA 11101

EPA Reg. No. 550-129  
EPA Est. No. 550-CA-1



GROSS WT	TARE WT	NET WT

**PRECAUTIONARY STATEMENT:  
HAZARDS TO HUMANS AND DOMESTIC ANIMALS  
DANGER**

Extremely hazardous liquid and vapor under pressure. Do not breathe vapor. Inhalation or cause serious acute illness or delayed lung, nerve or brain injury. Liquid or vapor can cause skin or eye injury which may have a delayed onset. Do not get liquid on skin, in eyes.

This product contains chloropicrin which may be irritating to the upper respiratory tract. Irritation to the eyes, producing watering. If these symptoms occur, leave the area immediately.

**RESPIRATORY PROTECTION:** Under normal conditions of use, no respiratory protection required. However, the following information regarding respiratory protection should be observed: concentration of methyl bromide and chloropicrin in the worker area, as measured by appropriate detector tubes (for example, Dräger, Kitagawa, MSA, and Sensidyne), does not exceed 20 ppm (20 mg/M3) for methyl bromide or 0.1 ppm (0.7 gm/M3) for chloropicrin, no respiratory protection is required. If these concentrations are exceeded at any time, or the concentration of fumigant in the fumigation area must wear a NIOSH/MSHA approved self-contained breathing apparatus or combination air supplied by a respirator or evacuate the area. Protective cloth to be worn any time respiratory protection is required. Because there is always a possibility of leak, the SPILL AND LEAK PROCEDURES under STORAGE, HANDLING, AND DISPOSAL should be followed.

**PROTECTIVE CLOTHING:** Methyl bromide may be trapped inside clothing and cause skin disease. Long-sleeved shirts, long trousers and socks that are cleaned after each wearing. Do not wear jewelry, gloves or other gas confining apparel. If full face respiratory protection is required, wear a full face shield for eye protection when handling liquid fumigant. Immediately remove clothing, shoes and socks. Do not reuse contaminated clothing until decontaminated by airing and washing. Leather shoes cannot be adequately decontaminated. Should be disposed of properly.

**POSTING OR PLACARDING REQUIREMENT:** The applicator must place and post at the fumigated area with signs bearing the English and Spanish:

1. The signal word "DANGER/PELIGRO" with the skull and cross-bones symbol.
2. The statement, "Area under fumigation, DO NOT ENTER/NO ENTREE".
3. The date of fumigation.

4. Name of fumigant used, i.e., methyl bromide with chloropicrin.
5. Name, address, and telephone number of the applicator.
6. A full and complete copy of the state regulations.

Only a certified applicator or someone under their supervision may remove placards. The maximum concentration of methyl bromide in the fumigated site is below 5 ppm and 0.1 ppm for chloropicrin.

**ENVIRONMENTAL HAZARDS:** Do not discharge into wildlife. Do not discharge into the ground, into lakes, streams, ponds, rivers or oceans, or public waters, or into surface water, including and addressed in state regulations. Do not discharge into sewer systems without notifying the local sewer treatment plant authority. For guidance, contact Water Board or Regional Office of EPA.

**PHYSICAL HAZARDS:** Contents are under pressure. Do not use or store near heat or open flame or in incinerator containers. Do not store at temperatures above 130°F. May cause explosion.

**CHEMICAL HAZARDS:** This product is highly flammable. There is no danger from fire at concentrations. However, flames at temperatures above 1000°F can cause degradation of the plastic tank and containers. The use of this product with aluminum, magnesium, or alkali metals will result in the formation of toxic gases, and possible fire and explosion. Severe corrosion of containers is a by-product made of these metals may occur.

**DIRECTIONS FOR USE**

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

This fumigant is a highly hazardous material and should be used only in accordance with proper use. Before using, read and follow all label precautions and directions.

All persons working with this fumigant must be knowledgeable about the hazards, and use of required respiratory equipment and detector devices, emergency procedures, and safe fumigant.

This product is to be used only for pre-plant soil fumigation.

Extreme caution should be taken when fumigating next to fields with animals or valuable next to buildings inhabited by humans or animals.

**Conditions of Sale and Warranties**

The purchaser will find the product information on the label and on the back of the container. The purchaser should be held responsible for the use of the product. The purchaser should be held responsible for the use of the product. The purchaser should be held responsible for the use of the product. The purchaser should be held responsible for the use of the product.

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THIS MATERIAL OR THE USE OF IT. OTHER THAN INDICATED ON THE LABEL, OR FOR DAMAGES ALL BY OR FOR THE AND/OR REASONING, WHEN SUCH USE OR HANDLING IS CONTRARY TO LABEL INSTRUCTIONS.

**Residues and Tolerances**

Residues and tolerances are given in the label. The purchaser should be held responsible for the use of the product. The purchaser should be held responsible for the use of the product. The purchaser should be held responsible for the use of the product.

**BEST AVAILABLE**

For retail sale to and use only by CERTIFIED APPLICATORS OR PERSONS UNDER THEIR DIRECT SUPERVISION, and only for those uses covered by the CERTIFIED APPLICATOR'S CERTIFICATION.

PRECAUTION AL USUARIO: Si usted no lee Ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.



**NAMCO**®

Pathofume 75/25  
Pathofume B

Pathofume 57/43  
Trifume

Trifume 2+2

For use as a pre-plant soil fumigant. Use in structures is limited to soil treatment in greenhouses.

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Product	Active Ingredients (%)		Lbs/Gal	EPA Reg. No.
	Methyl Bromide	Chloropicrin		
Pathofume 75/25	75	25	14.2	525-147-AA
Pathofume 57/43	57	43	14.2	525-137-AA
Pathofume B	67	33	14.2	57-117-AA
Trifume	43	57	14.2	57-117-AA
Trifume 2+2	25	25	14.1	57-117-AA

**KEEP OUT OF REACH OF CHILDREN, IRRESPONSIBLE PERSONS AND PETS**

**DANGER** **POISON** **PELIGRO**

In all cases of over-exposure, get medical attention immediately. Take person to a doctor or emergency treatment facility.

**STATEMENT OF PRACTICAL TREATMENT**

**IF INHALED:** If you or exposed person inhales vapors, get person to fresh air immediately. If breathing is difficult, give artificial respiration. If necessary, use mouth-to-mouth respiration. Do not use mouth-to-mouth respiration if you have a wound in your mouth. If necessary, use a resuscitator. If necessary, use a resuscitator. If necessary, use a resuscitator.

**IF ON SKIN:** Wash exposed skin immediately with plenty of water. If necessary, use soap and water. If necessary, use soap and water. If necessary, use soap and water.

**IF IN EYES:** Flush eyes immediately with plenty of water. If necessary, use soap and water. If necessary, use soap and water. If necessary, use soap and water.

**NOTE TO PHYSICIAN:** For information, the active ingredients are Methyl Bromide and Chloropicrin. These are highly toxic and should be handled with extreme care. If necessary, use soap and water. If necessary, use soap and water. If necessary, use soap and water.

ACCEPTED  
555-129  
22 SEP 1968

Van Waters & Rogers Inc.  
subsidiary of UNIVAR





### Conditions of Sale and Warranty

The Directions for Use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application all of which are beyond the control of Van Waters & Rogers Inc. All such risks shall be assumed by the Buyer.

**SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THIS MATERIAL OR THE USE OF THIS PRODUCT OTHER THAN INDICATED ON THE LABEL. BUYER ASSUMES ALL RISK OF USE AND/OR HANDLING OF THIS MATERIAL WHEN SUCH USE OR HANDLING IS CONTRARY TO LABEL INSTRUCTIONS.**

### Residues and Tolerances

Any pesticide chemicals are poisonous and may leave a toxic residue on the plants to which they are applied. The U.S. Environmental Protection Agency has established maximum amounts of such pesticide chemicals that may remain on agricultural products at harvest, and it is the user's responsibility to see that there is no residue on such crops at harvest in excess of these amounts. The U.S. Environmental Protection Agency also has established maximum residue tolerances for certain pesticides on certain crops. The user should refer to the label for the maximum residue tolerance for the pesticide. However, Van Waters & Rogers Inc. assumes no responsibility as to their liability for any loss due to excessive residues.

### Pests Controlled

This product is useful in controlling the following pests when present at the time of treatment:

**Plant parasitic nematodes**, including root knot, root lesion (necrotic), cyst, citrus burrowing, false root, and stunt (e.g., ring, sting, stubby root, dagger, gall, sheath and stunt styles).

**Soil-borne disease organisms**, including *Pythium*, *Rhizoctonia*, *Phytophthora*, *Pyrenopeziza*, *Sclerotinia*, *Fusarium* and the clubroot organism, *Plasmodiophora*.

**Weeds and weed seed**, broadleaf weeds and grasses including quackgrass and crabgrass (in certain states), lambsquarters, burdockgrass and Bermuda grass. While normally not effective against weeds of denser, green stands, some mungbean and some species of clover, enhanced control may be obtained by using higher dosages and/or repeating the process.

**Insects in the soil**, including wire worms, cutworms, grubs, rootworms, ants and garden symphylans.

### Treatment Conditions

**When to Treat:** Treatments can be made any time of year when soil conditions are suitable. In northern states, winter or early fall treatments are best for land to be planted to early spring crops.

**Temperature Requirements:** Do not fumigate if the soil temperature is below 50°F. For the best results, fumigate when soil temperature is 60 to 80°F at the depth of 6 to 8 inches.

**Preparation:** Before use, thoroughly till the soil to the depth to which effective treatment is required.





**Methyl Bromide Leak Detector** The detector is useful in detecting gross leaks of the product such as around taping and tarping. This detector cannot normally detect methyl bromide concentrations below 50 ppm, while the TLV is 5 ppm, the detector should not be used to determine appropriate respiratory protection or the adequacy of aeration. The following tabulation gives the approximate methyl bromide concentration associated with color intensity in the flame during use at night. The flame has a bluish cast which has to be taken into consideration, otherwise the color changes are as follows:

Gas Product ppm Present	Pounds per 1000 cubic feet	Flame Color in Daylight
0	0	No color
25	0.00625	Faint fringe of green
50	0.0125	Moderate green
75	0.031	Green
250	0.0625	Strong green
500	0.125	Strong green blue fringe
1000	0.20	Strong blue-green
2000	0.25	Blue

#### Chemical And Physical Properties for Methyl Bromide and Chloropicrin

	Methyl Bromide	Chloropicrin
Formula	CH <sub>3</sub> Br	CCl <sub>3</sub> NO <sub>2</sub>
Color	Colorless to light yellow	Colorless
Physical State	Gas at 25°C. Liquid under pressure	Gas liquid
Odor	Odorless	Strong irritating, causes tears
Flammability	Nonflammable	Nonflammable
Explosibility	Nonexplosive	Nonexplosive
Boiling Point	3.6°C (38.5°F)	11.2°C (22.0°F)
Freezing Point	-93°C (-135.4°F)	-64°C (-83.2°F)
Density of Liquid	1.732 g/ml	1.65 g/ml

0	0.00625	No color
1	0.0125	Faint fringe of green
2	0.031	Moderate green
3	0.0625	Green
4	0.125	Strong green
5	0.20	Strong green-blue fringe
6	0.25	Strong blue green
7		Blue

**Chemical and Physical Properties for Methyl Bromide and Chloropicrin**

Property	Methyl Bromide	Chloropicrin
Formula	CH <sub>3</sub> Br	CCl <sub>3</sub> NO <sub>2</sub>
Color	Colorless to light yellow	Colorless to yellow
Physical State	Gas at 25°C Liquid under pressure	Liquid**
Odor	Odorless	Strong irritating, caustic burn
Flammability	Nonflammable	Nonflammable
Stability	None explosive	None explosive
Melting Point	3.6°C (38.5°F)	1.24°C (220°F)
Boiling Point	-93°C (-135.4°F)	-64°C (83.2°F)
Weight of Liquid (32°F)	1.732 gm/ml	1.65 gm/ml
Weight per Gallon (32°F)	14.4 lb	13.7 lb
Specific Gravity of Gas at 100 mm Hg (Air = 1.00)	3.27	5.7
Relative Density (68°F)	0.247 lb/cu. ft.	—
Vapor Pressure (68°F)	1400 mm Hg	18.3 mm Hg
Solubility in Water	Very slight, forms a voluminous white precipitate with ice water	Slightly soluble

**MCO Pathofume 75/25 Rate/Exposure Table**

TREATMENT SITE	RATE <sup>1</sup> & METHOD <sup>2</sup>	EXPOSURE TIME
Field soils to be planted to: Asparagus, broccoli, cauliflower, eggplant, lettuce, musk melons, onions (dry bulb), peppers, pineapples, strawberries, tomatoes	240-320 lb/A	24-48 hr
Orchards Citrus <sup>3</sup>	1.5 lb/100 sq. ft.	24-48 hr
Nursery and greenhouse soils, seed and transplant beds and turf:		
Non-food crops	240-580 lb/A	24-48 hr
Tobacco	1.2 lb/100 sq. ft.	24-48 hr
Tomato (greenhouse crop)	240-580 lb/A	24-48 hr

**AMCO Pathofume 57/43 Rate/Exposure Table**

TREATMENT SITE	RATE <sup>1</sup> & METHOD <sup>2</sup>	EXPOSURE TIME
Field soils to be planted to: Asparagus, broccoli, cauliflower, eggplant, lettuce, musk melons, onions (dry bulb), peppers, pineapples, strawberries, tomatoes	315-420 lb/A	24-48 hr
Orchards Citrus <sup>3</sup>	2 lb/100 sq. ft.	96 hr
Nursery and greenhouse soils, seed and transplant beds and turf:		
Non-food crops	315-760 lb/A	24-48 hr
Tobacco	1.8 lb/100 sq. ft.	24-48 hr
Tomato (greenhouse crop)	315-420 lb/A	24-48 hr

**NAMCO Pathofume B Rate/Exposure Table**

TREATMENT SITE	RATE <sup>1</sup> & METHOD <sup>2</sup>	EXPOSURE TIME
Field soils to be planted to: Asparagus, broccoli, cauliflower, eggplant, lettuce, musk melons, onions (dry bulb), peppers, pineapples, strawberries, tomatoes	270-360 lb/A	24-48 hr
Orchards Citrus <sup>3</sup>	1.5 lb/100 sq. ft.	24-48 hr
Nursery and greenhouse soils, seed and transplant beds and turf:		
Non-food crops	270-650 lb/A	24-48 hr
Tobacco	1.5 lb/100 sq. ft.	24-48 hr
Tomato (greenhouse crop)	270-360 lb/A	24-48 hr

**NAMCO Triflume Rate/Exposure Table**

TREATMENT SITE	RATE <sup>1</sup> & METHOD <sup>2</sup>	EXPOSURE TIME
Field soils to be planted to: Asparagus, broccoli, cauliflower, eggplant, lettuce, musk melons, onions (dry bulb), peppers, pineapples, strawberries, tomatoes	400-510 lb/A	24-48 hr
Orchards Citrus <sup>3</sup>	2 lb/100 sq. ft.	24-48 hr
Nursery and greenhouse soils, seed and transplant beds and turf:		
Non-food crops	400-970 lb/A	24-48 hr
Tobacco	2 lb/100 sq. ft.	24-48 hr
Tomato (greenhouse crop)	400-510 lb/A	24-48 hr

**NAMCO Triflume 2+2 Rate/Exposure Table**

TREATMENT SITE	RATE <sup>1</sup> & METHOD <sup>2</sup>	EXPOSURE TIME
Field soils to be planted to: Asparagus, broccoli, cauliflower, eggplant, lettuce, musk melons, onions (dry bulb), peppers, pineapples, strawberries, tomatoes	360-480 lb/A	24-48 hr
Orchards Citrus <sup>3</sup>	2 lb/100 sq. ft.	96 hr
Nursery and greenhouse soils, seed and transplant beds and turf:		
Non-food crops	360-430 lb/A	24-48 hr
Tobacco	2 lb/100 sq. ft.	24-48 hr
Tomato (greenhouse crop)	360-480 lb/A	24-48 hr

1. Use the higher rates in finer soils and those high in organic matter.
2. Methods of application is by emission with sheets plus covered with tarpaulin.
3. Use limited to one application in 2 to 3 years. Use limited to California only. Lettuce bag vein is also controlled.
4. Onions (direct seeded/dry bulb) West of Rockies only. White rot is also controlled.
5. May not bear harvestable fruit within 24 months.
6. Seeds of certain weeds such as clover, ornamental, Ranunc, and others with hard seeds may require a higher dosage.

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