

MATERIAL SAFETY DATA SHEET

FURADAN® LFR INSECTICIDE / NEMATICIDE



MSDS Ref. No.: 1563-66-2-26

Date Approved: 10/26/2005

Revision No.: 9

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the EC directive, 2001/58/EC and other regulatory requirements. The information contained herein is for the concentrate as packaged, unless otherwise noted.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: FURADAN® LFR INSECTICIDE / NEMATICIDE
PRODUCT CODE: 2837
ACTIVE INGREDIENT(S): Carbofuran
CHEMICAL FAMILY: Carbamate Pesticide
MOLECULAR FORMULA: $C_{12}H_{15}NO_3$ (carbofuran)
SYNONYMS: FMC 10242; 2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate; IUPAC: 2,3-dihydro-2,2-dimethylbenzofuran-7-yl methylcarbamate

MANUFACTURER

FMC CORPORATION
Agricultural Products Group
1735 Market Street
Philadelphia, PA 19103
(215) 299 6000 (General Information)

EMERGENCY TELEPHONE NUMBERS

(800) 331-3148 (FMC - U.S.A. & Canada)
(716) 735-3765 (FMC - Reverse charges)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A. & Canada)
(703) 527-3887 (CHEMTREC - All Other Countries)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Creamy off-white liquid suspension with a mildly phenolic odor.
- Slightly combustible. May support combustion at elevated temperatures.
- Degrades at temperatures above 130°C (266°F).
- Thermal decomposition and burning may form toxic by-products.
- For large exposures or fire, wear personal protective equipment.
- Highly toxic to fish and aquatic organisms. Keep out of drains and water courses.
- Highly toxic if swallowed, and could be highly toxic if absorbed through the mucous membranes of the eyes.

- It is expected to be highly toxic by inhalation.

POTENTIAL HEALTH EFFECTS: Effects from overexposure result from either swallowing, inhaling or coming into contact with the eyes or skin. Conditions of increased temperature and humidity may aid skin absorption of this product and, therefore, increase toxicity. Symptoms of overexposure include headache, light-headedness, weakness, abdominal cramps, nausea, excessive salivation, perspiration, blurred vision, tearing, pin-point pupils, blue skin color, convulsions, tremor and coma.

MEDICAL CONDITIONS AGGRAVATED: None presently known.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt. %	EC No.	EC Class
Carbofuran	1563-66-2	40.64	216-353-0	R26/28-50/53; S1/2-36/37-45-60-61
Propylene Glycol	57-55-6	6	200-338-0	Not classified
Surfactant Blend		3	None	Not classified
Silica, quartz	14808-60-7	<0.5	238-878-4	Not classified

4. FIRST AID MEASURES

EYES: Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor immediately.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Drink 2 glasses of water and induce vomiting by touching the back of the throat with a finger. Never induce vomiting or give anything by mouth to an unconscious person. See a medical doctor.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, see a medical doctor. If breathing has stopped, give artificial respiration and see a medical doctor immediately.

NOTES TO MEDICAL DOCTOR: This product is highly toxic if swallowed, and has low dermal toxicity. It is expected to be highly toxic by inhalation. It is minimally irritating to the skin and practically non-irritating to the eyes, however, absorption through the mucous membranes of the eyes could be highly toxic. Carbofuran is a reversible cholinesterase inhibitor. Atropine sulfate is antidotal. Support respiration as needed with removal of secretions, maintenance of a patent airway and, if necessary, artificial ventilation. If cyanosis is absent: Adults - start treatment by giving 2 mg atropine intravenously or intramuscularly, if necessary, and repeat with 0.4 - 2.0 mg atropine at 15 minute intervals until

atropinization occurs (tachycardia, flushed skin, dry mouth, mydriasis); Children under 12 - initial dose = 0.05 mg/kg body weight and repeat dose = 0.02 - 0.05 mg/kg body weight. Use of oximes such as 2-PAM is controversial. Observe patient to insure that these symptoms do not recur as atropinization wears off. If in eyes, instill one drop of homatropine. Treatment is otherwise controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Foam, CO₂ or dry chemical. Soft stream water fog only if necessary. Contain all runoff.

FIRE / EXPLOSION HAZARDS: Slightly combustible. Carbofuran will burn if ignited and degrades at temperatures above 130°C (266°F).

FIRE FIGHTING PROCEDURES: Isolate fire area. Evacuate downwind. Wear full protective clothing and self-contained breathing apparatus. Do not breathe smoke, gases or vapors generated.

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Isolate and post spill area. Wear protective clothing and personal protective equipment as prescribed in Section 8, "Exposure Controls/Personal Protection". Keep unprotected persons and animals out of the area.

Keep material out of lakes, streams, ponds and sewer drains. Dike to confine spill and absorb with a non-combustible absorbent such as clay, sand or soil. Vacuum, shovel or pump waste into a drum and label contents for disposal.

To clean and neutralize spill area, tools and equipment, wash with a bleach or caustic/soda ash solution. Follow this by washing with a strong soap and water solution. Absorb, as above any excess liquid and add to the drums of waste already collected. Repeat if necessary. Dispose of drummed wastes according to the method outlined in Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

HANDLING AND STORAGE: Store in a cool, dry, well-ventilated place. Do not use or store near heat, open flame or hot surfaces. Store in original containers only. Keep out of reach of children and animals. Do not contaminate other pesticides, fertilizers, water, food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Carbofuran	0.1 mg/m ³ (TWA)	0.1 mg/m ³ (PEL)	
Propylene Glycol		10.0 mg/m ³ (WEEL)	
Silica, quartz	0.05 mg/m ³ (TWA) (respirable fraction)	0.1 mg/m ³ (PEL) (respirable dust)	

ENGINEERING CONTROLS: Use local exhaust at all process locations where vapor or mist may be emitted. Ventilate all transport vehicles prior to unloading.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: For splash, mist or spray exposure, wear chemical protective goggles or a face shield.

RESPIRATORY: For splash, mist or spray exposures wear, as a minimum, a properly fitted half-face or full-face air-purifying respirator which is approved for pesticides (U.S. NIOSH/MSHA, EU CEN or comparable certification organization). Respirator use and selection must be based on airborne concentrations.

PROTECTIVE CLOTHING: Depending upon concentrations encountered, wear coveralls or long-sleeved uniform and head covering. For larger exposures as in the case of spills, wear full body cover barrier suit, such as a PVC suit. Leather items - such as shoes, belts and watchbands - that become contaminated should be removed and destroyed. Launder all work clothing before reuse (separately from household laundry).

GLOVES: Wear chemical protective gloves made of materials such as rubber, neoprene or nitrile. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

WORK HYGIENIC PRACTICES: Clean water should be available for washing in case of eye or skin contamination. Wash skin prior to eating, drinking, chewing gum, or using tobacco. Shower at the end of the workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Mildly phenolic
APPEARANCE:	Creamy off-white liquid suspension
DENSITY / WEIGHT PER VOLUME:	9.78 lbs/gal (1175 g/L)
FLASH POINT:	> 100 °C (> 212 °F)
MOLECULAR WEIGHT:	221.26 (carbofuran)
pH:	6.34
SPECIFIC GRAVITY:	1.17

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat and fire.
STABILITY:	Stable
POLYMERIZATION:	Will not occur
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide, carbon dioxide, nitrogen oxides, and methyl isocyanate.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Practically non-irritating

SKIN EFFECTS: Minimally irritating

DERMAL LD₅₀: 6,783 mg/kg (rabbit)

ORAL LD₅₀: 7.34 mg/kg (rat)

INHALATION LC₅₀: Carbofuran: 0.10 mg/l (1 h) (rat)

ACUTE EFFECTS FROM OVEREXPOSURE: This product is highly toxic if swallowed, and has low dermal toxicity. It is expected to be highly toxic by inhalation. It is minimally irritating to the skin and practically non-irritating to the eyes, however, absorption through the mucous membranes of the eyes could be highly toxic. With dermal exposure to this product, conditions of increased temperature and humidity facilitate skin absorption and, therefore, promote increased toxicity. Carbofuran is a reversible cholinesterase inhibiting pesticide, which elicits symptoms in humans typical of cholinesterase inhibition including headaches, light-headedness, weakness, abdominal cramps, nausea, excessive salivation, perspiration and blurred vision. More severe signs of cholinesterase inhibition include tearing, pin-point pupils, excessive respiratory secretions, cyanosis, convulsions, generalized tremor and

coma. Excessive exposure may result in death. In humans, ingestion of large amounts of propylene glycol has resulted in symptoms of reversible central nervous system depression including stupor, rapid breathing and heartbeat, profuse sweating and seizures.

CHRONIC EFFECTS FROM OVEREXPOSURE: No data available for the formulation. In studies with laboratory animals, carbofuran did not cause reproductive toxicity, teratogenicity, or carcinogenicity. Chronic exposure of laboratory animals to carbofuran has caused decreased cholinesterase activity (erythrocyte, plasma, and/or brain). An overall absence of genotoxicity has been demonstrated in mutagenicity testing with carbofuran. Repeated overexposure to propylene glycol can produce central nervous system depression, hemolysis and minimal kidney damage. Repeated overexposure to crystalline silica for extended periods has caused acute silicosis. IARC has classified crystalline silica, inhaled in the form of quartz or cristobalite from occupational sources, as carcinogenic to humans (Group 1). NTP has classified respirable crystalline silica (quartz, cristobalite and tridymite) as "reasonably anticipated to be carcinogenic". The American Conference of Governmental Industrial Hygienists (ACGIH) has concluded that silica quartz is a suspected human carcinogen (A2 - limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals with relevance to humans).

CARCINOGENICITY:

Chemical Name	IARC	NTP	OSHA	Other
Silica, quartz	Listed	Listed	Not listed	(ACGIH) Listed

12. ECOLOGICAL INFORMATION

Unless otherwise indicated, the data presented below are for the active ingredient.

ENVIRONMENTAL DATA: Carbofuran has a moderate rate of degradation in soil (half-life = 50 days). It undergoes rapid hydrolysis under alkaline (high pH) conditions, but is stable at acidic (low) pH. Carbofuran has a Log Pow of 1.4 and a bioconcentration factor of 9 (low potential for environmental accumulation). It may be mobile in soil, especially soils with a high sand content and, therefore, has a potential to contaminate groundwater. In heavier textured soils, the mobility of carbofuran is expected to be moderate.

ECOTOXICOLOGICAL INFORMATION: With LC₅₀ values between 5.3 to 36 µg/L to fish and aquatic arthropods in the laboratory, this product is considered highly toxic. Care should be taken to avoid contamination of the aquatic environment. It is also considered highly toxic to waterfowl and upland game birds, and has an oral LD₅₀ of 2.67 to 10.75 mg/kg. Carbofuran is easily metabolized and, because it is a rapidly reversible cholinesterase inhibitor, recovery from symptoms of sublethal exposure occurs quickly.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Open dumping or burning of this material or its packaging is prohibited. If spilled material cannot be disposed of by use according to label instructions, an acceptable method of disposal is to incinerate in accordance with local, state and national environmental laws, rules, standards and regulations. However, because acceptable methods of disposal may vary by location and regulatory requirements may change, the appropriate agencies should be contacted prior to disposal.

EMPTY CONTAINER: Non-returnable containers that held this material should be cleaned, prior to disposal, by triple rinsing. Containers which held this material may be cleaned by being triple-rinsed, and recycled, with the rinsate being incinerated. Do not cut or weld metal containers. Vapors that form may create an explosion hazard.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Carbamate pesticide, liquid, toxic
TECHNICAL NAME(S):	Carbofuran
PRIMARY HAZARD CLASS / DIVISION:	6.1
UN/NA NUMBER:	UN 2992
PACKING GROUP:	II
LABEL(S):	6.1
PLACARD(S):	6.1
MARKING(S):	RQ Carbamate pesticide, liquid, toxic (carbofuran), UN 2992
REPORTABLE QUANTITY (RQ):	Carbofuran
ADDITIONAL INFORMATION:	Carbofuran is in an "RQ" quantity when this material meets or exceeds 24.6 pounds (2.5 gallons) per package.
PACKAGING TYPE:	Bulk
PROPER SHIPPING NAME:	Carbamate pesticide, liquid, toxic
TECHNICAL NAME(S):	Carbofuran
PRIMARY HAZARD CLASS / DIVISION:	6.1
UN/NA NUMBER:	UN 2992
PACKING GROUP:	II
MARINE POLLUTANT:	Carbofuran
LABEL(S):	6.1
PLACARD(S):	6.1
MARKING(S):	2992
REPORTABLE QUANTITY (RQ):	Carbofuran

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Carbamate pesticide, liquid, toxic
TECHNICAL NAME(S):	Carbofuran
PRIMARY HAZARD CLASS / DIVISION:	6.1
UN/NA NUMBER:	UN 2992
PACKING GROUP:	II
MARINE POLLUTANT:	Carbofuran
LABEL(S):	6.1
PLACARD(S):	6.1
MARKING(S):	RQ Carbamate pesticide, liquid, toxic (carbofuran), UN 2992 + Marine Pollutant
REPORTABLE QUANTITY (RQ):	Carbofuran
ADDITIONAL INFORMATION:	Carbofuran is in an "RQ" quantity when this material meets or exceeds 24.6 pounds (2.5 gallons) per package.

ADR - EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Carbamate pesticide, liquid, toxic
TECHNICAL NAME(S):	Carbofuran
PRIMARY HAZARD CLASS / DIVISION:	6.1
CLASSIFICATION CODE:	T6
UN/NA NUMBER:	UN2992
PACKING GROUP:	II
HAZARD IDENTIFICATION NUMBER:	60
MARINE POLLUTANT:	Carbofuran
LABEL(S):	6.1
PLACARD(S):	6.1
MARKING(S):	UN 2992 + Marine Pollutant

**INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) /
INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)**

PACKAGING TYPE:	Non-Bulk
PROPER SHIPPING NAME:	Carbamate pesticide, liquid, toxic
TECHNICAL NAME(S):	Carbofuran
PRIMARY HAZARD CLASS / DIVISION:	6.1
UN/NA NUMBER:	UN2992
PACKING GROUP:	II
LABEL(S):	6.1
LIMITED QUANTITY:	Y609 / 1 L
LIMITED QUANTITY: PASSENGER / CARGO:	609 / 5 L
LIMITED QUANTITY: CARGO:	611 / 60 L
ADDITIONAL INFORMATION:	Carbofuran is in an "RQ" quantity when this material meets or exceeds 24.6 pounds (2.5 gallons) per package. Marks: RQ Carbamate pesticide, liquid, toxic (carbofuran), UN2992 RQ: carbofuran

OTHER INFORMATION:

It has been determined that a lethal concentration of this material, by mist or particle, will not be reasonably encountered by humans while this material is in transportation.

HARMONIZED SYSTEM

Import to the U.S.A.: 3808.10.2500

Export from the U.S.A.: 3808.10.0000

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):

Listed

REPORTABLE QUANTITY:

Chemical Name

Carbofuran

RQ

10 lb

SECTION 311 HAZARD CATEGORIES (40 CFR 370):

Immediate, Delayed

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):

The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):

This product contains the following ingredients subject to Section 313 reporting requirements:
Carbofuran

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):

Listed

<u>Chemical Name</u>	<u>RQ</u>
Carbofuran	10 lb

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):

Waste Number: P127, Carbofuran

FEDERAL INSECTICIDE FUNGICIDE RODENTICIDE ACT

U.S. EPA Signal Word: DANGER-POISON

INTERNATIONAL LISTINGS

Australian Hazard Code: 3XE

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

Carbofuran, (Index #006-026-00-9):

EC Symbols:	T+ (Very Toxic)
	N (Dangerous for the environment)
EC Risk Phrases:	R26/28 (Very toxic by inhalation and if swallowed)
	R50/53 (Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.)
EC Safety Phrases:	S1/2 (Keep locked up and out of reach of children.)
	S36/37 (Wear suitable protective clothing and gloves.)
	S45 (In case of accident or if you feel unwell, seek medical advice immediately - show the label where possible.)
	S60 (This material and its container must be disposed of as hazardous waste)
	S61 (Avoid release to the environment. Refer to special instructions/safety data sheets.)

16. OTHER INFORMATION

REVISION SUMMARY:

This MSDS replaces Revision #8, dated October 27, 2004.

Changes in information are as follows:

Section 1 (Product and Company Identification) - Previous Tradename: Furadan 4F

Section 3 (Composition / Information on Ingredients)

Section 9 (Physical and Chemical Properties)

Section 16 (Other Information)

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