MATERIAL SAFETY DATA SHEET

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

EMPIRE* 20 MICROENCAPSULATED INSECTICIDE

Effective Date: 7/13/00
Product Code: 13042
MSDS: 2481

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Empire* 20 Microencapsulated Insecticide

COMPANY IDENTIFICATION:

Dow AgroSciences
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Chlorpyrifos: O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl) phosphorothioate	CAS # 002921-88-2	20%
Inert Ingredients, Total, Including Petroleum Solvent		80%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Hazardous chemical. Off-white liquid with a musty odor. LD_{50} for skin absorption in rabbits is >10,000 mg/kg. Oral LD_{50} for rats is >25,000 mg/kg. Cholinesterase inhibitor. Toxic to fish, birds, wildlife, and aquatic organisms.

EMERGENCY PHONE NUMBER: 800-992-5994

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYE: Essentially non-irritating to the eyes.

SKIN: Prolonged contact is essentially non-irritating to the skin. Did not cause allergic skin reactions when tested in guinea pigs. A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The LD_{50} for skin absorption in rabbits is >10,000 mg/kg.

INGESTION: Single dose oral toxicity is extremely low. The oral LD_{50} for rats is >25,000 mg/kg. No hazards anticipated from swallowing small amounts incidental to normal handling operations. If aspirated (liquid enters the lung), may cause lung damage or even death due to chemical pneumonia.

INHALATION: Vapors are unlikely due to physical properties. Excessive exposure to mists of the petroleum distillate may cause respiratory and eye irritation.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: For chlorpyrifos, excessive exposure may produce organophosphate type cholinesterase inhibition. Chlorpyrifos produced mild adrenal effects when fed to rats, but only at doses that greatly exceeded any exposures that would be received during use of this product. Excessive exposure to chlorpyrifos is extremely unlikely due to physical state (encapsulated. For the solvent, in animals, effects have been reported on the following organs following exposure to aerosols: central nervous system and respiratory tract. Observations in animals include anesthetic or narcotic effects.

CANCER INFORMATION: Chlorpyrifos did not cause cancer in laboratory studies.

TERATOLOGY (BIRTH DEFECTS): Chlorpyrifos did not cause birth defects; other fetal effects occurred only at doses toxic to the mother.

REPRODUCTIVE EFFECTS: Chlorpyrifos did not interfere with fertility in reproduction studies in laboratory animals. Some evidence of toxicity to the offspring occurred, but only at a dose high enough to produce significant toxicity to the parent animals.

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4. FIRST AID:

EYES: Flush with plenty of water for 5 minutes.

SKIN: Wash thoroughly with soap and water.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air if effects occur. Consult a physician.

NOTE TO PHYSICIAN: Chlorpyrifos is a cholinesterase inhibitor. Atropine, only by injection, is the preferable antidote. Oximes, such as 2-PAM/ protopam, may be therapeutic if used early; however, use only in conjunction with atropine. If exposed, plasma and red blood cell cholinesterase tests may indicate significance of exposure (baseline data are useful). Supportive care. Treatment based on judgment of the physician in response to reactions of the patient. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by a physician.

5. FIRE FIGHTING MEASURES:

FLASH POINT: Not applicable – no measurable flash point
METHOD USED: Not applicable

FLAMMABLE LIMITS
LFL: None
UFL: None

HAZARDOUS COMBUSION PRODUCTS: Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to sulfur oxides, phosphorus compounds, nitrogen oxides, hydrogen chloride, carbon monoxide, and carbon dioxide.

OTHER FLAMMABILITY INFORMATION: This material will not burn until the water has evaporated. Residue can burn. Container may rupture from gas generation in a fire situation.

EXTINGUISHING MEDIA: To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical, or foam. Fight fire from a protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of re-ignition has passed. Immediately withdraw all personnel from area in case of rising sound from venting safety device or discoloration of the container. Move container from fire area if this is possible without hazard. Contain firewater run-off if possible. Fire water run-off, if not contained may cause environmental damage. Review the “Accidental Release Measures” and the “Ecological Information” sections of this MSDS.

PROTECTIVE EQUIPMENT FOR FIREFIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Absorb small spills with dry material such as sand, ZORBALL, or dirt. Wash thoroughly after handling. Contain spill by diking to keep out of sewers. Barricade area and report large spills to Dow AgroSciences at 800-992-5994.

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7. STORAGE AND HANDLING:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store in original container in secured dry storage area. Prevent cross-contamination with other pesticides or fertilizers. Store below 122°F (50°C). Preferred storage is above 32°F. Storage below 32°F may result in solidification. If warmed to above 32°F, product will return to original form. Freezing does not adversely affect this product. Keep out of reach of children. Avoid contact with eyes and skin. Do not ingest this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE(S): Chlorpyrifos: ACGIH TLV and OSHA PEL are 0.2 mg/M^3, Skin. PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

EYE PROTECTION: Use safety glasses.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

BOILING POINT: 212°F (100°C**)
VAPOR PRESSURE: 17.5 mmHG @ 20°C**
VAPOR DENSITY: <1**
SOLUBILITY IN WATER: Disperses in water
SPECIFIC GRAVITY: 1.0410 @ 20°C
pH: 9.3 (9.9% mixture in water)
APPEARANCE: Off-white liquid
ODOR: Musty odor
**Data for water

10. STABILITY AND REACTIVITY:

STABILITY: Stable under recommended storage conditions. Unstable at elevated temperatures. See "Storage" section of this MSDS.

CONDITIONS TO AVOID: Avoid temperatures above 122°F (50°C). Chlorpyrifos decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

HAZARDOUS DECOMPOSITION: Hazardous decomposition products depend upon temperature, air supply and the presence of other materials. Hazardous decomposition products may include and are not limited to hydrogen chloride, organic sulfides, and sulfur dioxide. Toxic gases are released during decomposition.

INCOMPATIBLE MATERIALS: Avoid contact with oxidizing materials and bases.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

MUTAGENICITY: Based on a majority of negative data and some equivocal or marginally positive results, chlorpyrifos is considered to have minimal mutagenic potential.

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12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING:
Based largely or completely on information for chlorpyrifos.
Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Expected to be relatively immobile in soil (Koc >5000).

DEGRADATION & PERSISTENCE:
Based largely or completely on information for chlorpyrifos.
The photolysis half-life in water is 3-4 weeks.
In the atmospheric environment, material is estimated to have a tropospheric half-life of 1.4 hours.
Degradation is expected in the soil environment within days to weeks.
Under aerobic soil conditions the half-life is generally 30-60 days.

ECOTOXICOLOGY:
Based largely or completely on information for chlorpyrifos.
Material is very highly toxic to aquatic organisms on an acute basis (LC_{50}/EC_{50} <0.1 mg/L in most sensitive species).
Material is highly toxic to birds on a dietary basis (LC_{50} between 50 and 500 ppm).
Material is moderately toxic to birds on an acute basis (LD_{50} between 51 and 500 mg/kg).

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Do not contaminate food, feed, or water by storage or disposal. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of federal law. Pesticide, spray mixture, or rinse water that cannot be used according to label instructions must be disposed of in accordance with applicable local, state or federal requirements.

14. TRANSPORT INFORMATION:

For DOT regulatory information, if required, consult transportation regulations, product-shipping papers or contact your Dow AgroSciences representative.

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

A delayed health hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
Chlorpyrifos	002921-88-2	NJ3 PA1 PA3

NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).
PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).
PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

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OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA, which may require reporting of releases:

Chemical Name	CAS Number	RQ	% in Product
Chlorpyrifos	002921-88-2	1	20%

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections 3,5,6,7,10, & 12
Reference: DR-0275-9708
Replaces MSDS Dated: 3/9/00
Document Code: D03-022-003
Replaces Document Code: D03-022-002

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult Dow AgroSciences for Further Information.

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