1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: DURSBAN* XP Insecticidal Chemical

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
Inert Ingredients, total: 1%

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. White crystalline solid (unflaked) or off-white, irregularly flaked solid (flaked) with a faint mercaptan-type odor. May cause eye and skin irritation. LD$_{50}$ for skin absorption is >5000 mg/kg (in rabbits) and >2000 mg/kg (in rats). Oral LD$_{50}$ for rats is 100-250 mg/kg. Inhalation vapor LC$_{50}$ for rats: >200 mg/M$^3$ for 4 hours. In tests to determine the acute LC$_{50}$, no deaths occurred in rats exposed for 4 hours to vapors generated by passing air through heated, molten chlorpyrifos; the nominal concentration was 200 mg/M$^3$.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Excessive exposure may produce organophosphate type cholinesterase inhibition. Signs and symptoms of excessive exposure may be headache, dizziness, incoordination, muscle twitching, tremors, nausea, abdominal cramps, diarrhea, sweating, pinpoint pupils, blurred vision, salivation, tearing, tightness in chest, excessive urination, convulsions. Observations in animals include adrenal effects at high doses.

CANCER INFORMATION: Did not cause cancer in long-term animal studies.

TERATOLOGY (BIRTH DEFECTS): Birth defects are unlikely. Exposures having no effect on the mother should have no effect on the fetus. Did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother.

SKIN: Prolonged exposure may cause slight skin irritation. Repeated exposure may cause skin burns. A single prolonged exposure is not likely to result in the material being absorbed through the skin in harmful amounts. The LD$_{50}$ for skin absorption >5000 mg/kg (in rabbits) and >2000 mg/kg (in rats).

INGESTION: Single dose oral toxicity is considered to be moderate. The oral LD$_{50}$ for rats is 100-250 mg/kg. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing amounts larger than that may cause serious injury, even death. Observations in animals include diarrhea and tremors due to cholinesterase depression.

INHALATION: At room temperature, exposures to vapors are unlikely due to the low vapor pressure of chlorpyrifos. Higher temperatures may generate vapor levels sufficient to cause adverse effects. Vapor LC$_{50}$ for rats: >200 mg/M$^3$ for 4 hours. In tests to determine the acute LC$_{50}$, no deaths occurred in rats exposed for 4 hours to vapors generated by passing air through heated, molten chlorpyrifos; the nominal concentration was 200 mg/M$^3$.

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

EYE: May cause slight transient (temporary) eye irritation. Corneal injury is unlikely.

EMERGENCY PHONE NUMBER: 800-992-5994
MATERIAL SAFETY DATA SHEET

DURSBAN* XP Insecticidal Chemical

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.

4. FIRST AID:

EYES: Flush with plenty of water for 5 minutes. Seek medical attention if irritation persists.

SKIN: Immediately wash with plenty of soap and water. Seek medical attention. Remove contaminated clothing immediately and wash before reuse. Remove and dispose of contaminated leather items such as shoes, belts, and watchbands.

INGESTION: Call a physician or Poison Control Center immediately. Drink one or two glasses of water and induce vomiting by touching back of throat with finger. Do not give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air if symptoms of cholinesterase inhibition occur. Seek medical attention immediately.

NOTE TO PHYSICIAN: Chlorpyrifos is a cholinesterase inhibitor. Treat symptomatically. If exposed, plasma and red blood cell cholinesterase tests may indicate significance of exposure (baseline data are useful). 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. In case of severe acute poisoning, use antidote immediately after establishing an open airway and respiration. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: 299°F (148°C)
METHOD USED: Setaflash

HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to 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. Dense smoke is produced when product burns. Mechanical handling can cause formation of dusts. To reduce the potential for dust explosion, do not permit dust to accumulate. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Container may rupture from gas generation in a fire situation.

EXTINGUISHING MEDIA: Water fog or fine spray, carbon dioxide, dry chemical, and or foam. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Water fog, applied gently may be used as a blanket for fire extinguishment. Do not use direct water stream. May spread fire.

MEDIA TO BE AVOIDED: Do not use direct water stream.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Consider feasibility of a controlled burn to minimize environmental damage. Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Hand held carbon dioxide or dry chemical extinguishers may be used for small fires. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Water fog, applied gently may be used as a blanket for fire extinguishment. Do not use direct water stream. May spread fire. Fight fire from 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 “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: For small spills, sweep up and place in a suitable container for disposal. Keep product out of sewers. Report large spills to Dow AgroSciences at 800-992-5994.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: See product label. Keep out of reach of children. May be fatal if swallowed. Avoid eye and skin contact. Wash thoroughly with soap and water after handling and before eating, drinking or smoking. Avoid breathing dust. Toxic to fish. Recommend storage in a cool, dry place away from high temperatures, hot pipes, and direct sunlight. Store in original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

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

EXPOSURE GUIDELINES: Chlorpyrifos: ACGIH TLV and OSHA PEL are 0.2 mg/M³. Skin. ACGIH classification is A4. 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 guideline.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use a NIOSH approved air-purifying respirator.

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

EYE/FACE PROTECTION: Use safety glasses.

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

9. PHYSICAL AND CHEMICAL PROPERTIES:

MELTING POINT: 41.5-43.5°C (107-110°F)
VAPOR PRESSURE: 1.87 X 10⁻⁵ mmHg @ 20°C
VAPOR DENSITY: Not applicable
SOLUBILITY IN WATER: < 0.0002 g/100g @ 25°C
SPECIFIC GRAVITY: (Liquid.) 1.398 @ 43.5°C
BULK DENSITY: (For flaked product) 39 lbs/cu.ft.
BOILING POINT: Decomposes @ 160°C, 320°F
APPEARANCE: (Unflaked product) White crystalline solid
APPEARANCE: (Flaked product) off-white, irregularly flaked solid
ODOR: Very faint mercaptan-type odor

10. STABILITY AND REACTIVITY:

STABILITY: Stable under normal storage conditions. Unstable at elevated temperatures.

CONDITIONS TO AVOID: Avoid temperatures above 158°F (70°C). Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

INCOMPATIBILITY: Avoid contact with oxidizing materials and bases.

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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/or sulfur dioxide.

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.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING:
Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5). Measured log octanol/water partition coefficient (Log Pow) is 4.96.
Bioconcentration factor (BCF) in fish is 100-1673.
Bioconcentration factor (BCF) in invertebrates is 180.
Expected to be relatively immobile in soil (Koc >5000).
Log soil organic carbon partition coefficient (Log Koc) is 3.1-4.1.
Log air/water partition coefficient (Log Kaw) is estimated to be -3.05.
Henry's Law Constant (H) is estimated to be 6.6E-06 atm-M^3/mol.

DEGRADATION & PERSISTENCE:
The photolysis half-life in water is 3-4 weeks.
Tropospheric half-life is estimated to be 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: Material is very highly toxic to aquatic organisms on an acute basis (LC50/EC50 <0.1 mg/L in most sensitive species).
Acute LC50 in bluegill (Lepomis macrochirus) is 10.0 µg/L.
Acute LC50 in tidewater silverside (Menidia beryllina) is 4.2 µg/L.
Acute LC50 in Korean shrimp (Palaemon macrodactylus) is 0.05 µg/L.
Acute LC50 in rainbow trout (Oncorhynchus mykiss) is 8.485 µg/L.
Acute LC50 in channel catfish (Ictalurus punctatus) is 806 µg/L.
Maximum acceptable toxicant concentration (MATC) in fathead minnow (Pimephales promelas) is 2.26 µg/L.
Maximum acceptable toxicant concentration (MATC) in water flea (Daphnia magna) is 0.075 µg/L.
Material is highly toxic to birds on a dietary basis (LC50 between 50 and 500 ppm).
Material is moderately toxic to birds on an acute basis (LD50 between 51 and 500 mg/kg).
Dietary LC50 in bobwhite (Colinus virginianus) is 423 ppm.
Dietary LC50 in mallard (Anas platyrhynchos) is 591 ppm.
LC50 in earthworm (Eisenia fetida) is 209.9 mg/kg.
Acute contact LD50 in honeybee (Apis mellifera) is 0.070 µg/bee.
Acute oral LD50 in honeybee (Apis mellifera) is 0.36 µg/bee.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Do not contaminate food, feed, or water by storage or cleaning of equipment. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If wastes resulting from the use of this product cannot be disposed according to label instructions, dispose of these wastes at an approved facility. Contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA regional office for guidance.

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:

An immediate health hazard
A delayed health hazard
A fire 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
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CHLORPYRIFOS | 002921-88-2 | NJ3 PA1 PA3

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

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

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

<table>
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<th>Category</th>
<th>Rating</th>
</tr>
</thead>
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<tr>
<td>Health</td>
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<tr>
<td>Flammability</td>
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</tr>
<tr>
<td>Reactivity</td>
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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:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>RQ</th>
<th>% in Product</th>
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<tbody>
<tr>
<td>CHLORPYRIFOS</td>
<td>002921-88-2</td>
<td>1</td>
<td>99%</td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 3,5,6,7,10,12 & 15
Reference: DR-0202-9176
Replaces MSDS dated:3/1/99

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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