



# MATERIAL SAFETY DATA SHEET

**BAYER CORPORATION**  
**AGRICULTURE DIVISION**  
P.O. Box 4913 Hawthorn Road  
Kansas City, MO 64120-001

**TRANSPORTATION EMERGENCY:**  
CALL CHEMTREC: (800) 424-9300  
DISTRICT OF COLUMBIA: (202) 483-7616

**NON-TRANSPORTATION:**  
BAYER EMERGENCY PHONE: (800) 414-0244  
BAYER INFORMATION PHONE: (800) 842-8020

<b>1. CHEMICAL PRODUCT IDENTIFICATION:</b>	
<b>PRODUCT NAME:</b>	DYLOX 6.2 GR
<b>PRODUCT CODE:</b>	21037
<b>CHEMICAL FAMILY:</b>	Organophosphorus Insecticide
<b>CHEMICAL NAME:</b>	Dimethyl (2,2,2-trichloro-1-hydroxyethyl)phosphonate
<b>SYNONYMS:</b>	Trichlorfon, DIPTEREX, NEGUVON
<b>FORMULA:</b>	C4 H8 Cl3 O4 P

<b>2. COMPOSITION/INFORMATION ON INGREDIENTS:</b>		
INGREDIENT NAME		
/CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
***** HAZARDOUS INGREDIENTS *****		
<b>DYLOX (Trichlorfon)</b>		6.2 %
52-68-6	OSHA : Not Established	
	ACGIH: Not Established	

<b>3. HAZARDS IDENTIFICATION:</b>	
<b>EMERGENCY OVERVIEW      CAUTION!</b>	
<b>Color:</b> Tan	<b>Form:</b> Solid; Free-flowing granules <b>Odor:</b> Sweet
Organophosphate Insecticide - Cholinesterase Inhibitor; May be harmful if swallowed.	
<b>POTENTIAL HEALTH EFFECTS:</b>	
<b>ROUTE(S) OF ENTRY:</b> Inhalation; Eye Contact; Skin Contact; Skin Absorption	
<b>HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:</b>	
<b>ACUTE EFFECTS OF EXPOSURE:</b> Exposure during the labeled use of this product is expected to be minimal. Consumers should refer to the packaging label for proper handling procedures. Inhalation, dermal absorption or ingestion of this material may result in systemic intoxication due to inhibition of the enzyme cholinesterase. The sequence of development of systemic effects varies with the route of entry and the onset of symptoms may be delayed up to 12 hours. First symptoms of poisoning may be nausea, increased salivation, lacrimation, blurred vision and constricted pupils. Other symptoms of systemic poisoning include vomiting, diarrhea, abdominal cramping, dizziness and sweating. After inhalation, respiratory symptoms like tightness of chest, wheezing, laryngeal spasms, may be pronounced and appear first. If the poisoning is severe, then symptoms of weakness, muscle twitching, confusion, ataxia, slurred speech, then convulsions, low blood pressure, cardiac irregularities, loss of reflexes and coma may occur. In extreme cases death may occur due to a combination of factors such as respiratory arrest, paralysis of respiratory muscles or intense bronchoconstrictions. Complete symptomatic recovery from sublethal poisoning usually occurs within one week once the source of exposure is completely removed. Based on EPA Toxicity Category Criteria, this material is essentially non-toxic by the oral and dermal routes of exposure. In addition, animal studies have shown that it is a mild eye irritant.	

<b>HAZARDS IDENTIFICATION continued:</b>
<b>CHRONIC EFFECTS OF EXPOSURE:</b> Cholinesterase inhibition sometimes persists for 2-6 weeks, thus repeated exposure to small amounts of this material may result in an unexpected cholinesterase depression causing symptoms such as malaise, weakness, and anorexia that resemble other illnesses such as influenza. Exposure to a concentration that would not have produced symptoms in a person that was not previously exposed may produce severe symptoms of cholinesterase inhibition in a previously exposed person.
<b>CARCINOGENICITY:</b> This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.
<b>MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:</b> No specific medical conditions can be cited, but any disease, medication or prior exposure which reduces normal cholinesterase activity may increase susceptibility to the toxic effects of this material.

<b>4. FIRST AID MEASURES:</b>
<b>FIRST AID FOR EYES:</b> Hold eyelids open and immediately flush with copious amounts of water for at least 15 minutes. Call a physician if irritation persists or develops after flushing.
<b>FIRST AID FOR SKIN:</b> Wash affected areas with plenty of soap and water. Get medical attention if irritation persists. If signs of intoxication (poisoning) occur, get medical attention immediately.
<b>FIRST AID FOR INHALATION:</b> First remove victim to fresh air or uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention as soon as possible.
<b>FIRST AID FOR INGESTION:</b> If ingestion is suspected, call a physician or poison control center. If medical assistance cannot be given immediately, induce vomiting and get to a hospital. Drink one or two glasses of water and induce vomiting by touching back of throat with finger, or, if available, by administering syrup of ipecac. If syrup of ipecac is available, administer 1 tablespoonful (15 mL) of syrup of ipecac followed by 1 to 2 glasses of water. If vomiting does not occur within 20 minutes, repeat the dose once. Do not induce vomiting or given anything by mouth to an unconscious or convulsing person.
<b>NOTE TO PHYSICIAN:</b> This product contains the organophosphorus insecticide, Trichlorfon, a cholinesterase inhibitor. Cholinesterase inhibition results in stimulation of the central nervous system, the parasympathetic nervous system and the somatic motor nerves. If symptoms of organophosphate poisoning are present, the administration of atropine sulfate is indicated. Administer atropine sulfate in large therapeutic doses. In mild cases, start treatment by giving 1-2 mg of atropine intravenously every 15 minutes until signs of atropinization appear (dry mouth, flushing, and dilated pupils if pupils were originally pinpoint). In severe cases, start treatment by giving 2-4 mg intravenously every 5-10 minutes until fully atropinized. Dosages for children should be appropriately reduced. 2-PAM is also antidotal and may be used in conjunction with atropine. Do not give morphine. Watch for pulmonary edema which may develop in serious cases of poisoning even after 24 hours. At first sign of pulmonary edema, place patient in oxygen tent and treat symptomatically. In case of poisoning, it is also requested that Bayer Corp., Agriculture Division, Kansas City, MO, be notified. Telephone: 800/414-0244

**5. FIRE FIGHTING MEASURES:**

**FLASH POINT:** Not Applicable  
**FLAMMABLE LIMITS:**  
**UPPER EXPLOSIVE LIMIT (UEL)(%):** Not applicable  
**LOWER EXPLOSIVE LIMIT (LEL)(%):** Not applicable  
**EXTINGUISHING MEDIA:** Water  
**SPECIAL FIRE FIGHTING PROCEDURES:** If involved in a fire, stay upwind and wear self-contained breathing equipment.

**6. ACCIDENTAL RELEASE MEASURES:**

**SPILL OR LEAK PROCEDURES:** Isolate area and keep unauthorized people away. Do not walk through spilled material. Avoid breathing dusts and skin contact. Avoid generating dust (a fine water spray mist, plastic film cover, or floor sweeping compound may be used if necessary). Wear proper protective equipment. Carefully sweep up spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with detergent and bleach solution. Repeat. Rinse with water. Contaminated soil may have to be removed and disposed. Do not allow material to enter streams, sewers, or other waterways or contact vegetation.

**7. HANDLING AND STORAGE:**

**STORAGE TEMPERATURE(MIN/MAX):** None/30 day average not to exceed 100 °F  
**SHELF LIFE:** Time/temperature dependent. Specific information is available on request.  
**SPECIAL SENSITIVITY:** Heat, moisture  
**HANDLING/STORAGE PRECAUTIONS:** Do not allow product to contaminate material which is intended for use or consumption by humans or animals.

**8. PERSONAL PROTECTION:**

**REQUIRED WORK/HYGIENE PROCEDURES:** Exposure during the labeled use of this product is expected to be minimal. Consumers should refer to the packaging label for proper handling procedures. However, if exposure to this product is possible while handling large quantities such as in subsequent manufacturing, transportation spills or other emergencies, the following personal protection is recommended.  
**EYE PROTECTION REQUIREMENTS:** Use goggles when needed to prevent eye contact.  
**SKIN PROTECTION REQUIREMENTS:** Avoid skin contact. Wear long sleeves and trousers and chemical-resistant gloves, such as nitrile, to prevent dermal exposure.  
**VENTILATION REQUIREMENTS:** Control exposure levels through the use of general and local exhaust ventilation.  
**RESPIRATOR REQUIREMENTS:** When necessary, based on the conditions of use, wear NIOSH approved dust/mist respirator.  
**MEDICAL SURVEILLANCE:** Plasma and/or red blood cell cholinesterase activity can be used to detect excessive absorption of DYLOX (trichlorfon). It is preferable to establish a pre-exposure baseline value for best comparisons. Contact Bayer Corp., Agriculture Division for additional information. If significant cholinesterase depression occurs, no further exposure should be allowed until cholinesterase values return to normal.  
**ADDITIONAL PROTECTIVE MEASURES:** Clean water should be available for washing in case of eye or skin contamination. Educate and train employees in safe use of product. Follow all label instructions. Launder clothing after use. Wash thoroughly after handling.

**9. PHYSICAL AND CHEMICAL PROPERTIES:**

**PHYSICAL FORM:** Solid  
**APPEARANCE:** Free-flowing granules  
**COLOR:** Tan  
**ODOR:** Sweet  
**ODOR THRESHOLD:** Not established  
**MOLECULAR WEIGHT:** 257.4 for trichlorfon  
**pH:** 4.6 for 1% solution of DYLOX 6.2  
**BOILING POINT:** 100 °C @ 0.1 mm Hg for trichlorfon  
**MELTING/FREEZING POINT:** 75-84 °C for trichlorfon/not applicable  
**SOLUBILITY IN WATER:** 14% @ 20 °C for trichlorfon  
**SPECIFIC GRAVITY:** 1.72 @ 20 °C for trichlorfon  
**BULK DENSITY:** 30-35 lb/cu-ft  
**% VOLATILE BY VOLUME:** Not established  
**VAPOR PRESSURE:** 2 x 10<sup>-6</sup> mm Hg @ 20 °C for trichlorfon  
**VAPOR DENSITY:** Not established (Air = 1)

**10. STABILITY AND REACTIVITY:**

**STABILITY:** This is a stable material.  
**HAZARDOUS POLYMERIZATION:** Will not occur.  
**INCOMPATIBILITIES:** Strong oxidizing agents; subject to hydrolysis, bases  
**INSTABILITY CONDITIONS:** Temperatures above 100 °F, alkaline conditions  
**DECOMPOSITION PRODUCTS:** Proposed compounds under extreme conditions such as fire: CO, P<sub>2</sub>O<sub>5</sub>, chloral, dimethyl hydrogen phosphite

**11. TOXICOLOGICAL INFORMATION:**

Only acute studies have been performed on this product as formulated. The non-acute information pertains to the active ingredient, trichlorfon.

**ACUTE TOXICITY:**  
**ORAL LD50:** Male Rat: >5100 mg/kg; Female Rat: >5000 mg/kg  
**DERMAL LD50:** Male and Female Rat: >5000 mg/kg  
**INHALATION LC50:** (extrapolated based on EPA's assessment of the inhalation hazard of DYLOX 5% Granular Bait) 4 HR Exposure to Dust: Male & Female Rat: >2 mg/L - 1 HR Exposure to Dust: Male & Female Rat: >2 mg/L  
**EYE EFFECTS:** Rabbit: Mild irritation to the cornea, iris, and/or conjunctiva was observed with all irritation cleared within 4 days post-treatment.  
**SKIN EFFECTS:** Rabbit: Not a dermal irritant  
**SENSITIZATION:** Guinea Pig: Not a dermal sensitizer

**SUBCHRONIC TOXICITY:**  
 In a 3-week inhalation study, rats were exposed to trichlorfon at aerosol concentrations of 12.7, 35.4 or 103.5 mg/m<sup>3</sup> for 6 hours/day, 5 days/week. Cholinesterase inhibition occurred in animals at concentrations of 35.4 mg/m<sup>3</sup> and greater. The no-observed-effect-level (NOEL) was 12.7 mg/m<sup>3</sup>. In a 3 week dermal toxicity study, rabbits were treated with trichlorfon at levels of 100, 300 or 1000 mg/kg for 6 hours/day, 5 days/week. The only effect observed was erythrocyte cholinesterase inhibition. Under the conditions of this study, the NOEL was 100 mg/kg.

**CHRONIC TOXICITY:**  
 Trichlorfon was administered by oral gavage to Rhesus monkeys at doses of 0.2, 1.0 or 5.0 mg/kg, 6 days/week for 10 years. Effects observed included reduced body weight gain, cholinesterase inhibition and anemia (reductions in hematocrit, hemoglobin and erythrocyte counts). The NOEL for cholinesterase inhibition was 0.2 mg/kg. Excluding cholinesterase inhibition, the overall NOEL was 1.0 mg/kg. In chronic feeding using rats, trichlorfon was administered for 2 years at dietary concentrations ranging from 100 to 2500 ppm. Effects observed at the high dose of these studies

**TOXICOLOGICAL INFORMATION continued:**

included decreased body weight gain and feed consumptions, cholinesterase inhibition, anemia, hypercholesterolemia, nonglandular gastritis, duodenal hyperplasia, increased liver and kidney weights, and histopathological changes in the lung and kidney. The dose of 2500 ppm was a dose considered to exceed the maximum tolerated dose (MTD). The overall NOEL from these studies was 100 ppm.

**CARCINOGENICITY:**

Trichlorfon was investigated for carcinogenicity in chronic feeding studies using rats and mice at maximum levels of 2500 and 2700 ppm, respectively. There was no evidence of carcinogenic potential observed in either species.

**MUTAGENICITY:**

Numerous mutagenicity studies have been conducted on trichlorfon, some of which are positive.

**DEVELOPMENTAL TOXICITY:**

In a developmental toxicity study using rats, trichlorfon was administered at dietary concentrations of 500, 1125 or 2500 ppm. Maternal toxicity was observed at all levels tested. At 2500 ppm, there was an increased incidence of developmental toxicity as indicated by delayed ossification involving elements of the skull, ribs, vertebrae and pelvis, and by an increased incidence of wavy, curved and/or bulbous ribs. The NOELs for maternal and developmental toxicity were less than 500 and 1125 ppm, respectively. When rats were administered trichlorfon by oral gavage at doses of 10, 30 or 100 mg/kg, there was no indication of maternal or developmental toxicity. In a developmental toxicity study using rabbits, trichlorfon was administered by oral gavage at doses of 10, 35 or 110 mg/kg. There was an increased incidence of resorptions, lagging ossifications and decreased fetal weights at the maternally toxic level of 110 mg/kg. The NOELs for maternal and developmental toxicity were 10 and 35 mg/kg, respectively.

**REPRODUCTION:**

In a reproduction study on rats, trichlorfon was administered at dietary concentrations of 150, 500 or 1750 ppm. At the maternally toxic concentration of 1750 ppm, reproductive effects observed in the offspring included decreased body weight gain and dilated renal pelvises. Effects observed in parental animals included reduced body weights, cholinesterase inhibition, kidney effects, and increased organ weights for liver, lung and kidney. The NOELs for parental and reproductive effects were 150 and 500 ppm, respectively.

**NEUROTOXICITY:**

In an acute oral study, hens revealed no evidence of neurotoxicity when treated with the active ingredient at dose levels up to and including 185 mg/kg (highest dose tested). In a 3 month study in which hens received the active ingredient daily at oral doses of 3, 9 or 18 mg/kg, there was no evidence of delayed neurotoxicity. In an acute neurotoxicity screening study using rats, technical grade trichlorfon was administered as a single oral dose at doses of 10, 50, or 200 mg/kg. Compound-related deaths occurred at the high-dose for both sexes. All but one of the high-dose females died on the day of treatment. All clinical signs and neurobehavioral effects observed were ascribed to acute cholinergic toxicity, occurring at dose levels that produced substantial inhibition of cholinesterase activity. There were no compound-related microscopic lesions in skeletal muscle or neural tissues of high-dose males or mid-dose females and the one surviving high-dose female. Excluding cholinergic responses, the NOEL for neurotoxicity was 200 mg/kg for males and 50 mg/kg for females. In a 13 week neurotoxicity study, technical grade trichlorfon was administered to rats at dietary concentrations of 100, 500 and 2500 ppm. Effects observed at the high-dose included decreased body weights, decreased feed consumptions, perianal stains, urine stains, slightly uncoordinated righting response, reduced levels of activity, and cholinesterase inhibition (erythrocyte, plasma and brain). Microscopic examinations revealed minimal degeneration of myelin in the dorsal and ventral root fibers in cervical and lumbar regions of the spinal cord without degeneration of the axon. All clinical signs and neurobehavioral effects are ascribed to cholinergic neurotoxicity, occurring

**TOXICOLOGICAL INFORMATION continued:**

at exposure levels that produced substantial inhibition of cholinesterase activity. The minimal micropathologic findings at the high dose are not ascribed to the inhibition of cholinesterase activity. The NOEL for neurotoxicity was 500 ppm based on cholinergic effects and neuropathology. The overall NOEL was 100 ppm based on cholinesterase inhibition.

**12. ECOLOGICAL INFORMATION:**

This product is toxic to fish, birds and wildlife. Bayer will provide a summary of specific data upon written request. As with any pesticide, this product should be used according to label directions and should be kept out of streams, lakes and other aquatic habitats of concern. IN EVENT OF A SPILL EMERGENCY, CALL 1-800-414-0244.

**13. DISPOSAL CONSIDERATIONS**

**WASTE DISPOSAL METHOD:** Follow container label instructions for disposal of wastes generated during use in compliance with the FIFRA product label. In other situations, bury in an EPA approved landfill or burn in an incinerator approved for pesticide destruction. Do not reuse container.

**14. TRANSPORTATION INFORMATION:**

**TECHNICAL SHIPPING NAME:** Trichlorfon  
**FREIGHT CLASS BULK:** Insecticides, NOI - NMFC 102120  
**FREIGHT CLASS PACKAGE:** Insecticides, NOI - NMFC 102120  
**PRODUCT LABEL:** Not Noted  
**DOT (DOMESTIC SURFACE):**  
**HAZARD CLASS OR DIVISION:** Non-Regulated  
**IMO / IMDG CODE (OCEAN):**  
**HAZARD CLASS DIVISION NUMBER:** Non-Regulated  
**ICAO / IATA (AIR):**  
**HAZARD CLASS DIVISION NUMBER:** Non-Regulated

**15. REGULATORY INFORMATION:**

**OSHA STATUS:** This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.  
**TSCA STATUS:** This product is exempt from TSCA Regulation under FIFRA Section 3 (2)(B)(ii) when used as a pesticide.  
**CERCLA REPORTABLE QUANTITY:** Approximately 1600 pounds which contains 100 pounds trichlorfon.  
**SARA TITLE III:**  
**SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES:** No components listed  
**SECTION 311/312 HAZARD CATEGORIES:** Immediate Health Hazard; Delayed Health Hazard  
**SECTION 313 TOXIC CHEMICALS:** DYLOX (trichlorfon) CAS # 52-68-6  
**RCRA STATUS:** If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

**16. OTHER INFORMATION:****NFPA 704M RATINGS:**

Health: 2      Flammability: 1      Reactivity: 1      Other:  
0=Insignificant   1=Slight      2=Moderate      3=High      4=Extreme

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. NFPA ratings are provided by Bayer as a customer service.

**REASON FOR ISSUE:** Revise Sections 7-11; 16 (Health Rating); revise to ANSI format.

**PREPARED BY:** V. C. Standart

**APPROVED BY:** D. C. Eberhart

**TITLE:** Product Safety Manager

**APPROVAL DATE:** 02/28/1998

**SUPERSEDES DATE:** 01/31/1996

**MSDS NUMBER:** 09911

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