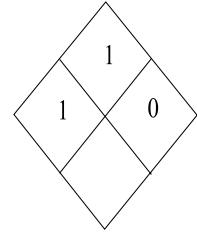


MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION


PRODUCT NAME: NUVAN® DIRECTED SPRAY AEROSOL
GENERAL USE: Organophosphate pesticide
PRODUCT DESCRIPTION: Aerosol with ethereal and faint sweetish odor
MOLECULAR FORMULA: C₄H₇Cl₂O₄P (DDVP)
EPA REGISTRATION NUMBER: 5481-13
MSDS NUMBER: 386_3
CURRENT REVISION DATE: 18 JULY, 2014

MANUFACTURER:
 AMVAC CHEMICAL CORPORATION
 4100 E. Washington Blvd.
 Los Angeles, CA 90023-4406
PHONE: 323-264-3910
FAX: 323-268-1028

EMERGENCY TELEPHONE NUMBERS:
PRODUCT USE: 888-462-6822
TRANSPORTATION (24 HOURS)
CHEMTREC®: 800-424-9300
OTHER (24 HOURS)
MEDICAL: 888-681-4261

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS #	Wt% (Optional)	Hazard(s)	PEL/TLV
2,2-Dichlorovinyl dimethyl phosphate (DDVP or Dichlorvos)	62-73-7	0.5	Poison	OSHA PEL: 1.0 mg/m ³ ACGIH TLV: 0.1 mg/m ³
Other Ingredients:		99.5		
1,1,1,2-Tetrafluoroethane	811-97-2		CNS Depression	AIHA: 1000 ppm
C12-C14 Isoalkanes	68551-19-9		Lung Ingestion	OSHA TLV: 1200 mg/m ³

3. HAZARDS IDENTIFICATION
EMERGENCY OVERVIEW:

CAUTION! Contains cholinesterase inhibitor. Repeated inhalation or skin contact with Dichlorvos (DDVP) may, without symptoms, progressively increase susceptibility to Organophosphate poisoning.

Contains combustible liquid. Harmful or fatal if swallowed. May enter lungs and cause damage.

Contains Non-flammable propellant. May cause CNS depression and cardiac arrhythmia. May cause asphyxiation in confined spaces.

POTENTIAL HEALTH EFFECTS

ROUTE(S) OF ENTRY: Typical routes of exposure are inhalation and eye or skin contact.

SIGNS OF ACUTE OVEREXPOSURE: Acute cholinesterase depression may be evidenced by headache, nausea, vomiting, diarrhea, abdominal cramps, excessive sweating, salivation and tearing, constricted pupils, blurred vision, tightness in chest, weakness, muscle twitching and confusion; in extreme cases, unconsciousness, convulsions, severe respiratory depression and death may occur.

Ingestion of the solvent could result in lung damage if the product is ingested directly into the lungs or is swallowed and subsequently vomited and enters the lungs.

Overexposure to the propellant can result in dizziness, loss of concentration, and frostbite if sprayed on the skin or eye. At higher levels, CNS depression and cardiac arrhythmia can result. Asphyxiation can occur in confined spaces if the vapors displace air.

SIGNS OF CHRONIC OVEREXPOSURE: Repeated exposures to small doses of organophosphates may lower the cholinesterase to levels where the above symptoms of acute overexposure are observed.

Repeated exposures to the solvent can result in defatting and drying of the skin, with symptoms that may include pain, itching, discoloration, swelling, and blistering.

Repeated exposures to the propellant will result in symptoms similar to those listed in acute overexposure.

OTHER POTENTIAL HEALTH EFFECTS: EPA under its 1999 proposed Guidelines for Carcinogen Risk Assessment has classified DDVP as having "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential." IARC lists DDVP (Dichlorvos) as being possibly carcinogenic to humans (Group 2B).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Preexisting conditions which lower cholinesterase levels increase vulnerability to cholinesterase depression. These include: (for plasma) genetic cholinesterase deficiency; advanced liver disease; chronic alcoholism; malnutrition; dermatomyositis; existing toxicity from exposure to carbon disulfide; benzalkonium salts, organic mercury compounds, ciguatoxins or solanines; and (for RBC) hemolytic anemias.

CARE SHOULD BE EXERCISED IN HANDLING DDVP AND ITS FORMULATIONS.

4. FIRST AID MEASURES

EYES: Immediately flush the eyes with copious amounts of clear, cool running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. If there is a possibility of frostbite use warm water. Contact a physician if irritation occurs and persists.

INHALATION: Remove victim to fresh air. If breathing has ceased, clear the victim's airway and start artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Contact a physician immediately.

INGESTION: If swallowed, do not induce vomiting. If conscious, give the person a glass of water or milk to drink and get immediate medical attention. Never give anything by mouth to an unconscious person.

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SKIN: Remove contaminated clothing. Wash thoroughly with soap and clean water. If a rash or any of the symptoms of acute exposure appear, contact a physician immediately. If skin shows signs of frostbite use warm water.

NOTE TO PHYSICIANS: This is an Organophosphate (OP) Insecticide. Do not wait for laboratory confirmation to treat patients with strong clinical evidence of poisoning. Contact your local or national poison control center for more information.

Do Not handle the patient without the following protective equipment in place: chemical resistant gloves and apron (preferably nitrile). Remove contaminated clothing and do not reuse without thorough cleaning with detergent and hot water. Dispose of heavily contaminated clothing, including shoes, as a hazardous waste.

Establish airway and oxygenation. IV Atropine sulfate is the antidote of choice. Moderately severe poisoning: use 0.4-2.0 mg in adults or 0.05 mg/kg in children. Repeat every 15 minutes until atropinization is achieved. Severe poisoning may require larger doses. Cholinergic toxicity may recur as atropinization wears off; monitor patient closely. Draw blood for RBC and plasma cholinesterase. In addition, Pralidoxime (2-PAM) is indicated during the first 36 hours in severe poisonings. Slow IV administration (no less than 2 minutes) of 1 g in adults or 20-50 mg/kg in children may be repeated in 1 to 2 hours if muscle weakness, twitching, and/or respiratory depression persist. Avoid morphine, aminophylline, phenothiazines, reserpine, furosemide and ethacrynic acid.

Bathe and shampoo contaminated skin and hair. If ingested, empty stomach; activated charcoal is useful to further limit absorption. If victim is alert, Syrup of Ipecac (2 tablespoons in adults, 1 tablespoon in small children) followed by water (2 glasses for adults, 1 glass for children) is indicated. If symptoms such as loss of gag reflex, convulsions, or unconsciousness occur before emesis, gastric lavage should be considered following intubation with a cuffed endotracheal tube.

5. **FIRE FIGHTING MEASURES**

FLAMMABLE PROPERTIES:

Flash Point: >175°F/79.4°C (TCC, for solvent)

Autoignition Temperature: Not determined

Flammable Limits:

Lower flammable limit: Not determined

Upper flammable limit: Not determined

EXPLOSIVITY:

Mechanical Impact: Not expected to be explosive under mechanical impact conditions.

Static Discharge: Not expected to be explosive.

HAZARDOUS COMBUSTION PRODUCTS: This product is a non-flammable aerosol. However, this product contains components which may be ignited under certain circumstances. Do not use near sources of sparks or open flames. This product may emit hazardous fumes of hydrogen chloride, hydrogen fluoride, carbon oxides, and unidentified organic compounds when it is heated excessively or burned. **WEAR SELF-CONTAINED BREATHING APPARATUS.**

EXTINGUISHING MEDIA: Water spray, dry chemical, foam, or carbon dioxide.

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

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6. ACCIDENTAL SPILL/RELEASE MEASURES

GENERAL: Wear appropriate PPE (see Section 8). Avoid breathing vapors. Evacuate area until vapor has been dispersed. Remove all sources of ignition. Stop or reduce discharge if it can be done safely.

7. HANDLING AND STORAGE

HANDLING: Keep this product cool and dry. Minimize breathing of vapors and avoid prolonged or repeated contact with skin. Wear personal protective equipment. Contents under pressure. Do not puncture or incinerate. Keep away from children and pets. Wash thoroughly after handling this product.

STORAGE: Store product in its original container in a cool, dry, locked place out of the reach of children. Store away from sources of heat and ignition.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: General air replacement or dilution ventilation is generally sufficient for material handling and storage.

RESPIRATORY PROTECTION: If ventilation is insufficient to keep exposures below the exposure limits, a NIOSH/MSHA-approved respirator or its international equivalent is the minimum protection recommended. If there is a chance the atmosphere is oxygen-deficient an SCBA or supplied air hood should be used.

SKIN PROTECTION: Applicators and other handlers, including those involved in the cleanup of small spills, must wear long-sleeved shirt and long pants; waterproof gloves (such as rubber, neoprene or PVC), head covering and shoes plus socks. Follow manufacturer's instructions for cleaning/ maintaining personal protection equipment (PPE). If no such instructions are available, use detergent and hot water. Keep and wash PPE separately from other laundry.

EYE PROTECTION: Safety glasses with side shields should be used whenever hazardous chemicals are being handled. Goggles or full face shield should be used if there is a potential for mist generation.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
APPEARANCE:	Clear aerosol
ODOR:	Slight ethereal and sweet odor
ODOR THRESHOLD:	None established
BOILING POINT:	Not available
FREEZING/MELTING POINT:	Not applicable
BULK DENSITY:	< 1
VAPOR PRESSURE (mm/Hg):	85.8 psia @ 70°F
VAPOR DENSITY:	Heavier than air

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PERCENT VOLATILE BY VOL:	Not applicable
SOLUBILITY IN WATER:	Not appreciably soluble in water
SOLUBILITY (Other):	Nonvolatiles are soluble in paraffinic and aromatic solvents
PARTITION COEFFICIENT (Log P_{O/W}):	Not available
pH (5% in water):	Not available
EVAPORATION RATE:	> 1

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY (Conditions to avoid): This product is stable under normal storage and use conditions.

INCOMPATIBILITY: Product is under pressure. Avoid excessive heat and flame. Under special conditions (very high temperatures and/or appropriate pressures) propellant will react with chemically reactive metals such as potassium, calcium, powdered aluminum, magnesium and zinc.

HAZARDOUS DECOMPOSITION PRODUCTS: This product may emit hazardous fumes of hydrogen chloride, hydrogen fluoride, carbon oxides, and unidentified organic compounds when it is heated excessively or burned. **WEAR SELF-CONTAINED BREATHING APPARATUS** when these conditions are present.

HAZARDOUS POLYMERIZATION: This product will not polymerize.

11. TOXICOLOGICAL INFORMATION

GENERAL: The information below is for the aerosol product (1) or for the active ingredient, DDVP (2).

INGESTION(1):	Oral LD ₅₀ (rat):	550 mg/kg (Tox Cat III)
INHALATION(1):	Inhalation LC ₅₀ (rat):	> 2.72 mg/L (Tox Cat IV)
DERMAL(1):	Skin LD ₅₀ (rabbit):	> 5050 mg/kg (Tox Cat IV)
IRRITATION(1):	Eye irritation:	Minimally irritating
	Skin irritation:	Mildly irritating
SENSITIZATION(1):	Skin sensitization: (guinea pig)	Not a Sensitizer

TERATOGENICITY(2): No evidence of teratogenicity in laboratory animals.

MUTAGENICITY(2): No clear evidence of *in vivo* mutagenicity activity in mammalian assay systems.

CARCINOGENICITY(2): Two laboratory studies have shown a low incidence of forestomach tumors in the mouse and mononuclear cell leukemia in the F344 rat. EPA under its 1999 proposed Guidelines for Carcinogen Risk Assessment has classified DDVP as having "suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential". IARC lists DDVP (Dichlorvos) as being possibly carcinogenic to humans (Group 2B).

REPRODUCTIVE TOXICITY(2): Reproductive effects have only been seen at a dose level which produced a generalized toxicity in the rat.

TOXICOLOGICALLY SYNERGISTIC PRODUCTS(2): No data are available.

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12. ECOLOGICAL INFORMATION

GENERAL: DDVP is highly toxic to fish and aquatic organisms. Drift and runoff from treated areas may be hazardous to fish and aquatic organisms in adjacent aquatic sites. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Do not apply directly adjacent to potable water supplies.

13. DISPOSAL CONSIDERATIONS

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional office for guidance.

CONTAINER DISPOSAL: Dispose of empty aerosol cans according to the label instructions, or by other procedures approved by State and local authorities. Contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional office for guidance.

14. TRANSPORTATION INFORMATION

DOT SHIPPING NAME:	Consumer Commodity, ORM-D
PACKING INSTRUCTION:	49 CFR 173.306(h)
LABEL/MARK:	Consumer Commodity, ORM-D
IATA SHIPPING NAME:	UN1950, Aerosols, 2.2, Ltd Qty
PACKING INSTRUCTION:	Y203
LABEL/MARK:	Limited Quantity
IMDG SHIPPING NAME:	UN1950, Aerosols, 2.2, Ltd Qty
PACKING INSTRUCTION:	P003
LABEL/MARK:	Limited Quantity
TYPICAL PACKAGING:	17 oz aerosol cans

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS: This product is registered under EPA/FIFRA Regulations. It is a violation of Federal Law to use this product in any manner inconsistent with its labeling. Read and follow all label directions. This product is excluded from listing requirements under EPA/TSCA.

SARA TITLE III DATA:

Section 311 & 312 Hazard Categories:

Immediate Health Hazard: Yes

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Delayed Health Hazard: Yes
 Fire Hazard: No
 Reactive Hazard: No
 Sudden Pressure Release Hazard: No

Section 302 Extremely Hazardous Substances: DDVP (Dichlorvos, 62-73-7) - 0.5%

Section 313 Toxic Chemicals: DDVP (Dichlorvos, 62-73-7) - 0.5%

CERCLA/EHS Reportable Quantities (RQ): DDVP (Dichlorvos) - 10 lbs

STATE REGULATIONS:

CALIFORNIA (Proposition 65): This product contains a chemical known to the State of California to cause cancer - DDVP(Dichlorvos).

16. OTHER INFORMATION

MSDS STATUS:

Date This Revision: 18 July, 2014

Date Previous Revision: 20 January, 2011

Person Responsible for Preparation: Gary A. Braden

REASONS FOR REVISION: Product has been registered and the name has been finalized.

DISCLAIMER: This information is provided for the limited guidance to the user. While AMVAC believes that the information is, as of the date hereof, reliable, it is the user's responsibility to determine the suitability of the information for the users' purposes. The user is advised not to construe the information as absolutely complete since additional information may be necessary or desirable when particular, exceptional, or variable conditions or circumstances exist (like combinations with other materials), or because of applicable regulations. No express or implied warranty of merchantability or fitness for a particular purpose or otherwise is made hereunder with respect to the information or the product to which the information relates.

ABBREVIATIONS:

ai	-	active ingredient
ACGIH	-	American Conference of Governmental Industrial Hygienists
BEI	-	Biological Exposure Index
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	-	Environmental Protection Agency
FIFRA	-	Federal Insecticide, Fungicide, and Rodenticide Act
IARC	-	International Agency for Research on Cancer
NTP	-	National Toxicology Program
OSHA	-	Occupational Safety and Health Agency
SARA	-	Superfund Amendments and Reauthorization Act
TSCA	-	Toxic Substances Control Act

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