

3. CHEMICAL AND PHYSICAL INFORMATION

3.1 CHEMICAL IDENTITY

Information regarding the chemical identity of dichlorvos is located in Table 3- 1.

3.2 PHYSICAL AND CHEMICAL PROPERTIES

Information regarding the physical and chemical properties of dichlorvos is located in Table 3-2.

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Table 3-1. Chemical Identity of Dichlorvos

Characteristic	Information	Reference
Chemical name	O,O-dimethyl-O-(2,2-dichlorovinyl)phosphate	Merck 1989
Synonym(s)	Phosphoric acid 2,2-dichloroethenyl dimethyl ester; phosphoric acid 2,2-dichlorovinyl dimethyl ester; 2,2-dichlorovinyl dimethyl phosphate; dichlorophos; dichlorovos; DDVP; dichlorvos	Merck 1989; Worthing 1983
Registered trade name(s)	SD 1750; Astrobot; Atgard; Canogard; Dedevap; Dichlorman; Divipan; Equigard; Equigel; Estrosol; Herkol; Nogos; Nuvan; Task; Vapona; Verdisol	Merck 1989
Chemical formula	$C_4H_7Cl_2O_4P$	Merck 1989
Chemical structure		Worthing 1983
Identification numbers:		
CAS Registry	62-73-7	Merck 1989
NIOSH RTECS	TC 0350000	HSDB 1996
EPA Hazardous Waste	No data	
OHM/TADS	7800015	HSDB 1996
DOT/UN/NA/IMCO	NA 2783 Dichlorvos UN 3018 Organophosphorus pesticides, liquid, toxic IMO 6.1	HSDB 1996
HSDB	319	HSDB 1996
NCI	C00113	HSDB 1996

CAS = Chemical Abstracts Services; DOT/UN/NA/IMCO = Department of Transportation/United Nations/North America/International Maritime Dangerous Goods Code; EPA = Environmental Protection Agency; HSDB = Hazardous Substance Data Bank; NCI = National Cancer Institute; NIOSH = National Institute for Occupational Safety and Health; OHM/TADS = Oil and Hazardous Materials/Technical Assistance Data System; RTECS = Registry of Toxic Effects of Chemical Substances

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Table 3-2. Physical and Chemical Properties of Dichlorvos

Property	Information	Reference
Molecular weight	220.98	Merck 1989
Color	Colorless to amber	Worthing 1983
Physical state	Liquid	Merck 1989
Melting point	No data	
Boiling point at 0.05 mm Hg	35 °C	Worthing 1983
at 20 mm Hg	140 °C	Merck 1989
at 14 mm Hg	120 °C	Sunshine 1969
at 760 mm Hg	221 °C	Aster 1996 (calculated)
Density at 25 °C	1.415 g/mL	Merck 1989
Odor	mild chemical odor aromatic odor	Mackison 1981 Worthing 1983
Odor threshold:		
Water	No data	
Air	No data	
Solubility:		
Water at 20 °C	10 mg/mL	Worthing 1983; Merck 1989
Water at 25 °C	16 mg/mL	Kawamoto and Urano 1989
Organic solvent(s)	Miscible with alcohol and most organic solvents Miscible with aromatic chlorinated hydrocarbons	Merck 1989; Sunshine 1969
Partition coefficients:		
Log K_{ow}	1.16 1.47	Kawamoto and Urano 1989 Bowman and Sans 1983
Log K_{oc}	1.45	Kenaga 1980
Vapor pressure at 20 °C	1.2×10^{-2} mm Hg	Sunshine 1969; Merck 1989
Henry's law constant at 25 °C	6.61×10^{-7} atm-m ³ /mol 7.01×10^{-8} atm-m ³ /mol 8.58×10^{-7} atm-m ³ /mol	Domine et al. 1992 ASTER (1996) (calculated) SRC 1994
Autoignition temperature	No data	
Flashpoint	>79 °C	HSDB 1996
Flammability limits at 25 °C	Nonflammable	Merck 1989

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Table 3-2. Physical and Chemical Properties of Dichlorvos (continued)

Property	Information	Reference
Atmospheric reaction rate constants		
Hydroxyl radicals	$9.408 \times 10^{-12} \text{ cm}^3/\text{molecule-sec}$	SRC 1995
Half-life with 5×10^5 hydroxyl radicals per cm^3	2 days	Howard 1991
Ozone reaction	$0.003579 \times 10^{-17} \text{ cm}^3/\text{molecule-sec}$	SRC 1995
Half-life with 7.0×10^{11} ozone molecules per cm^3 (first order)	320 days	Howard 1991
Hydrolysis half-lives		
pH = 5.4	3.2 days	Latif et al. 1984
pH = 6	0.32 days	Latif et al. 1984
pH = 7	0.2 days	Latif et al. 1984
T = 10 °C	240 days	Faust and Suffet 1966
T = 20 °C	61.5 days	Faust and Suffet 1966
T = 30 °C	1.7 days	Faust and Suffet 1966
Other		
	Readily decomposes in strong acid or alkali; hydrolyzes in water	Sunshine 1969
	Decomposition products may include hydrogen chloride gas, phosphoric acid mist, and carbon monoxide	NIOSH, OSHA 1981
	Corrosive to iron and mild steel	Worthing 1983
Conversion factors (25 °C)		
	$\text{ppm (v/v)} = 9.02 \text{ mg/m}^3$	Calculated
	$\text{mg/m}^3 = 0.11 \text{ ppm (v/v)}$	Calculated
Explosive limits		
	No data	

HSDB = Hazardous Substance Data Bank; NIOSH = National Institute for Occupational Safety and Health; OSHA = Occupational Safety and Health Administration; v/v = volume per volume