

2728 VINYL CHLORIDE

VINYL CHLORIDE

CAS RN: 75014

NIOSH #: KU 9625000

mf: C_2H_3Cl ; mw: 62.50

Colorless liquid or gas (when inhibited), faintly sweet odor. mp: -160° ; bp: -13.9° , lel = 4%, uel = 22%; flash p: $17.6^\circ F$ (COC), fp: -159.7° , d(liquid): 0.9195 @ $15^\circ/4^\circ$, vap. press: 2600 mm @ 25° , vap d: 2.15, autoign. temp.: $882^\circ F$. Slightly sol in water; sol in alc; very sol in ether.

SYNS:

CHLOROETHENE
CHLOROETHYLENE
CHLORURE DE VINYLE (FRENCH)
CLORURO DI VINILE (ITALIAN)
ETHYLENE MONOCHLORIDE
MONOCHLOROETHENE

MONOCHLOROETHYLENE (DOT)
VINYLCHLORID (GERMAN)
VINYL CHLORIDE (DOT)
VINYL CHLORIDE MONOMER
VINYL C MONOMER
WINYLU CHLOREK (POLISH)

TOXICITY DATA: 3

mma-smc 25000 ppm
otr-rat-ihl 2000 ppm/14W-I
hma-rat/smc 1 pph/24H-C
ihl-man TClO: 30 mg/m³ (5Y male)
ihl-rat TClO: 500 ppm/7H (6-15D preg)
ihl-rat TClO: 1500 ppm/24H (1-9D preg)
ihl-rat TClO: 6000 ppm/4H (12-18D preg): ETA
ihl-man TClO: 500 ppm/4Y-I: CAR
ori-rat TDLo: 10 gm/kg/52W-I: CAR
ihl-rat TClO: 50 ppm/52W-I: CAR
ihl-rat TClO: 6000 ppm/4H/(12-18D preg): CARC
ipr-rat TDLo: 21 mg/kg/65W-I: ETA
scu-rat TDLo: 21 mg/kg/67W-I: ETA
ihl-mus TClO: 50 ppm/30W-I: CAR
ihl-ham TClO: 50 ppm/4H/30W-I: CAR
ihl-mus TC: 2500 ppm/26W-I: NEO
ihl-rat TC: 250 ppm/52W-I: CAR
ihl-mus TC: 50 ppm/47W-I: CAR
ori-rat TD: 34 gm/kg/3Y-I: CAR
ihl-mus TC: 2500 ppm/26W-I: NEO
ihl-mus TC: 2500 ppm/35W-I: CAR
ihl-rat TC: 250 ppm/2Y-I: CAR
ihl-ham TC: 500 ppm/48W-I: NEO
ihl-rat TC: 250 ppm/80W-I: CAR
ihl-rat TC: 50 ppm/37W-I: CAR
ori-rat LD50: 500 mg/kg
ihl-gpg LCLo: 20 ppm/30M

CODEN:

MUREAV 91,381,81
ARTODN 47,71,81
MUREAV 91,381,81
GTPZAB 24(5),28,80
TXAPA9 33,134,75
TXCYAC 11,45,78
ANYAA9 271,431,76
JOCMA7 16,809,74
APDCDT 3,216,76
ANYAA9 271,431,76
ANYAA9 271,431,76
APDCDT 3,216,76
APDCDT 3,216,76
ANYAA9 271,431,76
APDCDT 3,216,76
ENVRAL 16,285,78
JTEHD6 4,15,78
JTEHD6 4,15,78
EVHPAZ 21,1,77
ENVRAL 16,285,78
ENVRAL 7,387,74
AANLAW 56,1,74
MELAAD 65,421,74
MELAAD 65,421,74
MELAAD 65,421,74
DOWCC*
85DVA7 -,1160,38

Aquatic Toxicity Rating: TLm96: over 1000 ppm
WQCHM* 3,-,74.

Carcinogenic Determination: Human Positive IARC**
19,377,79.

TLV: Air: 5 ppm DTLVS* 4,427,80. *Toxicology Review:*
FAZMAE 18,365,74; JTEHD6 1(1),47,75; CMTVAS
10(3),49,73; CHWEAP 70,5,74; CANCAR 39,1792,77;
MUREAV 32(2),93,76; ZHPMAT 166,113,78; BNY-
MAM 54,413,78; ABMHAM 35,585,77; CBINA8
22,117,78. OSHA Standard: Air: TWA 1 ppm; CL 5
ppm/15M FEREAC 40,27073,75. DOT: Flammable
Gas, Label: Flammable Gas FEREAC 41,57018,76.
Occupational Exposure to Vinyl Halides recm std: Air:
TWA 1 ppm; CL 5 ppm/15M NTIS**. "NIOSH Man-
ual of Analytical Methods" VOL 1 178. NIOSH Cur-

rent Intelligence Bulletin 28, 1978. Reported in EPA
TSCA Inventory, 1980. EPA TSCA 8E No.
03780104—Followup Reply Received as of April, 1979.

THR: HIGH irr via inhal route and to skin, eyes and
mu mem. In high conc, it acts as an anesthetic. Causes
skin burns by rapid evaporation and consequent freez-
ing. Chronic exposure has shown liver injury in rats
and rbt. Circulatory and bone changes in the fingertips
reported in workers handling unpolymerized materials.
A hmn brain CARC and an exper brain CARC, NEO,
ETA via inhal route. May cause local irr.

Fire Hazard: Dangerous, when exposed to heat, flame
or oxidizers. Large fires of this material are practically
inextinguishable.

Spontaneous Heating: No.

Explosion Hazard: Severe, in the form of vapor, when
exposed to heat or flame. Also, on standing, forms per-
oxides in air and can then explode.

Disaster Hazard: Very dangerous; when heated to decomp
it emits highly tox fumes of phosgene; can react vigor-
ously with oxidizing materials. Before storing or han-
dling this material, instructions for its use should be
obtained from the supplier.

To Fight Fire: Stop flow of gas.

For further information see Vol. 1, No. 3 of *DPIM Report*.

VINYL CROTONATE

CAS RN: 14861064

NIOSH #: GQ 5850000

mf: $C_6H_8O_2$; mw: 112.14

Slightly sol in water. d: 0.9, vap. d: 4.0, bp: 134° , flash
p: $78^\circ F$ (OC).

SYNS:

CROTONIC ACID, VINYL ESTER

2-BUTENOIC ACID, ETHENYL ES-
TER

TOXICITY DATA: 1

skin-rbt 500 mg open MLD
eye-rbt 500 mg
ori-rat LD50: 6500 mg/kg

CODEN:

UCDS** 11/15/71
AMHBC 10,61,54
UCDS** 11/15/71

THR: Skin, eye irr in rbt. See also ester. LOW via oral
route. Probably very irr.

Fire Hazard: Dangerous, when exposed to heat, flame
or oxidizers.

To Fight Fire: Alcohol foam.

VINYL CYCLOHEXANE MONOXIDE

CAS RN: 106865

NIOSH #: RN 8770000

mf: $C_6H_{12}O$; mw: 124.20

Liquid, very slightly sol in water. d: 0.9598 @ $20^\circ/20^\circ$,
bp: 169° , flash p: $136^\circ F$, fp: -100° .

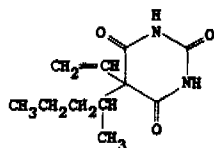
SYNS:

1,2-EPOXY-4-VINYLCYCLOHEX-
ANE4-VINYLCYCLOHEXENE MONOX-
IDE4-VINYLCYCLOHEXANE, 1,2-
EPOXIDE1-VINYL-3,4-EPOXYCYCLOHEX-
ANE4-VINYLCYCLOHEXENE-1,2-
EPOXIDE3-VINYL-7-OXABICYCLO(4.1.0)
HEPTANE

VINYL CYCLOHEXENE MONOXIDE

UCC 108067

bituric acid; 5-vinyl-5-(1-methylbutyl)barbituric acid; butyvinyl; Speda; Optanox. $C_{11}H_{16}N_2O_3$; mol wt 224.25. C 58.91%, H 7.19%, N 12.49%, O 21.40%. Prepns: Seefelder, *Festschr. Carl Wurster* 1960, 71, C.A. 56, 9928d (1962).



Crystals, mp 90-91.5°.

Caution: Abuse may lead to habituation or addiction. THERAP CAT: Sedative, hypnotic.

9796. Vinyl Chloride. *Chloroethylene.* C_2H_3Cl ; mol wt 62.50. C 38.43%, H 4.84%, Cl 56.73%. $CH_2=CHCl$. Prepnd from ethylene dichloride and alcoholic potassium: Regnault, *Ann.* 14, 22 (1835); by halogenation of ethylene: Miller, Jenks, U.S. pat. 2,896,000 (1959 to National Distillers and Chemical Corp.). Review of mfg processes: Faith, Keyes & Clark's *Industrial Chemicals*, F. A. Lowenheim, M. K. Moran, Eds. (Wiley-Interscience, New York, 4th ed., 1975) pp 868-873. Comprehensive monograph on toxicity of vinyl chloride: *Ann. N.Y. Acad. Sci.* 246, 1-337 (1975). Review of carcinogenicity studies: *IARC Monographs* 19, 377-437 (1979).

Colorless gas; liquefies in a freezing mixture. Polymerizes in light or in presence of catalyst. mp -153.8°; bp -13.37°. d_4^{20} 0.9106; n_D^{20} 1.3700. Vapor press. at 20°: 2530 mm Hg. **Flammable!** Flash pt -78°C (closed cup). Sol in alc. ether, carbon tetrachloride, benzene. Slightly sol in water.

Caution: Causes "vinyl chloride disease". May be narcotic in high concns. Consult latest Government regulations on allowable concentrations in air. If spilled on skin rapid evaporation can cause local frostbite. This substance has been listed as a carcinogen by the EPA: *Second Annual Report on Carcinogens* (NTP 81-43, Dec. 1981) pp 238-240.

USE: In the plastics industry; as refrigerant; in organic syntheses.

9797. Vinyl Ether. *1,1'-Oxybisethene*; divinyl ether; divinyl oxide; ethenyloxyethene. C_4H_6O ; mol wt 70.09. C 68.54%, H 8.63%, O 22.83%. $CH_2=CHOCH=CH_2$. Prepns: Major, Ruigh, U.S. pat. 2,021,872 (1935 to Merck & Co.); Mittag, Smidt, U.S. pat. 2,832,807 (1958 to Consortium für electrochem. Ind. GmbH).

Very volatile, flammable liq; characteristic odor. Dec on exposure to light or to acid fumes, forming acetaldehyde, and polymerizes to a solid glass-like mass. d_4^{20} 0.774; d_4^{25} 0.773. bp 28.4°. n_D^{20} 1.3989. Crit temp 183° (calc). Critical press. about 30 atm. Specific heat about 0.53 cal/g. Flash point (closed cup) < -30° (< -22°F). Explosives limits (% by vol in air), lower: 1.7, upper: 27.0. Autoignition temp 360° (680°F). 0.53 g dissolves in 100 g water at 37°. Oil-water soly coefficient at 37°: 41. Miscible with alcohol, ether, oils and other organic solvents. **Keep protected from light and acid fumes, in a cool place, and away from an open flame.** Lethal concn for mice in air: 51,233 ppm.

THERAP CAT: Anesthetic (inhalation).

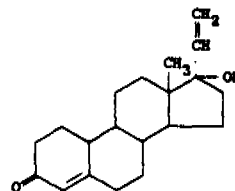
9798. Vinylidene Chloride. *1,1-Dichloroethene; 1,1-dichloroethylene; asym-dichloroethylene.* $C_2H_2Cl_2$; mol wt 96.93. C 24.78%, H 2.08%, Cl 73.14%. $CH_2=CCl_2$. Prepnd from ethylene chloride: Reilly, U.S. pat. 2,140,548 (1938 to Dow). By dehydrochlorination of 1,1,2-trichloroethane: Conrad, Gould, U.S. pat. 2,989,570 (1961 to Ethyl Corp.).

Liquid. Mild, sweet odor resembling that of chloroform. d_4^{20} 1.2129. mp -122.5°. bp₇₆₀ 31.7°. n_D^{20} 1.4249. Flash pt -15°. Practically insol in water. Sol in organic solvents. At temps above 0° and especially in the presence of oxygen or other suitable catalysts polymerizes to a plastic. Several inhibitors to preserve the monomer have been invented. Uncontrolled polymerization may lead to explosive reaction products with oxygen or ozone: Reinhardt, *Chem. Eng. News* 25, 2136 (1947).

USE: Intermediate in the production of "vinylidene polymers" such as *Saren* and *Velon*. **Caution:** Irritant to

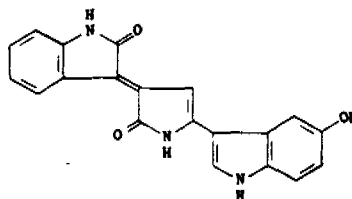
skin, mucous membranes; narcotic in high concentrations; has caused liver, kidney injury in exptl animals: Irish in *Industrial Hygiene and Toxicology* vol. 2, F. A. Patty, Ed. (Interscience, New York, 2nd ed., 1962) pp 1305-1307; Prendergast et al, *Toxicol. Appl. Pharmacol.* 10, 270 (1967).

9799. 17 α -Vinyl-19-nortestosterone. *17-Hydroxy-19-nor-17 α -pregna-4,20-dien-3-one; 17-hydroxy-17 α -vinyl-4-estren-3-one; 17-hydroxy-13-methyl-17 α -vinyl-1,2,3,6,7,8,9,10,11,12,13,14,16,17-tetradecahydro-15H-cyclopenta-[a]phenanthren-3-one; Nor-Progesteale; norvinisterone.* $C_{28}H_{40}O$; mol wt 300.42. C 79.95%, H 9.39%, O 10.65%. Prepnd: Colton, U.S. pats. 2,685,518; 2,802,015 (to Searle).



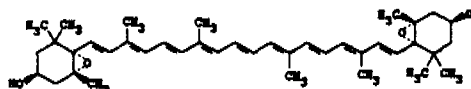
Crystals from ethyl acetate + petr ether, mp 169-171°. $[\alpha]_D^{25} +36°$.

9800. Violacein. *3-[1,2-Dihydro-5-(5-hydroxy-1H-indol-3-yl)-2-oxo-3H-pyrrol-3-ylidene]-1,3-dihydro-2H-indol-2-one; 3-[2-(5-hydroxyindol-3-yl)-5-oxo-2-pyrrolin-4-ylidene]-2-indolinone; 3-[2-(5-hydroxyindol-3-yl)-5-oxopyrrolin-4-ylidene]oxindole; 5-(5-hydroxy-3-indolyl)-3-(3-oxindolylidene)-2-oxopyrrolone.* $C_{20}H_{13}N_3O_3$; mol wt 343.33. C 69.96%, H 3.82%, N 12.24%, O 13.98%. Pigment isolated from *Chromobacterium violaceum* (Bacillus violaceus): Tobie, *J. Bact.* 29, 223 (1935); Strong, *Science* 100, 287 (1944); Ballantine et al, *J. Chem. Soc.* 1958, 755. Structure and synthesis: Ballantine et al, *ibid.* 1960, 2292. Review: DeMoss in *Antibiotics* vol. 2, D. Gottlieb, P. D. Shaw, Eds. (Springer, New York, 1967).



Purplish-black needles, prisms. Practically insol in water; slightly sol in alcohol; moderately sol in dioxane.

9801. Violaxanthin. *5,6,5',6'-Diepoxy-5,5',6,6'-tetrahydro- β , β -carotene-3,3'-diol; zeaxanthin diepoxide.* $C_{40}H_{56}O_4$; mol wt 600.85. C 79.95%, H 9.39%, O 10.65%. Widely distributed carotenoid pigment. Formed in plants from zeaxanthin. Isola from yellow pansies (*Viola tricolor*): Kuhn, Winterstein, *Ber.* 64, 326 (1931). Structure: Karrer et al, *Helv. Chim. Acta* 14, 1044 (1931); 16, 977 (1933); 19, 1024 (1936); 27, 1684 (1944). Partial synthesis: Karrer, Jucker, *ibid.* 28, 300 (1945). Abs config: Bartlett et al, *J. Chem. Soc. (C)* 1969, 2527. Isola from *Viola tricolor* and configuration of the 15-cis-isomer: P. Molnar, J. Szabolcs, *Phytochemistry* 19, 623 (1980).



Orange prisms from methanol, reddish-brown acicular crystals from CS_2 , mp 200°. $[\alpha]_D^{25} +35°$ (c = 0.08 in chloroform). Absorption max (in alc): 471.3, 442.3, 417.5 nm. Sol in alcohol, methanol, carbon disulfide, ether; almost insol in petr ether.

15-cis-Isomer, irregular yellow plates from benzene/

petrol, mp 109°. uv ($\log \epsilon$ 4.91, 4.98, 4.8 orange prisms).

9802. Viologens. the chlorides of cert dipyrindyl. Presentl diiodides. Prepnd: Michaelis, Hill, *J. Physiol.* 16, 859-87; tion-reduction indi very negative. In color is exhibited b oxidized form is th potential of these at of electrochemistry *Rev.* 10, 49-82 (198 Ethyl viologen, 1, yl- γ,γ' -dipyrindyliu volts.

Benzyl viologen. ium, N,N'-dibenzy. 30°: -0.359 volts.

Betaine viologen. mal potential at 3C Dimethyl analog **USE:** As biologic

9803. Violuric *5-oxime; alloxan (hydroxyimino)bar C 30.58%, H 1.93° as a mixture of k and hydroxylamin chard, *Ber.* 32, 17.

Orthorhombic c sol in water to a $FeCl_3$ produces bl

USE: Analytical cations. Forms *Chem. Soc.* 80, 56

9804. Violatin. copyranosyl)oxy/be 2- β -vicianoside; vi 51.12%, H 3.87%. Isola and structur: *Bull. Soc. Chim.* 5 341 (1929). Synt 1932, 2770. Acid binose and D-gluc

Hygroscopic n 173°, after prelimi sol in water; sol tone, ethyl acetat

9805. Viomyc cin B; Vinactane; 685.71. C 43.79° otic substance pr cluding *S. punice* al, *Am. Rev. Tu.* duction: Marsh Freaney, U.S. p structure: Yoshi Alternate structu