

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
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MATERIAL SAFETY DATA SHEET

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Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

February, 1977

SECTION I

MANUFACTURER'S NAME <u>PPG Industries, Inc.</u>		EMERGENCY TELEPHONE NO. <u>(304) 843-1300</u>
ADDRESS (Number, Street, City, State, and ZIP Code) <u>One Gateway Center, Pittsburgh, PA 15222</u>		
CHEMICAL NAME AND SYNONYMS <u>Vinylidene Chloride, Vinylidene Chloride Monomer</u>		TRADE NAME AND SYNONYMS <u>VDCM</u>
CHEMICAL FAMILY <u>Chlorinated Hydrocarbon</u>	FORMULA <u>CH₂=CCl₂</u>	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
<u>Vinylidene Chloride</u>				<u>100</u>	<u>10ppm</u>

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	<u>88.9</u>	SPECIFIC GRAVITY (H ₂ O=1)	<u>1.213</u>
VAPOR PRESSURE (mm Hg.) @20°C	<u>495</u>	PERCENT VOLATILE BY VOLUME (%)	<u>100</u>
VAPOR DENSITY (AIR=1)	<u>3.34</u>	EVAPORATION RATE (ETHYL ETHER=1)	<u>1</u>
SOLUBILITY IN WATER @20°C	<u>0.04%</u>		
APPEARANCE AND ODOR <u>Clear, colorless liquid, sweet odor</u>			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) <u>50°F (Cleveland open cup)</u>	FLAMMABLE LIMITS	Lel <u>7</u>	Uel <u>16</u>
EXTINGUISHING MEDIA <u>CO₂, dry chemical, water spray, foam</u>			
SPECIAL FIRE FIGHTING PROCEDURES <u>Wear NIOSH/MSHA-approved positive pressure self-contained</u>			
<u>Breathing apparatus; water spray may be used to cool equipment.</u>			
UNUSUAL FIRE AND EXPLOSION HAZARDS <u>Products of combustion include toxic and corrosive gases such as hydrogen</u>			
<u>chloride.</u>			

ADDENDUM TO MATERIAL SAFETY DATA SHEET
ON VINYLIDENE CHLORIDE (FEBRUARY 1977)

Section V - Health Hazard Data

Effects of Overexposure:

Acute - Overexposure to vapor can lead to anesthesia, irrational behavior, drunkenness, and if continued, unconsciousness and ultimately, death. Liquid vinylidene chloride is irritating to the eyes and skin. The inhibitor can cause local skin irritation or burns unless washed off thoroughly.

Since the odor threshold lies between 500 and 1000 ppm, the odor of vinylidene chloride is not an adequate warning to prevent overexposure.

Chronic - In recent preliminary animal studies, it has been reported that vinylidene chloride in concentrations higher than the present ACGIH threshold limit value (TLV) of 10 ppm may be carcinogenic to some species of experimental laboratory animals via inhalation. Although these findings are preliminary and incomplete, it is suggested that air concentrations of vinylidene chloride in the work area be maintained below 10 ppm at all times. It is also recommended that the 8-hour time weighted average (TWA) be maintained as far below 10 ppm as practical.

Chronic exposure to low concentrations of vinylidene chloride can result in injury to the liver and kidneys.

Emergency and First Aid Procedures:

Inhalation Overexposure - Remove to fresh air. If not breathing, give artificial respiration, preferable mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Eye or skin contact - Immediately flush with plenty of water (soap and water for skin) for at least 15 minutes. If irritation occurs, consult a physician. Wash contaminated clothing before reuse.

Section VIII - Special Protection Information

Respiratory protection:

Wear NIOSH/MESA - approved non-air purifying respiratory protection where concentrations cannot be maintained below 10 ppm. Establish a respiratory protection program in accordance with the minimum requirements of 29 CFR 1910.134 (May 28, 1975).

Vinylidene Chloride

Chemicals

PPG

Vinylidene chloride monomer (VDC) is a versatile product used with other monomers to make a wide variety of copolymer resins and latices.

Properly inhibited and protected from exposure to air, oxygen, water and light, VDC is stable in shipment and storage at ambient temperatures. Correct handling practices, outlined below must be followed at all times.

VDC supplied by PPG Industries' Chemicals Group from its Lake Charles, Louisiana, plant is inhibited with hydroquinone monomethyl ether (HQME or MEHQ) to prevent polymerization during shipment and storage. It is shipped under a nitrogen blanket to avoid contact with air and to prevent the formation of a peroxide that can act as a polymerization initiator.

For most applications, the MEHQ inhibitor in PPG vinylidene chloride need not be removed. If uninhibited monomer is required, however, the MEHQ can be removed by distillation or alkali extraction.

GRADES

The standard grade of VDC manufactured by PPG is inhibited with hydroquinone monomethyl ether at approximately 200 parts per million.

USES

Vinylidene chloride monomer has been used for many years, primarily as a copolymer with such monomers as vinyl chloride, vinyl acetate, acrylonitrile, and acrylic acid esters. The copolymer resins and latices are formed into films, fibers, coatings and linings.

VDC imparts to finished products qualities of flame retardance, chemical

resistance, and impermeability to water vapor and gases.

Data on reactivity ratios of VDC copolymerizations with 36 monomers are presented in a booklet, "Vinylidene Chloride Handling, Properties and Reactivity Ratios," Form A-967-120R,

available on request from PPG Industries' Chemicals Group.

HEALTH HAZARDS

Acute overexposure to vinylidene chloride vapor by inhalation can lead to anesthesia, irrational behavior, drunk-

PROPERTIES

Chemical Names: Vinylidene chloride; vinylidene chloride monomer; 1,1-dichloroethylene

Chemical Formula: CH_2CCl_2 ; $\begin{array}{c} \text{H} \quad \text{Cl} \\ \diagdown \quad \diagup \\ \text{C} = \text{C} \\ \diagup \quad \diagdown \\ \text{H} \quad \text{Cl} \end{array}$

Molecular Weight: 96.94. Contains 73.14% chlorine.

Description: At ordinary handling temperatures, below its boiling point of 88.9°F (31.6°C), vinylidene chloride is a liquid. It is clear and colorless and has a sweet odor. Vinylidene chloride is highly volatile and its vapor is toxic and extremely flammable.

Boiling Point, °C	+31.6	Critical Temperature, °C	222
°F	+88.9	°F	432
Freezing Point, °C	-122.5	Absolute Viscosity at 20°C, cps	0.330
°F	-188.5	Specific Gravity, 20°/20°C	1.213
Explosive Limits, volume % in air	7 to 16	Density at 20°C, pounds/gallon	10.1
Flash Point, Tag closed cup, °C	-30	Refractive Index, n_D at 20°C	1.4247
°F	-5	Vapor Pressure, mm Hg, at 20°C	495
Autoignition Temperature, °C	570.0	Solubility, water in monomer at 20°C, weight %	0.035
°F	1058		
Critical Pressure, atmospheres	51.3		

Solubility:

Vinylidene chloride is practically insoluble in water (0.04 weight % at 20°C) but soluble in most organic solvents.

Reactivity:

Uninhibited, or inhibitor-depleted, vinylidene chloride may polymerize very slowly even in the absence of oxygen. To further retard polymerization, the uninhibited monomer should be maintained in darkness below 14°F (-10°C).

Uninhibited, or inhibitor-depleted, vinylidene chloride reacts readily with oxygen or air to form a peroxide at temperatures as low as -40°F or C.

Specification and typical analysis:

	Specification	Typical Analysis
Appearance	clear, free of suspended matter	clear, free of suspended matter
Color, APHA	25 maximum	5
Vinylidene Chloride, weight % (excluding inhibitor)	99.6 maximum	99.9
Acetylene, as C_2H_2 , ppm	25 maximum	<1
Other Chlorinated Hydrocarbons, no one to exceed this weight %	0.25 maximum	0.1
Acidity, as HCl, ppm	10 maximum	<1
Peroxide, as H_2O_2 , ppm	10 maximum	<1
Water, ppm	50 maximum	30
Inhibitor, HQMME*, ppm	180 to 220	200

*Hydroquinone monomethyl ether is sometimes referred to as MEHQ (monomethyl ether of hydroquinone).

eness, and — if continued — to unconsciousness and, ultimately, death. Vinylidene chloride is highly volatile and its vapor is heavier than air. Since its odor threshold lies between 500 and 1000 ppm, the odor of vinylidene chloride is not an adequate warning to prevent overexposure. In all cases of overexposure, medical attention should be obtained.

Vinylidene chloride is irritating to eyes and skin. The inhibitor, if not washed off promptly, can cause severe local irritation or burns.

Chronic exposure to low concentrations of vinylidene chloride can result in injury to the liver and kidneys. Also, in recent preliminary animal studies, it has been reported that vinylidene chloride vapor in concentrations higher than the present American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) of 10 ppm may be carcinogenic to some species of experimental laboratory animals via inhalation. Although these findings are preliminary and incomplete, PPG suggests that air concentrations of vinylidene chloride in the work area be maintained below 10 ppm at all times. PPG also recommends that the 8-hour time-weighted average (TWA) be maintained as far below 10 ppm as practical.

HANDLING AND STORAGE

If tank car valves are defective or leaky, *do not unload*. Telephone the PPG Industries Emergency Response Center at (304) 843-1300 in Natrium, West Virginia. This telephone is manned to answer 24 hours a day.

Nitrogen used in vinylidene chloride service should have a maximum oxygen content of 10 ppm. In a bulk storage tank, oxygen content should be kept below 100 ppm by volume.

Information on unloading tank cars and drums, handling spills and leaks, construction materials, storage tanks and transfer lines is presented in a booklet on "Vinylidene Chloride," Form A-967-120R, available on request from PPG Industries' Chemicals Group.

Fire hazard

Vinylidene chloride vapor is extremely flammable and burns vigorously at concentrations between 7 and 16% by volume in air. Proper ventilation and the elimination of ignition sources are mandatory in areas where vapor concentrations may reach a flammable level due to spills or leaks.

Explosion hazard

The peroxide compound that forms when uninhibited vinylidene chloride

has been exposed to atmospheric oxygen is potentially dangerous. This peroxide can also form if the inhibitor content has been depleted. Depletion can result from any of several causes including distillation or exposure to oxygen due to improper storage. The potential presence of peroxide can frequently be detected by sharp, acrid odors or by the precipitation of a white flocculent polymer.

Dried polymer residues may contain adsorbed peroxide which can be exploded by a slight mechanical shock or by heat. These residues should be handled with extreme caution. Adding water that is at room temperature to polymer residues containing peroxide renders them inactive. However, the hazard may return if the water evaporates. The peroxide can be destroyed by several washes with a 5% by volume solution of methanol in perchlorethylene. Any peroxide present as a precipitate in monomer can be destroyed by mixing with one part perchlorethylene-methanol solution and four parts vinylidene chloride monomer. Separation and handling of precipitated polymer, and its potentially dangerous adsorbed peroxide, must be done with extreme caution. Contact either the PPG plant at Lake Charles or Technical Service in Pittsburgh for additional information. Equipment not used continually should be filled with water when shut down.

PACKAGING AND SHIPPING

PPG Industries ships vinylidene chloride (inhibited) in tank cars of 11,000-gallon (111,000-pound) and 20,000-gallon (190,000-pound) capacity and in 55-gallon (500-pound) drums from Lake Charles, Louisiana.

SAMPLES AND SERVICE

Samples of vinylidene chloride are available on request in 1-pint and 5-gallon containers. The technical service staff of PPG Industries' Chemicals Group is available for consulting on safe handling, storage and use.



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