



NATIONAL TRANSPORTATION SAFETY BOARD
Investigative Hearing

Norfolk Southern Railway general merchandise freight train 32N
derailment with subsequent hazardous material release and fires,
in East Palestine, Ohio, on February 3, 2023

GROUP	D
EXHIBIT	
26	

Agency / Organization

Oxy Vinyls, LP

Title

Vinyl Chloride Monomer Safety Data Sheet

SAFETY DATA SHEET

M9192 - North America - EN



VINYL CHLORIDE (MONOMER)

SDS No.: M9192

Rev. Date: 30-Nov-2020

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Identification:	Oxy Vinyls, LP 14555 Dallas Parkway, Suite 400 Dallas, Texas 75254-4300
24 Hour Emergency Telephone Number:	1-800-733-3665 (USA); CANUTEC (Canada): 1-613-996-6666; CHEMTREC (within USA and Canada): 1-800-424-9300; CHEMTREC (outside USA and Canada): +1 703-527-3887; CHEMTREC Contract No: CCN16186
To Request an SDS:	MSDS@oxy.com or 1-972-404-3245
Customer Service:	1-800-752-5151 or 1-972-404-3700
Product Identifier:	VINYL CHLORIDE (MONOMER)
Synonyms:	VCM; Monochloroethylene; Chloroethene; Ethylene, chloro-; Vinyl chloride monomer
Product Use:	PVC Manufacturing
Uses Advised Against:	Aerosol propellant.
Restrictions on Use (United States):	FOR INDUSTRIAL USE ONLY.
Restrictions on Use (EU):	In accordance with Article XVII of the regulation, vinyl chloride should not be used as an aerosol propellant.
Other Global Restrictions on Use:	FOR USE IN INDUSTRIAL INSTALLATIONS ONLY. Other restrictions on use based on local, regional, or national regulations may exist and must be determined on a case-by-case basis.

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

SECTION 2. HAZARDS IDENTIFICATION

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

EMERGENCY OVERVIEW:

Color: Colorless
Physical State: Compressed, liquefied gas
Odor: Sweet

Signal Word: **DANGER**

MAJOR HEALTH HAZARDS: CONTAINS VINYL CHLORIDE, A KNOWN HUMAN CANCER AGENT. CONTACT WITH LIQUID MAY CAUSE FROSTBITE TO EXPOSED TISSUE. MAY PRODUCE SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION INCLUDING HEADACHE, DIZZINESS, NAUSEA, LOSS OF BALANCE AND DROWSINESS. MAY CAUSE RESPIRATORY IRRITATION. CAUSES DAMAGE TO THE NERVOUS SYSTEM, MUSKOSKELETAL SYSTEM, LYMPHATIC SYSTEM AND RESPIRATORY SYSTEM THROUGH PROLONGED OR REPEATED EXPOSURE. SUSPECTED OF CAUSING GENETIC DEFECTS. MAY CAUSE CANCER. THIS MATERIAL IS A POTENTIAL ENDOCRINE DISRUPTOR.

PHYSICAL HAZARDS: MAY MASS EXPLODE IN FIRE. EXTREMELY FLAMMABLE GAS. CONTAINS GAS UNDER PRESSURE, MAY EXPLODE IF HEATED. POLYMERIZATION CAN OCCUR.

PRECAUTIONARY STATEMENTS: Keep away from heat/ sparks/ open flames/ hot surfaces - No smoking. Requires stabilizer to prevent potential dangerous polymerization. Keep only in original container or container compatible with product (see Section 7 - Safe Storage Conditions). Ground/ bond container and receiving equipment. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe vapors. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves, protective clothing, eye, and face protection.

HAZARD CLASSIFICATION:

GHS: PHYSICAL HAZARDS:	Flammable Gas - Cat. 1 Extremely Flammable Gas Under Pressure - Liquefied Explosive - Division 1.5
GHS: TARGET ORGAN TOXICITY (SINGLE EXPOSURE):	Category 3 - May cause respiratory tract irritation Category 3 - May cause drowsiness or dizziness
GHS: TARGET ORGAN TOXICITY (REPEATED EXPOSURE):	Category 1 - Causes damage to the nervous system, musculoskeletal system, lymphatic system and respiratory

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

	system through prolonged or repeated exposure
GHS: CARCINOGENICITY:	Category 1A - May cause cancer
GHS: GERM CELL MUTAGENICITY:	Category 2 - Suspected of causing genetic defects

GHS SYMBOL: Flame, Gas cylinder, Exclamation mark, Health hazards



GHS SIGNAL WORD: **DANGER**

GHS HAZARD STATEMENTS:

GHS - Physical Hazard Statement(s)

- May mass explode in fire
- Extremely flammable gas
- Contains gas under pressure; may explode if heated

GHS - Health Hazard Statement(s) -

- May cause respiratory irritation
- May cause drowsiness or dizziness
- Suspected of causing genetic defects
- May cause cancer
- May cause damage to organs through prolonged or repeated exposure: (nervous system, musculoskeletal system, lymphatic system, respiratory system)

GHS - Precautionary Statement(s) - Prevention

- Keep away from heat/sparks/open flames/hot surfaces - No smoking
- Stabilize with a polymerization inhibitor (e.g. p-Methoxyphenol [Hydroquinone Monomethyl Ether]) or purging to remove oxygen
- Keep only in original container or container compatible with product (see Section 7 - Safe Storage Conditions)
- Ground/ bond container and receiving equipment
- Obtain special instructions before use
- Do not handle until all safety precautions have been read and understood
- Do not breathe dust/fume/gas/mist/vapors/spray
- Use personal protective equipment as required
- Wear protective gloves/protective clothing/eye protection/face protection
- Wash thoroughly after handling
- Do not eat, drink or smoke when using this product
- Use only outdoors or in a well-ventilated area

GHS - Precautionary Statement(s) - Response

- Leaking gas fire: Do not extinguish, unless leak can be stopped safely
- Eliminate all ignition sources if safe to do so
- IF INHALED: Remove person to fresh air and keep comfortable for breathing
- IF INHALED: Call a POISON CENTER or doctor/physician if you feel unwell
- IF exposed or concerned: call a POISON CENTER or doctor/physician

VINYL CHLORIDE (MONOMER)

SDS No.: M9192

Rev. Date: 30-Nov-2020

Supersedes Date: 2015-06-April

GHS - Precautionary Statement(s) - Storage

- Store in accordance with manufacturer's recommendations (See Section 7 of the SDS)
- Store in a well-ventilated place. Keep container tightly closed
- Protect from sunlight
- Store in a secure manner

GHS - Precautionary Statement(s) - Disposal

- Dispose of contents and container in accordance with applicable local, regional, national, and/or international regulations

Physical Hazards Not Otherwise Classified

- Polymerization can occur

Hazard Not Otherwise Classified (HNOC)-Health

- Repeat occupational exposure to Vinyl Chloride have been associated with Raynaud syndrome and associated scleroderma-like skin changes on the hands
- Direct contact with liquid or rapidly expanding gas may cause frostbite to contacted tissue (eyes, skin, etc.)
- Vinyl Chloride is listed on The Endocrine Disruptors Exchange's (TEDX) List of Potential Endocrine Disruptors database of chemicals with the potential to affect the endocrine system. Every chemical on the TEDX List has one or more verified citations published, accessible, primary scientific research demonstrating effects on the endocrine system
- May displace oxygen and cause rapid suffocation

See Section 11: TOXICOLOGICAL INFORMATION

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Percent [%]
Vinyl Chloride	75-01-4	99 - 100

SECTION 4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation and/or Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

SKIN CONTACT: If frostbite or freezing occur, immediately flush with plenty of lukewarm water (100-105 °F, 38-41 °C). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION: Not a likely route of exposure in occupational environment.

Most Important Symptoms/Effects (Acute and Delayed):

Acute Symptoms/Effects:

Inhalation (Breathing): Respiratory Tract Irritation: rhinitis, scratchy throat, cough, sore throat, runny nose, wheezing, difficulty breathing (dyspnea). Inhalation of this material may cause central nervous system depression (narcotic effects).

Skin: Skin Irritation. If spilled on skin, rapid evaporation can cause local frostbite with redness, blistering, and scaling.

Eye: Eye Irritation. Rapid evaporation can cause local frostbite with corneal and conjunctival irritation or burns. High concentrations of vapor can cause eye irritation.

Ingestion (Swallowing): Ingestion is not a likely route of exposure.

Other Health Effects: Narcotic Effects (Central Nervous System Depression): Ataxia or dizziness, drowsiness or fatigue, loss of consciousness, headache, euphoria and irritability, visual or hearing disturbances, nausea, memory loss.

Delayed Symptoms/Effects:

- Carcinogen: Long term significant occupational overexposure to VCM has been associated with a specific cancer (angiosarcoma of the liver) and is associated with hepatocellular cancer
- Suspected mutagen and suspected of causing reproductive damage
- Repeated exposure can damage the skin (scleroderma), bones (acro-osteolysis) and blood vessels in the hand (Raynaud's Syndrome)
- Scleroderma is characterized by a hardening and tightening of patches of skin
- Raynaud's syndrome is characterized by an exaggerated response to cold temperatures or emotional distress, which can cause numbness, pain or color changes in the fingers or toes

Protection of First-Aiders: Protect yourself by avoiding contact with this material. Direct contact with liquid may cause frostbite to exposed tissue (eyes, skin, etc.). Use personal protective equipment (PPE). Refer to Section 8 for specific PPE recommendations. At minimum, treating personnel should utilize PPE sufficient for prevention of bloodborne pathogen transmission.

Notes to Physician: There is no specific antidote. Treat symptoms with supportive care. Cardiac stimulants such as epinephrine should be avoided in persons overexposed to chlorinated hydrocarbons.

Interaction with Other Chemicals Which Enhance Toxicity: Alcohol may enhance toxic effects.

Medical Conditions Aggravated by Exposure: Alcoholic Liver Disease. Infectious Hepatitis. Cirrhosis.

SECTION 5. FIRE-FIGHTING MEASURES

Fire Hazard: Severe fire hazard. Vapor/air mixtures are explosive. Vapors or gases may ignite at distant sources and flash back. Containers may rupture or explode if exposed to heat.

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

Extinguishing Media: Stop flow of gas before extinguishing fire. Use carbon dioxide, regular dry chemical, foam or water. Use water spray to keep containers cool.

Fire Fighting: If material on fire or involved in fire: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this can't be done, then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode.

Hazardous Combustion Products: Oxides of carbon; Hydrogen chloride; Phosgene

Sensitivity to Mechanical Impact: Not sensitive.

Sensitivity to Static Discharge: Electrostatic charges may build up during handling and may form ignitable vapor-air mixtures in storage containers. Ground equipment in accordance with industry standards and best practices such as NFPA 77 [Recommended Practices on Static Electricity (2007)] and American Petroleum Institute (API) RP Recommended Practice 2003 [Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents (2008)].

Lower Flammability Level (air): 3.6%

Upper Flammability Level (air): 33.0%

Flash point: -108 °F (-78 °C)

Auto-ignition Temperature: 882 °F (472 °C)

GHS: PHYSICAL HAZARDS:

- Flammable Gas - Cat. 1 Extremely Flammable
- Gas Under Pressure - Liquefied
- Explosive - Division 1.5

Physical Hazards Not Otherwise Classified

- Polymerization can occur

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Isolate hazard area and deny entry. Keep unnecessary and unprotected persons away. Eliminate all sources of heat and ignition. Ventilate closed spaces before entering. Wear appropriate personal protective equipment recommended in Section 8, Exposure Controls / Personal Protection, of the SDS. Refer to Section 7, Handling and Storage, for additional precautionary measures.

Environmental Precautions: Keep out of water supplies and sewers. Releases should be reported, if required,

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

to appropriate agencies.

Methods and Materials for Containment, Confinement, and/or Abatement: Remove sources of ignition. Ventilate closed spaces before entering. Stop leak if possible without personal risk. Vapors or gases may ignite at distant ignition sources and flash back. See Section 13, Disposal considerations, for additional information.

SECTION 7. HANDLING AND STORAGE

Handling:

Precautions for Safe Handling: Avoid breathing vapor or mist. Avoid contact with skin, eyes and clothing. Keep away from heat, sparks and flame. Ground any equipment used in handling. Use non-sparking tools and equipment. All energized electrical equipment must be designed in accordance with the electrical classification of the area.

Technical measures/precautions: Do not allow liquid Vinyl Chloride to be trapped between closed valves, resulting in extremely high pressure, which could result in a gasket or line leak.

Other precautions: Simple Asphyxiant - May displace oxygen and cause rapid suffocation.

Prevention of contact: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe vapors. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves, protective clothing, eye, and face protection.

Storage:

Safe Storage Conditions: Store and handle in accordance with all current regulations and standards. Keep container tightly closed and properly labeled. Store in a cool, dry area. Store in a well-ventilated area. Do not enter confined spaces unless adequately ventilated. Avoid heat, flames, sparks and other sources of ignition. May be subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Keep separated from incompatible substances (see below or Section 10 of the Safety Data Sheet).

Technical measures: An unstable polyperoxide may be formed in Vinyl Chloride through oxidation by atmospheric oxygen in the presence of any of a variety of contaminants. Storage under these conditions for a long period increases the concentration of unstable polyperoxide to hazardous levels.

Incompatible Substances: Oxidizing agents, oxides of nitrogen, metals, aluminum, aluminum alloys, copper, metal alkyl complexes and alkali metals such as sodium, potassium and their alloys.

Packaging Material: Containers of Vinyl Chloride shall be legibly labeled either: VINYL CHLORIDE: EXTREMELY FLAMMABLE GAS UNDER PRESSURE: CANCER SUSPECT AGENT or with the additional legend, CANCER-SUSPECT AGENT applied near the label or placard. 29 CFR 1910.1017. Procedures for the handling, use, and storage of cylinders should comply with OSHA 1910.101 and 1910.169, as with the recommendations of the Compressed Gas Association. A regulated, marked area should be established where this chemical is handled, used, or stored in compliance with OSHA Standard 1910.1045.

GHS: PHYSICAL HAZARDS:

- Flammable Gas - Cat. 1 Extremely Flammable
- Gas Under Pressure - Liquefied

VINYL CHLORIDE (MONOMER)

SDS No.: M9192

Rev. Date: 30-Nov-2020

Supersedes Date: 2015-06-April

- Explosive - Division 1.5

Physical Hazards Not Otherwise Classified

- Polymerization can occur

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION**REGULATORY EXPOSURE LIMIT(S):**

See 29 CFR 1910.1017 (OSHA's regulatory standard for Vinyl Chloride) for additional requirements when 8-hour action level (0.5 ppm TWA) is exceeded. Listed below for the product components that have regulatory occupational exposure limits (OEL's).

Component	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PEL Ceiling
Vinyl Chloride 75-01-4 (99 - 100 %)	1 ppm	5 ppm	-----

OEL: Occupational Exposure Limit; OSHA: United States Occupational Safety and Health Administration; PEL: Permissible Exposure Limit; TWA: Time Weighted Average; STEL: Short Term Exposure Limit

Component	Canada - TWAs	Canada - STELs	Canada - Ceilings
Vinyl Chloride 75-01-4 (99 - 100 %)	Ontario - 1 ppm (TWA) Alberta - 1 ppm (TWA) Alberta - 2.6 mg/m ³ (TWA) British Columbia - 1 ppm (TWA)	-----	-----

NON-REGULATORY EXPOSURE LIMIT(S):

Listed below are the product components that have advisory (non-regulatory) occupational exposure limits (OEL's) established.

Component	ACGIH TWA	ACGIH STEL	ACGIH Ceiling	Skin Absorption - ACGIH	OSHA TWA (Vacated)	OSHA STEL (Vacated)	OSHA Ceiling (Vacated)
Vinyl Chloride 75-01-4 (99 - 100 %)	1 ppm	-----	-----	-----	-----	-----	-----

- The American Conference of Governmental Industrial Hygienists (ACGIH) is a voluntary organization of professional industrial hygiene personnel in government or educational institutions in the United States. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLVs) for hundreds of chemicals, physical agents, and biological exposure indices.

ENGINEERING CONTROLS: Use closed systems when possible. Provide local exhaust ventilation where vapor may be generated. Ensure compliance with applicable exposure limits.

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear safety glasses with side-shields. If eye contact is likely, wear chemical resistant safety goggles. Provide an emergency eyewash fountain and quick drench shower in the immediate work area.

Skin and Body Protection: Wear appropriate chemical resistant clothing.

Hand Protection: Wear appropriate chemical resistant gloves. Consult a glove supplier for assistance in selecting an appropriate chemical resistant glove.

Protective Material Types: Butyl rubber, Nitrile, Silver Shield®, Viton®

Respiratory Protection: Refer to 29 CFR 1910.1017 for selection of respirators for vinyl chloride. A respiratory protection program that meets applicable regulatory requirements must be followed whenever workplace conditions warrant use of a respirator.

HYGIENE MEASURES: Obtain proper training prior to use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Compressed, liquefied gas
Color:	Colorless
Odor:	Sweet
Molecular Weight:	62.5
Molecular Formula:	C ₂ H ₃ Cl
pH:	Not applicable
Melting Point/Range:	-244.82 (°F)
Freezing Point/Range:	No data available
Flash point:	-108 °F (-78 °C)
Vapor Pressure:	2660 mmHg @ 25 °C
Vapor Density (air=1):	2.15
Relative Density/Specific Gravity (water=1):	0.91 @ 25/25 °C
Water Solubility:	2.7 g/L
Partition Coefficient (n-octanol/water):	Log Kow = 1.36
Auto-ignition Temperature:	882 °F (472 °C)
Decomposition Temperature:	Not applicable
Odor Threshold [ppm]:	Not reliable to prevent excessive exposure
Evaporation Rate (ether=1):	>15
VOC Content (%):	100%
Volatility:	100%
Flammability (solid, gas):	No data available
Lower Flammability Level (air):	3.6%
Upper Flammability Level (air):	33.0%
Viscosity:	Not applicable

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability: Generally stable at normal temperatures and pressures; however, may violently polymerize or generate other hazardous conditions when not stabilized and/or stored correctly.

Reactivity: Explosive or violent polymerization can occur when exposed to air, sunlight, or excessive heat if not properly stabilized. Polymerizes exothermically in the presence of light, air, oxygen or catalyst. Reacts with the following incompatible materials and create a strong exothermic reaction: oxygen, moisture, polymerization additives, copper, aluminum, oxidizing agents, strong alkalis, and strong acids. Reacts with air to form peroxides. Shock sensitive compounds may be formed.

Possibility of Hazardous Reactions: In addition to violent polymerization, Vinyl Chloride may also react with organic peroxides, strong bases, and oxidizing agents resulting in potential heat generation, fire, and/or explosion. At 15°C – 208°C ultraviolet (UV) can initiate a reaction between VCM with excessive oxygen, to produce peroxides (e.g. polyperoxides, polyvinyl peroxides) which can automatically ignite on their own to create an explosive condition under extreme heat or impact. Peroxides may also cause uncontrollable polymerization reactions at high concentrations or temperatures. Further heating to 358°C causes peroxides to decompose to formaldehyde, carbon monoxide and hydrogen chloride.

Conditions to Avoid (e.g., static discharge, shock, or vibration): Electrostatic charges may build up during handling and may form ignitable vapor-air mixtures in storage containers. Ground equipment in accordance with industry standards and best practices such as NFPA 77 [Recommended Practices on Static Electricity (2007)] and American Petroleum Institute (API) RP Recommended Practice 2003 [Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents (2008)]. Avoid air and sunlight. Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

Incompatible Substances: Oxidizing agents, oxides of nitrogen, metals, aluminum, aluminum alloys, copper, metal alkyl complexes and alkali metals such as sodium, potassium and their alloys.

Hazardous Decomposition Products: Oxides of Carbon, Chlorine, Hydrogen chloride, Phosgene.

Hazardous Polymerization: Polymerization can occur. Exposure to the following conditions or mixtures with the following elements and materials can cause explosive or violent polymerization of VCM: Air, Sunlight, Excessive heat, Oxidizers, Catalytic metals, such as copper, aluminum and their alloys and certain catalytic impurities. Avoid elevated temperatures, oxidizing agents, oxides of nitrogen, oxygen, peroxides, other polymerization catalysts/initiators, air and sunlight.

SECTION 11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS:

ACUTE TOXICITY:

Eye contact: Causes eye irritation. Rapid evaporation of the material may cause frostbite.

Skin contact: Causes skin irritation. Rapid evaporation of the material may cause frostbite.

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
 Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

Inhalation: May cause respiratory tract irritation. Several minutes of exposure to high, but attainable concentrations (over 1000 ppm) may cause difficulty breathing, central nervous system depression and symptoms such as: ataxia or dizziness, drowsiness or fatigue, loss of consciousness, headache, euphoria and irritability, visual and or hearing disturbances, nausea, memory loss. Prolonged, high concentration exposures may cause unconsciousness or death. Cardiac: Acute intoxication may cause irregular heartbeats.

Ingestion: Not a likely route of exposure in occupational settings.

CHRONIC TOXICITY:

Chronic Effects: Chronic exposure to Vinyl Chloride monomer (VCM) may cause damage to the nervous system, respiratory system, musculoskeletal system, and lymphatic system. Occupational overexposure has produced a specific cancer (angiosarcoma of the liver) and is associated with hepatocellular cancer. Repeated prolonged exposure may damage: skin (scleroderma), bones (acro-osteolysis), blood vessels in the hands (Raynaud's Syndrome). Suspected of causing genetic defects. Suspected of damaging fertility or the unborn child. Reproductive effects and testes damage occurred in rats exposed to vinyl chloride. These endpoints, however, were generally noted at concentrations greater than those necessary to cause liver damage.

SIGNS AND SYMPTOMS OF EXPOSURE:

Inhalation (Breathing): Respiratory Tract Irritation: rhinitis, scratchy throat, cough, sore throat, runny nose, wheezing, difficulty breathing (dyspnea). Inhalation of this material may cause central nervous system depression (narcotic effects).

Skin: Skin Irritation. If spilled on skin, rapid evaporation can cause local frostbite with redness, blistering, and scaling.

Eye: Eye Irritation. Rapid evaporation can cause local frostbite with corneal and conjunctival irritation or burns. High concentrations of vapor can cause eye irritation.

Ingestion (Swallowing): Ingestion is not a likely route of exposure.

Other Health Effects: Narcotic Effects (Central Nervous System Depression): Ataxia or dizziness, drowsiness or fatigue, loss of consciousness, headache, euphoria and irritability, visual or hearing disturbances, nausea, memory loss.

Interaction with Other Chemicals Which Enhance Toxicity: Alcohol may enhance toxic effects.

GHS HEALTH HAZARDS:

GHS: TARGET ORGAN TOXICITY (SINGLE EXPOSURE): Category 3 - May cause respiratory tract irritation
 Category 3 - May cause drowsiness or dizziness

GHS: TARGET ORGAN TOXICITY (REPEATED EXPOSURE): Category 1 - Causes damage to the nervous system, musculoskeletal system, lymphatic system and respiratory system through prolonged or repeated exposure

GHS: CARCINOGENICITY: Category 1A - May cause cancer

GHS: GERM CELL MUTAGENICITY: Category 2 - Suspected of causing genetic defects

TOXICITY DATA:

PRODUCT TOXICITY DATA: Data is from studies conducted internally.

LD50 Oral: > 4,000 mg/kg oral-rat LD50	LD50 Dermal: -----	LC50 Inhalation: -----
--	------------------------------	----------------------------------

COMPONENT TOXICITY DATA: The component toxicity data is populated by the LOLI database and may differ

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

from the product toxicity data given.

Component	Oral LD50	Dermal LD50	Inhalation LC50
Vinyl Chloride	500 mg/kg (Rat)	No data available	18 pph (15-min Rat)

Skin/Eye Irritation/Corrosion: Liquid Vinyl Chloride may freeze tissue and produce a chemical burn as it evaporates, causing damage to the underlying tissue.

Skin Absorbent / Dermal Route: NO.

RESPIRATORY OR SKIN SENSITIZATION: Not classified as a skin or respiratory sensitizer per GHS criteria.

CARCINOGENICITY: Category 1A - May cause cancer. Vinyl Chloride is a multi-site carcinogen in animals inducing angiosarcomas at many sites (though predominantly liver), hepatocellular tumors, tumors of the mammary, and lung tumors. Worker cohort studies indicate that occupational exposure to Vinyl Chloride is not strongly associated with increased mortality risk from respiratory disease or cancers other than liver and biliary tract cancers (predominantly angiosarcomas).

SPECIFIC TARGET ORGAN TOXICITY (Single Exposure): Category 3 - May cause drowsiness or dizziness. Category 3 - May cause respiratory irritation.

SPECIFIC TARGET ORGAN TOXICITY (Repeated or Prolonged Exposure): Chronic exposure to Vinyl Chloride monomer (VCM) may cause damage to the nervous system, respiratory system, musculoskeletal system, and lymphatic system.

INHALATION HAZARD: Inhalation is associated with both acute and chronic health effects.

IN-VITRO / IN-VIVO GENOTOXICITY: Vinyl Chloride has tested positive for mutagenicity in in vitro and in vivo test systems. Category 2 - Suspected of causing genetic defects. Mutagenic in bacteria studies. Genetic studies in animals were negative in some cases and positive in others.

REPRODUCTIVE TOXICITY: In a recent well conducted combined two-generation reproductive/developmental study in rats the NOAEC for developmental effects was 1,100 ppm (2816 mg/m³), the highest dose tested (Thornton, 2002). There was no effect of treatment on sex ratio, fetal body weight or number or type of malformations. The substance is not classified as toxic for reproduction, according to GHS.

DEVELOPMENTAL TOXICITY: No maternal or developmental toxicity was seen at the 10 ppm exposure level. At the 100 ppm level only maternal toxicity seen was an increase in kidney weight relative to Day 20 gestation weight. At the 1100 ppm exposure level both kidney and liver weights increased. No developmental toxicity was seen at either level.

ASPIRATION HAZARD: Not classified as an aspiration hazard per GHS criteria.

TOXICOKINETICS: The pattern of pulmonary elimination of 10 and 1000 ppm Vinyl Chloride is similar first-order kinetics, with half-lives of 20.4 and 22.4 minutes respectively. The half-lives for the initial phase of excretion of (14)°C radioactivity in urine were 4.6 and 4.1 hours, respectively.

METABOLISM: Vinyl Chloride is primarily and rapidly metabolized in the liver, and this metabolism is saturable. The first step in the metabolism of vinyl chloride is oxidation, which is predominantly mediated by human cytochrome P450 (CYP) 2E1, to form the highly reactive chloroethylene oxide, which can spontaneously rearrange to chloroacetaldehyde. Conjugation of chloroethylene oxide and chloroacetaldehyde with glutathione (GSH) eventually

VINYL CHLORIDE (MONOMER)

SDS No.: M9192

Rev. Date: 30-Nov-2020

Supersedes Date: 2015-06-April

leads to the major urinary metabolites N-acetyl-S-(2-hydroxyethyl)cysteine and thiodiglycolic acid. Chloroethylene oxide and chloroacetaldehyde can also be detoxified to glycolaldehyde by microsomal epoxide hydrolase (mEH) and to the urinary metabolite chloroacetic acid by aldehyde dehydrogenase 2 (ALDH2), respectively.

BIOLOGICAL DISTRIBUTION: See Toxicokinetics above.

ENDOCRINE DISRUPTOR: Vinyl Chloride is listed on The Endocrine Disruptors Exchange's (TEDX) List of Potential Endocrine Disruptors database of chemicals with the potential to affect the endocrine system. Every chemical on the TEDX List has one or more verified citations published, accessible, primary scientific research demonstrating effects on the endocrine system.

NEUROTOXICITY: Neurotoxicity/ Neuropathological alterations were observed in rats exposed to 78,000 mg/ m³ vinyl chloride (4 hr/day, 5 days/week) for 12 months. During the exposure period, the rats were slightly soporific. Histopathology revealed diffuse degeneration in the gray and white matter of the brain and at the level of the white matter zones of reactive gliosis. In the cerebellum, atrophy of the granular layer and degeneration of Purkinje cells were most prominent. In addition, peripheral nerve bundles were often surrounded and invaded by fibrotic processes.

IMMUNOTOXICITY: The major immunological abnormalities reported in vinyl chloride disease patients include hyperimmunoglobulinemia with a polyclonal increase in IgG, cryoglobulinemia, cryofibrinogenemia, and in vivo activation of complement.

Hazard Not Otherwise Classified (HNOC)-Health

- Repeat occupational exposure to Vinyl Chloride have been associated with Raynaud syndrome and associated scleroderma-like skin changes on the hands
- Direct contact with liquid or rapidly expanding gas may cause frostbite to contacted tissue (eyes, skin, etc.)
- Vinyl Chloride is listed on The Endocrine Disruptors Exchange's (TEDX) List of Potential Endocrine Disruptors database of chemicals with the potential to affect the endocrine system. Every chemical on the TEDX List has one or more verified citations published, accessible, primary scientific research demonstrating effects on the endocrine system
- May displace oxygen and cause rapid suffocation

SECTION 12. ECOLOGICAL INFORMATION**ECOTOXICITY (EC, IC, and LC):**

Component:	Freshwater Fish:	Invertebrate Toxicity:	Algae Toxicity:	Other Toxicity:
Vinyl Chloride 75-01-4 (99 - 100 %)	*LC50 Brachydanio rerio: 210 mg/L 96h	-----	*EC50 Chilomonas paramecium (48 h) =943 mg/L	No data available

Aquatic Toxicity:

This material is believed to be practically non-toxic to fish on an acute basis (LC50>100 mg/L).

FATE AND TRANSPORT:

PERSISTENCE: Tropospheric half-life is estimated to be 23 hours. If released to air, this material will remain in the gas phase. If released to soil, volatilization will occur, but material that does not volatilize may be highly

VINYL CHLORIDE (MONOMER)

SDS No.: M9192

Rev. Date: 30-Nov-2020

Supersedes Date: 2015-06-April

mobile. If released to water, evaporation will occur.

BIODEGRADATION: Vinyl chloride may degrade under anaerobic conditions.

BIOCONCENTRATION: Bioconcentration potential is low (BCF <100 or log Kow <3).

BIOACCUMULATIVE POTENTIAL: This material is believed not to bioaccumulate.

MOBILITY IN SOIL: The Koc of vinyl chloride has been reported to be 57. According to a classification scheme, this Koc value suggests that vinyl chloride is expected to have high mobility in soil.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste from material:

Reuse or reprocess, if possible. May be subject to disposal regulations. Dispose in accordance with all applicable regulations. Generators of waste (equal to or greater than 100 kg/mo) containing this contaminant, EPA hazardous waste number U043 and D043, must conform with USEPA regulations in storage, transportation, treatment and disposal of waste. 40 CFR 240-280, 300-306, 702-799 (USEPA). If the material is to be incinerated, the chemical incinerator must be equipped with an afterburner (to assure complete combustion to prevent the formation of phosgene) and an acid scrubber (to remove the halo acids produced).

Container Management:

Refer to manufacturer/supplier for information on recovery/recycling. Dispose of container in accordance with applicable local, regional, national, and/or international regulations. Container rinsate must be disposed of in compliance with applicable regulations.

Contaminated Material:

Contaminated material must be disposed of in a permitted waste management facility.

SECTION 14. TRANSPORT INFORMATION

LAND TRANSPORT

U.S. DOT 49 CFR 172.101:

UN NUMBER: UN1086
PROPER SHIPPING NAME: Vinyl chloride, stabilized
HAZARD CLASS/ DIVISION: 2.1
LABELING REQUIREMENTS: 2.1
RQ (lbs.): RQ 1 Lbs. (Vinyl chloride)

Special provisions for transport: 21, B44, N86, T50.

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

Packaging Exceptions 306.
Non-bulk Packaging: 304.
Bulk Packaging: 314, 315.

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

UN NUMBER: UN1086
SHIPPING NAME: Vinyl chloride, stabilized
CLASS OR DIVISION: 2.1
LABELING REQUIREMENTS: 2.1
RQ (lbs): RQ 1 Lbs. (Vinyl chloride)

MARITIME TRANSPORT (IMO / IMDG)

UN NUMBER: UN1086
PROPER SHIPPING NAME: Vinyl chloride, stabilized
HAZARD CLASS / DIVISION: 2.1
LABELING REQUIREMENTS: 2.1

AIR TRANSPORT (ICAO / IATA)

Special Instructions CAO: IATA Certificate for shipping personnel is required

SECTION 15. REGULATORY INFORMATION**U.S. REGULATIONS****OSHA REGULATORY STATUS:**

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 426-2675.

Component	U.S. DOT Hazardous Substances/ RQs	CERCLA Hazardous Substances / RQs	CERCLA Section 302 EHS EPCRA RQs	Section 302 Threshold Planning Quantity (TPQ)
Vinyl Chloride 75-01-4 (99 - 100)	1 lbs(RQ)	1 lb	Not listed	Not Listed

SARA EHS Chemical (40 CFR 355.30)

Not regulated.

EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.10):

Acute Health Hazard, Chronic Health Hazard, Fire Hazard, Sudden Release of Pressure

SARA HAZARD CATEGORIES ALIGNED WITH GHS (2018):

Physical Hazard - Flammable (gases, aerosols, liquids, or solids)
Physical Hazard - Gas Under Pressure
Physical Hazard - Explosive
Health Hazard - Carcinogen

VINYL CHLORIDE (MONOMER)

SDS No.: M9192

Rev. Date: 30-Nov-2020

Supersedes Date: 2015-06-April

Health Hazard - Germ Cell Mutagenicity
 Health Hazard - Specific Target Organ Toxicity (STOT) Single Exposure (SE)
 Health Hazard - Specific Target Organ Toxicity (STOT) Repeat Exposure (RE)

EPCRA SECTION 313 (40 CFR 372.65):

The following chemicals are listed in 40 CFR 372.65 and may be subject to Community Right-to Know Reporting requirements.

Component	SARA 313 - Emission Reporting	SARA 313 PBT
Vinyl Chloride 75-01-4 (99 - 100)	0.1% (de minimis concentration)	Not Listed

DEPARTMENT OF HOMELAND SECURITY (DHS)- Chemical Facility Anti-Terrorism Standards (6 CFR 27):

This product is regulated under the U.S. Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards (CFATS) as follows:

- DHS - Security Issue
- DHS - Release Screening Threshold Quantity
- DHS - Release Min. Concentration

Component	DHS - Security Issues	DHS-Sabotage Screening Threshold Qty.	DHS-Sabotage Min. Conc.	DHS-Theft Screening Threshold Qty.	DHS-Theft Min. Conc.	DHS-Release Screening Threshold Qty.	DHS-Release Min. Conc.	CWC Toxic Chemicals:
Vinyl Chloride 75-01-4 (99 - 100)	Release - Flammable	Not Listed	Not Listed	Not Listed	Not Listed	10000 lb STQ	1.0% Minimum Concentration	Not Listed

OSHA SPECIFICALLY REGULATED SUBSTANCES:

OSHA 29 CFR 1910.1017 (Vinyl chloride); The U.S. Department of Labor, Occupational Safety and Health Administration specifically regulates manufacturing, handling and processing of vinyl chloride. Such regulations have been published at 29 CFR 1910.1017.

OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):

The PSM standard may apply to processes which involve a flammable liquid or gas in a quantity of 10,000 pounds (4535.9 kg) or more.

Component	EPA RMP Toxic or Flammable TPQ	PSM - Highly Hazardous Substances, Toxics and Reactives	Flash Point
Vinyl Chloride 75-01-4 (99 - 100)	Flammable (10000 lb threshold quantity)	Not Listed	-78°C Open cup

EPA'S CLEAN WATER AND CLEAN AIR ACTS:

Regulated as noted in table below.

Component	Clean Water Act - Priority Pollutants	CAA - ODS CLASS 1 AND CLASS 2	CAA - Volatile Organic Compounds (VOCs) in SOCM1	CAA - HON Rule - Organic HAPs	CAA - Hazard Air Pollutants	CAA - Urban HAPs List (Integrated Urban Strategy)	SNAP - Substitutes for ODS	EPA RMP Toxic or Flammable TPQ
Vinyl Chloride 75-01-4 (99 - 100 %)	Present	Not Listed	Present	Present	Present	Present	Not Listed	Flammable (10000 lb threshold quantity)

NATIONAL INVENTORY STATUS**U.S. INVENTORY STATUS: Toxic Substance Control Act (TSCA):**

VINYL CHLORIDE (MONOMER)

SDS No.: M9192

Rev. Date: 30-Nov-2020

Supersedes Date: 2015-06-April

Component	TSCA Inventory	TSCA ACTIVE LIST	TSCA 12(b)	TSCA - Section 4	TSCA - Section 5	TSCA - Section 6	TSCA - Section 8
Vinyl Chloride 75-01-4 (99 - 100 %)	Listed	ACTIVE	Not Listed	Not listed	Not Listed	Not listed	Not listed

CANADIAN CHEMICAL INVENTORY: All components of this product are listed on either the DSL or the NDSL.

Component	DSL	NDSL
Vinyl Chloride 75-01-4 (99 - 100)	Listed	Not Listed

STATE REGULATIONS

California Proposition 65:

Proposition 65 regulations should be consulted regarding warning requirements, if any, for the final product and whether any exposures to listed chemicals would be within a safe level (i.e., a No Significant Risk Level or NSRL for carcinogens, and/or a Maximum Allowable Dose Level or MADL for reproductive toxins).

Component	California Proposition 65 Cancer WARNING:	California Proposition 65 CRT List - Male reproductive toxin:	California Proposition 65 CRT List - Female reproductive toxin:	Massachusetts Right to Know Hazardous Substance List	Rhode Island Right to Know Hazardous Substance List
Vinyl Chloride 75-01-4 (99 - 100 %)	Listed	Not Listed	Not Listed	Listed	Not Listed

Component	New Jersey Right to Know Hazardous Substance List	New Jersey Special Health Hazards Substance List	New Jersey - Environmental Hazardous Substance List	Pennsylvania Right to Know Hazardous Substance List	Pennsylvania Right to Know Special Hazardous Substances	Pennsylvania Right to Know Special Hazardous Substances	Pennsylvania Right to Know Environmental Hazard List
Vinyl Chloride	2001	carcinogen; flammable - fourth degree; mutagen	Listed	Listed	Present	Present	Present

CANADIAN REGULATIONS

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

Canadian Federal Regulation Status: The component(s) in this product formulation are listed on Canadian Domestic Substance List (either DSL/NDSL). The component(s) information is listed below:

Component	Canada - CEPA - Schedule I - List of Toxic Substances	Canada - NPRI	Canada - CEPA - 2010 Greenhouse Gases (GHG) Subject to Mandatory Reporting	CANADIAN CHEMICAL INVENTORY:	NDSL:
Vinyl Chloride 75-01-4 (99 - 100)	Present (009) Present (065)	Part 1, Group 1 Substance Part 4 Substance	Not Listed	Listed	Not Listed

SECTION 16. OTHER INFORMATION

VINYL CHLORIDE (MONOMER)

SDS No.: M9192
Supersedes Date: 2015-06-April

Rev. Date: 30-Nov-2020

Prepared by: Occidental Chemical Corporation - HES&S Product Stewardship Department

Rev. Date: 30-Nov-2020

Reason for Revision:

- Revised Major Health Hazards: SEE SECTION 2
- Revised GHS Information: SEE SECTION 2
- Updated First Aid Measures: SEE SECTION 4
- PPE recommendations have been modified: SEE SECTION 8
- Toxicological Information has been revised: SEE SECTION 11
- Updated Disposal Considerations. SEE SECTION 13
- Updated Transportation Information: SEE SECTION 14
- A component has been added to the formulation. SEE SECTION 3

IMPORTANT:

The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESSED OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and Occidental Chemical Corporation assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any federal, state, local or foreign laws.

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Safety Data Sheet available to your employees.

End of Safety Data Sheet