

MATERIAL SAFETY DATA SHEET



Complies with U.S. OSHA
E.C. Guideline 91/155/EEC:
Revision: 4
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EMERGENCY TELEPHONE NUMBERS:
NATIONAL RESPONSE CENTER: 1-800-424-8802
CHEMTREC U.S. and CANADA: 1-800-424-9300
CHEMTREC International: 1-202-483-7616 (Collect)

Users of this product are requested to study this data sheet to learn the product's characteristics so that the product can be used safely. If the material is resold, the purchaser should be furnished a copy of this data sheet and the information should be made available to all users.

SECTION 1

Chemical Product and Company Identification

Product Trade Name	Vanadium Tetrachloride	
Article No.	MC8	
Company Identification	Evrax Stratcor, Inc. 4285 Malvern Road Hot Springs, Arkansas 71901; U.S.A.	Tel.: (501) 262-1270 Fax: (501) 262-2793
Inquiry Department	Evrax Stratcor, Inc.; Pittsburgh, Pennsylvania; U.S.A. 1-412-787-4500; www.evraxstratcor.com	

SECTION 2

Composition and Information on Ingredients

Chemical Characterization:

Chemical Description	Vanadium Tetrachloride, VCl₄
UN Number	UN 2444
DOT Guide	137
CAS No.	7632-51-1
EINECS No.	231-561-1 vanadium tetrachloride

This substance contains only vanadium tetrachloride with trace impurities.

SECTION 3

Hazards Identification

Potential Hazards for Humans and Animals:

Eye Contact	Chemical and possible thermal burns with redness, swelling, corneal burns, and possible blindness.
Skin Contact	Liquid causes chemical burns with redness, swelling, blisters, and pain. Vapors and fumes may cause chemical burns.
Inhalation	Fumes cause chemical burns of nasal passages, throat, and respiratory tract, with coughing, chest pain, and breathing difficulty.
Ingestion	Chemical and possible thermal burns of the mouth, throat, stomach, and intestinal tract, with injury to liver and kidneys.

SECTION 4

First-Aid Measures

General Information:

Inhalation	Remove to fresh air. Administer oxygen if breathing difficult. Administer artificial aspiration if breathing has stopped. Call a physician.
Skin	Remove contaminated clothing. Dab liquid from skin using DRY cotton or paper toweling. Flood area with plenty of the coldest water available. See a physician if exposure symptoms develop.
Eyes	Immediately flood the eyes with plenty of cold water for at least 15 minutes. See a physician and ophthalmologist.
Ingestion	Do not induce vomiting. Give at least two glasses of water. Call a physician.

SECTION 5 Fire-Fighting Measures

Suitable Extinguishing Media	No fire hazard. Use media suitable for surrounding fire.
Extinguishing Media Not to Be Used	Cool containers immersed in fire by blanketing with cold water. Do not use water to cool leaking containers. Product reacts violently with water.
Special Exposure Hazards	Dense fumes of product, vanadium oxytrichlorides and hydrochloric acid. Product reacts exothermically with water to form vanadium oxychlorides and hydrochloric acid.
Special Protective Equipment for Fire Fighters	Impermeable acid-resistant clothing. Positive-pressure, self-contained breathing apparatus.
Additional Information	Shipping container vapor space contains a fusible plug which melts between 75 and 175°C (165 and 350°F).

SECTION 6 Accidental- Release Measures

Personal Precautions	Evacuate the area immediately. Cleanup personnel must wear impermeable acid-resistant clothing, including positive-pressure, self-contained breathing apparatus.
Environmental Precautions	Prevent water and moisture contact. Product fumes in air from reaction with atmospheric moisture. Fumes are a mix of hydrochloric acid and vanadium oxychlorides. May also form vanadium-pentoxide fume, which is U.S. EPA-listed as hazardous substance with a reportable quantity (RQ) of 454 kg (1000 lbs.).
Cleaning Methods	Minor spills can be misted with water and neutralized with soda ash. Dike large spills with clay, earth, or soda ash. Pump or absorb with dry clay and shovel up to a dry-polyethylene container. Steel or aluminum may react and dissolve.
Additional Information	Product may be neutralized in place using foam and soda ash. Vanadium-pentoxide fume has an OSHA PEL of 0.1 mg/m ³ . Shipping-container vapor space contains a fusible plug which melts between 75 and 175°C (165 and 350°F).

SECTION 7 Handling and Storage

Handling	Do not allow contact with moisture. Use only in a closed system. Do not open container to the atmosphere. Use only approved materials of construction. Product slowly decomposes to vanadium trioxide, a solid. Higher temperatures and mixing with solvents and monomers accelerate decomposition.
Storage	Store in a closed steel container under dry inert-gas blanket. Storage area should be well ventilated. Protect containers from temperature cycling which may cause breathing.

SECTION 8 Exposure Controls and Personal Protection

Recommendations on Equipment Designs	Ensure sufficient ventilation of the workplace. Use recommended materials of construction. Use design and operational practices which exclude atmosphere and moisture contact.
Occupational Exposure Limit	Not listed in OSHA 29 CFR 1910.1000, Table Z-1 (Air Contaminants): 0.05 mg/m ³ 15 Min. Ceiling for Vanadium (NIOSH) 0.05 mg/m ³ for V ₂ O ₅ (NIOSH TLV TWA) 5 ppm (7 mg/m ³) Ceiling for Hydrogen Chloride from reaction of VCl ₄ with Moisture
Personal Safety Equipment:	
Respiratory Protection	Use full-face gas mask approved by NIOSH/MSHA; self-contained breathing apparatus.
Hand Protection	Use nitrile or natural-rubber gloves.
Eye Protection	Use goggles, face mask, face shield; do not wear contact lenses.
Skin Protection	Use chemically acid-resistant clothing and boots.
Personal Hygiene	Do not allow contact.

SECTION 9

Physical and Chemical Properties

This MSDS reflects available research data and is not a product- or quality-specification document.

Appearance:	
Physical State	Liquid.
Color	Dark Reddish-Brown.
Odor	Acrid.
Change in Physical State:	
Vapor Pressure	6 mm Hg (20°C), 100 mm Hg (100°C), 360 mm Hg (136°C).
Boiling Point	154.4°C
Decomposition	Vanadium tetrachloride slowly decomposes to vanadium trichloride, a solid. Long-term storage may affect usability
Flash Point	None.
Flammability	Not flammable.
Ignition Temperature	Not applicable.
Auto Flammability	Not applicable.
Oxidizing Properties	Acts as a catalyst in certain chemical environments.
Explosive Properties	
Upper Explosion Limit	Not applicable.
Lower Explosion Limit	Not applicable.
Density	1.8.
Solubility in Water (20°C)	Exothermically hygroscopic; dissolves as HCl, VOCl, and VOCl ₂ .
pH Value	Not applicable.

SECTION 10

Stability and Reactivity

Conditions to Avoid	Contact with water in any form.
Incompatible Materials	Water, polar solvents, most plastics, aluminum, sodium.
Hazardous Decomposition	Exothermically hygroscopic, forming vanadium oxytrichlorides and hydrochloric acid. May also form vanadium pentoxide.

SECTION 11

Toxicological Information

Acute Toxicity	LD ₅₀ orl-rat: 160 mg/kg.
Irritation	Corrosive irritant to skin, eyes, and mucous membranes. Hydrothermic property may cause thermal burns.
Chronic Toxicity	Inhalation of fumes may cause chronic bronchitis, allergic skin reaction, or asthmatic reaction with possible lung injury in susceptible individuals. When exposure ceases, effects are usually reversible.
Carcinogen Status:	
IARC	Not listed, International Agency for Research on Cancer
NTP Annual Report	Not listed, National Toxicology Program
OSHA Subpart Z	Not listed.
U.S. EPA Genetic Toxicity	Not reported.
Mutagen Status	Water-decomposition products may have mutagenic effects or may be an experimental teratogen.
Teratogen Status	See above.

SECTION 12

Ecological Information

Persistence and Degradability	Cannot exist in the environment.
Aquatic Toxicity and Other Data Relating to Exotoxicity	Violently exothermically reacts with water, forming hydrochloric acid and vanadium oxychlorides. Any of these may be harmful to aquatic environment.

SECTION 13 Disposal Considerations

Product Recommendation	Neutralize by slowly reacting with an alkaline solution, preferably sodium hydroxide. Dispose of resulting solution in accordance with local regulatory guidelines. Unused product may be returned to manufacturer for recycling.
Empty-Container Recommendation	Rinse with alkaline solution, preferably sodium hydroxide. Dispose of rinseate and cleaned packaging in accordance with local regulatory guidelines.

SECTION 14 Transport Information


U.N. packaging requirements shall be met for air and non-U.S. shipments.	
Proper Shipping Description	UN 2444, VANADIUM TETRACHLORIDE, 8, I.
Empty-Container Description	Last contained UN 2444, Vanadium Tetrachloride, 8, I. (Both of above must be prefaced with X in "HM" column on Bill of Lading.)
Land Transport	U.S. DOT or appropriate local guidelines.
Inland-Waterway Transport	U.S. DOT or appropriate local guidelines.
Sea Transport	Requires an IMO Shipper's Declaration Form. Container shipments require a Container Packing Certificate or Vehicle Packing Declaration.
Air Transport	ICAO-IT and IATA-DGR (cargo only, 2.51). Requires an ICAO or IATA Air Declaration Form.

SECTION 15 Regulatory Information

Classification According to U.N. Guidelines	Corrosive, 8.
E.C. Danger Symbol	C, X _m
R-Phrases	R14, R20, R21.
S-Phrases	S3, S9, S23, S36, S37, S39, S49.
U.S. EPA TSCA Inventory	Reported in the initial EPA TSCA Inventory.
U.S. EPA SARA III, Section 302 and 304.	Not applicable.
U.S. EPA SARA III, Section 311 and 312	Reporting may be required. Check local regulations.
U.S. EPA SARA III, Section 313	Water-decomposition products, such as hydrochloric acid, may require reporting.
Non-U.S. Requirements	Refer to specific national guidelines.

SECTION 16 Other Information

Data Sheet Prepared by:


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Evraz Stratcor, Inc. believes that the data on this sheet are correct as of the effective date and that the opinions given reflect those of qualified experts. Since Evraz Stratcor cannot control the product or its use, it is the user's responsibility to use the product safely. The data on this sheet apply only to products sold by corporate subsidiaries of Evraz Stratcor and may not apply to products sold by others.

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