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SAFETY DATA SHEET

Section 1- IDENTIFICATION		
COMPOSITION V205		PRODUCT NAME Vanadium Pentoxide
SUPPLIER: Plasmaterials, Inc. 2268 Research Drive Livermore, CA 94550 Ph: 925-447-4030	RECOMMENDED USE: Laboratory Chemicals Scientific Research	EMERGENCY TELEPHONE NUMBERS US: 001-800-424-9300 Europe: 001-703-527-3887

Section 2- HAZARD(S) IDENTIFICATION		
Classification: This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)		
Acute Inhalation Toxicity (Dusts & Mists): Category 4		Acute Oral Toxicity: Category 4
Serious Eye Damage/Eye Irritation: Category 1		Carcinogenicity: Category 2
Germ Cell Mutagenicity: Category 2		Reproductive Toxicity: Category 2
Specific Target Organ Toxicity (Single Exposure): Category 3		Target Organs: Respiratory System
Specific Target Organ Toxicity (Repeated Exposure): Category 1		
LABEL ELEMENTS: Signal Word: Danger	Hazard Statements:	
	-Harmful if swallowed -Causes serious eye damage -Harmful if inhaled -May cause respiratory irritation -Suspected of causing genetic defects	-Suspected of causing cancer -Suspected of damaging the unborn child -Causes damage to organs through prolonged or repeated exposure
		
<u>PRECAUTIONARY STATEMENTS</u>		
Prevention:		
<ul style="list-style-type: none"> -Obtain special instructions before use -Do not handle until all safety precautions have been read and understood -Wash face, hands and any exposed skin thoroughly after handling -Do not eat, drink or smoke when using this product -Use personal protection equipment as required -Do not breathe dust/fume/gas/mist/vapors/spray -Use only outdoors or in a well ventilated area 		
Inhalation:		
-IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.		
Inhalation:		
-IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a Poison Center or doctor/physician.		
Ingestion:		

-IF SWALLOWED: Call a Poison Center or doctor/physician if you feel unwell. Rinse mouth.

Storage:

- Store locked up.
- Store in a well-ventilated place. Keep container tightly closed.

Disposal:

- Dispose of contents/containers to an approved waste disposal plant.

Hazards not otherwise classified (HNOC):

- Toxic to aquatic life with long lasting effects.
- WARNING! This product contains a chemical known to the State of California to cause cancer.

Section 3- COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS-No	Weight%
Vanadium Pentoxide	1314-62-1	>95

Section 4- FIRST AID MEASURES

INHALATION: Remove victim from exposure to fresh air; lie down. Give oxygen if breathing is difficult. If not breathing, give artificial respiration. Immediate medical attention is required.

SKIN CONTACT: Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

EYE CONTACT: Flush eyes with lukewarm water, lifting upper and lower lids, for at least 15 minutes. Obtain medical attention.

INGESTION: Call a physician immediately. Clean mouth with water.

MOST IMPORTANT SYMPTOMS/EFFECTS: Causes eye burns.

NOTES TO PHYSICIAN: Treat symptomatically

Section 5- FIREFIGHTING MEASURES

Suitable Extinguishing Media:

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment

Unsuitable Extinguishing Media:

No Information Available

Flash Point: No Information Available

Method: No Information Available

Auto Ignition Temperature: No Information Available

Explosion Limits:

Upper: No Data Available

Lower: No Data Available

Sensitivity to Mechanical Impact: No Information Available

Sensitivity to Static Discharge: No Information Available

Specific Hazards Arising from the Chemical:

Non-combustible

Hazardous Combustion Products:

Thermal decomposition can lead to release of irritating gases and vapors

Protective Equipment & Precautions for Firefighters:

As in any fire, Firefighters must wear full face, self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective clothing to prevent contact with skin and eyes.

NFPA:

Health	Flammability	Instability	Physical Hazards
3	0	0	N/A

Section 6- ACCIDENTAL RELEASE MEASURES

Personal Precautions: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.

Environmental Precautions: Do not flush into surface water or sanitary sewer system.

Methods for Containment & Clean Up: Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

Section 7- HANDLING AND STORAGE

Handling: Do not get in eyes, on skin or on clothing. Do not breathe dust. Use only in area provided with appropriate exhaust ventilation.

Storage: Keep in a dry, cool and well ventilated place. Keep container tightly closed. Keep locked up.

Section 8- EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines:

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Vanadium Pentoxide	TWA: 0.05 mg/m ³		IDLH: 35mg/m ³ Ceiling: 0.05mg/m ³	TWA: 0.5mg/m ³

Engineering Measures: Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment:

Eye/Face Protection: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and Body Protection: Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice.

Section 9- PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Powder Solid

Appearance: Amber

Odor: Odorless

Odor Threshold: No information available

pH: 4 (5%)

Melting Point/Range: 690°C / 1274°F

Boiling Point/Range: 1750°C / 3182°F

Flash Point: No information available

Evaporation Rate: No information available

Flammability (solid,gas): No information available

Flammability or Exposure Limits:

Upper: No data available

Lower: No data available

Vapor Pressure: 0.0443 hPa at 700°C

Vapor Density: No information available

Specific Gravity: 3.350

Solubility: 8 g/L

Partition coefficient; n-octanol/water: No data available

Auto Ignition Temperature: No information available

Decomposition Temperature: 1750°C

Viscosity: No information available

Molecular Formula: V₂O₅

Molecular Weight: 181.88

Section 10- STABILITY AND REACTIVITY

Reactive Hazard: None known, based on information available.

Stability: Stable under normal conditions
Conditions to Avoid: Incompatible products. Combustible material
Incompatible Materials: Strong acids, reducing agents
Hazardous Decomposition Products: Thermal decomposition can lead to release of irritating gases and vapors
Hazardous Polymerization: Hazardous polymerization does not occur
Hazardous Reactions: None under normal processing

Section 11- TOXICOLOGICAL INFORMATION

Acute Toxicity:

Product Information

Component Information:

Component	CAS-No	LD50 Oral	LD50 Dermal	LC50 Inhalation
V205	1314-62-1	474 mg/kg (Rat, male) 467 mg/kg (Rat, female) 314 mg/kg (Rat, male) 221 mg/kg (Rat, female)	LD50 = 50mg/kg (Rabbit)	LC50=4.29 mg/L (Rat) 4 h

Toxicological Synergistic Products: No information available

Delayed and immediate effects as well as chronic effects from short and long term exposure:

Irritation: No information available

Sensitization: No information available

Carcinogenicity: The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
V205	1314-62-1	Group 2B	Not Listed	A3	X	Not Listed

Mutagenic Effects: No information available

Reproductive Effects: No information available

Development Effects: No information available

Teratogenicity: No information available

STOT – single exposure: Respiratory system

STOT – repeated exposure: None known

Aspiration Hazard: No information available

Symptoms/effects, both acute & delayed: No information available

Endocrine Disruptor: No information available

Other Adverse Effects: The toxicological properties have not been fully investigated.

Section 12- ECOLOGICAL INFORMATION

Ecotoxicity: Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment

Persistence and Degradability: Soluble in water. Persistence is unlikely based on information available

Bioaccumulation/Accumulation: No information available

Mobility: Will likely be mobile in the environment due to its water solubility

Section 13- DISPOSAL CONSIDERATIONS

Waste Disposal Methods: Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional and national hazardous waste regulations to ensure complete and accurate classification.

Section 14- TRANSPORT INFORMATION

DOT: UN-No: UN2862 Proper Shipping Name: Vanadium Pentoxide Hazard Class: 6.1 Packing Group: III
TDG: UN-No: UN2862 Proper Shipping Name: Vanadium Pentoxide Hazard Class: 6.1 Packing Group: III
IATA: UN-No: UN2862 Proper Shipping Name: Vanadium Pentoxide Hazard Class: 6.1 Packing Group: III
IMDG/IMO: UN-No: UN2862 Proper Shipping Name: Vanadium Pentoxide Hazard Class: 6.1 Packing Group: III

Section 15- REGULATORY INFORMATION

International Inventories:

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Vanadium Pentoxide	X	X	-	215-239-8	-		X	X	X	X	X

Legend:

X – Listed

E – Indicates a substance that is subject of a Section 5(e) Consent order under TSCA.

F – Indicates a substance that is subject of a Section 5(f) Rule under TSCA.

N – Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P – Indicates a commenced PMN substance.

R – Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S – Indicates a substance that is identified in a proposed or final Significant New Use Rule.

T – Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU – Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 – Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 – Indicates an exempt polymer that is polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

US Federal Regulations:

TSCA 12(b): Not applicable

SARA 313:

Component	CAS-No	Weight %	SARA 313 – Threshold Values %
Vanadium Pentoxide	1314-62-1	>95	1.0

SARA 311/312 Hazardous Categorization:

Acute Health Hazard: Yes

Chronic Health Hazard: Yes

Fire Hazard: No

Sudden Release of Pressure Hazard: No

Reactive Hazard: No

Clean Water Act (CWA):

Component	CWA – Hazardous Substances	CWA – Reportable Quantities	CWA – Toxic Pollutants	CWA – Priority Pollutants
Vanadium Pentoxide	X	1000 lb	-	-

Clean Air Act: Not applicable

OSHA (Occupational Safety and Health Administration): Not applicable

CERCLA: This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Vanadium Pentoxide	1000 lb	1000 lb

California Proposition 65: This product contains the following Proposition 65 chemicals

Component	CAS-No	Californian Prop. 65	Prop. 65 NSRL	Category
Vanadium Pentoxide	1314-62-1	Carcinogen	-	Carcinogen

US State Right-to-Know:

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Vanadium Pentoxide	X	X	X	X	X

US Department of Transportation:

Reportable Quantity (RQ): N

DOT Marine Pollutant: N

DOT Severe Marine Pollutant: N

US Department of Homeland Security: This product does not contain any DHS chemicals.

Other International Regulations:

Mexico – Grade: No information available

Section 16- OTHER INFORMATION

The above information is accurate to the best of our knowledge. However, since data, safety standards and government regulations are subject to change, the conditions of handling and use, or misuse are beyond our control, Plasmaterials, Inc. makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Users should satisfy themselves that they have all current data relevant to their particular use.

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