**SECTION 1: Identification**

### 1.1. Identification

<table>
<thead>
<tr>
<th>Description</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product name</strong></td>
<td>VANADIUM OXIDE TRIS(METHOXYETHOXIDE)</td>
</tr>
<tr>
<td><strong>Product code</strong></td>
<td>AKV903</td>
</tr>
<tr>
<td><strong>Product form</strong></td>
<td>Substance</td>
</tr>
<tr>
<td><strong>Physical state</strong></td>
<td>Liquid</td>
</tr>
<tr>
<td><strong>Formula</strong></td>
<td>C9H21O7V</td>
</tr>
<tr>
<td><strong>Synonyms</strong></td>
<td>VANADIUM TRIMETHOXYETHOXIDE OXIDE</td>
</tr>
<tr>
<td><strong>Chemical family</strong></td>
<td>METAL COMPOUND</td>
</tr>
</tbody>
</table>

### 1.2. Recommended use and restrictions on use

- **Recommended use**: Chemical intermediate

### 1.3. Supplier

**GELEST, INC.**  
11 East Steel Road  
Morrisville, PA 19067  
USA  
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST  
info@gelest.com - www.gelest.com

### 1.4. Emergency telephone number

- **Emergency number**: CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

---

**SECTION 2: Hazard(s) identification**

### 2.1. Classification of the substance or mixture

- **GHS-US classification**
  - Flammable liquids Category 4
  - Skin corrosion/irritation Category 2
  - Serious eye damage/eye irritation Category 2A
  - Specific target organ toxicity (single exposure) Category 3
  - Full text of H statements: see section 16
  - H227 Combustible liquid
  - H315 Causes skin irritation
  - H319 Causes serious eye irritation
  - H335 May cause respiratory irritation

### 2.2. GHS Label elements, including precautionary statements

**GHS US labeling**

- **Signal word (GHS US)**: Warning
- **Hazard pictograms (GHS US)**: ![warning]
- **Hazard statements (GHS US)**:  
  - H227 - Combustible liquid  
  - H315 - Causes skin irritation  
  - H319 - Causes serious eye irritation  
  - H335 - May cause respiratory irritation
- **Precautionary statements (GHS US)**:  
  - P280 - Wear protective gloves/protective clothing/eye protection/face protection.  
  - P210 - Keep away from heat, open flames, sparks. - No smoking.  
  - P261 - Avoid breathing vapors.  
  - P264 - Wash hands thoroughly after handling.  
  - P271 - Use only outdoors or in a well-ventilated area.  
  - P302+P352 - If on skin: Wash with plenty of soap and water  
  - P332+P313 - If skin irritation occurs: Get medical advice/attention.  
  - P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
  - P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing  
  - P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
  - P337+P313 - If eye irritation persists: Get medical advice/attention.  
  - P312 - Call a doctor if you feel unwell  
  - P321 - Specific treatment (see first aid instructions on this label)  
  - P362+P364 - Take off contaminated clothing and wash it before reuse.  
  - P370+P378 - In case of fire: Use water spray. foam, carbon dioxide, dry chemical to extinguish.  
  - P403+P233 - Store in a well-ventilated place. Keep container tightly closed.  
  - P403+P235 - Keep in a cool place  
  - P405 - Store locked up.  
  - P501 - Dispose of contents/container to licensed waste disposal facility.
**VANADIUM OXIDE TRIS(METHOXYETHOXIDE)**  
Safety Data Sheet

### SECTION 3: Composition/Information on ingredients

#### 3.1. Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
</table>
| Vanadium oxide tris(methoxyethoxide) | (CAS-No.) 30707-88-1 | 95 - 100 | Flam. Liq. 4, H227  
Skin Irrit. 2, H315  
Eye Irrit. 2A, H319  
STOT SE 3, H335 |

Full text of hazard classes and H-statements: see section 16

#### 3.2. Mixtures

Not applicable

### SECTION 4: First-aid measures

#### 4.1. Description of first aid measures

- **First-aid measures general**: Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.

- **First-aid measures after inhalation**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

- **First-aid measures after skin contact**: Wash with plenty of soap and water. Get medical advice/attention.

- **First-aid measures after eye contact**: Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

- **First-aid measures after ingestion**: Never give anything by mouth to an unconscious person. Get medical advice/attention.

#### 4.2. Most important symptoms and effects (acute and delayed)

- **Symptoms/effects after inhalation**: May cause respiratory irritation.

- **Symptoms/effects after skin contact**: Causes skin irritation.

- **Symptoms/effects after eye contact**: Causes serious eye irritation.

- **Symptoms/effects after ingestion**: May be harmful if swallowed.

#### 4.3. Immediate medical attention and special treatment, if necessary

No additional information available

### SECTION 5: Fire-fighting measures

#### 5.1. Suitable (and unsuitable) extinguishing media

- **Suitable extinguishing media**: Water spray. Foam. Carbon dioxide. Dry chemical.

- **Unsuitable extinguishing media**: Do not use straight streams.

#### 5.2. Specific hazards arising from the chemical

- **Fire hazard**: Combustible liquid. Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

#### 5.3. Special protective equipment and precautions for fire-fighters

- **Firefighting instructions**: Exercise caution when fighting any chemical fire. Use water spray to cool exposed surfaces.

- **Protection during firefighting**: Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapor and mist.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

- **General measures**: Remove ignition sources. Use special care to avoid static electric charges.

#### 6.1.1. For non-emergency personnel

- **Protective equipment**: Wear protective equipment as described in Section 8.

- **Emergency procedures**: Evacuate unnecessary personnel.

#### 6.1.2. For emergency responders

- **Protective equipment**: Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: "Exposure controls/personal protection".

Print date: 04/09/2019  
EN (English US)  
SDS ID: AKV903  
2/6
6.2. Environmental precautions
Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up
For containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.
Methods for cleaning up: Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal. Use only non-sparking tools.

6.4. Reference to other sections
See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage
7.1. Precautions for safe handling
Additional hazards when processed: Avoid all eye and skin contact and do not breathe vapor and mist. Ground/bond container and receiving equipment. Provide good ventilation in process area to prevent accumulation of vapors. Use only non-sparking tools.
Precautions for safe handling: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Hygiene measures: Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions: Keep container tightly closed. Keep in a cool place. Store locked up.
Incompatible materials: Moist air. Water.
Storage area: Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection
8.1. Control parameters
No additional information available

8.2. Appropriate engineering controls
Appropriate engineering controls: Provide local exhaust or general room ventilation.

8.3. Individual protection measures/Personal protective equipment
Personal protective equipment:
Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Hand protection:
Neoprene or nitrile rubber gloves
Eye protection:
Chemical goggles. Contact lenses should not be worn
Skin and body protection:
Wear suitable protective clothing
Respiratory protection:
Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified organic vapor (black cartridge) respirator.

SECTION 9: Physical and chemical properties
9.1. Information on basic physical and chemical properties
Physical state: Liquid
Appearance: Clear liquid.
Molecular mass: 292.2 g/mol
Color: Clear to greenish. Turns orange-brown on exposure to moist air.
Odor: Mild.
Odor threshold: No data available
Refractive index: No data available
pH: No data available
Relative evaporation rate (butyl acetate=1): No data available
Melting point: No data available
VANADIUM OXIDE TRIS(METHOXYETHOXIDE)
Safety Data Sheet

Freezing point : < 0 °C
Boiling point : 110 °C @ 1.5 mm Hg
Flash point : > 65 °C
Auto-ignition temperature : No data available
Decomposition temperature : No data available
Flammability (solid, gas) : Combustible liquid
Vapor pressure : < 10 mm Hg @ 20°C
Relative vapor density at 20 °C : > 1
Relative density : > 1
Solubility : Reacts with water.
Log Pow : No data available
Log Kow : No data available
Viscosity, kinematic : No data available
Viscosity, dynamic : No data available
Explosive properties : No data available
Oxidizing properties : No data available
Explosion limits : No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity
10.1. Reactivity
No additional information available

10.2. Chemical stability
Stable in sealed containers.

10.3. Possibility of hazardous reactions
Material reacts rapidly with water or moist air, liberating isobutanol and vanadium oxide gel.

10.4. Conditions to avoid
Heat. Open flame. Sparks.

10.5. Incompatible materials
Moist air. Water.

10.6. Hazardous decomposition products

SECTION 11: Toxicological information
11.1. Information on toxicological effects
Acute toxicity : Not classified
Skin corrosion/irritation : Causes skin irritation.
Serious eye damage/irritation : Causes serious eye irritation.
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified

None of the components in this product at concentrations >0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

Reproductive toxicity : Not classified
Specific target organ toxicity – single exposure : May cause respiratory irritation.

Specific target organ toxicity – repeated exposure : Not classified
Aspiration hazard : Not classified
Symptoms/effects after inhalation : May cause respiratory irritation.
Symptoms/effects after skin contact : Causes skin irritation.
Symptoms/effects after eye contact : Causes serious eye irritation.
Symptoms/effects after ingestion : May be harmful if swallowed.
Reason for classification : Expert judgment
### SECTION 12: Ecological information

<table>
<thead>
<tr>
<th>12.1. Toxicity</th>
<th>No additional information available</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.2. Persistence and degradability</td>
<td>No additional information available</td>
</tr>
<tr>
<td>12.3. Bioaccumulative potential</td>
<td>No additional information available</td>
</tr>
<tr>
<td>12.4. Mobility in soil</td>
<td>No additional information available</td>
</tr>
<tr>
<td>12.5. Other adverse effects</td>
<td>Effect on the ozone layer : No additional information available</td>
</tr>
</tbody>
</table>

### SECTION 13: Disposal considerations

<table>
<thead>
<tr>
<th>13.1. Disposal methods</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewage disposal recommendations</td>
<td>Do not dispose of waste into sewer.</td>
</tr>
<tr>
<td>Product/Packaging disposal recommendations</td>
<td>Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.</td>
</tr>
<tr>
<td>Ecology - waste materials</td>
<td>Avoid release to the environment.</td>
</tr>
</tbody>
</table>

### SECTION 14: Transport information

<table>
<thead>
<tr>
<th>14.1. UN number</th>
<th>NA1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT NA no.</td>
<td></td>
</tr>
<tr>
<td>14.2. UN proper shipping name</td>
<td></td>
</tr>
<tr>
<td>Transport document description</td>
<td>NA1993 Combustible liquid, n.o.s. (VANADIUM OXIDE TRIS(METHOXYETHOXIDE)), 3, III (VANADIUM OXIDE TRIS(METHOXYETHOXIDE))</td>
</tr>
<tr>
<td>Proper Shipping Name (DOT)</td>
<td>Combustible liquid, n.o.s.</td>
</tr>
<tr>
<td>Class (DOT)</td>
<td>3 - Class 3 : Flammable and combustible liquid 49 CFR 173.120</td>
</tr>
<tr>
<td>Packing group (DOT)</td>
<td>III - Minor Danger</td>
</tr>
<tr>
<td>DOT Packaging Non Bulk (49 CFR 173.xxx)</td>
<td>203</td>
</tr>
<tr>
<td>DOT Packaging Bulk (49 CFR 173.xxx)</td>
<td>241</td>
</tr>
<tr>
<td>DOT Packaging Exceptions (49 CFR 173.xxx)</td>
<td>150</td>
</tr>
<tr>
<td>DOT Symbols</td>
<td>D - Proper shipping name for domestic use only, or to and from Canada,G - Identifies PSN requiring a technical name</td>
</tr>
<tr>
<td>14.3. Additional information</td>
<td>This product is Combustible as defined by the US Department of Transportation (DOT). It is regulated for transport in the US in container &gt; 119 gallons (450 liters). The product is not regulated for transport by the IATA, ADR/RID, ADNR or the IMDG regulations.</td>
</tr>
</tbody>
</table>

#### Transport by sea
- DOT Vessel Stowage Location: A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.

#### Air transport
- DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27): 60 L
- DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75): 220 L

### SECTION 15: Regulatory information

<table>
<thead>
<tr>
<th>15.1. US Federal regulations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>VANADIUM OXIDE TRIS(METHOXYETHOXIDE) (30707-88-1)</td>
<td>CAUTION: This material is supplied for research and development purposes subject to the R&amp;D exemption under TSCA, 40 CFR 720.36, and must meet the requirements of the exemption, including supervision by a &quot;technically qualified individual&quot; as defined by 40 CFR 720.3(ee). The use of this material for &quot;commercial purposes&quot; as defined by 40 CFR 720.3(r) is not permitted in the United States.</td>
</tr>
</tbody>
</table>
Vanadium oxide tris(methoxyethoxide) (30707-88-1)
Not listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA
No additional information available

EU-Regulations
No additional information available

National regulations
No additional information available

15.3. US State regulations
California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

Full text of H-phrases:

<table>
<thead>
<tr>
<th>H227</th>
<th>Combustible liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>H315</td>
<td>Causes skin irritation</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation</td>
</tr>
</tbody>
</table>

Abbreviations and acronyms:
Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor.

Hazard Rating

Health: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability: 2 Moderate Hazard - Materials which must be moderately heated or exposed to high ambient temperatures before ignition will occur. Includes liquids having a flash point at or above 100 F but below 200 F. (Classes II & IIIA)

Physical: 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Prepared by safety and environmental affairs.

Date of issue: 11/22/2017 Revision date: 04/08/2019 Version: 1.1

SDS US (GHS HazCom 2012) - Custom

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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