## SECTION 1: Identification

### 1.1. Identification

<table>
<thead>
<tr>
<th><strong>Product form</strong></th>
<th>Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trade name</strong></td>
<td>VANADIUM PENTOXIDE</td>
</tr>
<tr>
<td><strong>Chemical name</strong></td>
<td>divanadium pentoxide</td>
</tr>
<tr>
<td><strong>CAS No</strong></td>
<td>1314-62-1</td>
</tr>
<tr>
<td><strong>Formula</strong></td>
<td>V2O5</td>
</tr>
<tr>
<td><strong>Other means of identification</strong></td>
<td>EC# 215-239-8; Index # 023-001-00-8</td>
</tr>
</tbody>
</table>

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

No additional information available.

### 1.3. Details of the supplier of the safety data sheet

Distributed by:
Laguna Clay Company
14400 Lomitas Ave
City of Industry, CA 91746
1-800-4Laguna
info@lagunaclay.com
www.lagunaclay.com

### 1.4. Emergency telephone number

Emergency number: 1-800-424-9300 (US, CDN, Puerto-rico) 1-703-527-3887 (international)

## SECTION 2: Hazard(s) identification

### 2.1. Classification of the substance or mixture

**GHS-US classification**
- Acute toxicity (oral), Category 4: H302
- Acute toxicity (inhalation:dust,mist), Category 4: H332
- Germ cell mutagenicity, Category 2: H341
- Carcinogenicity, Category 2: H351
- Reproductive toxicity, Category 2: H361
- Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation: H335
- Specific target organ toxicity — Repeated exposure, Category 1: H372
- Hazardous to the aquatic environment — Chronic Hazard, Category 2: H411

Full text of H statements: see section 16

### 2.2. Label elements

**GHS-US labelling**

- Hazard pictograms (GHS-US):
  - GHS07
  - GHS08
  - GHS09

- Signal word (GHS-US): Danger
- Hazard statements (GHS-US):
  - H302+H332 - Harmful if swallowed or if inhaled
  - H335 - May cause respiratory irritation
VANADIUM PENTOXIDE
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

H341 - Suspected of causing genetic defects
H351 - Suspected of causing cancer
H361 - Suspected of damaging fertility or the unborn child
H372 - Causes damage to organs (respiratory system) through prolonged or repeated exposure (Inhalation)
H411 - Toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US):

P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe vapours
P261 - Avoid breathing dust, fume, gas, mist, spray, vapours
P264 - Wash Skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P273 - Avoid release to the environment
P280 - Wear protective gloves, protective clothing, face protection, eye protection
P301+P312 - If swallowed: Call a POISON CENTER, a doctor if you feel unwell
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P308+P313 - If exposed or concerned: Get medical advice/attention
P312 - Call a POISON CENTER, a doctor if you feel unwell
P314 - Get medical advice/attention if you feel unwell
P330 - Rinse mouth
P391 - Collect spillage
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation

2.3. Other hazards
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance
Substance type: Mono-constituent

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>VANADIUM PENTOXIDE US</td>
<td>(CAS No) 1314-62-1</td>
<td>&gt; 99</td>
<td>Acute Tox. 4 (Oral), H302</td>
</tr>
<tr>
<td>(Main constituent)</td>
<td></td>
<td></td>
<td>Acute Tox. 4 (Inhalation:dust,mist), H332</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carc. 2, H341</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Repr. 2, H361</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STOT SE 3, H335</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STOT RE 1, H372</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aquatic Chronic 2, H411</td>
</tr>
</tbody>
</table>

Full text of classification categories and H statements: see section 16

3.2. Mixture
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general: Never give anything by mouth to an unconscious person. IF exposed or concerned: Get medical advice/attention. Call a poison center or a doctor if you feel unwell.

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

First-aid measures after skin contact: Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

First-aid measures after eye contact: Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persist.

First-aid measures after ingestion: Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention. Call a POISON CENTER or doctor/physician if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries: Suspected of causing genetic defects. Causes damage to organs (respiratory system) through prolonged or repeated exposure (Inhalation).

Symptoms/injuries after inhalation: May cause respiratory irritation.
4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media: Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Reactivity: The product is non-reactive under normal conditions of use, storage and transport.

5.3. Advice for firefighters

Firefighting instructions: Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures: Ventilate spillage area. Evacuate unnecessary personnel. Do not breathe vapours.

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".

Emergency procedures: Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

For containment: Collect spillage.

Methods for cleaning up: Recover mechanically the product. On land, sweep or shovel into suitable containers. Minimize generation of dust. Store away from other materials. Notify authorities if product enters sewers or public waters.

Other information: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection. For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear personal protective equipment. Provide good ventilation in process area to prevent formation of vapour.

Hygiene measures: Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.

Incompatible products: Strong bases. Strong acids.

Incompatible materials: Sources of ignition. Direct sunlight.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>VANADIUM PENTOXIDE (1314-62-1)</th>
<th>OSHA PEL (TWA) (mg/m³)</th>
<th>OSHA PEL (Ceiling) (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA</td>
<td>0.1 mg/m³ as V2O5 fume</td>
<td>0.5 mg/m³ as V2O5 respirable dust</td>
</tr>
</tbody>
</table>
8.2. Exposure controls

Appropriate engineering controls: Ensure good ventilation of the work station.
Personal protective equipment: Avoid all unnecessary exposure.

Hand protection: Wear protective gloves.
Eye protection: tightly fitting safety goggles. Safety glasses.
Skin and body protection: Wear suitable protective clothing.
Respiratory protection: Wear appropriate mask. If excessive exposure exists, use only approved air-purifying or supplied air respirator operated in a positive pressure mode. Wear respiratory protection.

Environmental exposure controls: Avoid release to the environment.
Other information: Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Solid
Appearance: Powder.
Colour: dark orange
Odour: characteristic
Odour threshold: No data available
pH: 2.7 Irreversible eye effects (OECD 405)
pH solution: 0.45 (≥ 6.5) g/l
Melting point: 656 - 690 °C
Freezing point: Not applicable
Boiling point: 1750 °C
Flash point: Not applicable
Relative evaporation rate (butylacetate=1): No data available
Flammability (solid, gas): Non flammable.
Vapour pressure: No data available
Relative vapour density at 20 °C: No data available
Relative density: Not applicable
Density: 3.65 g/cm³
Molecular mass: 181.88 g/mol
Solubility: Water: 0.92 g/l at 20C
Log Pow: No data available
Auto-ignition temperature: Not applicable
Decomposition temperature: No data available
Viscosity, kinematic: Not applicable
Viscosity, dynamic: No data available
Explosive limits: Not applicable
Explosive properties: No data available
Oxidising properties: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.
10.2. Chemical stability
Not established.

10.3. Possibility of hazardous reactions
Not established.

10.4. Conditions to avoid
Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials
Strong acids. Strong bases.

10.6. Hazardous decomposition products

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity
- Oral: Harmful if swallowed. Inhalation:dust,mist: Harmful if inhaled.

**VANADIUM PENTOXIDE (1314-62-1)**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>467 mg/kg OECD 401</td>
<td></td>
</tr>
<tr>
<td>LD50 dermal rat</td>
<td>&gt; 2500 mg/kg OECD 402</td>
<td></td>
</tr>
<tr>
<td>LC50 inhalation rat (mg/l)</td>
<td>2.21 mg/l/4h OECD 403</td>
<td></td>
</tr>
<tr>
<td>ATE US (oral)</td>
<td>467.000 mg/kg bodyweight</td>
<td></td>
</tr>
<tr>
<td>ATE US (vapours)</td>
<td>2.210 mg/l/4h</td>
<td></td>
</tr>
<tr>
<td>ATE US (dust,mist)</td>
<td>2.210 mg/l/4h</td>
<td></td>
</tr>
</tbody>
</table>

Skin corrosion/irritation
- Not classified
  - pH: 2.7 Irreversible eye effects (OECD 405)

Serious eye damage/irritation
- Not classified
  - pH: 2.7 Irreversible eye effects (OECD 405)

Respiratory or skin sensitisation
- Not classified

Germ cell mutagenicity
- Suspected of causing genetic defects.

Carcinogenicity
- Suspected of causing cancer.

**VANADIUM PENTOXIDE (1314-62-1)**

| IARC group                  | 2B - Possibly carcinogenic to humans |

Reproductive toxicity
- Suspected of damaging fertility or the unborn child.
  - Based on available data, the classification criteria are not met

Specific target organ toxicity (single exposure)
- May cause respiratory irritation.

Specific target organ toxicity (repeated exposure)
- Causes damage to organs (respiratory system) through prolonged or repeated exposure (Inhalation).

**VANADIUM PENTOXIDE (1314-62-1)**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAEL (oral, rat, 90 days)</td>
<td>5.36 mg/kg bodyweight/day</td>
<td></td>
</tr>
<tr>
<td>LOAEL (inhalation, rat,dust/mist/fume, 90 days)</td>
<td>0.5 mg/l/6h/day</td>
<td></td>
</tr>
</tbody>
</table>

Aspiration hazard
- Not classified

Potential adverse human health effects and symptoms
- Harmful if swallowed.

Symptoms/injuries after inhalation
- May cause respiratory irritation.

Symptoms/injuries after ingestion
- Swallowing a small quantity of this material will result in serious health hazard.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general
- Toxic to aquatic life with long lasting effects.

Ecology - water
- Toxic to aquatic life with long lasting effects.

**VANADIUM PENTOXIDE (1314-62-1)**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fish 1</td>
<td>1.24 mg/l 96 h Golden Orfe (OECD 203)</td>
<td></td>
</tr>
</tbody>
</table>
**VANADIUM PENTOXIDE**

Safety Data Sheet

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

<table>
<thead>
<tr>
<th><strong>VANADIUM PENTOXIDE (1314-62-1)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 Daphnia 1</td>
<td>4.27 mg/l 48 h (OECD 202)</td>
</tr>
<tr>
<td>EC50 other aquatic organisms 1</td>
<td>2.907 mg/l 72 h (OECD 201)</td>
</tr>
<tr>
<td>NOEC (acute)</td>
<td>1.51 mg/l 48h Daphnie OECD 202</td>
</tr>
<tr>
<td>NOEC (chronic)</td>
<td>0.56 mg/l 14 week Daphnia OECD 202</td>
</tr>
</tbody>
</table>

**12.2. Persistence and degradability**

**VANADIUM PENTOXIDE (1314-62-1)**

Persistence and degradability: May cause long-term adverse effects in the environment.

**12.3. Bioaccumulative potential**

**VANADIUM PENTOXIDE (1314-62-1)**

Bioconcentration factor (BCF REACH): 12.3 L/kg ww

Bioaccumulative potential: Not established.

**12.4. Mobility in soil**

**VANADIUM PENTOXIDE (1314-62-1)**

Mobility in soil: 2.66 log Kp = 2.66 L/kg

**12.5. Other adverse effects**

Other information: Avoid release to the environment.

**SECTION 13: Disposal considerations**

**13.1. Waste treatment methods**

Waste treatment methods: Dispose of contents/container in accordance with licensed collector’s sorting instructions.

Waste disposal recommendations: Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to..

Ecology - waste materials: Avoid release to the environment.

**SECTION 14: Transport information**

**Department of Transportation (DOT)**

In accordance with DOT

Transport document description: UN2862 Vanadium pentoxide (non-fused form), 6.1, III

UN-No.(DOT): UN2862

Proper Shipping Name (DOT): Vanadium pentoxide non-fused form


Packing group (DOT): III - Minor Danger

Hazard labels (DOT): 6.1 - Poison

Dangerous for the environment: Yes

Marine pollutant: Yes

DOT Packaging Non Bulk (49 CFR 173.xxx): 213

DOT Packaging Bulk (49 CFR 173.xxx): 240
DOT Special Provisions (49 CFR 172.102) : IB8 - Authorized IBCs: Metal (11A, 11B, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2)
IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner

DOT Packaging Exceptions (49 CFR 173.xxx) : 153
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 100 kg
DOT Quantity Limitations Cargo aircraft only (49 CFR 173.75) : 200 kg
DOT Vessel Stowage Location : A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel
DOT Vessel Stowage Other : 40 - Stow “clear of living quarters”
Emergency Response Guide (ERG) Number : 151
Other information : No supplementary information available.

TDG

Transport by sea
UN-No. (IMDG) : 2862
Proper Shipping Name (IMDG) : VANADIUM PENTOXIDE
Class (IMDG) : 6.1 - Toxic substances
Packing group (IMDG) : III - substances presenting low danger
Limited quantities (IMDG) : 5 kg
Marine pollutant : Yes

Air transport
UN-No. (IATA) : 2862
Proper Shipping Name (IATA) : Vanadium pentoxide
Class (IATA) : 6.1 - Toxic Substances
Packing group (IATA) : III - Minor Danger

SECTION 15: Regulatory information
15.1: US Federal regulations
VANADIUM PENTOXIDE (1314-62-1)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Subject to reporting requirements of United States SARA Section 313

CERCLA RQ : 1000 lb
SARA Section 302 Threshold Planning Quantity (TPQ) : 10000 lb 100lb if the substance is solid in powder form with particle size less than 100 microns, or is in solution or molten form
SARA Section 313 - Emission Reporting : 100 %

800-452-4862  www.Lagunaclay.com/SDS/  info@lagunaclay.com
15.2. International regulations

CANADA
No additional information available

EU-Regulations
No additional information available

National regulations

| VANADIUM PENTOXIDE (1314-62-1) | Listed on IARC (International Agency for Research on Cancer) |

15.3. US State regulations

| VANADIUM PENTOXIDE (1314-62-1) | Yes |
| U.S. - California - Proposition 65 - Carcinogens List | Yes |
| U.S. - California - Proposition 65 - Developmental Toxicity | No |
| U.S. - California - Proposition 65 - Reproductive Toxicity - Female | No |
| U.S. - California - Proposition 65 - Reproductive Toxicity - Male | No |
| U.S. - Massachusetts - Right To Know List | U.S. - New Jersey - Right to Know Hazardous Substance List |
| U.S. - Pennsylvania - RTK (Right to Know) List |

SECTION 16: Other information


Other information: None.

Full text of H-statements:

| H302 | Harmful if swallowed |
| H332 | Harmful if inhaled |
| H335 | May cause respiratory irritation |
| H341 | Suspected of causing genetic defects |
| H351 | Suspected of causing cancer |
| H361 | Suspected of damaging fertility or the unborn child |
| H372 | Causes damage to organs through prolonged or repeated exposure |
| H411 | Toxic to aquatic life with long lasting effects |

NFPA health hazard: 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard: 0 - Materials that will not burn.

NFPA reactivity: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

HMIS III Rating

Health: 2 Moderate Hazard - Temporary or minor injury may occur

* - Chronic (long-term) health effects may result from repeated overexposure

Flammability: 0 Minimal Hazard - Materials that will not burn

Physical: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (GHS HazCom 2012)
This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.