SAFETY DATA SHEET
ROHM AND HAAS ELECTRONIC MATERIALS LLC

Product name: TRIETHYLGALLIUM OPTOGRADE™

ROHM AND HAAS ELECTRONIC MATERIALS LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: TRIETHYLGALLIUM OPTOGRADE™

Recommended use of the chemical and restrictions on use
Identified uses: Chemical Specialty

COMPANY IDENTIFICATION
ROHM AND HAAS ELECTRONIC MATERIALS LLC
A Subsidiary of The Dow Chemical Company
455 FOREST STREET
MARLBOROUGH MA  01752
UNITED STATES

Customer Information Number: 215-592-3000
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 1 800 424 9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.
Pyrophoric liquids - Category 1
Substances and mixtures, which in contact with water, emit flammable gases - Category 1
Skin corrosion - Category 1A
Serious eye damage - Category 1

Label elements
Hazard pictograms
Signal word: **DANGER!**

**Hazards**
Catches fire spontaneously if exposed to air.
In contact with water releases flammable gases which may ignite spontaneously.
Causes severe skin burns and eye damage.
Causes serious eye damage.

**Precautionary statements**

**Prevention**
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Do not allow contact with air.
- Do not allow contact with water.
- Handle under inert gas. Protect from moisture.
- Wash skin thoroughly after handling.
- Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response**
- IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- IF ON SKIN: Immerse in cool water/ wrap in wet bandages.
- IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
- 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.
- Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
- Wash contaminated clothing before reuse.
- In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

**Storage**
- Store in a dry place. Store in a closed container.
- Store locked up.
- Store contents under inert gas.

**Disposal**
- Dispose of contents/ container to an approved waste disposal plant.

**Other hazards**
- Water Reactive

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**
Synonyms: triethylgallium
This product is a substance.

<table>
<thead>
<tr>
<th>Component</th>
<th>CASRN</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triethylgallium</td>
<td>1115-99-7</td>
<td>90.0 - 100.0 %</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Description of first aid measures

General advice: If potential for exposure exists refer to Section 8 for specific personal protective equipment. First Aid responders should pay attention to self-protection and use the recommended protective clothing.

Inhalation: Remove from exposure. If there is difficulty in breathing, give oxygen. Immediate medical attention is required.

Skin contact: Immediately flush the skin with large quantities of water, preferably under a shower. If skin contact occurs, remove contaminated clothing and wash skin thoroughly. Continue washing for at least 20 minutes. Contaminated clothing should be washed or dry-cleaned before re-use. Immediate medical attention is required.

Eye contact: Immediately flush the eye with plenty of water for at least 20 minutes, holding the eye open. Immediate medical attention is required.

Ingestion: Do NOT induce vomiting. Wash out mouth with water. Have victim drink 1-3 glasses of water to dilute stomach contents. Immediate medical attention is required. Never administer anything by mouth if a victim is losing consciousness, is unconscious or is convulsing.

Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed

Notes to physician: Treat symptomatically. Treat skin burns conventionally.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Pyrophoric! Do not use wet chemical, water or foam. Use dry chemical powder followed by sand or dolomite (powdered limestone).

Unsuitable extinguishing media: no data available

Special hazards arising from the substance or mixture

Hazardous combustion products: no data available

Unusual Fire and Explosion Hazards: Pyrophoric! Can ignite spontaneously when exposed to air at normal or slightly elevated temperatures. Smoke may contain various hydrocarbons and hazardous metallic oxides.
Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Reacts violently with water resulting in flammable vapor and metal oxide(s). Be aware of reignition.

Special protective equipment for firefighters: Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Wear suitable protective clothing.

Environmental precautions: Prevent the material from entering drains or water courses. Advise Authorities if spillage has entered watercourse or sewer or has contaminated soil or vegetation.

Methods and materials for containment and cleaning up: Cover with dry sand or dolomite and allow to decompose or burn out completely. Transfer into suitable containers for recovery or disposal. Use non-sparking tools and/or explosion-proof equipment. Eliminate all ignition sources.

7. HANDLING AND STORAGE

Precautions for safe handling: Use local exhaust ventilation. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Eliminate all possible sources of ignition. Wear flame-proof clothing. Handle in glovebox/bag under inert atmosphere only.

Conditions for safe storage: Store in original container. Keep away from heat and sources of ignition. Storage area should be: cool dry well ventilated out of direct sunlight Practice good personal hygiene to prevent accidental exposure.

8. EXPOSURE CONTROLS/PERSOAL PROTECTION

Control parameters
Exposure limits are listed below, if they exist.

Exposure controls
Engineering controls: Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (local exhaust), and control of process conditions. Use glove box or bag in a closed system under inert atmosphere, in conjunction with adequate ventilation.

Individual protection measures
Eye/face protection: Chemical goggles and face shield.
Skin protection
Hand protection: Leather-palmed, heat-resistant gloves
Other protection: Not applicable
Respiratory protection: The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.
9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Physical state: liquid
Color: colourless
Odor: Garlic odor
Odor Threshold: Not applicable

pH: Not applicable
Melting point/range: no data available
Freezing point: no data available
Boiling point (760 mmHg): 143 °C (289 °F)
Flash point: Pyrophoric
Evaporation Rate (Butyl Acetate = 1): no data available
Flammability (solid, gas): Not Applicable
Lower explosion limit: no data available
Upper explosion limit: no data available
Vapor Pressure: 6 mmHg at 25 °C (77 °F)
Relative Vapor Density (air = 1): no data available
Relative Density (water = 1): 1.058
Water solubility: Reacts with water.
Partition coefficient: n-octanol/water: no data available
Auto-ignition temperature: no data available
Decomposition temperature: no data available
Kinematic Viscosity: no data available
Explosive properties: Not explosive
Oxidizing properties: No
Molecular weight: no data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: no data available

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Catches fire spontaneously if exposed to air. Reacts violently with water. Product will not undergo hazardous polymerization.

Conditions to avoid: High temperatures  Exposure to water or moisture  Exposure to sunlight.
11. TOXICOLOGICAL INFORMATION

Toxicological information on this product or its components appear in this section when such data is available.

Acute toxicity
   Acute oral toxicity
     Product test data not available.

   Acute dermal toxicity
     Product test data not available.

   Acute inhalation toxicity
     Product test data not available.

Skin corrosion/irritation
   Product test data not available.

Serious eye damage/eye irritation
   Product test data not available.

Sensitization
   Product test data not available.

Specific Target Organ Systemic Toxicity (Single Exposure)
   Product test data not available.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
   Product test data not available.

Carcinogenicity
   Not considered carcinogenic by NTP, IARC, and OSHA

Teratogenicity
   Product test data not available.

Reproductive toxicity
   Product test data not available.

Mutagenicity
   Product test data not available.

Aspiration Hazard
   Product test data not available.
COMPONENTS INFLUENCING TOXICOLOGY:

**Triethylgallium**

**Acute oral toxicity**
Single dose oral LD50 has not been determined.

**Acute dermal toxicity**
The dermal LD50 has not been determined.

**Acute inhalation toxicity**
Vapor concentrations are attainable which could be hazardous on single exposure. Vapor may cause irritation of the upper respiratory tract (nose and throat).

The LC50 has not been determined.

**Skin corrosion/irritation**
Brief contact may cause severe skin burns. Symptoms may include pain, severe local redness and tissue damage.

**Serious eye damage/eye irritation**
May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

**Sensitization**
For skin sensitization:
No relevant data found.

For respiratory sensitization:
No relevant data found.

**Specific Target Organ Systemic Toxicity (Single Exposure)**
Material is corrosive. Material is not classified as a respiratory irritant; however, upper respiratory tract irritation or corrosivity may be expected.

**Specific Target Organ Systemic Toxicity (Repeated Exposure)**
No relevant data found.

**Teratogenicity**
No relevant data found.

**Reproductive toxicity**
No relevant data found.

**Mutagenicity**
No relevant data found.

**Aspiration Hazard**
Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

**Carcinogenicity**
Not considered carcinogenic by NTP, IARC, and OSHA
12. ECOLOGICAL INFORMATION

Ecotoxicological information on this product or its components appear in this section when such data is available.

General Information
There is no data available for this product.

Toxicity

Triethylgallium

Acute toxicity to fish
No relevant data found.

Persistence and degradability

Triethylgallium

Biodegradability: No relevant data found.

Bioaccumulative potential

Triethylgallium

Bioaccumulation: No relevant data found.

Mobility in soil

Triethylgallium
No relevant data found.

13. DISPOSAL CONSIDERATIONS

Disposal methods: Dispose in accordance with all local, state (provincial), and federal regulations. Under RCRA, it is the responsibility of the product's user to determine at the time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because the product uses, transformations, mixtures, processes, etc. may render the resulting materials hazardous.

Treatment and disposal methods of used packaging: Empty containers retain product residues. Follow label warnings even after container is emptied. Improper disposal or reuse of this container may be dangerous and illegal. Refer to applicable federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>Organometallic substance, liquid, pyrophoric, water-reactive(Triethylgallium)</th>
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<tr>
<td>UN number</td>
<td>UN 3394</td>
</tr>
<tr>
<td>Class</td>
<td>4.2 (4.3)</td>
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</table>
Packing group

Classification for SEA transport (IMO-IMDG):

- **Proper shipping name**: ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE (Triethylgallium)
- **UN number**: UN 3394
- **Class**: 4.2 (4.3)
- **Packing group**: I
- **Marine pollutant**: No
- **Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code**: Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

- Transport forbidden by regulation

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

## 15. REGULATORY INFORMATION

**OSHA Hazard Communication Standard**

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

- Immediate (acute) Health Hazard
- Fire Hazard
- Reactivity Hazard

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

This product does not contain a chemical which is listed in Section 313 at or above de minimis concentrations.

**California (Proposition 65)**

This product does not contain materials which the State of California has found to cause cancer, birth defects or other reproductive harm.

**United States TSCA Inventory (TSCA)**

All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.
16. OTHER INFORMATION

Hazard Rating System

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
<th>Special classification</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>Pyrophoric</td>
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Revision

Identification Number: 101099863 / 1304 / Issue Date: 04/20/2015 / Version: 2.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Information Source and References

This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

ROHM AND HAAS ELECTRONIC MATERIALS LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.