SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form: Substance
Physical state: Solid
Substance name: BIS(BENZONITRILE)DICHLOROPALLADIUM(II)
Product code: INPD024
Formula: C14H10Cl2N2Pd
Synonyms: TRANS BIS(BENZONITRILE)PALLADIUM CHLORIDE; BIS(BENZONITRILE)PALLADIUM(II) CHLORIDE
Chemical family: METAL COMPOUND

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

Use of the substance/mixture: Chemical intermediate
For research use only

1.3. Details of the supplier of the safety data sheet

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: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)
Skin Irrit. 2 H315
Eye Irrit. 2A H319
Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling
Hazard pictograms (GHS-US): 

Signal word (GHS-US): Warning
Hazard statements (GHS-US): H315 - Causes skin irritation
H319 - Causes serious eye irritation
Precautionary statements (GHS-US): P280 - Wear protective gloves/protective clothing/eye protection/face protection
P264 - Wash hands thoroughly after handling
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
P337+P313 - If eye irritation persists: Get medical advice/attention
P321 - Specific treatment (see first aid instructions on this label)
P362+P364 - Take off contaminated clothing and wash it before reuse

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

No data available
SECTION 3: Composition/information on ingredients

3.1. Substance

Substance type : Mono-constituent
Name : BIS(BENZONITRILE)DICHLOROPALLADIUM(II)
CAS No : 14220-64-5
EC no : 238-085-3

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bis(benzonitrile)palladium chloride</td>
<td>(CAS No) 14220-64-5</td>
<td>95 - 100</td>
<td>Skin Irrit. 2, H315 Eye Irrit. 2A, H319</td>
</tr>
</tbody>
</table>

3.2. Mixture

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. IF exposed or concerned: Get medical advice/attention.

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, both acute and delayed

Symptoms/injuries after inhalation : May cause irritation to the respiratory tract. May cause nervous system disturbances.

Symptoms/injuries after skin contact : Causes skin irritation. May cause sensitization by skin contact.

Symptoms/injuries after eye contact : Causes serious eye irritation.

Symptoms/injuries after ingestion : May be harmful if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media


Unsuitable extinguishing media : Do not use straight streams.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Irritating fumes and organic acid vapors may develop when material is exposed to water or open flame.

5.3. Advice for firefighters

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

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid contact with skin and eyes. Do not breathe dust.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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".

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if product 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 : Sweep or shovel spills into appropriate container for disposal.
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
Precautions for safe handling: Avoid contact with skin and eyes. Do not breathe dust. Provide local exhaust or general room ventilation to minimize exposure to dust. Avoid dust formation.

Hygiene measures: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

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

7.3. Specific end use(s)
No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
No additional information available

8.2. Exposure controls
Appropriate engineering controls: Handle in an enclosing hood with exhaust ventilation.
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 dust and mist (orange cartridge) respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties
Physical state: Solid
Appearance: Solid.
Molecular mass: 383.55 g/mol
Color: Yellow-orange.
Odor: No data available
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: 129 - 130 °C
Freezing point: No data available
Boiling point: No data available
Flash point: No data available
Auto-ignition temperature: No data available
Decomposition temperature: No data available
Flammability (solid, gas): No data available
Vapor pressure: No data available
Relative vapor density at 20 °C: No data available
Relative density: > 1
VOC content: < 3 %
Solubility: Insoluble in water.
Organic solvent: Soluble: acetone, chloroform
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.

### 10.3. Possibility of hazardous reactions
Material decomposes slowly in contact with air by reaction with water and carbon dioxide.

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

### 10.5. Incompatible materials
Air. Water.

### 10.6. Hazardous decomposition products
Organic acid vapors. Palladium and palladium oxide fumes.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>rabbit eye - non-irritating</td>
<td></td>
</tr>
<tr>
<td>Respiratory or skin sensitization</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (repeated exposure)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not classified</td>
</tr>
<tr>
<td>Symptoms/injuries after inhalation</td>
<td>May cause irritation to the respiratory tract. May cause nervous system disturbances.</td>
</tr>
<tr>
<td>Symptoms/injuries after skin contact</td>
<td>Causes skin irritation. May cause sensitization by skin contact.</td>
</tr>
<tr>
<td>Symptoms/injuries after eye contact</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>Symptoms/injuries after ingestion</td>
<td>May be harmful if swallowed.</td>
</tr>
<tr>
<td>Reason for classification</td>
<td>Expert judgment</td>
</tr>
</tbody>
</table>

## SECTION 12: Ecological information

### 12.1. Toxicity
No additional information available

### 12.2. Persistence and degradability
No additional information available

### 12.3. Bioaccumulative potential
No additional information available

### 12.4. Mobility in soil
No additional information available

### 12.5. Other adverse effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other adverse effects</td>
<td>This substance may be hazardous to the environment.</td>
</tr>
<tr>
<td>Effect on ozone layer</td>
<td>No additional information available</td>
</tr>
<tr>
<td>Effect on the global warming</td>
<td>No known ecological damage caused by this product.</td>
</tr>
</tbody>
</table>
SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Sewage disposal recommendations: Do not dispose of waste into sewer.
- Waste disposal recommendations: Dispose in a safe manner in accordance with local/national regulations. Save material and return to supplier for reclaim of precious metal.
- Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number

- Not regulated for transport.

14.2. UN proper shipping name

- Not applicable

14.3. Additional information

- Other information: No supplementary information available.

Transport by sea

- No additional information available

Air transport

- No additional information available

SECTION 15: Regulatory information

15.1. US Federal regulations

- **BIS(BENZONITRILE)DICHLOROPALLADIUM(II) (14220-64-5)**
  - **TSCA Exemption/Exclusion**
    - CAUTION: This material is supplied for research and development purposes subject to the R&D exemption under TSCA, 40 CFR 720.36, and must meet the requirements of the exemption, including supervision by a "technically qualified individual" as defined by 40 CFR 720.3(ee). The use of this material for "commercial purposes" as defined by 40 CFR 720.3(r) is not permitted in the United States.

- **Bis(benzonitrile)palladium chloride (14220-64-5)**
  - Not listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

- **Bis(benzonitrile)palladium chloride (14220-64-5)**
  - Listed on the AICS (Australian Inventory of Chemical Substances)
  - Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
  - Listed on NZIoC (New Zealand Inventory of Chemicals)
  - Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
  - Listed on the Japanese Poisonous and Deleterious Substances Control Law

15.3. US State regulations

- **BIS(BENZONITRILE)DICHLOROPALLADIUM(II)(14220-64-5)**
  - U.S. - California - Proposition 65 - Carcinogens List: No
  - 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

- **Bis(benzonitrile)palladium chloride (14220-64-5)**
  - U.S. - California - Proposition 65 - Carcinogens List: No
  - 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
  - No significance risk level (NSRL): No
SECTION 16: Other information

Abbreviations and acronyms:
- 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

Full text of H-phrases:

<table>
<thead>
<tr>
<th>H-Phrase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Irrit. 2A</td>
<td>Serious eye damage/eye irritation Category 2A</td>
</tr>
<tr>
<td>Skin Irrit. 2</td>
<td>Skin corrosion/irritation Category 2</td>
</tr>
<tr>
<td>H315</td>
<td>Causes skin irritation</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation</td>
</tr>
</tbody>
</table>

HMIS III Rating
- Health: 2 Moderate Hazard - Temporary or minor injury may occur
- Flammability: 1 Slight Hazard
- Physical: 0 Minimal Hazard

Prepared by safety and environmental affairs.

Date of issue: 08/31/2015 Version: 1.0

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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