SECTION 1: Identification

1.1. Identification

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

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
Skin corrosion/irritation Category 2 : H315 - Causes skin irritation
Serious eye damage/eye irritation Category 2A : H319 - Causes serious eye irritation
Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

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.
P564 - Wash hands thoroughly after handling.
P302+P352 - If on skin: Wash with plenty of soap and water
P332+P337 - If eye irritation persists: Get medical advice/attention.
P333+P313 - Take off contaminated clothing and wash it before reuse.
P362+P364 - Take off contaminated clothing and wash it before reuse.
P321 - Specific treatment (see first aid instructions on this label)

2.3. Hazards not otherwise classified (HNOC)
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent
Name : BIS(BENZONITRILE)DICHLOROPALLADIUM(II)
CAS-No. : 14220-64-5
**Name**: Bis(benzonitrile)palladium chloride  
**Product identifier**: (CAS No.) 14220-64-6  
**%**: 96 - 100  
**GHS-US classification**: Skin Irrit. 2, H315  
**Eye Irrit. 2A, H319**

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. 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 (acute and delayed)

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

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

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

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

**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.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
No additional information available

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

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Solid.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>383.55 g/mol</td>
</tr>
<tr>
<td>Color</td>
<td>Yellow-orange.</td>
</tr>
<tr>
<td>Odor</td>
<td>No data available</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Refractive index</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>129 - 130 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>&gt; 1</td>
</tr>
<tr>
<td>% Volatiles</td>
<td>&lt; 3 %</td>
</tr>
<tr>
<td>Solubility</td>
<td>Insoluble in water. Organic solvent:Soluble: acetone, chloroform</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
</tbody>
</table>
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
Acute toxicity : Not classified
Skin corrosion/irritation : Causes skin irritation.
Serious eye damage/irritation : Causes serious eye irritation.
rabbit eye- non-irritating
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
Specific target organ toxicity – single exposure : Not classified
Specific target organ toxicity – repeated exposure : Not classified
Aspiration hazard : Not classified
Symptoms/effects after inhalation : May cause irritation to the respiratory tract. May cause nervous system disturbances.
Symptoms/effects after skin contact : Causes skin irritation. May cause sensitization by skin contact.
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

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
Other adverse effects : This substance may be hazardous to the environment.
Effect on the ozone layer : No additional information available
**BIS(BENZONITRILE)DICHLOROPALLADIUM(II)**

**Safety Data Sheet**

<table>
<thead>
<tr>
<th>SECTION 13: Disposal considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>13.1. Disposal methods</strong></td>
</tr>
<tr>
<td>Sewage disposal recommendations</td>
</tr>
<tr>
<td>Product/Packaging disposal recommendations</td>
</tr>
<tr>
<td>Ecology - waste materials</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION 14: Transport information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>14.1. UN number</strong></td>
</tr>
<tr>
<td>Not regulated for transport.</td>
</tr>
<tr>
<td><strong>14.2. UN proper shipping name</strong></td>
</tr>
<tr>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>14.3. Additional information</strong></td>
</tr>
<tr>
<td>Other information</td>
</tr>
</tbody>
</table>

**Transport by sea**
- No additional information available

**Air transport**
- No additional information available

<table>
<thead>
<tr>
<th>SECTION 15: Regulatory information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>15.1. US Federal regulations</strong></td>
</tr>
<tr>
<td><strong>BIS(BENZONITRILE)DICHLOROPALLADIUM(II) (14220-64-5)</strong></td>
</tr>
<tr>
<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>
<tr>
<td><strong>Bis(benzonitrile)palladium chloride (14220-64-5)</strong></td>
</tr>
<tr>
<td>Not listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
</tr>
</tbody>
</table>

| **15.2. International regulations** |
| **CANADA** |
| No additional information available |
| **EU-Regulations** |
| **Bis(benzonitrile)palladium chloride (14220-64-5)** |
| Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances) |
| **National regulations** |
| **Bis(benzonitrile)palladium chloride (14220-64-5)** |
| Listed on the AICS (Australian Inventory of Chemical Substances) |
| Listed on NZIoC (New Zealand Inventory of Chemicals) |
| Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) |
|Japanese Poisonous and Deleterious Substances Control Law |

| **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 |

<table>
<thead>
<tr>
<th>SECTION 16: Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full text of H-phrases:</td>
</tr>
<tr>
<td><strong>H315</strong></td>
</tr>
<tr>
<td><strong>H319</strong></td>
</tr>
</tbody>
</table>
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
- GHS: The Globally Harmonized System of Classification and Labelling
- APF: Assigned Protection Factor

Hazard Rating:

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

Flammability: 1 Slight Hazard - Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200 F. (Class IIIB)

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.

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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