SAFETY DATA SHEET

According to JIS Z 7253:2012
Revision Date 23-Apr-2018
Version 1.02

Section 1: PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product name</th>
<th>Bredereck's Reagent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product code</td>
<td>026-18831,024-18832</td>
</tr>
<tr>
<td>CAS No</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Manufacturer: FUJIFILM Wako Pure Chemical Corporation
1-2 Doshomachi 3-Chome
Chuo-ku, Osaka 540-8605, Japan
Phone: +81-6-6203-3741
Fax: +81-6-6203-5964

Supplier: FUJIFILM Wako Pure Chemical Corporation
1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan
Phone: +81-6-6203-3741
Fax: +81-6-6203-2029

Emergency telephone number: +81-6-6203-3741 / +81-3-3270-8571
Recommended uses and restrictions on use: For research purposes
Announcement of company name change: Company name has changed since April 1, 2018. Former name was "Wako Pure Chemical Industries, Ltd."

Section 2: HAZARDS IDENTIFICATION

GHS classification
Classification of the substance or mixture:
- Flammable liquids: Category 3
- Skin corrosion/irritation: Category 2
- Serious eye damage/eye irritation: Category 1
- Germ cell mutagenicity: Category 2
- Reproductive Toxicity: Category 1B
- Specific target organ toxicity (single exposure): Category 2, Category 3
  - Category 2 respiratory system
  - Category 3 Respiratory tract irritation
- Specific target organ toxicity (repeated exposure): Category 2
- Liver

Pictograms:
- Flammable liquid and vapor (Category 3)
- Flammable liquids (Category 3)
- Corrosive (Category 2)
- Yeast cells (Category 1B)

Signal word: Danger
Hazard statements:
- H226 - Flammable liquid and vapor
- H315 - Causes skin irritation
H318 - Causes serious eye damage
H341 - Suspected of causing genetic defects
H360 - May damage fertility or the unborn child
H350 - May cause respiratory irritation
H371 - May cause damage to the following organs: respiratory system
H373 - May cause damage to the following organs through prolonged or repeated exposure: liver

Precautionary statements-(Prevention)
• Obtain special instructions before use
• Do not handle until all safety precautions have been read and understood
• Use personal protective equipment as required.
• Wash face, hands and any exposed skin thoroughly after handling
• Do not eat, drink or smoke when using this product
• Use only outdoors or in a well-ventilated area
• Keep away from heat/sparks/open flames/hot surfaces. — No smoking
• Keep container tightly closed
• Ground/bond container and receiving equipment
• Use explosion-proof electrical/ventilating/lighting/equipment
• Use only non-sparking tools
• Take precautionary measures against static discharge
• Keep cool

Precautionary statements-(Response)
• IF exposed or concerned: Get medical advice/attention
• 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
• IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
• Wash contaminated clothing before reuse.

Precautionary statements-(Storage)
• Store locked up.
• Store in a well-ventilated place. Keep container tightly closed

Precautionary statements-(Disposal)
• Dispose of contents/container to an approved waste disposal plant

Others
Other hazards Not available

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Single Substance or Mixture Mixture

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Weight-%</th>
<th>Molecular weight</th>
<th>ENCS</th>
<th>ISHL No.</th>
<th>CAS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-Butoxybis(dimethylamino)methane</td>
<td>94.0 - 95.0</td>
<td>174.28</td>
<td>N/A</td>
<td>N/A</td>
<td>5815-08-7</td>
</tr>
<tr>
<td>N,N-Dimethylformamide</td>
<td>&lt;3.0</td>
<td>73.09</td>
<td>(2)-680</td>
<td>N/A</td>
<td>68-12-2</td>
</tr>
</tbody>
</table>

Impurities and/or Additives : Not applicable

Section 4: FIRST AID MEASURES

Inhalation
Remove to fresh air. If symptoms persist, call a physician.
Skin contact
Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Eye contact
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediate medical attention is required.

Ingestion
Rinse mouth. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately. Do not induce vomiting without medical advice.

Protection of first-aiders
Use personal protective equipment as required.

Section 5: FIRE FIGHTING MEASURES

Suitable extinguishing media
Water spray (fog), Carbon dioxide (CO2), Foam, Extinguishing powder, Sand

Unsuitable extinguishing media
No information available

Special extinguishing method
No information available

Specific hazards arising from the chemical product
Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Protection of fire-fighters
Use personal protective equipment as required. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
For indoor, provide adequate ventilation process until the end of working. Deny unnecessary entry other than the people involved by, for example, using a rope. While working, wear appropriate protective equipments to avoid adhering it on skin, or inhaling the gas. Work from windward, and retract the people downwind.

Environmental precautions
To be careful not discharged to the environment without being properly handled waste water contaminated.

Methods and materials for contaminant and methods and materials for cleaning up
Absorb dry sand, earth, sawdust and the waste. Collect empty container that can be sealed. Absorb the product flowing out on the water to soak the absorber.

Recovery, neutralization
No information available

Secondary disaster prevention measures
Clean contaminated objects and areas thoroughly observing environmental regulations.

Section 7: HANDLING AND STORAGE

Handling
Technical measures
Highly flammable. Avoid contact with high temperature objects, spark, and strong oxidizing agents. Be careful to hygroscopic. Use with local exhaust ventilation.

Precautions
Do not rough handling containers, such as upsetting, falling, giving a shock, and dragging. Prevent leakage, overflow, and scattering. Not to generate steam and dust in vain. Seal the container after use. After handling, wash hands and face, and then gargle. In places other than those specified, should not be smoking or eating and drinking. Should not be brought contaminated protective equipment and gloves to rest stops. Deny unnecessary entry of non-emergency personnel to the handling area.

Safety handling precautions
Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).

**Storage**

**Safe storage conditions**
- Keep container protect from light, store in well-ventilated place at room temperature (preferably cool). Keep container tightly closed.
- Packed with an inert gas. Protect from moisture.

**Safe packaging material**
- Glass

**Incompatible substances**
- Strong oxidizing agents

### Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering controls**
- In case of indoor workplace, seal the source or use a local exhaust system. Provide the safety shower facility, and hand- and eye-wash facility. And display their position clearly.

**Exposure limits**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>JSOH (Japan)</th>
<th>ISHL (Japan)</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide 68-12-2</td>
<td>10ppm(30mg/m³)(Skin)</td>
<td>ISHL/ACL: 10 ppm</td>
<td>TWA: 10 ppm Skin</td>
</tr>
</tbody>
</table>

**Personal protective equipment**
- **Respiratory protection**: gas mask for organic gas
- **Hand protection**: Impermeable protective gloves
- **Eye protection**: protective eyeglasses or chemical safety goggles
- **Skin and body protection**: Long-sleeved work clothes

**General hygiene considerations**
- Handle in accordance with good industrial hygiene and safety practice.

### Section 9: PHYSICAL AND CHEMICAL PROPERTIES

**Form**
- **Color**: Colorless - slight yellow
- **Turbidity**: clear
- **Appearance**: liquid
- **Odor**: No data available
- **pH**: No data available
- **Melting point/freezing point**: No data available
- **Boiling point, initial boiling point and boiling range**: No data available
- **Flash point**: 41 °C
- **Evaporation rate**: No data available
- **Flammability (solid, gas)**: No data available
- **Upper/lower flammability or explosive limits**
  - **Upper**: No data available
  - **Lower**: No data available
- **Vapour pressure**: No data available
- **Vapour density**: No data available
- **Specific Gravity / Relative density**: No data available
- **Solubilities**: No data available
- **n-Octanol/water partition coefficient:(log Pow)**: No data available
- **Auto-ignition temperature**: No data available
- **Decomposition temperature**: No data available
- **Viscosity (coefficient of viscosity)**: No data available
- **Dynamic viscosity**: No data available
Section 10: STABILITY AND REACTIVITY

Stability

Stability
May be altered by light. Hygroscopic.

Reactivity
No data available

Hazardous reactions
None under normal processing

Conditions to avoid
Extremes of temperature and direct sunlight, Heat, flames and sparks, static electricity, spark, Moisture

Incompatible materials
Strong oxidizing agents

Hazardous decomposition products
Carbon monoxide (CO), Carbon dioxide (CO2), Nitrogen oxides (NOx)

Section 11: TOXICOLOGICAL INFORMATION

Acute toxicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>3000 mg/kg (Rat)</td>
<td>3500 mg/kg (Rat)</td>
<td>4.7mg/L 4h(Mouse)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Acute toxicity-oral-source information</th>
<th>Acute toxicity-dermal-source information</th>
<th>Acute toxicity-inhalation gas-source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>LD50(Orl, rat): 3,000 mg/kg, 3,920 mg/kg, 4,000 mg/kg, 4,320 mg/kg, 3,200 mg/kg, 7,170 mg/kg (EHC 114 (1991)).</td>
<td>LD50(skn, rat): 3,500 mg/kg, LD50(skn, rabbit): 5,000 mg/kg, 11,140 mg/kg, 11,000 mg/kg (EHC 114 (1991)).</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Acute toxicity-inhalation vapor-source information</th>
<th>Acute toxicity-inhalation dust-source information</th>
<th>Acute toxicity-inhalation mist-source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>LC50(ihl, mouse): 9400mg/m2h(4.7mg/L/4h)(HSDB, 2005).</td>
<td>Based on the NITE GHS classification results.</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

Skin irritation/corrosion

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Skin corrosion irritation source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

Serious eye damage/irritation

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Serious eye damage source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

Respiratory or skin sensitization

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Respiratory, Skin sensitization source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

Reproductive cell mutagenicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Mutagenic source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

Carcinogenicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Carcinogenicity source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>NTP</th>
<th>IARC</th>
<th>ACGIH</th>
<th>JSOH (Japan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>68-12-2</td>
<td>Group 3</td>
<td>Group 2B</td>
<td></td>
</tr>
</tbody>
</table>

Reproductive toxicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Reproductive toxicity source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

STOT-single exposure

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>STOT -single exposure- source information</th>
</tr>
</thead>
</table>
N,N-Dimethylformamide

Based on the NITE GHS classification results.

**STOT-repeated exposure**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>STOT -repeated exposure- source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

**Aspiration hazard**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Aspiration Hazard source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

# Section 12: ECOLOGICAL INFORMATION

## Ecotoxicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Algae/aquatic plants</th>
<th>Fish</th>
<th>Crustacea</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>N/A</td>
<td>LC50: Oryzias latipes &gt; 100 mg/L 96 h</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Other data**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Aquatic toxicity -Acute- source information</th>
<th>Aquatic toxicity -Chronic- source information</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>LC50(Oryzias latipes): &gt;100 mg/L/96h (Ministry of the Environment ecological effects test. 1995).</td>
<td>Based on the NITE GHS classification results.</td>
</tr>
</tbody>
</table>

- **Persistence and degradability**: No information available
- **Bioaccumulative potential**: No information available
- **Mobility in soil**: No information available
- **Hazard to the ozone layer**: No information available

# Section 13: DISPOSAL CONSIDERATIONS

- **Waste from residues**: Disposal should be in accordance with applicable regional, national and local laws and regulations.
- **Contaminated container and contaminated packaging**: Disposal should be in accordance with applicable regional, national and local laws and regulations.

# Section 14: TRANSPORT INFORMATION

**ADR/RID**

- **UN number**: UN1993
- **Proper shipping name**: Flammable liquid, n.o.s. (t-Butoxybis(dimethylamino)methane)
- **UN classification**: 3
- **Subsidiary hazard class**: 
- **Packing group**: III
- **Marine pollutant**: Not applicable

**IMDG**

- **UN number**: UN1993
- **Proper shipping name**: Flammable liquid, n.o.s. (t-Butoxybis(dimethylamino)methane)
- **UN classification**: 3
- **Subsidiary hazard class**: 
- **Packing group**: III
- **Marine pollutant (Sea)**: Not applicable
- **Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**: No information available

**IATA**
UN number: UN1993
Proper shipping name: Flammable liquid, n.o.s. (t-Butoxybis(dimethylamino)methane)
UN classification: 3
Subsidiary hazard class: III
Packing group: Not applicable
Environmentally Hazardous Substance: Not applicable

Section 15: REGULATORY INFORMATION

International Inventories
- EINECS/ELINCS
- TSCA

Japanese regulations
- Fire Service Act: Category IV, Class II petroleums, dangerous grade 3
- Poisonous and Deleterious Substances Control Law: Not applicable
- Industrial Safety and Health Act: Dangerous Substances - Flammable Substance (Enforcement Order Attached Table 1 Item 4), Harmful Substances Whose Names Are to be Indicated on the Label (Law Art.57, Para.1, Enforcement Order Art.18), Notifiable Substances (Law Art.57-2, Enforcement Oder Art.18-2 Attached Table No.9)No.299
- Regulations for the carriage and storage of dangerous goods in ship
  - Fire Service Act: Category IV, Class II petroleums, dangerous grade 3
  - Poisonous and Deleterious Substances Control Law: Not applicable
  - Industrial Safety and Health Act: Dangerous Substances - Flammable Substance (Enforcement Order Attached Table 1 Item 4), Harmful Substances Whose Names Are to be Indicated on the Label (Law Art.57, Para.1, Enforcement Order Art.18), Notifiable Substances (Law Art.57-2, Enforcement Oder Art.18-2 Attached Table No.9)No.299
- Civil Aeronautics Law: Flammable Liquids (Ordinance Art.194, MITL Nortification for Air Transportation of Explosives etc., Attached Table 1)
- Pollutant Release and Transfer Register Law: Not applicable
- Export Trade Control Order: Not applicable

Section 16: OTHER INFORMATION

Key literature references and sources for data etc.
- NITE: National Institute of Technology and Evaluation (JAPAN)
- IATA dangerous Goods Regulations
- RTECS: Registry of Toxic Effects of Chemical Substances
- Japan Industrial Safety and Health Association GHS Model SDS
- Chemical Dictionary, Kyouritsu Publishing Co., Ltd.
- etc

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
GHS Classification is according to JIS Z7252(2014). *JIS: Japanese Industrial Standards

Product information
You might get a product which indicates a former company name, during the period of transition.

End of Safety Data Sheet