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

1.1. Product identifier

<table>
<thead>
<tr>
<th>Trade name/designation:</th>
<th>1-Methyl-2-pyrrolidinone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product No.:</td>
<td>BDH2022, BDH 2037</td>
</tr>
<tr>
<td>Other means of identification:</td>
<td>NMP, 1-Methylpyrrolidinone, 2-Pyrrolidone, M-Pyro</td>
</tr>
</tbody>
</table>

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

Recommended Use: No information available

Uses advised against: No information available

1.3. Details of the supplier of the safety data sheet

Company: VWR International, LLC
Radnor Corporate Center
100 Matsonford Road
Radnor, PA 19087-8660

Telephone: 610.386.1700

1.4. Emergency Telephone number

CHEMTREC: 800.424.9300
CANUTEC: 613.996-6666

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

For the full text of the H-Statement(s) and R-phrase(s) mentioned in this Section, see Section 16.

<table>
<thead>
<tr>
<th>Hazard classes and hazard categories</th>
<th>Hazard statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1B</td>
<td>Reproductive toxicity</td>
</tr>
<tr>
<td>Category 2</td>
<td>Eye irritation</td>
</tr>
<tr>
<td>Category 2</td>
<td>Skin irritation</td>
</tr>
<tr>
<td>Category 3</td>
<td>Specific Target Organ Toxicity-Single Exposure (Respiratory System)</td>
</tr>
</tbody>
</table>

2.2. GHS Label elements, including precautionary statements

Symbol(s)
Xi - Irritant

R-code(s)
R61, Xi;R36, R37, R38

Pictograms

Signal word
DANGER

Hazard statements

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H227</td>
<td>Combustible liquid</td>
</tr>
<tr>
<td>H315</td>
<td>Causes skin irritation</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation</td>
</tr>
<tr>
<td>H360D</td>
<td>May damage the unborn child</td>
</tr>
</tbody>
</table>

Precautionary measures

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P210</td>
<td>Keep away from heat, hot surfaces, sparks, open flames and other sources of ignition. No smoking</td>
</tr>
<tr>
<td>P233</td>
<td>Keep container tightly closed.</td>
</tr>
<tr>
<td>P261</td>
<td>Avoid breathing dust/fume/gas/mist/vapors/spray</td>
</tr>
<tr>
<td>P264</td>
<td>Wash skin thoroughly after handling.</td>
</tr>
<tr>
<td>P271</td>
<td>Use only outdoors, or in a well-ventilated area.</td>
</tr>
<tr>
<td>P280</td>
<td>Wear protective gloves/eye protection/face protection</td>
</tr>
<tr>
<td>P501</td>
<td>Dispose of contents/container in accordance with local, state, and federal regulations</td>
</tr>
<tr>
<td>P308 + P313</td>
<td>IF exposed or concerned: Get medical advice/attention</td>
</tr>
</tbody>
</table>

2.3. WHIMS Classification
B3 Flammable and combustible material – Combustible liquid
D2B Toxic materials (Eye Irritant)

2.4. Hazards not otherwise classified (HNOC) or not covered by GHS or WHIMS
None especially mentioned.

SECTION 3: Composition / information on ingredients

3.1. Hazard components

Product Number: BDH2022, BDH2037
### SECTION 4: First aid measures

#### 4.1. General information

In case of inhalation move the exposed person to fresh air at once and keep at rest in a position comfortable for breathing. If breathing is difficult administer Oxygen, or give artificial respiration (if trained)

Get medical attention immediately

In case of skin contact remove victim from source of contamination. Promptly flush contaminated skin with soap and water for at least 15 minutes. Promptly remove clothing if soaked through and flush skin with water. Seek medical attention if irritation persists.

In case of eye contact wash eyes immediately with plenty of water for at least 15 minutes while lifting upper and lower eyelids. Get medical attention immediately.

In case of ingestion never make an unconscious person vomit or drink fluids. Induce vomiting immediately. Rinse mouth. Get medical attention immediately.

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

Burning sensation in eyes, temporary reddening of skin with potential dryness and cracking, Headache, dazed feeling, vomiting, nausea with skin absorption/inhalation

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

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

**Suitable extinguishing media**
Use Water spray, CO2, dry chemical, or foam If using water or foam, prevent product and runoff from entering drains, sewers or surface water due to high toxicity to aquatic organisms

**Extinguishing media which shall not be used for safety reasons**
No information available

#### 5.2. Special hazards arising from the substance or mixture
Special Hazard
None

5.3. Special protective equipment for firefighters
As in any fire, wear self-contained breathing apparatus and full protective gear

5.4. Hazardous combustion products
Carbon monoxide (CO), Carbon dioxide (CO2), peroxides

5.5. Advice for firefighters

5.6. Additional information

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Remove all sources of ignition Evacuate personnel to safe areas. Ensure adequate ventilation. Use personal protective equipment. Keep people away from and upwind of spill/leak. See Section 12 for additional Ecological Information.

6.2. Environmental precautions
Prevent further leakage or spillage if safe to do so. Prevent product from entering drains Do not flush into surface water or sanitary sewer system

6.3. Methods and material for containment and cleaning up
Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust)

6.4. Additional information

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Ensure adequate ventilation Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. Use only in an area containing flame proof equipment. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Avoid contact with skin, eyes and clothing. Do not eat, drink or smoke when using this product. Use only in area provided with appropriate exhaust ventilation. Wear personal protective equipment. Do not breathe vapors or spray mist

7.2. Conditions for safe storage, including any incompatibilities
Keep tightly closed in a dry and cool place. Keep in properly labeled containers. Keep containers tightly closed in a cool, well-ventilated place. Containers must be stored in an upright position.

**7.3. Specific end use(s)**

**SECTION 8: Exposure controls/personal protection**

**8.1. Control parameters**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Limit value type &amp; Country of Origin</th>
<th>Exposure Limit value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Methyl-2-pyrrolidinone (872-50-4)</td>
<td>TWA-USA</td>
<td>10 ppm</td>
<td>US WEEL</td>
</tr>
</tbody>
</table>

**8.2. Exposure controls**

- **Appropriate engineering controls**
  Ensure adequate ventilation, especially in confined areas

- **Personal protection equipment**
  - **Eye/face protection**
    Tightly fitting safety goggles
  - **Skin protection**
    Protective gloves and antistatic boots. Wear fire/ flame resistant/ retardant clothing impervious gloves. Long sleeved clothing apron.
  - **Respiratory protection**
    If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn
  - **Hygiene measures**
    When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing.

**SECTION 9: Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

a) **Appearance:**
   - **Physical state:** Liquid
   - **Color:** Clear light yellow
b) **Odor:** mild, amine like
c) **Odor Threshold:** No information available
d) **pH:** No information available
e) **Melting point/freezing point:** No information available/ -24.4°C / -11.9 °F
f) **Initial boiling point and boiling range:** 202°C / 396°F
g) **Flash point:** 91 °C / 196 °F (Closed Cup)
h) **Evaporation rate:** No information available
9.2. Other information

Softening point: No information available
Molecular weight: 99.13 g/mol
VOC Content (%): No information available
Density VALUE: No information available
Bulk Density VALUE: No information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No dangerous reaction known under conditions of normal use

10.2. Chemical stability
Stable under normal conditions

10.3. Possibility of hazardous reactions
Vapors may form explosive mixtures with air

10.4. Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5. Incompatible materials
Strong oxidizing agents Incompatible with strong acids and bases

10.6. Hazardous decomposition products
Fire or mixing with incompatible materials may produce oxides of carbon and other toxic or irritating fumes.

SECTION 11: Toxicology

11.1. Information on toxicological effects
Acute toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

Oral LD$_{50}$:
4,150 mg/kg (RAT)

Inhalation LC$_{50}$:
Vapor: > 5.1 mg/l 4 hours (RAT)

Dermal LD$_{50}$:
> 5,000 mg/kg (Rabbit)

Other information on acute toxicity

Skin corrosion/irritation
May cause irritation with redness and pain. May be absorbed through skin with possible systemic effects.

Serious eye damage/eye irritation
Causes eye irritation.

Germ cell mutagenicity
In vivo tests did not show mutagenic effects.

Carcinogenicity
This product does NOT contain a substance which is classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

Reproductive toxicity
Presumed human reproductive toxicant.

Effects on fertility
Test Type: Two generation study
Species: Rat (Male and Female)
Application Route: Oral
Dose(s) 0, 50, 160, 350, 500 mg/kg Bodyweight
General Toxicity: Parent, NOAEL: 350 mg/kg
General Toxicity: F1: NOAEL: 160mg/kg
Symptoms: Fetal effects: Reduced embryonic survival
Method: OECD Test Guideline 415
Results: Embryotoxic effects and adverse effects on the offspring were detected
GLP: Yes

Effects on fetal development
Species: Rat (Female)
Application Route: Oral
Dose(s) 0, 125, 250, 500, 750 mg/kg Bodyweight
Duration of single Treatment 0 Days
Safety Data Sheet

General Toxicity: Maternal, NOAEL: 125 mg/kg
Teratogenicity: NOAEL: 250mg/kg
Embryo-Fetal Toxicity: NOAEL: 125 mg/kg
Symptoms: Skeletal malformations, Visceral malformations. Reduced number of viable fetuses
Method: OECD Test Guideline 414
Results: Teratogenic effects. Developmental toxicity occurred at maternal toxicity dose levels
GLP: Yes

Specific target organ toxicity-single exposure
No information available

Specific target organ toxicity-repeated exposure
No information available

Aspiration hazard
No information available

Additional information
No information available

SECTION 12: Ecological information

12.1. Ecotoxicity
Components of this product have been identified as having potential environmental concerns.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Toxicity to algae</th>
<th>Toxicity to fish</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Methyl-2-pyrrolidinone</td>
<td>&gt; 100 mg/l: 72 h Desmodesmus subspicatus</td>
<td>&gt;100 mg/l: 96 h Rainbow Trout</td>
<td>&gt;100 mg/l: 24 h Daphnia magna mg/L EC50</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability
No information available

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Methyl-2-pyrrolidinone</td>
<td>-0.38</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil
No information available

12.5. Results of PBT and vPvB assessment
No information available

12.6. Other adverse effects
SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste from residues / unused products:
Dispose of in accordance with local, state, and federal regulations

Contaminated packaging: Empty containers should be taken to an approved waste handling site for recycling or disposal.

Other information: According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used.

Contaminated packaging: Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

Note: For transportation solely by land within the United States, this material is not regulated, if shipped in NON BULK packaging (<450L/<119 Gallons).

Land Transport DOT (U.S.) (NON BULK PACKAGING)
UN Number: Not regulated as a dangerous good
Proper Shipping name:
Transport Hazard Classes
Class:
Hazard Label(s):
Packing Group:
Environmental hazard(s): Marine Pollutant:
Special precautions for user:

Sea Transport IMDG

UN Number: Not regulated as a dangerous good
Proper Shipping name:
Transport Hazard Classes
Class:
Hazard Label(s):
Packing Group:
Environmental hazard(s):
Marine Pollutant:
Segregation Group:
Special precautions for user:
Air Transport IATA
UN Number: Not regulated as a dangerous good
Proper Shipping name:
Transport Hazard Classes
Class:
Hazard Label(s):
Packing Group:
Environmental hazard(s): Marine Pollutant:
Special precautions for user:

SECTION 15: Regulatory information

OSHA Hazards
Combustible liquid, Moderate skin irritant, Moderate eye irritant, Moderate respiratory irritant, Teratogen.

SARA 302 Extremely Hazardous Substances
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 (TRI reporting)
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
<th>Purity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Methyl-2-pyrrolidinone</td>
<td>872-50-4</td>
<td>100%</td>
</tr>
</tbody>
</table>

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 311/312 Hazardous Chemicals

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Sudden Release of Pressure Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td>No</td>
</tr>
</tbody>
</table>

Massachusetts Right-To-Know Substance List
Listed as: 1-Methyl-2-pyrrolidinone

Pennsylvania Right-To-Know Hazardous Substances
Listed as: 1-Methyl-2-pyrrolidinone
New Jersey Worker and Community Right-To-Know Components
Listed as: 1-Methyl-2-pyrrolidinone

California Proposition 65
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.
872-50-4 1-Methyl-2-pyrrolidinone

Inventory status:
Canada DSL/NDSL Inventory List
US TSCA Inventory List

SECTION 16: Other information

Full text of H-Statement(s) and R-phrase(s)
R61 – May cause harm to the unborn child.
R36/37/38 - Irritating to eyes, respiratory system, and skin.
H227 - Combustible liquid.
H315 - Causes skin irritation
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation
H360D – May damage the unborn child

Canadian Carcinogenicity hazard class
PHNOC hazard class: No information
HHNOC hazard class: No information
Bio-hazardous Infectious Materials hazard class: No information

NFPA Rating:
    Health:   2
    Flammability:  2
    Reactivity:  0
    Special Hazard:

DISCLAIMER
The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. VWR International, LLC and its Affiliates shall not be held liable for any damage resulting from handling.