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

· 1.1 Product identifier
  · Product name: Pyrrolidin-2-one (2-Pyrrolidone)
  · Part number: MM0083.05
  · CAS Number: 616-45-5
  · EC number: 210-483-1

· 1.2 Relevant identified uses of the substance or mixture and uses advised against
  · Application of the substance / the mixture
    Reference material for laboratory use only

· 1.3 Details of the supplier of the safety data sheet
  · Manufacturer/Supplier:
    LGC Limited
    Queens Road
    Teddington
    Middlesex TW11 0LY
    UNITED KINGDOM
  · Further information obtainable from:
    Product safety department
    eMail: sds-request@lgcgroup.com
  · 1.4 Emergency telephone number: +44 (0) 20 8943 7000 (Monday - Friday : 8am - 5pm)

SECTION 2: Hazards identification

· 2.1 Classification of the substance or mixture
  · Classification according to Regulation (EC) No 1272/2008
    GHS07
    Acute Tox. 4 H302 Harmful if swallowed.
    Skin Irrit. 2 H315 Causes skin irritation.
    Eye Irrit. 2 H319 Causes serious eye irritation.
    STOT SE 3 H335 May cause respiratory irritation.

· 2.2 Label elements
  · Labelling according to Regulation (EC) No 1272/2008
    The substance is classified and labelled according to the CLP regulation.
  · Hazard pictograms
    GHS07
  · Signal word Warning
  · Hazard statements
    H302 Harmful if swallowed.
    H315 Causes skin irritation.
    H319 Causes serious eye irritation.
    H335 May cause respiratory irritation.
  · Precautionary statements
    P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
Product name: Pyrrolidin-2-one (2-Pyrrolidone)

P280 Wear protective gloves / eye protection / face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P321 Specific treatment (see on this label).
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards
- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.

SECTION 3: Composition/information on ingredients

3.1 Chemical characterisation: Substances
- CAS No. Description
  616-45-5 2-Pyrrolidone
- Identification number(s) None
- EC number: 210-483-1
- RTECS: UY5715000
- Additional information: For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures
- General information:
  Immediately remove any clothing soiled by the product. Symptoms of poisoning may occur even after several hours; therefore medical observation for at least 48 hours after the accident is recommended.
- After inhalation: Supply fresh air; consult doctor in case of complaints.
- After skin contact:
  Immediately wash with water and soap and rinse thoroughly. If skin irritation continues, consult a doctor.
- After eye contact:
  Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- After swallowing:

4.2 Most important symptoms and effects, both acute and delayed
  No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed
  No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media
- Suitable extinguishing agents: Use fire extinguishing methods suitable for surrounding conditions.

5.2 Special hazards arising from the substance or mixture
- Formation of toxic gases is possible during heating or in case of fire.

5.3 Advice for firefighters
- Protective equipment: Wear self-contained respiratory protective device.

(Contd. from page 1)
SECTION 6: Accidental release measures

- 6.1 Personal precautions, protective equipment and emergency procedures: Wear protective clothing.
- 6.2 Environmental precautions: Do not allow to enter sewers/ surface or ground water.
- 6.3 Methods and material for containment and cleaning up:
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  Dispose of contaminated material as waste according to item 13.
  Ensure adequate ventilation.
- 6.4 Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

SECTION 7: Handling and storage

- 7.1 Precautions for safe handling
  Ensure good ventilation/extraction at the workplace.
  Store in cool, dry place in tightly closed receptacles.
  Prevent formation of aerosols.
- Information about fire - and explosion protection: No special measures required.
- 7.2 Conditions for safe storage, including any incompatibilities
- Storage:
  Requirements to be met by storerooms and receptacles:
  Please refer to the manufacturer's certificate for specific storage and transport temperature conditions.
  Store only in the original receptacle.
  Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
- Information about storage in one common storage facility: Store away from foodstuffs.
- Further information about storage conditions: Keep container tightly sealed.
- 7.3 Specific end use(s) No further relevant information available.

SECTION 8: Exposure controls/personal protection

- Additional information about design of technical facilities: No further data; see item 7.
- 8.1 Control parameters
- Ingredients with limit values that require monitoring at the workplace: Not required.
- Additional information: Lists used were valid at the time of SDS preparation.
- 8.2 Exposure controls
- Personal protective equipment:
  General protective and hygienic measures:
  Keep away from foodstuffs, beverages and feed.
  Immediately remove all soiled and contaminated clothing
  Wash hands before breaks and at the end of work.
  Avoid contact with the eyes and skin.
  Respiratory protection:
  In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
  Protection of hands:
  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

(Contd. on page 4)
The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374

- Material of gloves Butyl rubber, BR
- Penetration time of glove material
  The exact breakthrough time has to be found out by the manufacturer of the protective gloves and has to be observed.

- Eye protection:
  Tightly sealed goggles

### SECTION 9: Physical and chemical properties

- 9.1 Information on basic physical and chemical properties
- General Information
- Appearance:
  - Form: Liquid
  - Colour: Colourless
  - Odour: Odourless
  - Odour threshold: Not determined.
- pH-value: Not determined.
- Change in condition
  - Melting point/freezing point: 23-25 °C
  - Initial boiling point and boiling range: 245 °C
- Flash point: 138 °C
- Flammability (solid, gas): Not determined.
- Ignition temperature: 240 °C
- Decomposition temperature: Not determined.
- Auto-ignition temperature: Not determined.
- Explosive properties: Not determined.
- Explosion limits:
  - Lower: Not determined.
  - Upper: Not determined.
- Vapour pressure at 20 °C: 0.04 hPa
- Density at 20 °C: 1.12 g/cm³
- Relative density: Not determined.
- Vapour density: Not determined.
- Evaporation rate: Not determined.
- Solubility in / Miscibility with water: -0.85 logP
  - Not determined.
- Partition coefficient: n-octanol/water: Not determined.


**Product name:** Pyrrolidin-2-one (2-Pyrrolidone)

(Contd. from page 4)

- **Viscosity:**
  - Dynamic: Not determined.
  - Kinematic: Not determined.

- **9.2 Other information**
  - No further relevant information available.

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**SECTION 10: Stability and reactivity**

- **10.1 Reactivity** Stable under normal conditions.
- **10.2 Chemical stability** Stable under normal conditions.
- **Thermal decomposition / conditions to be avoided:**
  - Formation of toxic gases is possible during heating or in case of fire.
- **10.3 Possibility of hazardous reactions** No dangerous reactions known.
- **10.4 Conditions to avoid** Heat.
- **10.5 Incompatible materials:** Strong oxidizing agents.
- **10.6 Hazardous decomposition products:**
  - Formation of toxic gases is possible during heating or in case of fire.

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**SECTION 11: Toxicological information**

- **11.1 Information on toxicological effects**
- **Acute toxicity** Harmful if swallowed.

<table>
<thead>
<tr>
<th>Route</th>
<th>LD50/1000mg/kg (rat)</th>
<th>LC50/1000mg/kg (rat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>328 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Dermal</td>
<td>&gt;2,000 mg/kg</td>
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</tr>
<tr>
<td></td>
<td>LD 50 (Intraperitoneal) 160 mg/kg (rat)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LD 50 (Intravenous)  &gt;7,200 mg/kg (rat)</td>
<td></td>
</tr>
</tbody>
</table>

- **Primary irritant effect:**
- **Skin corrosion/irritation**
  - Causes skin irritation.
- **Serious eye damage/irritation**
  - Causes serious eye irritation.
- **Respiratory or skin sensitisation**
  - Based on available data, the classification criteria are not met.
- **CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)**
- **Germ cell mutagenicity**
  - Based on available data, the classification criteria are not met.
- **Carcinogenicity**
  - Based on available data, the classification criteria are not met.
- **Reproductive toxicity**
  - Based on available data, the classification criteria are not met.
- **STOT-single exposure**
  - May cause respiratory irritation.
- **STOT-repeated exposure**
  - Based on available data, the classification criteria are not met.
- **Aspiration hazard**
  - Based on available data, the classification criteria are not met.

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**SECTION 12: Ecological information**

- **12.1 Toxicity**
- **Aquatic toxicity:**
  - EC50/48h 13.2 mg/l (daphnia)

- **12.2 Persistence and degradability**
  - No further relevant information available.
- **12.3 Bioaccumulative potential**
  - No further relevant information available.

(Contd. on page 6)
Product name: Pyrrolidin-2-one (2-Pyrrolidone)

12.4 Mobility in soil
No further relevant information available.

Additional ecological information:
12.5 Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

12.6 Other adverse effects
No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Recommendation
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

European waste catalogue
Waste disposal key numbers from EWC have to be assigned depending on origin and processing.

Uncleaned packaging:
Recommendation: Dispose of in accordance with national regulations.

SECTION 14: Transport information

14.1 UN-Number
ADR, ADN, IMDG, IATA: Not applicable
ADR, ADN, IMDG, IATA: Not applicable

14.3 Transport hazard class(es)
ADR, ADN, IMDG, IATA: Class: Not applicable

14.4 Packing group
ADR, IMDG, IATA: Not applicable

14.5 Environmental hazards:
Not applicable.

14.6 Special precautions for user
Not applicable.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code
Not applicable.

UN "Model Regulation": Not applicable

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Philippines Inventory of Chemicals and Chemical Substances: Substance is listed.
Australian Inventory of Chemical Substances: Substance is listed.
Standard for the Uniform Scheduling of Medicines and Poisons: Substance is not listed.

Directive 2012/18/EU
Named dangerous substances - ANNEX I: Substance is not listed.
REGULATION (EC) No 1907/2006 ANNEX XVII: Conditions of restriction: 3
**Product name:** Pyrrolidin-2-one (2-Pyrrolidone)

- **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

**SECTION 16: Other information**

The information in this safety data sheet (SDS) has been prepared with due care and is true and accurate to the best of our knowledge. The user must determine the suitability of the information for its particular purpose, ensure compliance with existing laws and regulations, and be aware that other or additional safety or performance considerations may arise when using, handling and/or storing the material. The information in this SDS does not purport to be all inclusive or a guarantee as to the properties of the material supplied, and should be used only as a guide. LGC makes no warranties or representations as to the accuracy and completeness of the information contained herein, shall not be held responsible for the suitability of this information for the user's intended purposes or the consequences of such use, and shall not be liable for any damage or loss, howsoever arising, direct or otherwise.

- **Abbreviations and acronyms:**
  - ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  - IMDG: International Maritime Code for Dangerous Goods
  - IATA: International Air Transport Association
  - GHS: Globally Harmonised System of Classification and Labelling of Chemicals
  - EINECS: European Inventory of Existing Commercial Chemical Substances
  - CAS: Chemical Abstracts Service (division of the American Chemical Society)
  - LC50: Lethal concentration, 50 percent
  - LD50: Lethal dose, 50 percent
  - PBT: Persistent, Bioaccumulative and Toxic
  - vPvB: very Persistent and very Bioaccumulative
  - Acute Tox. 4: Acute toxicity – Category 4
  - Skin Irrit. 2: Skin corrosion/irritation – Category 2
  - Eye Irrit. 2: Serious eye damage/eye irritation – Category 2
  - STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

- **Sources**

- **Data compared to the previous version altered:** All sections have been updated.