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

1.1 Product identifier

Identification of the substance: N-Methyl-2-pyrrolidone

Article number: 4306
Registration number (REACH): 01-2119472430-46-xxxx
Index No: 606-021-00-7
EC number: 212-828-1
CAS number: 872-50-4

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

Identified uses: laboratory chemical laboratory and analytical use

1.3 Details of the supplier of the safety data sheet

Carl Roth GmbH + Co KG
Schoemperlenstr. 3-5
D-76185 Karlsruhe
Germany

Telephone: +49 (0) 721 - 56 06 0
Telefax: +49 (0) 721 - 56 06 149
e-mail: sicherheit@carlroth.de
Website: www.carlroth.de

Competent person responsible for the safety data sheet: Department Health, Safety and Environment

e-mail (competent person): sicherheit@carlroth.de

1.4 Emergency telephone number

Emergency information service: Poison Centre Munich: +49/(0)89 19240

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 (CLP)

<table>
<thead>
<tr>
<th>Classification acc. to GHS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section</strong></td>
</tr>
<tr>
<td>3.2</td>
</tr>
<tr>
<td>3.3</td>
</tr>
<tr>
<td>3.7</td>
</tr>
<tr>
<td>3.8R</td>
</tr>
</tbody>
</table>
2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP)

Signal word: Danger

Pictograms
GH507, GH508

Hazard statements
H315 Causes skin irritation
H319 Causes serious eye irritation
H335 May cause respiratory irritation
H360D May damage the unborn child

Precautionary statements - prevention
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statements - response
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 IF exposed or concerned: Get medical advice/attention.

For professional users only

Labelling of packages where the contents do not exceed 125 ml
Signal word: Danger

Symbol(s)

H360D May damage the unborn child.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313 IF exposed or concerned: Get medical advice/attention.

2.3 Other hazards

There is no additional information.

SECTION 3: Composition/information on ingredients

3.1 Substances

<table>
<thead>
<tr>
<th>Name of substance</th>
<th>N-Methyl-2-pyrrolidone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index No</td>
<td>606-021-00-7</td>
</tr>
<tr>
<td>Registration number (REACH)</td>
<td>01-2119472430-46-xxxx</td>
</tr>
<tr>
<td>EC number</td>
<td>212-828-1</td>
</tr>
<tr>
<td>CAS number</td>
<td>872-50-4</td>
</tr>
</tbody>
</table>
N-Methyl-2-pyrrolidone ≥99,8 %, for synthesis

**article number: 4306**

<table>
<thead>
<tr>
<th>Molecular formula</th>
<th>C₅H₉NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molar mass</td>
<td>99,13 g/mol</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Substance of Very High Concern (SVHC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of substance</strong></td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
</tr>
</tbody>
</table>

**Legend**
- Candidate list: Substances meeting the criteria referred to in Article 57 and for eventual inclusion in Annex XIV
- Repr. A57c: Toxic for reproduction (article 57c)

**SECTION 4: First aid measures**

4.1 Description of first aid measures

**General notes**
Take off contaminated clothing.

**Following inhalation**
Provide fresh air. In all cases of doubt, or when symptoms persist, seek medical advice.

**Following skin contact**
Rinse skin with water/shower. In case of skin irritation, consult a physician.

**Following eye contact**
Irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart. In case of eye irritation consult an ophthalmologist.

**Following ingestion**
In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

4.2 Most important symptoms and effects, both acute and delayed
Cough, Diarrhoea, Irritation, Vomiting, Dyspnoea

4.3 Indication of any immediate medical attention and special treatment needed
none

**SECTION 5: Firefighting measures**

5.1 Extinguishing media

**Suitable extinguishing media**
Co-ordinate fire-fighting measures to the fire surroundings
water spray, foam, dry extinguishing powder, carbon dioxide (CO2)
N-Methyl-2-pyrrolidone  ≥99,8 %, for synthesis

Unsuitable extinguishing media
water jet

5.2 Special hazards arising from the substance or mixture
Combustible. Vapours are heavier than air, spread along floors and form explosive mixtures with air.

Hazardous combustion products
In case of fire may be liberated: nitrogen oxides (NOx), carbon monoxide (CO), carbon dioxide (CO2)

5.3 Advice for firefighters
Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Use personal protective equipment as required. Avoid contact with skin, eyes and clothes. Do not breathe vapour/spray.

6.2 Environmental precautions
Keep away from drains, surface and ground water.

6.3 Methods and material for containment and cleaning up

Advices on how to contain a spill
Covering of drains.

Advices on how to clean up a spill
Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents).

Other information relating to spills and releases
Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provision of sufficient ventilation. Avoid: Aerosol or mist formation.

• Measures to prevent fire as well as aerosol and dust generation

Keep away from sources of ignition - No smoking.

Advice on general occupational hygiene
Wash hands before breaks and after work. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed.
Incompatible substances or mixtures
Observe hints for combined storage.

Consideration of other advice
• Ventilation requirements
Use local and general ventilation.
• Specific designs for storage rooms or vessels
Recommended storage temperature: 15 – 25 °C.

7.3 Specific end use(s)
No information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

<table>
<thead>
<tr>
<th>Country</th>
<th>Name of agent</th>
<th>CAS No</th>
<th>Notation</th>
<th>Identifier</th>
<th>TWA [ppm]</th>
<th>TWA [mg/m³]</th>
<th>STEL [ppm]</th>
<th>STEL [mg/m³]</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>N-methyl-2-pyrrolidone</td>
<td>872-50-4</td>
<td>IOELV</td>
<td>10</td>
<td>40</td>
<td>20</td>
<td>80</td>
<td>2009/161/ EU</td>
<td></td>
</tr>
<tr>
<td>IE</td>
<td>1-methyl-2-pyrrolidone</td>
<td>872-50-4</td>
<td>OELV</td>
<td>10</td>
<td>40</td>
<td>20</td>
<td>80</td>
<td>S.I. No. 619 of 2001</td>
<td></td>
</tr>
</tbody>
</table>

**Notation**
- **STEL**: Short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)
- **TWA**: Time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified)

Relevant DNELs/DMELs/PNECs and other threshold levels

• human health values

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Threshold level</th>
<th>Protection goal, route of exposure</th>
<th>Used in</th>
<th>Exposure time</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNEL</td>
<td>208 mg/kg</td>
<td>human, dermal</td>
<td>worker (industry)</td>
<td>acute - systemic effects</td>
</tr>
<tr>
<td>DNEL</td>
<td>80 mg/m³</td>
<td>human, inhalatory</td>
<td>worker (industry)</td>
<td>acute - systemic effects</td>
</tr>
<tr>
<td>DNEL</td>
<td>14,4 mg/m³</td>
<td>human, inhalatory</td>
<td>worker (industry)</td>
<td>chronic - systemic effects</td>
</tr>
<tr>
<td>DNEL</td>
<td>40 mg/m³</td>
<td>human, inhalatory</td>
<td>worker (industry)</td>
<td>chronic - local effects</td>
</tr>
<tr>
<td>DNEL</td>
<td>4,8 mg/kg bw/day</td>
<td>human, dermal</td>
<td>worker (industry)</td>
<td>chronic - systemic effects</td>
</tr>
</tbody>
</table>

• environmental values
8.2 Exposure controls

Individual protection measures (personal protective equipment)

Eye/face protection

Use safety goggles with side protection.

Skin protection

• hand protection
  Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

• type of material
  Butyl caoutchouc (butyl rubber)

• material thickness
  0,7mm.

• breakthrough times of the glove material
  >480 minutes (permeation: level 6)

• other protection measures
  Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended.

Respiratory protection


Environmental exposure controls

Keep away from drains, surface and ground water.
SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>liquid (fluid)</td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>like: amine</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
</tbody>
</table>

Other physical and chemical parameters

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH (value)</td>
<td>8.5 – 10 (water: 100 g/l, 20 °C)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>-24.2 °C at 1.013 hPa</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>204.3 °C at 1.016 hPa</td>
</tr>
<tr>
<td>Flash point</td>
<td>91 °C at 1.013 hPa</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>no data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>not relevant (fluid)</td>
</tr>
</tbody>
</table>

Explosive limits

- lower explosion limit (LEL) 1.3 vol%
- upper explosion limit (UEL) 9.5 vol%

Explosion limits of dust clouds not relevant

Vapour pressure

0.32 hPa at 20 °C

Density

1.03 g/cm³ at 25 °C

Vapour density

3.42 (air = 1)

Bulk density

Not applicable

Relative density

Information on this property is not available.

Solubility(ies)

Water solubility

1.000 g/l at 20 °C miscible in any proportion

Partition coefficient

n-octanol/water (log KOW) -0.46 (25 °C) (ECHA)

Soil organic carbon/water (log KOC) 0.87 (ECHA)

Auto-ignition temperature

245 °C at 1.013 hPa - ECHA

Decomposition temperature

no data available

Viscosity

- kinematic viscosity 1.613 mm²/s
- dynamic viscosity 1.661 mPa s at 25 °C

Explosive properties

Shall not be classified as explosive

Oxidising properties

none
9.2 Other information
Temperature class (EU, acc. to ATEX) T3 (Maximum permissible surface temperature on the equipment: 200°C)

SECTION 10: Stability and reactivity

10.1 Reactivity
In case of warming: Vapours can form explosive mixtures with air.

10.2 Chemical stability
The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions
Violent reaction with: Strong oxidiser, Strong alkali, Strong acid

10.4 Conditions to avoid
Direct light irradiation. Keep away from heat.

10.5 Incompatible materials
different plastics

10.6 Hazardous decomposition products
Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Shall not be classified as acutely toxic.

<table>
<thead>
<tr>
<th>Exposure route</th>
<th>Endpoint</th>
<th>Value</th>
<th>Species</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>oral</td>
<td>LD50</td>
<td>4.150 mg/kg</td>
<td>rat</td>
<td>ECHA</td>
</tr>
<tr>
<td>inhalation: dust/mist</td>
<td>LC50</td>
<td>&gt;5.1 mg/l/4h</td>
<td>rat</td>
<td>ECHA</td>
</tr>
<tr>
<td>dermal</td>
<td>LD50</td>
<td>&gt;5.000 mg/kg</td>
<td>rat</td>
<td>ECHA</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation
Causes skin irritation.

Serious eye damage/eye irritation
Causes serious eye irritation.

Respiratory or skin sensitisation
Shall not be classified as a respiratory or skin sensitiser.

Summary of evaluation of the CMR properties
Reproductive toxicity:
May damage the unborn child

• Specific target organ toxicity - single exposure
May cause respiratory irritation.

• Specific target organ toxicity - repeated exposure
Shall not be classified as a specific target organ toxicant (repeated exposure).
Aspiration hazard
Shall not be classified as presenting an aspiration hazard.

Symptoms related to the physical, chemical and toxicological characteristics
• If swallowed
diarrhoea, vomiting, nausea
• If in eyes
Irritating to eyes
• If inhaled
cough, breathing difficulties, Irritation to respiratory tract
• If on skin
causes skin irritation

Other information
None

SECTION 12: Ecological information

12.1 Toxicity
acc. to 1272/2008/EC: Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute)

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Value</th>
<th>Species</th>
<th>Source</th>
<th>Exposure time</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50</td>
<td>&gt;500 mg/l</td>
<td>rainbow trout</td>
<td>ECHA</td>
<td>96 h</td>
</tr>
<tr>
<td>ErC50</td>
<td>600,5 mg/l</td>
<td>algae</td>
<td>ECHA</td>
<td>72 h</td>
</tr>
</tbody>
</table>

Aquatic toxicity (chronic)

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Value</th>
<th>Species</th>
<th>Source</th>
<th>Exposure time</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50</td>
<td>&gt;1.000 mg/l</td>
<td>daphnia magna</td>
<td>ECHA</td>
<td>24 h</td>
</tr>
<tr>
<td>NOEC</td>
<td>12,5 mg/l</td>
<td>daphnia magna</td>
<td>ECHA</td>
<td>21 d</td>
</tr>
</tbody>
</table>

12.2 Process of degradability
The substance is readily biodegradable.
Theoretical Oxygen Demand with nitrification: 2,502 mg/O2/mg
Theoretical Oxygen Demand: 1,937 mg/O2/mg
Theoretical Carbon Dioxide: 2,22 mg/CO2/mg

<table>
<thead>
<tr>
<th>Process</th>
<th>Degradation rate</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>biotic/abiotic</td>
<td>&gt;90 %</td>
<td>20 d</td>
</tr>
<tr>
<td>oxygen depletion</td>
<td>73 %</td>
<td>28 d</td>
</tr>
</tbody>
</table>

12.3 Bioaccumulative potential
Does not significantly accumulate in organisms.
n-octanol/water (log KOW) -0.46 (25 °C)
12.4 Mobility in soil

Henry's law constant

\[ 0 \text{ Pa m}^3\text{/mol at 20 °C} \]

The Organic Carbon normalised adsorption coefficient

0,87

12.5 Results of PBT and vPvB assessment

Data are not available.

12.6 Other adverse effects

Data are not available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

This material and its container must be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

Sewage disposal-relevant information

Do not empty into drains.

Sewage disposal-relevant information

Do not empty into drains.

13.2 Relevant provisions relating to waste

The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process.

13.3 Remarks

Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Please consider the relevant national or regional provisions.

SECTION 14: Transport information

14.1 UN number

(not subject to transport regulations)

14.2 UN proper shipping name

not relevant

14.3 Transport hazard class(es)

Class

- not relevant

14.4 Packing group

not relevant not assigned to a packing group

14.5 Environmental hazards

none (non-environmentally hazardous acc. to the dangerous goods regulations)

14.6 Special precautions for user

There is no additional information.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

The cargo is not intended to be carried in bulk.

14.8 Information for each of the UN Model Regulations

N-Methyl-2-pyrrolidone ≥99,8 %, for synthesis

article number: 4306
N-Methyl-2-pyrrolidone ≥99,8 %, for synthesis

article number: 4306

- Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN)
  Not subject to ADR, RID and ADN.
- International Maritime Dangerous Goods Code (IMDG)
  Not subject to IMDG.
- International Civil Aviation Organization (ICAO-IATA/DGR)
  Not subject to ICAO-IATA.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant provisions of the European Union (EU)

- Regulation 649/2012/EU concerning the export and import of hazardous chemicals (PIC)
  Not listed.
- Regulation 1005/2009/EC on substances that deplete the ozone layer (ODS)
  Not listed.
- Regulation 850/2004/EC on persistent organic pollutants (POP)
  Not listed.
- Restrictions according to REACH, Annex XVII

<table>
<thead>
<tr>
<th>Name of substance</th>
<th>CAS No</th>
<th>Wt%</th>
<th>Type of registration</th>
<th>Conditions of restriction</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
<td>872-50-4</td>
<td>100</td>
<td>2018/0035/EC annex XVII</td>
<td>R71</td>
<td>71</td>
</tr>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
<td>100</td>
<td></td>
<td>1907/2006/EC annex XVII</td>
<td>R3</td>
<td>3</td>
</tr>
<tr>
<td>N-Methyl-2-pyrrolidone</td>
<td>100</td>
<td></td>
<td>1907/2006/EC annex XVII</td>
<td>R28-30</td>
<td>30</td>
</tr>
</tbody>
</table>

Legend

R28-30  1. Shall not be placed on the market, or used,
- as substances,
- as constituents of other substances, or,
- in mixtures,
for supply to the general public when the individual concentration in the substance or mixture is equal to or greater than:
- either the relevant specific concentration limit specified in Part 3 of Annex VI to Regulation (EC) No 1272/2008, or,
Without prejudice to the implementation of other Community provisions relating to the classification, packaging and labelling of substances and mixtures, suppliers shall ensure before the placing on the market that the packaging of such substances and mixtures is marked visibly, legibly and indelibly as follows: ‘Restricted to professional users’.
2. By way of derogation, paragraph 1 shall not apply to:
   (a) medicinal or veterinary products as defined by Directive 2001/82/EC and Directive 2001/83/EC;
   (b) cosmetic products as defined by Directive 76/768/EEC;
   (c) the following fuels and oil products:
       - motor fuels which are covered by Directive 98/70/EC,
       - mineral oil products intended for use as fuel in mobile or fixed combustion plants,
       - fuels sold in closed systems (e.g. liquid gas bottles);
   (d) artists’ paints covered by Directive 1999/45/EC;
   (e) the substances listed in Appendix 11, column 1, for the applications or uses listed in Appendix 11, column 2. Where a date is specified in column 2 of Appendix 11, the derogation shall apply until the said date.
N-Methyl-2-pyrrolidone  ≥99,8 %, for synthesis

article number: 4306

Legend

R3
1. Shall not be used in:
- ornamental articles intended to produce light or colour effects by means of different phases, for example in ornamental lamps and ashtrays,
- tricks and jokes,
- games for one or more participants, or any article intended to be used as such, even with ornamental aspects,
2. Articles not complying with paragraph 1 shall not be placed on the market.
3. Shall not be placed on the market if they contain a colouring agent, unless required for fiscal reasons, or perfume, or both, if they:
- can be used as fuel in decorative oil lamps for supply to the general public, and,
- present an aspiration hazard and are labelled with R65 or H304,
4. Decorative oil lamps for supply to the general public shall not be placed on the market unless they conform to the European Standard on Decorative oil lamps (EN 14059) adopted by the European Committee for Standardisation (CEN).
5. Without prejudice to the implementation of other Community provisions relating to the classification, packaging and labelling of dangerous substances and mixtures, suppliers shall ensure, before the placing on the market, that the following requirements are met:
   (a) lamp oils, labelled with R65 or H304, intended for supply to the general public are visibly, legibly and indelibly marked as follows: ‘Keep lamps filled with this liquid out of the reach of children’; and, by 1 December 2010, ‘Just a sip of lamp oil – or even sucking the wick of lamps – may lead to life-threatening lung damage’;
   (b) grill lighter fluids, labelled with R65 or H304, intended for supply to the general public are legibly and indelibly marked by 1 December 2010 as follows: ‘Just a sip of grill lighter may lead to life threatening lung damage’;
   (c) lamp oils and grill lighters, labelled with R65 or H304, intended for supply to the general public are packaged in black opaque containers not exceeding 1 litre by 1 December 2010.
6. No later than 1 June 2014, the Commission shall request the European Chemicals Agency to prepare a dossier, in accordance with Article 69 of the present Regulation with a view to ban, if appropriate, grill lighter fluids and fuel for decorative lamps, labelled R65 or H304, intended for supply to the general public.
7. Natural or legal persons placing on the market for the first time lamp oils and grill lighter fluids, labelled with R65 or H304, shall by 1 December 2011, and annually thereafter, provide data on alternatives to lamp oils and grill lighter fluids labelled R65 or H304 to the competent authority in the Member State concerned. Member States shall make those data available to the Commission.

R71
Shall not be placed on the market, or used, as substance or in mixtures, where the substance or mixture is intended for the manufacturing or processing of non-ferrous metals.

• Restrictions according to REACH, Title VIII

None.

• List of substances subject to authorisation (REACH, Annex XIV)/SVHC - candidate list

<table>
<thead>
<tr>
<th>Substance of Very High Concern (SVHC)</th>
<th>Name acc. to inventory</th>
<th>CAS No</th>
<th>Listed in</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-methyl-2-pyrrolidone (NMP)</td>
<td>872-50-4</td>
<td>Candidate list</td>
<td>Repr. A57c</td>
<td></td>
</tr>
</tbody>
</table>

Legend

Candidate list  Substances meeting the criteria referred to in Article 57 and for eventual inclusion in Annex XIV
Repr. A57c  Toxic for reproduction (article 57c)

• Seveso Directive

2012/18/EU (Seveso III)

<table>
<thead>
<tr>
<th>No</th>
<th>Dangerous substance/hazard categories</th>
<th>Qualifying quantity (tonnes) for the application of lower and upper-tier requirements</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not assigned</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• Directive 75/324/EEC relating to aerosol dispensers

Filling batch

<table>
<thead>
<tr>
<th>VOC content</th>
<th>100 %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.030 g/l</td>
</tr>
</tbody>
</table>
N-Methyl-2-pyrrolidone ≥99.8 %, for synthesis

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### Directive on industrial emissions (VOCs, 2010/75/EU)

<table>
<thead>
<tr>
<th>VOC content</th>
<th>100 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC content</td>
<td>1.030 g/l</td>
</tr>
</tbody>
</table>

### Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) - Annex II

not listed

### Regulation 166/2006/EC concerning the establishment of a European Pollutant Release and Transfer Register (PRTR)

not listed

### Directive 2000/60/EC establishing a framework for Community action in the field of water policy (WFD)

not listed

### Regulation 98/2013/EU on the marketing and use of explosives precursors

not listed

### Regulation 111/2005/EC laying down rules for the monitoring of trade between the Community and third countries in drug precursors

not listed

### National inventories

Substance is listed in the following national inventories:

<table>
<thead>
<tr>
<th>Country</th>
<th>National inventories</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>AICS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>CA</td>
<td>DSL</td>
<td>substance is listed</td>
</tr>
<tr>
<td>CN</td>
<td>IECSC</td>
<td>substance is listed</td>
</tr>
<tr>
<td>EU</td>
<td>ECSI</td>
<td>substance is listed</td>
</tr>
<tr>
<td>EU</td>
<td>REACH Reg.</td>
<td>substance is listed</td>
</tr>
<tr>
<td>JP</td>
<td>CSCL-ENCS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>JP</td>
<td>ISHA-ENCS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>KR</td>
<td>KECI</td>
<td>substance is listed</td>
</tr>
<tr>
<td>MX</td>
<td>INSQ</td>
<td>substance is listed</td>
</tr>
<tr>
<td>NZ</td>
<td>NZIoC</td>
<td>substance is listed</td>
</tr>
<tr>
<td>PH</td>
<td>PICCS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>TR</td>
<td>CICR</td>
<td>substance is listed</td>
</tr>
<tr>
<td>TW</td>
<td>TCSI</td>
<td>substance is listed</td>
</tr>
<tr>
<td>US</td>
<td>TSCA</td>
<td>substance is listed</td>
</tr>
</tbody>
</table>

**Legend**

- **AICS**: Australian Inventory of Chemical Substances
- **CICR**: Chemical Inventory and Control Regulation
- **CSCL-ENCS**: List of Existing and New Chemical Substances (CSCL-ENCS)
- **DSL**: Domestic Substances List (DSL)
- **ECSI**: EC Substance Inventory (EINECS, ELINCS, NLP)
- **IECSC**: Inventory of Existing Chemical Substances Produced or Imported in China
- **INSQ**: National Inventory of Chemical Substances
- **ISHA-ENCS**: Inventory of Existing and New Chemical Substances (ISHA-ENCS)
- **KECI**: Korea Existing Chemicals Inventory

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Safety data sheet according to Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU

N-Methyl-2-pyrrolidone ≥99.8 %, for synthesis

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<table>
<thead>
<tr>
<th>National inventories</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>AICS</td>
<td>substance is listed</td>
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<tr>
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<tr>
<td>CSCL-ENCS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>DSL</td>
<td>substance is listed</td>
</tr>
<tr>
<td>ECSI</td>
<td>substance is listed</td>
</tr>
<tr>
<td>EINECS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>ELINCS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>NLP</td>
<td>substance is listed</td>
</tr>
<tr>
<td>ISHA-ENCS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>KECI</td>
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</tr>
<tr>
<td>PICCS</td>
<td>substance is listed</td>
</tr>
<tr>
<td>TSCA</td>
<td>substance is listed</td>
</tr>
</tbody>
</table>
Safety data sheet
according to Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU

N-Methyl-2-pyrrolidone ≥99.8 %, for synthesis
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Legend
NZIoC New Zealand Inventory of Chemicals
PICCS Philippine Inventory of Chemicals and Chemical Substances
REACH Reg. REACH registered substances
TCSI Taiwan Chemical Substance Inventory
TSCA Toxic Substance Control Act

15.2 Chemical Safety Assessment
No Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>Descriptions of used abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADN</td>
<td>Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)</td>
</tr>
<tr>
<td>ADR</td>
<td>Accord européen relatif au transport international des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)</td>
</tr>
<tr>
<td>CLP</td>
<td>Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures</td>
</tr>
<tr>
<td>CMR</td>
<td>Carcinogenic, Mutagenic or toxic for Reproduction</td>
</tr>
<tr>
<td>DGR</td>
<td>Dangerous Goods Regulations (see IATA/DGR)</td>
</tr>
<tr>
<td>DMEL</td>
<td>Derived Minimal Effect Level</td>
</tr>
<tr>
<td>DNEL</td>
<td>Derived No-Effect Level</td>
</tr>
<tr>
<td>EINECS</td>
<td>European Inventory of Existing Commercial Chemical Substances</td>
</tr>
<tr>
<td>ELINCS</td>
<td>European List of Notified Chemical Substances</td>
</tr>
<tr>
<td>GHS</td>
<td>&quot;Globally Harmonized System of Classification and Labelling of Chemicals&quot; developed by the United Nations</td>
</tr>
<tr>
<td>IATA</td>
<td>International Air Transport Association</td>
</tr>
<tr>
<td>IATA/DGR</td>
<td>Dangerous Goods Regulations (DGR) for the air transport (IATA)</td>
</tr>
<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
</tr>
<tr>
<td>IMDG</td>
<td>International Maritime Dangerous Goods Code</td>
</tr>
<tr>
<td>index No</td>
<td>the Index number is the identification code given to the substance in Part 3 of Annex VI to Regulation (EC) No 1272/2008</td>
</tr>
<tr>
<td>IOELV</td>
<td>indicative occupational exposure limit value</td>
</tr>
<tr>
<td>MARPOL</td>
<td>International Convention for the Prevention of Pollution from Ships (abbr. of &quot;Marine Pollutant&quot;)</td>
</tr>
<tr>
<td>NLP</td>
<td>No-Longer Polymer</td>
</tr>
<tr>
<td>PBT</td>
<td>Persistent, Bioaccumulative and Toxic</td>
</tr>
<tr>
<td>PNEC</td>
<td>Predicted No-Effect Concentration</td>
</tr>
<tr>
<td>ppm</td>
<td>parts per million</td>
</tr>
<tr>
<td>REACH</td>
<td>Registration, Evaluation, Authorisation and Restriction of Chemicals</td>
</tr>
<tr>
<td>Repr.</td>
<td>reproductive toxicity</td>
</tr>
<tr>
<td>RID</td>
<td>Règlement concernant le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the International carriage of Dangerous goods by Rail)</td>
</tr>
</tbody>
</table>
N-Methyl-2-pyrrolidone ≥99.8%, for synthesis

article number: 4306

### Abbreviations and Descriptions

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>Descriptions of used abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEL</td>
<td>short-term exposure limit</td>
</tr>
<tr>
<td>SVHC</td>
<td>Substance of Very High Concern</td>
</tr>
<tr>
<td>TWA</td>
<td>time-weighted average</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile Organic Compounds</td>
</tr>
<tr>
<td>vPvB</td>
<td>very Persistent and very Bioaccumulative</td>
</tr>
</tbody>
</table>

### Key Literature References and Sources for Data

- Regulation (EC) No. 1272/2008 (CLP, EU GHS)
- Dangerous Goods Regulations (DGR) for the air transport (IATA)
- International Maritime Dangerous Goods Code (IMDG)

### List of Relevant Phrases (Code and Full Text as Stated in Chapter 2 and 3)

<table>
<thead>
<tr>
<th>Code</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<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>

### Disclaimer

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.