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

1.1 Product identifier

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

Article number: CN19

Registration number (REACH): 01-2119472138-36-xxxx

Index No: 616-208-00-5

EC number: 220-250-6

CAS number: 2687-91-4

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

Identified uses:

- professional use
- consumer uses
- laboratory chemical

1.3 Details of the supplier of the safety data sheet

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>Section</th>
<th>Hazard class</th>
<th>Hazard class and category</th>
<th>Hazard statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3</td>
<td>serious eye damage/eye irritation</td>
<td>(Eye Dam. 1)</td>
<td>H318</td>
</tr>
<tr>
<td>3.7</td>
<td>reproductive toxicity</td>
<td>(Repr. 1B)</td>
<td>H360Df</td>
</tr>
</tbody>
</table>
2.2 Label elements

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

Signal word  Danger

Pictograms

Hazard statements

H318  Causes serious eye damage.
H360Df  May damage the unborn child. Suspected of damaging, fertility.

Precautionary statements

Precautionary statements - prevention

P202  Do not handle until all safety precautions have been read and understood.
P280  Wear protective clothing/eye protection/face protection.

Precautionary statements - response

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)

H318  Causes serious eye damage.
H360Df  May damage the unborn child. Suspected of damaging, fertility.
P202  Do not handle until all safety precautions have been read and understood.
P280  Wear protective gloves/protective clothing/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.
P308+P313  IF exposed or concerned: Get medical advice/attention.

2.3 Other hazards

There is no additional information.
Take off contaminated clothing. Provide fresh air. In all cases of doubt, or when symptoms persist, seek medical advice.

Rinse skin with water/shower. In all cases of doubt, or when symptoms persist, seek medical advice.

In case of contact with eyes flush immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart and consult an ophthalmologist.

Rinse mouth. Do not induce vomiting. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

Risk of serious damage to eyes

SECTION 3: Composition/information on ingredients

3.1 Substances

<table>
<thead>
<tr>
<th>Name of substance</th>
<th>N-Ethyl-2-pyrrolidone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index No</td>
<td>616-208-00-5</td>
</tr>
<tr>
<td>Registration number (REACH)</td>
<td>01-2119472138-36-xxxx</td>
</tr>
<tr>
<td>EC number</td>
<td>220-250-6</td>
</tr>
<tr>
<td>CAS number</td>
<td>2687-91-4</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>C₆H₁₁NO</td>
</tr>
<tr>
<td>Molar mass</td>
<td>113.2 g/mol</td>
</tr>
</tbody>
</table>

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 all cases of doubt, or when symptoms persist, seek medical advice.

Following eye contact
In case of contact with eyes flush immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart and consult an ophthalmologist.

Following ingestion
Rinse mouth. Do not induce vomiting. 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
Risk of serious damage to eyes

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)
   Unsuitable extinguishing media
   water jet

5.2 Special hazards arising from the substance or mixture
   Combustible.
   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
   Wearing of suitable protective equipment (including personal protective equipment referred to under
   Section 8 of the safety data sheet) to prevent any contamination of skin, eyes and personal clothing.
   Avoid contact with skin, eyes and clothes.

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.
   Reference to other sections
   Hazardous combustion products: see section 5. Personal protective equipment: see section 8.
   Incompatible materials: see section 10. Disposal considerations: see section 13.
**SECTION 7: Handling and storage**

7.1 Precautions for safe handling

Provision of sufficient ventilation.

- **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)

See attached exposure scenario.

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

8.1 Control parameters

**National limit values**

**Occupational exposure limit values (Workplace Exposure Limits)**

not relevant

**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>20,1 mg/m³</td>
<td>human, inhalatory</td>
<td>worker (industry)</td>
<td>acute - local effects</td>
</tr>
<tr>
<td>DNEL</td>
<td>10,05 mg/m³</td>
<td>human, inhalatory</td>
<td>worker (industry)</td>
<td>chronic - local effects</td>
</tr>
<tr>
<td>DNEL</td>
<td>4 mg/kg</td>
<td>human, dermal</td>
<td>worker (industry)</td>
<td>chronic - systemic effects</td>
</tr>
<tr>
<td>DNEL</td>
<td>16,75 mg/m³</td>
<td>human, inhalatory</td>
<td>worker (industry)</td>
<td>chronic - systemic effects</td>
</tr>
</tbody>
</table>

- **environmental values**

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Threshold level</th>
<th>Environmental compartment</th>
<th>Exposure time</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNEC</td>
<td>0,25 mg/l</td>
<td>freshwater</td>
<td>short-term (single instance)</td>
</tr>
<tr>
<td>PNEC</td>
<td>0,025 mg/l</td>
<td>marine water</td>
<td>short-term (single instance)</td>
</tr>
<tr>
<td>PNEC</td>
<td>10 mg/l</td>
<td>sewage treatment plant (STP)</td>
<td>short-term (single instance)</td>
</tr>
<tr>
<td>PNEC</td>
<td>1,91 mg/kg</td>
<td>freshwater sediment</td>
<td>short-term (single instance)</td>
</tr>
<tr>
<td>PNEC</td>
<td>0,191 mg/kg</td>
<td>marine sediment</td>
<td>short-term (single instance)</td>
</tr>
</tbody>
</table>
N-Ethyl-2-pyrrolidone ≥98 %, for synthesis

Endpoint | Threshold level | Environmental compartment | Exposure time
---|---|---|---
PNEC | 0.235 mg/kg | soil | short-term (single instance)
PNEC | 1 mg/l | water | continuous

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
NBR (Nitrile rubber)

• material thickness
0.4 mm.

• 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
Respiratory protection necessary at: Aerosol or mist formation. Type: A (against organic gases and vapours with a boiling point of > 65 °C , colour code: Brown). Observe the wear time limits according GefStoffV in combination with the rules for using respiratory protection apparatus (BGR 190).

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 - yellow</td>
</tr>
<tr>
<td>Odour</td>
<td>this information is not available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
</tbody>
</table>
### Other physical and chemical parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH (value)</td>
<td>8 - 9 (water: 100 g/l, 20 °C)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>&lt; 75 °C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>212,5 °C at 1.013 hPa</td>
</tr>
<tr>
<td>Flash point</td>
<td>91 °C at 1.013 hPa (closed cup)</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>
<tr>
<td><strong>Explosive limits</strong></td>
<td></td>
</tr>
<tr>
<td>• lower explosion limit (LEL)</td>
<td>1.3 vol%</td>
</tr>
<tr>
<td>• upper explosion limit (UEL)</td>
<td>7.7 vol%</td>
</tr>
<tr>
<td><strong>Explosion limits of dust clouds</strong></td>
<td>not relevant</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>0.18 hPa at 20 °C</td>
</tr>
<tr>
<td>Density</td>
<td>0.998 g/cm³ at 20 °C</td>
</tr>
<tr>
<td>Vapour density</td>
<td>This information is not available.</td>
</tr>
<tr>
<td>Bulk density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Relative density</td>
<td>Information on this property is not available.</td>
</tr>
<tr>
<td><strong>Solubility(ies)</strong></td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>&gt;1.000 g/l at 23 °C</td>
</tr>
<tr>
<td><strong>Partition coefficient</strong></td>
<td></td>
</tr>
<tr>
<td>n-octanol/water (log KOW)</td>
<td>-0.2 (pH value: 7, 23 °C) (ECHA)</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>245 °C - ECHA</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>no data available</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td></td>
</tr>
<tr>
<td>• kinematic viscosity</td>
<td>2.1 mm²/s at 20 °C</td>
</tr>
<tr>
<td>• dynamic viscosity</td>
<td>2.09 mPa s at 20 °C</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>none</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>none</td>
</tr>
</tbody>
</table>

### 9.2 Other information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface tension</td>
<td>69 mN/m (20 °C, 0.1 wt%)</td>
</tr>
</tbody>
</table>
In case of warming: Vapours can form explosive mixtures with air.

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

Violent reaction with: Alkali (lye), Strong acid.

Keep away from heat. No smoking.

There is no additional information.

Hazardous combustion products: see section 5.

Shall not be classified as corrosive/irritant to skin.

Causes serious eye damage.

Shall not be classified as a respiratory or skin sensitiser.

Reproductive toxicity:
May damage the unborn child. Suspected of damaging fertility.

• Specific target organ toxicity - single exposure
Shall not be classified as a specific target organ toxicant (single exposure).

• 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**
  data are not available

- **If in eyes**
  Causes serious eye damage, risk of blindness

- **If inhaled**
  data are not available

- **If on skin**
  data are not available

**Other information**
Gastrointestinal complaints, Vomiting, Diarrhoea, Dizziness, Vertigo, Nausea

---

### 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>999 mg/l</td>
<td>fish</td>
<td>ECHA</td>
<td>96 hours</td>
</tr>
<tr>
<td>EC50</td>
<td>&gt;104 mg/l</td>
<td>aquatic invertebrates</td>
<td>ECHA</td>
<td>48 hours</td>
</tr>
<tr>
<td>ErC50</td>
<td>&gt;101 mg/l</td>
<td>algae</td>
<td>ECHA</td>
<td>72 hours</td>
</tr>
<tr>
<td>NOEC</td>
<td>215 mg/l</td>
<td>fish</td>
<td>ECHA</td>
<td>96 hours</td>
</tr>
<tr>
<td>LOEC</td>
<td>&gt;101 mg/l</td>
<td>algae</td>
<td>ECHA</td>
<td>72 hours</td>
</tr>
<tr>
<td>growth rate (ErC50) 10%</td>
<td>&gt;101 mg/l</td>
<td>algae</td>
<td>ECHA</td>
<td>72 hours</td>
</tr>
</tbody>
</table>

#### 12.2 Process of degradability

The substance is readily biodegradable.

- Theoretical Oxygen Demand with nitrification: 2,686 mg/mg
- Theoretical Oxygen Demand: 2,121 mg/mg
- Theoretical Carbon Dioxide: 2,333 mg/mg

<table>
<thead>
<tr>
<th>Process</th>
<th>Degradation rate</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>biotic/abiotic</td>
<td>90 - 100 %</td>
<td>28 d</td>
</tr>
<tr>
<td>DOC removal</td>
<td>90 - 100 %</td>
<td>28 d</td>
</tr>
</tbody>
</table>

#### 12.3 Bioaccumulative potential

Does not significantly accumulate in organisms.

n-octanol/water (log KOW) -0,2 (pH value: 7, 23 °C)
N-Ethyl-2-pyrrolidone ≥98 %, for synthesis
article number: CN19

12.4 Mobility in soil
Data are not available.

12.5 Results of PBT and vPvB assessment
Data are not available.

12.6 Other adverse effects
Slightly hazardous to water.

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.

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) not relevant
   Class -
14.4 Packing group not relevant
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
   • 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.
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
  not listed
- List of substances subject to authorisation (REACH, Annex XIV)
  not listed
- Limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products (2004/42/EC, Deco-Paint Directive)
  VOC content 100 %
- Directive on industrial emissions (VOCs, 2010/75/EU)
  VOC content 100 %
- 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

National inventories

Substance is listed in the following national inventories:

- EINECS/ELINCS/NLP (Europe)
- REACH (Europe)

15.2 Chemical Safety Assessment

For this substance a chemical safety assessment has been carried out.
**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>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>“Globally Harmonized System of Classification and Labelling of Chemicals” developed by the United Nations</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>MARPOL</td>
<td>International Convention for the Prevention of Pollution from Ships (abbr. of “Marine Pollutant)</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>REACH</td>
<td>Registration, Evaluation, Authorisation and Restriction of Chemicals</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>
<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)

**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>H318</td>
<td>causes serious eye damage</td>
</tr>
<tr>
<td>H360Df</td>
<td>may damage the unborn child. Suspected of damaging, fertility</td>
</tr>
</tbody>
</table>
safety data sheet
going to Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU

N-Ethyl-2-pyrrolidone ≥98 %, for synthesis

article number: CN19

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.