

safety data sheet

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



N-Methyl-2-pyrrolidone ≥99,8%, VLSI Grade

article number: **9786**
Version: **1.0 en**

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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	9786
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

1.3 Details of the supplier of the safety data sheet

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

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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)

Classification acc. to GHS			
Section	Hazard class	Hazard class and category	Hazard statement
3.2	skin corrosion/irritation	(Skin Irrit. 2)	H315
3.3	serious eye damage/eye irritation	(Eye Irrit. 2)	H319
3.7	reproductive toxicity	(Repr. 1B)	H360D
3.8R	specific target organ toxicity - single exposure (respiratory tract irritation)	(STOT SE 3)	H335

safety data sheet

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



N-Methyl-2-pyrrolidone $\geq 99,8\%$, VLSI Grade

article number: 9786

Remarks

For full text of Hazard- and EU Hazard-statements: see SECTION 16.

2.2 Label elements

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

Signal word

Danger

Pictograms



Hazard statements

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

Precautionary statements

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.
P308+P313	IF exposed or concerned: Get medical advice/attention.

2.3 Other hazards

There is no additional information.

safety data sheet

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



N-Methyl-2-pyrrolidone $\geq 99,8\%$, VLSI Grade

article number: 9786

SECTION 3: Composition/information on ingredients

3.1 Substances

Name of substance	N-Methyl-2-pyrrolidone
Index No	606-021-00-7
Registration number (REACH)	01-2119472430-46-xxxx
EC number	212-828-1
CAS number	872-50-4
Molecular formula	C ₅ H ₉ NO
Molar mass	99,13 g/mol

Substance of Very High Concern (SVHC)

Name of substance	CAS No	Wt%	Listed in	Remarks
1-methyl-2-pyrrolidone	872-50-4	100	Candidate list	Repr. A57c

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

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

Cough, Diarrhoea, Irritation, Vomiting, Dyspnoea

safety data sheet

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



N-Methyl-2-pyrrolidone ≥99,8%, VLSI Grade

article number: **9786**

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. 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 (NO_x), 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. 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.

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.

safety data sheet

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



N-Methyl-2-pyrrolidone ≥99,8%, VLSI Grade

article number: 9786

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)

No information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

Country	Name of agent	CAS No	Notation	Identifier	TWA [ppm]	TWA [mg/m ³]	STEL [ppm]	STEL [mg/m ³]	Source
EU	N-methyl-2-pyrrolidone (1-methyl-2-pyrrolidone)	872-50-4		IOELV	10	40	20	80	2009/161/EU
GB	N-methyl-2-pyrrolidone	872-50-4		WEL	10	40	20	80	EH40/2005

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

Relevant DNELs/DMELs/PNECs and other threshold levels

- human health values

Endpoint	Threshold level	Protection goal, route of exposure	Used in	Exposure time
DNEL	208 mg/kg	human, dermal	worker (industry)	acute - systemic effects
DNEL	80 mg/m ³	human, inhalatory	worker (industry)	acute - systemic effects
DNEL	19,8 mg/kg	human, dermal	worker (industry)	chronic - systemic effects
DNEL	40 mg/m ³	human, inhalatory	worker (industry)	chronic - systemic effects

safety data sheet

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



N-Methyl-2-pyrrolidone $\geq 99,8\%$, VLSI Grade

article number: 9786

• environmental values

Endpoint	Threshold level	Environmental compartment	Exposure time
PNEC	0,25 mg/l	freshwater	short-term (single instance)
PNEC	0,025 mg/l	marine water	short-term (single instance)
PNEC	10 mg/l	sewage treatment plant (STP)	short-term (single instance)
PNEC	1,42 mg/kg	freshwater sediment	short-term (single instance)
PNEC	0,142 mg/kg	marine sediment	short-term (single instance)
PNEC	0,138 mg/kg	soil	short-term (single instance)
PNEC	5 mg/l	water	continuous

8.2 Exposure controls

Individual protection measures (personal protective equipment)



Eye/face protection

Use safety goggle 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

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.

safety data sheet

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



N-Methyl-2-pyrrolidone $\geq 99,8\%$, VLSI Grade

article number: 9786

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	liquid (fluid)
Colour	colourless
Odour	like: amine
Odour threshold	No data available

Other physical and chemical parameters

pH (value)	8,5 - 10 (100 g/l, 20 °C)
Melting point/freezing point	-24,4 °C
Initial boiling point and boiling range	204,3 °C at 1.016 hPa
Flash point	91 °C at 1.013 hPa
Evaporation rate	no data available
Flammability (solid, gas)	not relevant (fluid)
<u>Explosive limits</u>	
• 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/cm ³ at 25 °C
Vapour density	3,42 (air = 1)
Bulk density	Not applicable
Relative density	Information on this property is not available.
<u>Solubility(ies)</u>	
Water solubility	1.000 g/l at 20 °C , miscible in any proportion
<u>Partition coefficient</u>	
n-octanol/water (log KOW)	-0,46 (25 °C) (ECHA)
Auto-ignition temperature	245 °C - ECHA
Decomposition temperature	no data available
Viscosity	
• dynamic viscosity	1,65 mPa s at 25 °C 0,97 mPa s at 100 °C
Explosive properties	none
Oxidising properties	none

safety data sheet

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



N-Methyl-2-pyrrolidone ≥99,8%, VLSI Grade

article number: 9786

9.2 Other information

Refractive index	1,468
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 acid

10.4 Conditions to avoid

There are no specific conditions known which have to be avoided.

10.5 Incompatible materials

different Rubber articles

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.

Exposure route	Endpoint	Value	Species	Source
oral	LD50	4.150 mg/kg	rat	ECHA
dermal	LD50	>5.000 mg/kg	rat	ECHA

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

safety data sheet

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



N-Methyl-2-pyrrolidone $\geq 99,8\%$, VLSI Grade

article number: 9786

- **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**

data are not available

- **If inhaled**

data are not available

- **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)

Endpoint	Value	Species	Source	Exposure time
LC50	$>500 \text{ mg/l}$	fish	ECHA	96 h
EC50	1.107 mg/l	aquatic invertebrates	ECHA	96 h
ErC50	$600,5 \text{ mg/l}$	algae	ECHA	72 h

Aquatic toxicity (chronic)

Endpoint	Value	Species	Source	Exposure time
EC50	$>1.000 \text{ mg/l}$	aquatic invertebrates	ECHA	24 h
NOEC	$12,5 \text{ mg/l}$	aquatic invertebrates	ECHA	21 d
LOEC	25 mg/l	aquatic invertebrates	ECHA	21 d

12.2 Process of degradability

The substance is readily biodegradable.

Theoretical Oxygen Demand with nitrification: $2,582 \text{ mg/mg}$

Theoretical Oxygen Demand: $1,937 \text{ mg/mg}$

Theoretical Carbon Dioxide: $2,22 \text{ mg/mg}$

Biochemical Oxygen Demand: $1,1 \text{ g/g}$ at 5 h

safety data sheet

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



N-Methyl-2-pyrrolidone $\geq 99,8\%$, VLSI Grade

article number: 9786

Process	Degradation rate	Time
biotic/abiotic	>90 %	20 d
oxygen depletion	73 %	28 d

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 $324 \text{ Pa m}^3/\text{mol}$ at 20 °C

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.	

safety data sheet

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



N-Methyl-2-pyrrolidone ≥99,8%, VLSI Grade

article number: 9786

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)**

Name acc. to inventory	CAS No	Listed in	Remarks
1-methyl-2-pyrrolidone	872-50-4	Candidate list	Repr. A57c

Legend

Candidate list
Repr. A57c

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

- **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

safety data sheet

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



N-Methyl-2-pyrrolidone $\geq 99,8\%$, VLSI Grade

article number: 9786

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

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

SECTION 16: Other information

Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
2009/161/EU	Commission Directive establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC
ADN	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)
ADR	Accord européen relatif au transport international des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
CLP	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
CMR	Carcinogenic, Mutagenic or toxic for Reproduction
DMEL	Derived Minimal Effect Level
DNEL	Derived No-Effect Level
EH40/2005	EH40/2005 Workplace exposure limits (http://www.nationalarchives.gov.uk/doc/open-government-licence/)
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IMDG	International Maritime Dangerous Goods Code
index No	the Index number is the identification code given to the substance in Part 3 of Annex VI to Regulation (EC) No 1272/2008
IOELV	indicative occupational exposure limit value
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
NLP	No-Longer Polymer
PBT	Persistent, Bioaccumulative and Toxic
PNEC	Predicted No-Effect Concentration
ppm	parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
Repr.	reproductive toxicity
RID	Règlement concernant le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the International carriage of Dangerous goods by Rail)
STEL	short-term exposure limit

safety data sheet

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



N-Methyl-2-pyrrolidone $\geq 99,8\%$, VLSI Grade

article number: **9786**

Abbr.	Descriptions of used abbreviations
TWA	time-weighted average
VOC	Volatile Organic Compounds
vPvB	very Persistent and very Bioaccumulative
WEL	workplace exposure limit

Key literature references and sources for data

- Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU
- Regulation (EC) No. 1272/2008 (CLP, EU GHS)

List of relevant phrases (code and full text as stated in chapter 2 and 3)

Code	Text
H315	causes skin irritation
H319	causes serious eye irritation
H335	may cause respiratory irritation
H360D	may damage the unborn child

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.