

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 26.05.2017

Version 5.5

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

1.1 Product identifier

Catalogue No.	807041
Product name	2-Pyrrolidone for synthesis
REACH Registration Number	01-2119475471-37-xxxx
CAS-No.	616-45-5

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

Identified uses	Chemical for synthesis In compliance with the conditions described in the annex to this safety data sheet.
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1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number	Please contact the regional company representation in your country.
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SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Eye irritation, Category 2, H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

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Catalogue No.	807041
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2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms



Signal word

Warning

Hazard statements

H319 Causes serious eye irritation.

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.

Reduced labelling (≤125 ml)

Hazard pictograms



Signal word

Warning

CAS-No. 616-45-5

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

3.1 Substance

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Product name	2-Pyrrolidone for synthesis

Formula	C ₄ H ₇ NO (Hill)
EC-No.	210-483-1
Molar mass	85,11 g/mol

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

CAS-No.	Registration number	Classification
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2-pyrrolidinone (<= 100 %)

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

616-45-5	01-2119475471-37-	
	xxxx	Eye irritation, Category 2, H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

3.2 Mixture

Not applicable

SECTION 4. First aid measures

4.1 Description of first aid measures

After inhalation: fresh air.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower.

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

irritant effects

4.3 Indication of any immediate medical attention and special treatment needed

No information available.

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SECTION 5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water, Foam, Carbon dioxide (CO₂), Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Combustible.

Vapours are heavier than air and may spread along floors.

Forms explosive mixtures with air on intense heating.

Development of hazardous combustion gases or vapours possible in the event of fire.

Fire may cause evolution of:

nitrogen oxides

5.3 Advice for firefighters

Special protective equipment for firefighters

In the event of fire, wear self-contained breathing apparatus.

Further information

Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid substance contact. Avoid inhalation of vapours/aerosols or dusts. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

6.2 Environmental precautions

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Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Depending on the state of matter, take up with suitable equipment or with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

Indications about waste treatment see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Observe label precautions.

Hygiene measures

Change contaminated clothing. Wash hands after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Dry.

Tightly closed.

Recommended storage temperature see product label.

7.3 Specific end use(s)

See exposure scenario in the Annex to this MSDS.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

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Derived No Effect Level (DNEL)

Worker DNEL, acute	Systemic effects	dermal	277 mg/kg Body weight
Worker DNEL, longterm	Systemic effects	dermal	10 mg/kg Body weight
Worker DNEL, longterm	Systemic effects	inhalation	57,8 mg/m ³
Consumer DNEL, acute	Systemic effects	dermal	167 mg/kg Body weight
Consumer DNEL, acute	Systemic effects	oral	33,3 mg/kg Body weight
Consumer DNEL, longterm	Systemic effects	dermal	6 mg/kg Body weight
Consumer DNEL, longterm	Systemic effects	oral	5,2 mg/kg Body weight
Consumer DNEL, longterm	Systemic effects	inhalation	17,1 mg/m ³

Predicted No Effect Concentration (PNEC)

PNEC Fresh water	0,5 mg/l
PNEC Marine water	0,05 mg/l
PNEC Aquatic intermittent release	0,5 mg/l
PNEC Fresh water sediment	0,42 mg/kg
PNEC Soil	0,0612 mg/kg
PNEC Sewage treatment plant	10 mg/l

8.2 Exposure controls

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

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Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection

Safety glasses

Hand protection

full contact:

Glove material:	polychloroprene
Glove thickness:	0,65 mm
Break through time:	> 480 min

splash contact:

Glove material:	natural latex
Glove thickness:	0,6 mm
Break through time:	> 120 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 720 Camapren® (full contact), KCL 706 Lapren® (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet<(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment

protective clothing

Respiratory protection

required when dusts/vapours/aerosols are generated.

Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

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Environmental exposure controls

Do not let product enter drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	solid
Colour	colourless
Odour	weak characteristic odour
Odour Threshold	not determined
pH	9 - 11 at 100 g/l 20 °C
Melting point	25,5 °C at 1.013 hPa (External MSDS)
Boiling point/boiling range	250 °C at 1.013 hPa
Flash point	138 °C Method: DIN 51758
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	1,8 %(V)

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Upper explosion limit	16,6 %(V)
Vapour pressure	0,04 hPa at 20 °C 2 hPa at 80 °C
Relative vapour density	No information available.
Density	1,11 g/cm ³ at 20 °C
Relative density	No information available.
Water solubility	at 20 °C soluble
Partition coefficient: n-octanol/water	log Pow: -0,71 (25 °C) OECD Test Guideline 107 Bioaccumulation is not expected.
Auto-ignition temperature	not auto-flammable
Decomposition temperature	> 240 °C
Viscosity, dynamic	16,4 mPa.s at 26 °C
Explosive properties	Not classified as explosive.
Oxidizing properties	none

9.2 Other data

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Ignition temperature	395 °C
	Method: DIN 51794

SECTION 10. Stability and reactivity

10.1 Reactivity

Forms explosive mixtures with air on intense heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

Strong oxidizing agents

10.4 Conditions to avoid

Strong heating.

10.5 Incompatible materials

no information available

10.6 Hazardous decomposition products

in the event of fire: See section 5.

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SECTION 11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity

LD50 Rat: > 2.000 mg/kg

OECD Test Guideline 401

Acute inhalation toxicity

LC0 Rat: 0,061 mg/l; 8 h ; vapour

OECD Test Guideline 403

(highest concentration to be prepared)

Symptoms: Possible symptoms:, mucosal irritations

Acute dermal toxicity

LD50 Rabbit: > 2.000 mg/kg

OECD Test Guideline 402

Skin irritation

Rabbit

Result: No skin irritation

OECD Test Guideline 404

Eye irritation

Rabbit

Result: Eye irritation

OECD Test Guideline 405

Causes serious eye irritation.

Sensitisation

Patch test: human

Result: negative

(IUCLID)

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Sensitisation test: Mouse

Result: negative

Method: OECD Test Guideline 429

The value is given in analogy to the following substances: 1-ethylpyrrolidin-2-one

Germ cell mutagenicity

Genotoxicity in vivo

In vivo micronucleus test

Mouse

male and female

Intraperitoneal injection

Bone marrow

Result: negative

Method: OECD Test Guideline 474

Genotoxicity in vitro

Ames test

Salmonella typhimurium

Result: negative

(ECHA)

In vitro mammalian cell gene mutation test

Result: negative

Method: OECD Test Guideline 476

Mutagenicity (mammal cell test): chromosome aberration.

Human lymphocytes

Result: negative

Method: OECD Test Guideline 473

Carcinogenicity

No substantiated information from toxicological studies available.

Reproductive toxicity

Animal testing did not show any effects on fertility.

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Teratogenicity

Did not show teratogenic effects in animal experiments.

Specific target organ toxicity - single exposure

This information is not available.

Specific target organ toxicity - repeated exposure

This information is not available.

Aspiration hazard

This information is not available.

11.2 Further information

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12. Ecological information

12.1 Toxicity

Toxicity to fish

static test LC50 Danio rerio (zebra fish): > 4.600 mg/l; 96 h

Analytical monitoring: yes

OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

static test EC50 Daphnia magna (Water flea): > 500 mg/l; 48 h

Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae

static test IC50 Desmodesmus subspicatus (green algae): > 500 mg/l; 72 h

DIN 38412

Toxicity to bacteria

static test EC50 activated sludge: > 1.000 mg/l; 0,5 h

OECD Test Guideline 209

12.2 Persistence and degradability

Biodegradability

ca. 98 %; 9 d; aerobic

OECD Test Guideline 302B

Readily eliminated from water

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Biochemical Oxygen Demand (BOD)

1.200 mg/g

(External MSDS)

Adsorbed organic bound halogens (AOX)

Product does not contain any organic halogens.

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: -0,71 (25 °C)

OECD Test Guideline 107

Bioaccumulation is not expected.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

12.6 Other adverse effects

Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

Waste treatment methods

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 - 14.6 Not classified as dangerous in the meaning of transport regulations.

Inland waterway transport (ADN)

Not relevant

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Air transport (IATA)

14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
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Sea transport (IMDG)

14.1 - 14.6	Not classified as dangerous in the meaning of transport regulations.
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14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant

SECTION 15. Regulatory information

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

EU regulations

Major Accident Hazard	SEVESO III
Legislation	Not applicable

Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work.
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Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
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Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
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Substances of very high concern (SVHC)	This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w).
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National legislation

Storage class	10 - 13
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15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

SECTION 16. Other information

Full text of H-Statements referred to under sections 2 and 3.

H319 Causes serious eye irritation.

Training advice

Provide adequate information, instruction and training for operators.

Labelling

Hazard pictograms



Signal word

Warning

Hazard statements

H319 Causes serious eye irritation.

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.

Key or legend to abbreviations and acronyms used in the safety data sheet

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Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Regional representation

This information is given on the authorised Safety Data Sheet for your country.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.

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EXPOSURE SCENARIO 1 (Industrial use)

1. Industrial use Chemical for synthesis)

Sectors of end-use

<i>SU 3</i>	Industrial uses: Uses of substances as such or in preparations at industrial sites
<i>SU9</i>	Manufacture of fine chemicals
<i>SU 10</i>	Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

Chemical product category

<i>PC19</i>	Intermediate
<i>PC21</i>	Laboratory chemicals

Process categories

<i>PROC1</i>	Use in closed process, no likelihood of exposure
<i>PROC2</i>	Use in closed, continuous process with occasional controlled exposure
<i>PROC3</i>	Use in closed batch process (synthesis or formulation)
<i>PROC4</i>	Use in batch and other process (synthesis) where opportunity for exposure arises
<i>PROC5</i>	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
<i>PROC8a</i>	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
<i>PROC8b</i>	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
<i>PROC9</i>	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
<i>PROC10</i>	Roller application or brushing
<i>PROC15</i>	Use as laboratory reagent

Environmental Release Categories

<i>ERC2</i>	Formulation of preparations
<i>ERC4</i>	Industrial use of processing aids in processes and products, not becoming part of articles
<i>ERC6d</i>	Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

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2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure for: PROC1

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	<= 20 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor without local exhaust ventilation (LEV)
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Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	<= 20 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with good general ventilation
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Catalogue No.	807041
Product name	2-Pyrrolidone for synthesis

Technical conditions and measures

Avoid dip sampling. Ensure material transfers are under containment or extract ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure

Clear up spills immediately and dispose of waste safely.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.3 Contributing scenario controlling worker exposure for: PROC4

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	<= 20 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with good general ventilation
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Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.4 Contributing scenario controlling worker exposure for: PROC5

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	<= 20 °C

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Product name	2-Pyrrolidone for synthesis

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)
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Organisational measures to prevent /limit releases, dispersion and exposure

Avoid manual contact with wet work pieces.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.5 Contributing scenario controlling worker exposure for: PROC8a

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	<= 20 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor without local exhaust ventilation (LEV)
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Technical conditions and measures

Clear transfer lines prior to de-coupling. Transfer via enclosed lines.

Organisational measures to prevent /limit releases, dispersion and exposure

Apply vessel entry procedures including use of forced supplied air. Clear up spills immediately and dispose of waste safely.

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Product name	2-Pyrrolidone for synthesis

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.6 Contributing scenario controlling worker exposure for: PROC8b

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	$\leq 20\text{ }^{\circ}\text{C}$

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with good general ventilation
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Technical conditions and measures

Clear transfer lines prior to de-coupling.

Organisational measures to prevent /limit releases, dispersion and exposure

Ensure operatives are trained to minimise exposures.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.7 Contributing scenario controlling worker exposure for: PROC9

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid

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Product name	2-Pyrrolidone for synthesis

Process Temperature	<= 20 °C
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Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor without local exhaust ventilation (LEV)
Remarks	Ensure material transfers are under containment or extract ventilation.

Technical conditions and measures

Clear transfer lines prior to de-coupling.

Organisational measures to prevent /limit releases, dispersion and exposure

Put lids on containers immediately after use.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.8 Contributing scenario controlling worker exposure for: PROC10

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	<= 20 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with good general ventilation
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Technical conditions and measures

Use long handled tools where possible.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

2.9 Contributing scenario controlling worker exposure for: PROC15

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	<= 20 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Remarks	Handle in a fume cupboard or under extract ventilation.
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Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

A chemical safety assessment was performed according REACH Article 14(3), Annex I, sections 3 (Environmental Hazard Assessment) and 4 (PBT/vPvB Assessment). As no hazard was identified, an exposure assessment and risk characterisation is not necessary (REACH Annex I section 5.0).

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Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.1	PROC1	longterm, inhalative, systemic	< 0,01	ECETOC TRA 2
		longterm, dermal, systemic	0,03	ECETOC TRA 2
		longterm, combined, systemic	0,03	
2.2	PROC2	longterm, inhalative, systemic	0,06	ECETOC TRA 2
		longterm, dermal, systemic	0,14	ECETOC TRA 2
		longterm, combined, systemic	0,20	
2.2	PROC3	longterm, inhalative, systemic	0,18	ECETOC TRA 2
		longterm, dermal, systemic	0,03	ECETOC TRA 2
		longterm, combined, systemic	0,21	
2.3	PROC4	longterm, inhalative, systemic	0,21	ECETOC TRA 2
		longterm, dermal, systemic	0,69	ECETOC TRA 2
		longterm, combined, systemic	0,90	
2.4	PROC5	longterm, inhalative, systemic	0,03	ECETOC TRA 2
		longterm, dermal, systemic	0,14	ECETOC TRA 2
		longterm, combined, systemic	0,17	
2.5	PROC8a	longterm, inhalative, systemic		Qualitative assessment used to conclude safe use.
		longterm, dermal, systemic		Qualitative assessment used to conclude safe use.
2.6	PROC8b	longterm, inhalative, systemic	0,09	ECETOC TRA 2
		longterm, dermal, systemic	0,69	ECETOC TRA 2
		longterm, combined, systemic	0,78	
2.7	PROC9	longterm, inhalative, systemic	0,03	ECETOC TRA 2
		longterm, dermal, systemic	0,69	ECETOC TRA 2
		longterm, combined, systemic	0,72	
2.8	PROC10	longterm, inhalative, systemic	0,18	ECETOC TRA 2
		longterm, dermal, systemic	0,14	ECETOC TRA 2
		longterm, combined, systemic	0,32	
2.9	PROC15	longterm, inhalative, systemic	0,03	ECETOC TRA 2
		longterm, dermal, systemic	< 0,01	ECETOC TRA 2
		longterm, combined, systemic	0,03	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	807041
Product name	2-Pyrrolidone for synthesis

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

For scaling of worker exposure assessments performed with ECETOC TRA, please consult the Merck tool SciDeEx® at www.merckmillipore.com/scideex.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 807041
Product name 2-Pyrrolidone for synthesis

EXPOSURE SCENARIO 2 (Professional use)

1. Professional use Chemical for synthesis)

Sectors of end-use

SU 22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Chemical product category

PC21 Laboratory chemicals

Process categories

PROC15 Use as laboratory reagent

Environmental Release Categories

ERC8a Wide dispersive indoor use of processing aids in open systems

ERC8c Wide dispersive indoor use resulting in inclusion into or onto a matrix

ERC8d Wide dispersive outdoor use of processing aids in open systems

ERC8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure for: PROC15

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Low volatile liquid
Process Temperature	<= 20 °C

Frequency and duration of use

Frequency of use	8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Remarks	Handle in a fume cupboard or under extract ventilation.
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Catalogue No. 807041
Product name 2-Pyrrolidone for synthesis

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

A chemical safety assessment was performed according REACH Article 14(3), Annex I, sections 3 (Environmental Hazard Assessment) and 4 (PBT/vPvB Assessment). As no hazard was identified, an exposure assessment and risk characterisation is not necessary (REACH Annex I section 5.0).

Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.1	PROC15	longterm, inhalative, systemic	0,03	ECETOC TRA 2
		longterm, dermal, systemic		Qualitative assessment used to conclude safe use.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

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