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

· **1.1 Product identifier**
· **Molecular formula:** C5 H11 N
· **Trade name: piperidine**
· **SDS number:** CH0433

· **EC number:**
203-813-0
· **Index number:**
613-027-00-3
· **Registration number** 01-2119962908-20
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Life cycle stages**
IS Use at industrial Sites
F Formulation or re-packing
· **Sector of Use**
SU9 Manufacture of fine chemicals
SU24 Scientific research and development
· **Product category**
PC20 Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
PC21 Laboratory chemicals
PC29 Pharmaceuticals
PC40 Extraction agents
· **Process category**
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
PROC15 Use as laboratory reagent
· **Environmental release category**
ERC1 Manufacture of the substance
ERC2 Formulation into mixture
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC6a Use of intermediate
· **Application of the substance / the mixture** Chemicals products for laboratory

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
CARLO ERBA REAGENTS
Chaussée du Vexin
Parc d'Affaires des Portes - BP616
27106 VAL DE REUIL Cedex
Téléphone: +33 (0)2 32 09 20 00
Télécopie: +33 (0)2 32 09 20 20
· **Further information obtainable from:**
Q.A / Normative
email: MSDS_CER-SDS@cer.dgroup.it

Supplied by NCC
NCC House, 42 Lower Leeson Street
Dublin 2, D02FX39, Ireland
EMERGENCY NUMBER: 00353 86 830 3413
Available 24 hours, 7 days a week
Email: info@ncc.ie Ph: 00353 1 613 1400
Office Hours: 9am - 5pm. Mon - Fri

(Contd. on page 2)

Trade name: piperidine

(Contd. of page 1)

· **1.4 Emergency telephone number:**
Ireland - Tel : 00 353 1 8092568 - 00 353 1 8379964 (24h/24)
EU Tel : 112

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SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS02 flame

Flam. Liq. 2 H225 Highly flammable liquid and vapour.

GHS06 skull and crossbones

Acute Tox. 3 H311 Toxic in contact with skin.
Acute Tox. 3 H331 Toxic if inhaled.

GHS05 corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The substance is classified and labelled according to the CLP regulation.
· **Hazard pictograms**

GHS02 GHS05 GHS06

· **Signal word** Danger
· **Hazard statements**
H225 Highly flammable liquid and vapour.
H311+H331 Toxic in contact with skin or if inhaled.
H314 Causes severe skin burns and eye damage.
· **Precautionary statements**
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P310 Immediately call a POISON CENTER/doctor.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

(Contd. on page 3)

(Contd. of page 2)

P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

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

SECTION 3: Composition/information on ingredients

· **3.1 Substances**

· **CAS No. Description**
Piperidine

· **Identification number(s)**

· **EC number:** 203-813-0

· **Index number:** 613-027-00-3

· **Impurities and stabilising additives:**

CAS: 110-86-1 EINECS: 203-809-9 Index number: 613-002-00-7 RTECS: UR 8400000 Reg.nr.: 01-2119493105-40	Pyridine Flam. Liq. 2, H225; Acute Tox. 4, H302; Acute Tox. 4, H312; Acute Tox. 4, H332

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SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
Remove immediately any clothing soiled by the product and wash with plenty of water. The rescuer has to be equipped with individual protection
Remove breathing equipment only after contaminated clothing have been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
· **After inhalation:**
Supply fresh air or oxygen; call for doctor.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:**
Immediately wash with water and soap and rinse thoroughly. Wash contaminated clothing before reuse.
Seek immediate medical advice.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
Seek immediate medical advice.
· **After swallowing:**
Drink plenty of water and provide fresh air.
Call for a doctor immediately.
Rinse out mouth and then drink plenty of water.
· **Information for doctor:** Show the doctor this Material Safety Data Sheet.
· **4.2 Most important symptoms and effects, both acute and delayed**
Breathing difficulty
Headache
Dizziness
Disorientation

(Contd. on page 4)

(Contd. of page 3)

Dilation of pupils
· **Hazards**
Danger of impaired breathing.
Danger of pulmonary oedema.
Danger of disturbed cardiac rhythm.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

*
SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** CO2 or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents:** Water with full jet.
· **5.2 Special hazards arising from the substance or mixture**
In case of fire, the following can be released:
Nitrogen oxides (NOx)
Carbon monoxide and carbon dioxide
In the absence of oxygen: Ammonia (NH3).
· **5.3 Advice for firefighters**
· **Protective equipment:**
In closed rooms wear a self contained breathing apparatus.
Do not inhale gases in case or fire or combustion.
· **Additional information** Keep receptacles cool with water spray.

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SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Keep away any ignition source.
Wear protective equipment. Keep unprotected persons away.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
Ensure adequate ventilation
· **6.2 Environmental precautions:**
Do not allow to penetrate the ground/soil.
Dilute with plenty of water after collecting the liquid.
Prevent seepage into sewage system, workpits and cellars.
· **6.3 Methods and material for containment and cleaning up:**
Collect the liquid with vacuum in a suitable container and absorb the remainder with a porous material (diatomite, acid binders, universal binders, etc).
Ensure adequate ventilation.
Use neutralising agent.
Dispose contaminated material as waste according to section 13.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

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SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Store in cool, dry place in tightly closed receptacles.
Ensure good ventilation/exhaustion at the workplace.

(Contd. on page 5)

(Contd. of page 4)

Only handle and refill product in closed systems or under local exhaust.
Wear suitable respiratory protective device when decanting larger quantities without extractor facilities.
Pneumatic conveyance only with nitrogen or other inert gases.
When diluting always pour product into water and not vice versa.
Open and handle receptacle with care.
· ***Information about fire - and explosion protection:***

Keep ignition sources away - Do not smoke.

Protect against electrostatic charges.
Keep respiratory protective device available.

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage:***
· ***Requirements to be met by storerooms and receptacles:***
Store in a cool location.
Provide alkali-resistant floor.
Provide floor trough without outlet.
Use only receptacles specifically permitted for this substance/product.
· ***Information about storage in one common storage facility:*** *Not required.*
· ***Further information about storage conditions:***
Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
· ***7.3 Specific end use(s)*** *No further relevant information available.*

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SECTION 8: Exposure controls/personal protection

· ***8.1 Control parameters***
· ***Ingredients with limit values that require monitoring at the workplace:*** *TLV not established.*

· **DNELs**		
Inhalative	*DNEL (workers-local chronic effects)*	*7.05 mg/m3*

· **PNECs**	
PNEC (Fresh water)	*0.038 mg/l*
PNEC (Freshwater sediment)	*0.965 mg/kg*
PNEC (Marine water)	*0.004 mg/l*
PNEC (Seawater sediment)	*0.097 mg/l*
PNEC (STP)	*100 mg/l*
PNEC (Soil)	*0.17 mg/kg*

Country	Limit Value - 8 Hours ppm	mg/ m³	Limit Value – Short Term 15 minutes ppm	mg/m³
Ireland	1	3.5	-	-

Piperidine **(110-89-4)**
Notes: Sk
Added by NCC on 06.07.2023

· ***Additional information:*** *The lists valid during the making were used as basis.*

· ***8.2 Exposure controls***
· ***Appropriate engineering controls***
Safety shower and eye bath. Mechanical exhaust required.
No further data; see section 7.
· ***Individual protection measures, such as personal protective equipment***
· ***General protective and hygienic measures:***
The usual precautionary measures are to be adhered to when handling chemicals.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Store protective clothing separately.
Avoid contact with the eyes and skin.

(Contd. on page 6)

(Contd. of page 5)

Clean skin thoroughly immediately after handling the product.

· **Respiratory protection:**
Filter A/P2

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.

Suitable respiratory protective device recommended in case of leakages or handling in open devices.
The selected respiratory protection must comply with standard EN 136/140/143/145/149.

· **Hand protection**
The selected protective gloves have to satisfy the specifications of REGULATION (EU) 2016/425 and the standard EN 374 derived from it.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Protective gloves

Rubber gloves

· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· **Penetration time of glove material**
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **For the permanent contact of a maximum of 15 minutes gloves made of the following materials are suitable:**
The penetration time has to be at least 30 minutes
Nitrile rubber, NBR
Recommended thickness of the material: ≥ 0.4 mm
Butyl rubber, BR
Recommended thickness of the material: ≥ 0.7 mm
Chloroprene rubber, CR
Recommended thickness of the material: ≥ 0.5 mm

· **As protection from splashes gloves made of the following materials are suitable:**
Nitrile rubber, NBR
Butyl rubber, BR
Chloroprene rubber, CR

· **Eye/face protection**

Tightly sealed goggles

· **Body protection:**
Alkaline resistant protective clothing
Apron

· **Environmental exposure controls**
In case of unintended release of the product: See section 6 of the Safety Data Sheet.

· **Risk management measures** Keep good industrial hygiene.

(Contd. on page 7)

(Contd. of page 6)

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SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **Molecular weight**	85.15 g
· **Physical state**	Fluid
· **Colour:**	Yellowish
· **Odour:**	Amine-like
· **Odour threshold:**	Not determined.
· **Melting point/freezing point:**	-9 °C
· **Boiling point or initial boiling point and boiling range**	106 °C
· **Flammability**	Highly flammable.
· **Lower and upper explosion limit**	
· **Lower:**	1.3 Vol %
· **Upper:**	10.3 Vol %
· **Flash point:**	4 °C
· **Auto-ignition temperature:**	339 °C
· **Decomposition temperature:**	320 °C (DIN 51007)
· **pH**	12.6
· **Viscosity:**	
· **Kinematic viscosity at 20 °C**	1.77 mm2/s (OECD 114)
· **Kinematic viscosity**	
· **Dynamic at 20 °C:**	1.52 mPas
· **Solubility**	
· **water:**	Fully miscible.
· **organic solvents:**	Miscible with many organic solvents.
· **Partition coefficient n-octanol/water (log value)**	0.66997
· **Vapour pressure at 20 °C:**	33 hPa
· **Vapour pressure (2) at 50 °C:**	140 hPa
· **Vapour pressure at 50 °C:**	140 hPa
· **Density and/or relative density**	
· **Density at 20 °C:**	0.8606 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not determined.

· **9.2 Other information**	
· **Appearance:**	
· **Form:**	Fluid
· **Important information on protection of health and environment, and on safety.**	
· **Ignition temperature:**	Not determined.
· **Explosive properties:**	Product is not explosive. However, formation of explosive air/vapour mixtures are possible.
· **Change in condition**	
· **Evaporation rate**	Not determined.

· **Information with regard to physical hazard classes**	
· **Explosives**	Void
· **Flammable gases**	Void
· **Aerosols**	Void
· **Oxidising gases**	Void
· **Gases under pressure**	Void
· **Flammable liquids**	Highly flammable liquid and vapour.
· **Flammable solids**	Void
· **Self-reactive substances and mixtures**	Void

(Contd. on page 8)

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· **Pyrophoric liquids**	Void
· **Pyrophoric solids**	Void
· **Self-heating substances and mixtures**	Void
· **Substances and mixtures, which emit flammable gases in contact with water**	Void
· **Oxidising liquids**	Void
· **Oxidising solids**	Void
· **Organic peroxides**	Void
· **Corrosive to metals**	Void
· **Desensitised explosives**	Void

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SECTION 10: Stability and reactivity

· **10.1 Reactivity** See 10.3
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **10.3 Possibility of hazardous reactions** Strong exothermic reaction with acids.
· **10.4 Conditions to avoid**
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
· **10.5 Incompatible materials:** nitrous acid, nitrites
· **10.6 Hazardous decomposition products:**
Carbon monoxide, Carbon dioxide.
Nitrogen oxides (NOx)

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SECTION 11: Toxicological information

· **11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008**
· **Acute toxicity** Toxic in contact with skin or if inhaled.

· **LD/LC50 values relevant for classification:**

Oral	LD50	740 mg/kg (rat)
Dermal	LD50	275 mg/kg (rabbit)
Inhalative	LC50/4 h	4.8 mg/L (rat)

· **Skin corrosion/irritation** Causes severe skin burns and eye damage.
· **Serious eye damage/irritation**
Strong caustic effect.
Strong irritant with the danger of severe eye injury.
Causes serious eye damage.
· **Inhalation:**
Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Toxic if inhaled.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.
· **Other information (about experimental toxicology):** No further relevant information available.

(Contd. on page 9)

(Contd. of page 8)

· **11.2 Information on other hazards**
· **Endocrine disrupting properties** Substance is not listed.

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SECTION 12: Ecological information

· **12.1 Toxicity**

· **Aquatic toxicity:**	
EC50/48h	19 mg/l (Daphnia)
LC50/96h	68.12 mg/l (fishes)
LC50/72h	106 mg/l (algae)

· **12.2 Persistence and degradability** No further relevant information available.
· **Method**
· **Ecological information** The product is biodegradable.
· **BOD5/ThOD:** 67%
· **Other information:** The product is easily biodegradable.
· **12.3 Bioaccumulative potential** Does not accumulate in organisms
· **12.4 Mobility in soil** No further relevant information available.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Endocrine disrupting properties**
The product does not contain substances with endocrine disrupting properties.
· **12.7 Other adverse effects**
· **Remark:** Local effects: may change the environmental pH endangering the aquatic life.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (German Regulation) (Assessment by list): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
Rinse off of bigger amounts into drains or the aquatic environment may lead to increased pH-values. A high pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably reduced, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.

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SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Reutilise if possible or contact a waste processors for recycling or safe disposal.
· **Waste disposal key:**
The European Union does not establish uniform rules for the disposal of chemical waste, which are special waste. Their treatment and elimination of the domestic legislation of each country. So, in each case, you should contact the relevant authorities, or those companies legally authorized for elimination of waste.
2014/955/UE: Council Decision of 18 December 2014 amending the list of wastes contained in Decision 2000/532/EC.
Directive 2008/98/EC of the european parliament and of the council of 18 November 2008, in ist latest valid version.

· **European waste catalogue**	
HP3	Flammable

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HP6	Acute Toxicity
HP8	Corrosive

· **Uncleaned packaging:**
The containers and packaging materials contaminated with dangerous substances or preparations, have the same treatment of products.
Directive 94/62/EC of the European Parliament and the Council of 20 December 1994 on packaging and packaging waste.
· **Recommendation:**
Disposal must be made according to official regulations.
Packagings that may not be cleansed are to be disposed of in the same manner as the product.

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SECTION 14: Transport information

· **14.1 UN number or ID number**
· **ADR/RID, IMDG, IATA** UN2401

· **14.2 UN proper shipping name**
· **ADR/RID** 2401 PIPERIDINE
· **IMDG** PIPERIDINE
· **IATA** Piperidine

· **14.3 Transport hazard class(es)**

· **ADR/RID**

· **Class** 8 (CF1) Corrosive substances.
· **Label** 8+3

· **IMDG**

· **Class** 8 Corrosive substances.
· **Label** 8/3

· **IATA**

· **Class** 8 Corrosive substances.
· **Label** 8 (3)

· **14.4 Packing group**
· **ADR/RID, IMDG, IATA** I

· **14.5 Environmental hazards:**
· **Marine pollutant:** No

· **14.6 Special precautions for user** Warning: Corrosive substances.

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· **Hazard identification number (Kemler code):**	883
· **EMS Number:**	F-E,S-C
· **Segregation groups**	(SGG18) Alkalis
· **Stowage Category**	D
· **Segregation Code**	SG35 Stow "separated from" SGG1-acids
· **14.7 Maritime transport in bulk according to IMO instruments**	Not applicable.
· **Transport/Additional information:**	
· **ADR/RID**	
· **Excepted quantities (EQ):**	E0
· **Limited quantities (LQ)**	0
· **Excepted quantities (EQ)**	Code: E0 Not permitted as Excepted Quantity
· **Transport category**	1
· **Tunnel restriction code**	D/E
· **IMDG**	
· **Limited quantities (LQ)**	0
· **Excepted quantities (EQ)**	Code: E0 Not permitted as Excepted Quantity
· **UN "Model Regulation":**	UN 2401 PIPERIDINE, 8 (3), I

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SECTION 15: Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **SARA Section 355 (extremely hazardous substances)** Substance is listed.
· **SARA Section 313 (specific toxic chemical listings)** Substance is not listed.
· **Prop 65 - Chemicals known to cause cancer** Substance is not listed.

· **Directive 2012/18/EU**
· **Named dangerous substances - ANNEX I** Substance is listed.
· **Qualifying quantity (tonnes) for the application of lower-tier requirements** 50 t
· **Qualifying quantity (tonnes) for the application of upper-tier requirements** 200 t
· **REGULATION (EU) 2019/1021 on persistent organic pollutants (POP)** Substance is not listed.
· **LIST OF SUBSTANCES SUBJECT TO AUTHORISATION (ANNEX XIV)** Substance is not listed.
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3, 40
· **DIRECTIVE 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment – Annex II**
Substance is not listed.
· **National regulations:**

· **Technical instructions (air):**

Class	Share in %
I	50-100

· **Waterhazard class:** Water hazard class 1 (Assessment by list): slightly hazardous for water.

· **Other regulations, limitations and prohibitive regulations**
· **Substances of very high concern (SVHC) according to REACH, Article 57** Substance is not listed.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has been carried out.

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(Contd. of page 11)

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SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** Q.A./Normative
· **Date of previous version:** 24.11.2021
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
RCR : Risk Characterisation Ratio
ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
SVHC: Substances of Very High Concern
vPvB: very Persistent and very Bioaccumulative
IMO : International Maritime Oragnization
Flam. Liq. 2: Flammable liquids – Category 2
Acute Tox. 3: Acute toxicity – Category 3
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
· **Sources**
Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006, REACH, in the latest valid version.
Regulation (EC) N° 1272/2008 of the European Parliament and of the Council of 16 December 2008, CLP, in the latest valid version.
Globally Harmonized System, GHS
ADR/RID, IMDG, IATA
PubChem : an open chemistry database at the National Institutes of Health (NIH)
ECHA : European CHemicals Agency
GESTIS : Information system on hazardous substances of the German Social Accident Insurance
· *** Data compared to the previous version altered.** .

(Contd. on page 13)

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Annex: Exposure scenario 1

· **Short title of the exposure scenario** Formulation or re-packing
· **Sector of Use** Industrial use.
· **Process category**
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4 Chemical production where opportunity for exposure arises
PROC5 Mixing or blending in batch processes
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities
PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
· **Environmental release category** ERC2 Formulation into mixture
· **Description of the activities / processes covered in the Exposure Scenario**
See section 1 of the annex to the Safety Data Sheet.
· **Conditions of use**
According to directions for use.
Customary application according to section 1.
· **Duration and frequency** 5 workdays/week.
· **Worker** 5 workdays/week.
· **Physical parameters**
The data on the physical - chemical properties in the Exposure Scenario is based on the properties of the preparation.
· **Physical state** Fluid
· **Concentration of the substance in the mixture** Raw material.
· **Used amount per time or activity** According to directions for use.
· **Other operational conditions** Observe the general safety regulations when handling chemicals.
· **Other operational conditions affecting environmental exposure**
No special measures required.
Observe section 6 of the Safety Data Sheet (Accidental release measures).
Use only on hard ground.
· **Other operational conditions affecting worker exposure**
Avoid contact with eyes.
Avoid contact with the skin.
Do not breathe gas/vapour/aerosol.
Take precautionary measures against static discharge.
Keep away from sources of ignition - No smoking.
Respiratory protection is required in work areas with inadequate ventilation and during spraying application.
· **Risk management measures**
· **Worker protection**
· **Organisational protective measures**
Keep good industrial hygiene.
Ensure that activities are executed by specialists or authorised personnel only.
No special measures required.
Persons, who tend to skin diseases or other hypersensitivity reactions of the skin, should not handle the product.
Ensure good ventilation. This can be achieved by using a local exhaustion or general exhaust system. If these measures are insufficient to keep the solvent vapour concentration below the workplace limit, wear an adequate respiratory protective device.
Provide sufficient washing facilities.

(Contd. on page 14)

(Contd. of page 13)

Work clothes must not consist of textiles that exhibit dangerous melting behaviour in case of fire.

· ***Technical protective measures***
Provide explosion-proof electrical equipment.
Ensure that suitable extractors are available on processing machines
Ensure good ventilation/exhaustion at the workplace.

· ***Personal protective measures***
Do not inhale gases / fumes / aerosols.
Avoid contact with the skin.
Avoid contact with the eyes.
Tightly sealed goggles
Filter A/P2
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
Suitable respiratory protective device recommended in case of leakages or handling in open devices.
The selected respiratory protection must comply with standard EN 136/140/143/145/149.
The selected protective gloves have to satisfy the specifications of REGULATION (EU) 2016/425 and the standard EN 374 derived from it.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
Protective gloves
Rubber gloves
Alkaline resistant protective clothing
Apron
Tightly sealed goggles
The usual precautionary measures are to be adhered to when handling chemicals.
Detailed measures on hand protection according to Safety Data Sheet, section 8.

· ***Environmental protection measures***

· ***Water***
Generally, prior to the introduction of wastewater into wastewater treatment plants a neutralisation is required.

· ***Notes*** *In case of unintended release of the product: See section 6 of the Safety Data Sheet.*

· ***Disposal measures***
Disposal must be made according to official regulations.
Ensure that waste is collected and contained.

· ***Disposal procedures***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· ***Waste type*** *Partially emptied and uncleaned packaging*

· ***Exposure estimation***

· ***Worker (inhalation)***
The highest inhalative exposure to be expected is 5.5435 ppm.
The exposure estimation was carried out in accordance with ECETOC TRA.

· ***Guidance for downstream users***
Whether the downstream user acts within the scope of the Exposure Scenario can be verified based on the information in sections 1 to 8.

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Annex: Exposure scenario 2

· **Short title of the exposure scenario** Chemicals products for laboratory
· **Sector of Use** Industrial use.
· **Process category** PROC15 Use as laboratory reagent
· **Environmental release category**
ERC2 Formulation into mixture
ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
· **Description of the activities / processes covered in the Exposure Scenario**
See section 1 of the annex to the Safety Data Sheet.
· **Conditions of use** Customary application according to section 1.
· **Duration and frequency** 5 workdays/week.
· **Worker** 5 workdays/week.
· **Physical parameters**
The data on the physical - chemical properties in the Exposure Scenario is based on the properties of the preparation.
· **Physical state** Fluid
· **Concentration of the substance in the mixture** Raw material.
· **Other operational conditions** Observe the general safety regulations when handling chemicals.
· **Other operational conditions affecting environmental exposure** No special measures required.
· **Other operational conditions affecting worker exposure**
Avoid contact with eyes.
Avoid contact with the skin.
Do not breathe gas/vapour/aerosol.
Take precautionary measures against static discharge.
Keep away from sources of ignition - No smoking.
Respiratory protection is required in work areas with inadequate ventilation and during spraying application.
· **Risk management measures**
· **Worker protection**
· **Organisational protective measures**
Keep good industrial hygiene.
Ensure that activities are executed by specialists or authorised personnel only.
Persons, who tend to skin diseases or other hypersensitivity reactions of the skin, should not handle the product.
Ensure good ventilation. This can be achieved by using a local exhaustion or general exhaust system. If these measures are insufficient to keep the solvent vapour concentration below the workplace limit, wear an adequate respiratory protective device.
Provide sufficient washing facilities.
Work clothes must not consist of textiles that exhibit dangerous melting behaviour in case of fire.
· **Technical protective measures**
No special measures required.
Provide explosion-proof electrical equipment.
Ensure good ventilation/exhaustion at the workplace.
· **Personal protective measures**
Avoid contact with the skin.
Avoid contact with the eyes.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
Suitable respiratory protective device recommended in case of leakages or handling in open devices.
The selected respiratory protection must comply with standard EN 136/140/143/145/149.
The selected protective gloves have to satisfy the specifications of REGULATION (EU) 2016/425 and the standard EN 374 derived from it.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
Protective gloves

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Rubber gloves
Avoid direct contact with the chemical/ the product/ the preparation by organisational measures.
Tightly sealed goggles
The usual precautionary measures are to be adhered to when handling chemicals.
Detailed measures on hand protection according to Safety Data Sheet, section 8.
Protective work clothing
Alkaline resistant protective clothing
Apron
· ***Environmental protection measures***
· ***Water***
Generally, prior to the introduction of wastewater into wastewater treatment plants a neutralisation is required.
· ***Notes*** *In case of unintended release of the product: See section 6 of the Safety Data Sheet.*
· ***Disposal measures*** *Ensure that waste is collected and contained.*
· ***Disposal procedures***
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
· ***Waste type*** *Partially emptied and uncleaned packaging*
· ***Exposure estimation***
· ***Worker (inhalation)***
The highest inhalative exposure to be expected is 6.3861 ppm.
The exposure estimation was carried out in accordance with ECETOC TRA.
· ***Guidance for downstream users***
Whether the downstream user acts within the scope of the Exposure Scenario can be verified based on the information in sections 1 to 8.