

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Trade name : PIPERAZINE 68% (PIP-68)

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

Use of the Substance/Mixture : Specific use(s): Refer to attached exposure scenario Annex.

1.3 Details of the supplier of the safety data sheet

Company : Nouryon
Functional Chemicals AB
SE 444 85 Stenungsund
Sweden

Telephone : +4630385000
Telefax : +46303770551
E-mail address : QTS@nouryon.com

1.4 Emergency telephone number

Emergency telephone number : 24 hours emergency response number: +31 57 06 79211
Kemiakuten-SE: 020 99 60 00

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Skin corrosion, 1B, H314
Serious eye damage, 1, H318
Respiratory sensitisation, 1B, H334
Skin sensitisation, 1B, H317
Reproductive toxicity, 2, H361

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

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Pictogram

:



Signal word

: Danger

Hazard statements

: H314

Causes severe skin burns and eye damage.

H317

May cause an allergic skin reaction.

H334

May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H361

Suspected of damaging fertility or the unborn child.

Precautionary statements

: **Prevention:**

P260

Do not breathe dust or mist.

P261

Avoid breathing dust or fume.

P280

Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P303 + P361 + P353

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.

P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

P308 + P313

IF exposed or concerned: Get medical advice/ attention.

Hazardous components which must be listed on the label:

Piperazine

110-85-0

2.3 Other hazards

No further data available.

PBT and vPvB assessment

: This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Pure substance/mixture : Mixture

Hazardous substance

Chemical name	PBT vPvB OEL	CAS-No. EC-No. REACH No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [%]
Piperazine		110-85-0 203-808-3 01-2119480384-35	Skin Corr. 1B; H314 Eye Dam. 1; H318 Resp. Sens. 1B; H334 Skin Sens. 1B; H317 Repr. 2; H361	>= 60 - < 70

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

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).

Status : Not applicable

Non-hazardous substance

Chemical name	CAS-No.	Concentration [%]
Water	7732-18-5	20 - 40

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

- General advice : Immediate medical attention is required.
Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
- If inhaled : Consult a physician after significant exposure.
- In case of skin contact : Take off contaminated clothing and shoes immediately.
Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
If skin irritation persists, call a physician.
- In case of eye contact : Rinse with plenty of water.
Get medical attention immediately. Continue to rinse during transport.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
Small amounts splashed into eyes can cause irreversible tissue damage and blindness.
- If swallowed : Clean mouth with water and drink afterwards plenty of water.

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Never give anything by mouth to an unconscious person.
Take victim immediately to hospital.
Do not induce vomiting! May cause chemical burns in mouth and throat.

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms : The symptoms and effects are as expected from the hazards as shown in section 2. No specific product related symptoms are known.
- Risks : May cause an allergic skin reaction.
Causes serious eye damage.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Suspected of damaging fertility or the unborn child.
Causes severe burns.

4.3 Indication of any immediate medical attention and special treatment needed

- Treatment : Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

- Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

- Specific hazards during firefighting / Specific hazards arising from the chemical
Combustion products : Do not allow run-off from fire fighting to enter drains or water courses.
: Carbon oxides
Nitrogen oxides (NO_x)

5.3 Advice for firefighters

- Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.
- Further information : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

- Personal precautions : Use personal protective equipment.
Wear respiratory protection.
Ensure adequate ventilation.
- Emergency measures on accidental release : Evacuate personnel to safe areas.
Only qualified personnel equipped with suitable protective equipment may intervene.
Prevent unauthorised persons entering the zone.

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

6.2 Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system.
If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and materials for containment and cleaning up

Methods for cleaning up / : Pick up and arrange disposal without creating dust.
Methods for containment : Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal considerations see section 13.
For personal protection see section 8.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling : Persons with a history of skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

: For personal protection see section 8.
Avoid formation of respirable particles.
Do not breathe vapours/dust.
Avoid contact with skin.
Smoking, eating and drinking should be prohibited in the application area.
Provide sufficient air exchange and/or exhaust in work rooms.
Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion : Provide appropriate exhaust ventilation at places where dust is formed.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Prevent unauthorized access.
Keep container tightly closed in a dry and well-ventilated place.
Reacts with copper, aluminium, zinc and their alloys.

Other data : No decomposition if stored and applied as directed.

7.3 Specific end use(s)

Specific use(s) : Refer to attached exposure scenario Annex.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Components	CAS-No.	Value	Control	Update	Basis	Form of
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PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

			parameters			exposure
Piperazine	110-85-0	TWA	0.1 mg/m ³	2000-06-16	2000/39/EC	
	Further information	:	Indicative			
		STEL	0.3 mg/m ³	2000-06-16	2000/39/EC	
	Further information	:	Indicative			
		TWA	0.1 mg/m ³	2007-08-01	GB EH40	
	Further information	:	<p>53+54: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. 54 Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified as asthmagens or respiratory sensitisers.</p> <p>55: Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance.</p> <p>Sen: Capable of causing occupational asthma.</p> <p>56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.</p>			
		STEL	0.3 mg/m ³	2007-08-01	GB EH40	
	Further information	:	<p>53+54: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. 54 Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified as asthmagens or respiratory sensitisers.</p> <p>55: Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance.</p> <p>Sen: Capable of causing occupational asthma.</p> <p>56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.</p>			

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

ACGIH: American Conference of Governmental Industrial Hygienists
AGW: Arbeitsplatzgrenzwert
BEI: Biological Exposure Index
MAC: Maximum Allowable Concentration
NIOSH: National Institute for Occupational Safety and Health
OEL: OEL: Occupational exposure limit.
STEL: Short term exposure limit
TRGS: Technische Regel für Gefahrstoffe
TWA: Time Weighted Average

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006

Substance name	End Use	Exposure routes	Potential health effects	Value
Piperazine	Workers	Inhalation	Long-term systemic effects	0.1 mg/m ³
	Workers	Inhalation	Acute systemic effects	0.3 mg/m ³
	Workers	Inhalation	Long-term local effects	0.1 mg/m ³
	Workers	Inhalation	Acute local effects	0.3 mg/m ³
	Workers	Dermal	Long-term systemic effects	0.014 mg/kg bw /day
	Workers	Dermal	Acute systemic effects	0.042 mg/kg bw /day
	Workers	Dermal	Acute local effects	2 %
	Consumers	Ingestion	Long-term systemic effects	1.5 mg/kg bw /day

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006

Substance name	Environmental Compartment	Value
Piperazine	Fresh water	1.25 mg/l
	Marine water	0.125 mg/l
	Fresh water sediment	4.5 mg/kg dry weight (d.w.)
	Marine sediment	0.45 mg/kg dry weight (d.w.)
	Soil	11.5 mg/kg dry weight (d.w.)
	Sewage treatment plant	54 mg/l
	Intermittent water	1.25 mg/l
	Secondary Poisoning	4.6 mg/kg food

8.2 Exposure controls

Engineering controls

Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment

Respiratory protection : In the case of dust or aerosol formation use respirator with an approved filter.
Wear full face mask supplied with:
Gas cartridge K (ammonia, green).
Suitable mask with particle filter P3 (European Norm 143)

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

- Hand protection : butyl-rubber
Break through time: > 30 min
Glove thickness: >= 0.2 mm
Wearing time
< 30 minutes
- butyl-rubber
Break through time: > 240 min
Glove thickness: >= 0.6 mm
Wearing time
< 240 minutes
- butyl-rubber
Break through time: > 480 min
Glove thickness: >= 0.8 mm
Wearing time
< 480 minutes
- The data about break through time/strength of material are standard values! The exact break through time/strength of material has to be obtained from the producer of the protective glove.
- Eye protection : Safety glasses with side-shields conforming to EN166
- Skin and body protection : Protective suit
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.
Wash contaminated clothing before re-use.

Environmental exposure controls

- General advice : Do not flush into surface water or sanitary sewer system.
If the product contaminates rivers and lakes or drains inform respective authorities.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance

- Form : Solid (20°C)
- Colour : white
- Odour : amine-like
- Odour Threshold : No data available

Safety data

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

pH	: 10 - 12 at 15 % solution
Melting point/range	: 35 - 45 °C
Boiling point/boiling range	: 110 °C
Flash point	: 100 - 199 °C
Ignition temperature	: > 150 °C
Evaporation rate	: No data available
Flammability (solid, gas)	: Not classified as a flammability hazard
Flammability (liquids)	: Not classified as a flammability hazard
Lower explosion limit	: 4 %(V)
Upper explosion limit	: 12 %(V)
Vapour pressure	: 2.6 hPa at 20 °C
Relative vapour density	: 3.0
Density	: 1,020 kg/m ³ at 50 °C 1,004 kg/m ³ at 65 °C
Relative density	: 1.020 at 50 °C
Water solubility	: 150 g/l at 20 °C
Solubility in other solvents	: Soluble in ethanol and acetone.
Partition coefficient: n-octanol/water	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, dynamic	: 15 mPa.s at 50 °C
Viscosity, kinematic	: Not applicable
Explosive properties	: Not explosive
Oxidizing properties	: The substance or mixture is not classified as oxidizing.

9.2 Other information

This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal conditions.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Heating can release hazardous gases.

10.4 Conditions to avoid

Conditions to avoid : Extremes of temperature and direct sunlight.

10.5 Incompatible materials

Materials to avoid : Reacts with copper, aluminium, zinc and their alloys.
Strong acids and oxidizing agents
Halogenated compounds

10.6 Hazardous decomposition products

Hazardous decomposition products : Nitrogen oxides (NO_x)

Thermal decomposition : No data available

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Product information:

Acute toxicity : Not classified based on available information.

Skin corrosion/irritation : Causes severe burns.

Serious eye damage/eye irritation : Causes serious eye damage.

Respiratory or skin sensitisation : Respiratory sensitisation: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin sensitisation: May cause an allergic skin reaction.

Germ cell mutagenicity : Not classified based on available information.

Carcinogenicity : Not classified based on available information.

Reproductive toxicity : Suspected of damaging fertility or the unborn child.

STOT - single exposure : Not classified based on available information.

STOT - repeated exposure : Not classified based on available information.

Aspiration hazard : Not classified based on available information.

Further information : Suspected of damaging fertility or the unborn child.

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Test result

- Acute oral toxicity : LD50: > 2,000 - 5,000 mg/kg
Species: Rat
- Respiratory or skin sensitisation : Result: The product is a skin sensitiser, sub-category 1B.
Result: The product is a respiratory sensitiser, sub-category 1B.

Toxicology data for the components:

Piperazine

Acute toxicity:

- Acute oral toxicity : LD50: ca. 2,600 mg/kg
Species: Rat
Method: OECD Test Guideline 401
Information taken from reference works and the literature.
- Acute inhalation toxicity : Based on available data, the classification criteria are not met.
- Acute dermal toxicity : LD50: > 5,000 mg/kg
Species: Rabbit
Method: OECD Test Guideline 402
Information taken from reference works and the literature.
- Skin corrosion/irritation : Result: Causes burns.
- Serious eye damage/eye irritation : Result: Risk of serious damage to eyes.
- Respiratory or skin sensitisation : Maximisation Test
Species: Guinea pig
Result: The product is a skin sensitiser, sub-category 1B.
Method: OECD Test Guideline 406
Information taken from reference works and the literature.

Result: The product is a respiratory sensitiser, sub-category 1B.
- Germ cell mutagenicity
- Genotoxicity in vitro : Ames test
Salmonella typhimurium
Result: negative
Method: OECD Test Guideline 471
Information taken from reference works and the literature.
- Genotoxicity in vivo : In vivo micronucleus test
Species: Mouse
Result: negative
Information taken from reference works and the literature.
- Carcinogenicity : No data available
- CMR effectsReproductive toxicity : Suspected human reproductive toxicant

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

STOT - single exposure	: Not classified due to data which are conclusive although insufficient for classification.
STOT - repeated exposure	: Not classified due to data which are conclusive although insufficient for classification.
Aspiration hazard	: No data available

SECTION 12: ECOLOGICAL INFORMATION

Product information: Ecotoxicology Assessment

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life.

12.1 Toxicity

Components:

Test result

Piperazine

Toxicity to fish	: LC50: > 1,800 mg/l Exposure time: 96 h Species: <i>Poecilia reticulata</i> (guppy) Information taken from reference works and the literature.
Toxicity to daphnia and other aquatic invertebrates	: EC50: 21 mg/l Exposure time: 48 h Species: <i>Daphnia magna</i> (Water flea) Information taken from reference works and the literature.
Toxicity to algae	: NOEC: > 1,000 mg/l Exposure time: 72 h Species: <i>Pseudokirchneriella subcapitata</i> (green algae) Method: OECD Test Guideline 201 Information taken from reference works and the literature.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	: NOEC: 25 mg/l Exposure time: 21 d Species: <i>Daphnia magna</i> (Water flea) Method: OECD Test Guideline 211 Information taken from reference works and the literature.

12.2 Persistence and degradability

Product information:

Biodegradability : Result: Readily biodegradable.

Components:

Piperazine

Biodegradability : Result: Readily biodegradable.
Method: OECD Test Guideline 301F

12.3 Bioaccumulative potential

Product information:

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Bioaccumulation : Bioaccumulation is unlikely.

Components:

Piperazine

Bioaccumulation : Bioaccumulation is unlikely.

12.4 Mobility in soil

Product information:

Mobility : The product is miscible in water and readily biodegradable in both water and soil. Accumulation is not expected.

Components:

Piperazine

Mobility : The product is miscible in water and readily biodegradable in both water and soil. Accumulation is not expected.

12.5 Results of PBT and vPvB assessment

Product information:

PBT and vPvB assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Components:

Piperazine

PBT and vPvB assessment : This substance is not considered to be a PBT (Persistent, Bioaccumulation, Toxic)
This substance is not considered to be vPvB (very Persistent nor very Bioaccumulating)

12.6 Other adverse effects

Product information:

Biochemical Oxygen Demand (BOD) : No data available

Components:

Piperazine

Biochemical Oxygen Demand (BOD) : No data available

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product : The product should not be allowed to enter drains, water courses or the soil.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Hazardous waste
Dispose of contents/container in accordance with local regulation.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

SECTION 14: TRANSPORT INFORMATION

14.1 UN number

ADR : UN 2579
RID : UN 2579
IMDG-Code : UN 2579
IATA-DGR : UN 2579

14.2 Proper shipping name

ADR : PIPERAZINE
RID : PIPERAZINE
IMDG-Code : PIPERAZINE
IATA-DGR : Piperazine

14.3 Transport hazard class

ADR : 8
RID : 8
IMDG-Code : 8
IATA-DGR : 8

14.4 Packing group

ADR
Packing group : III
Classification Code : C8
Hazard Identification Number : 80
Labels : 8
Tunnel restriction code : (E)

RID
Packing group : III
Classification Code : C8
Hazard Identification Number : 80
Labels : 8

IMDG-Code
Packing group : III
Labels : 8
EmS Code : F-A, S-B

IATA-DGR
Packing instruction (cargo aircraft) : 864
Packing instruction (passenger aircraft) : 860
Packing instruction (LQ) : Y845
Packing group : III
Labels : 8

14.5 Environmental hazards

ADR
Environmentally hazardous : no

RID
Environmentally hazardous : no

IMDG-Code
Marine pollutant : no

IATA-DGR
Environmentally hazardous : no

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

14.6 Special precautions for user

Not applicable

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

SECTION 15: REGULATORY INFORMATION

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

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

Not applicable

Notification status

DSL : YES. All components of this product are on the Canadian DSL
AICS : YES. On the inventory, or in compliance with the inventory
NZIoC : YES. On the inventory, or in compliance with the inventory
ENCS : YES. On the inventory, or in compliance with the inventory
ISHL : YES. On the inventory, or in compliance with the inventory
KECI : YES. On the inventory, or in compliance with the inventory
PICCS : YES. On the inventory, or in compliance with the inventory
IECSC : YES. On the inventory, or in compliance with the inventory
TCSI : YES. On the inventory, or in compliance with the inventory
TSCA : YES. All chemical substances in this product are either listed on the TSCA Inventory or in compliance with a TSCA Inventory exemption.

For explanation of abbreviation see section 16.

15.2 Chemical safety assessment

Piperazine : A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: OTHER INFORMATION

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

H314 : Causes severe skin burns and eye damage.
H317 : May cause an allergic skin reaction.
H318 : Causes serious eye damage.
H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H361 : Suspected of damaging fertility or the unborn child.

Classification procedure:

Skin corrosion, 1B, H314, Calculation method
Serious eye damage, 1, H318, Calculation method
Respiratory sensitisation, 1B, H334, Based on product data or assessment
Skin sensitisation, 1B, H317, Based on product data or assessment
Reproductive toxicity, 2, H361, Calculation method

Full text of other abbreviations

2000/39/EC : Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

GB EH40	:	UK. EH40 WEL - Workplace Exposure Limits
2000/39/EC / TWA	:	Limit Value - eight hours
2000/39/EC / STEL	:	Short term exposure limit
GB EH40 / TWA	:	Long-term exposure limit (8-hour TWA reference period)
GB EH40 / STEL	:	Short-term exposure limit (15-minute reference period)

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Annex :

Use as an intermediate and in polymerisation

Industrial formulation

Gas-washer formulations, gas sweetening, scrubber

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

1. Short title of Exposure Scenario: Use as an intermediate and in polymerisation

Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental Release Categories	: ERC6a, ERC6c: Use of intermediate, Industrial use of monomers for manufacture of thermoplastics
Process categories	: PROC1: Use in closed process, no likelihood of exposure PROC8a: Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/ to vessels/ large containers at dedicated facilities PROC15: Use as laboratory reagent

2.1 Contributing scenario controlling environmental exposure for: ERC6a, ERC6c: Use of intermediate, Industrial use of monomers for manufacture of thermoplastics

Amount used

Regional use tonnage (tonnes/year):	: 15000 ton(s)/year
Fraction of EU tonnage used in region:	: 20 %
Fraction of Regional tonnage used locally:	: 100 %

Environment factors not influenced by risk management

Flow rate	: 18,000 m ³ /day
Dilution Factor (River)	: 10

Other given operational conditions affecting environmental exposure

Number of emission days per year	: 220
Emission or Release Factor: Air	: 0.01 %
Emission or Release Factor: Water	: 0.7 %
Emission or Release Factor: Soil	: 0.01 %
Remarks	: EU ESD
Remarks	: All industrial surfaces are hard surfaces, and run-off is led to waste., Vent-gases are assumed to be led via scrubbers and scrubber water is led to waste.

Technical conditions and measures / Organizational measures

Exposure time	: Continuous use/release
Water	: Incineration, Ion exchange processes

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	: Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	: 2,000 m ³ /day
Percentage removed from waste water	: 87 %

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Activity : General exposures, Continuous process, Bulk product storage, Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa

Frequency and duration of use

Exposure duration : > 240 min

Remarks : Inhalation, Dermal

Frequency of use : <= 240 days/year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Outdoor / Indoor : Outdoor

Technical conditions and measures

Local exhaust ventilation is required at any step if there is opportunity for significant exposure. (Effectiveness (of a measure): 90 %)

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)

Wear suitable protective clothing.

2.3 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity : Equipment maintenance

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : liquid

Amount used

Dermal : 0.2 L/min

Frequency and duration of use

Exposure duration : < 15 min

Remarks : Inhalation

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Exposure duration : < 5 min
Remarks : Dermal
Frequency of use : <= 240 days/year

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Outdoor / Indoor : Outdoor

Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)

Wear a respirator conforming to EN140 with Type A filter or better. (Effectiveness (of a measure): 90 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure that no significant amounts of aerosols or splashes are released during the process

2.4 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Activity : Bulk transfers, Dedicated facility

Product characteristics

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

Amount used

Application rate : 0.002 L/min
Remarks : Dermal
Application rate : 1000 L/min
Remarks : maximum, Inhalation

Frequency and duration of use

Exposure duration : < 8 h
Remarks : Inhalation
Exposure duration : < 10 min
Remarks : Dermal
Frequency of use : <= 240 days/year

Human factors not influenced by risk management

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Dermal exposure : Palms of both hands (480 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Ventilation rate per hour : 1
Remarks : Use in large workrooms only.

Technical conditions and measures

Mechanical ventilation

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

2.5 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Activity : Laboratory activities

Product characteristics

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

Frequency and duration of use

Exposure duration : 15 - 60 min
Remarks : Inhalation, Dermal
Frequency of use : <= 240 days/year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Local exhaust ventilation is required at any step if there is opportunity for significant exposure. (Effectiveness (of a measure): 90 %)

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC6a	TGD Excel v. 1.24		Fresh water		0.604 mg/L	0.483
			Fresh water sediment		0.473 mg/kg wet weight	0.483
			Marine water		0.0604 mg/L	0.465
			Marine sediment		0.0473 mg/kg wet weight	0.473
			Sewage treatment plant		6.05 mg/L	0.112
			Soil		< 0.0001 mg/kg wet weight	< 0.0001
			Grassland		< 0.0001 mg/kg wet weight	< 0.0001

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA		Long term inhalation	0.035 mg/m3	0.358
			Long term dermal	0.0003 mg/kg bw/day	0.024
PROC8a	ECETOC TRA	Product sampling	Long term inhalation	0.045 mg/m3	0.45
	RISKOFDERM		Long term dermal	0.0013 mg/kg bw/day	0.098
PROC8b	ART		Long term inhalation	0.047 mg/m3	0.47
	RISKOFDERM		Long term dermal	0.004 mg/kg bw/day	0.286
PROC15	Based on measurements.		Long term inhalation	< 0.03 mg/m3	< 0.3
	ECETOC TRA		Long term dermal	0.0003 mg/kg bw/day	0.024

ERC6a: Use of intermediate

ERC6c: Industrial use of monomers for manufacture of thermoplastics

PROC1: Use in closed process, no likelihood of exposure

PROC15: Use as laboratory reagent

PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

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

For further information, please also consult our Internet site: Downstream Users
http://guidance.echa.europa.eu/downstream_users_en.htm

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

1. Short title of Exposure Scenario: Industrial formulation

Main User Groups : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Environmental Release Categories : ERC2: Formulation of preparations

Process categories : PROC1: Use in closed process, no likelihood of exposure
PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
PROC15: Use as laboratory reagent

2.1 Contributing scenario controlling environmental exposure for: ERC1: Manufacture of the substance

Amount used

Regional use tonnage : 1600 ton(s)/year
(tonnes/year):
Fraction of EU tonnage used in : 100 %
region:
Fraction of Regional tonnage used : 100 %
locally:

Environment factors not influenced by risk management

Flow rate : 18,000 m³/day
Dilution Factor (River) : 10

Other given operational conditions affecting environmental exposure

Number of emission days per year : 220
Emission or Release Factor: Air : 2.5 %
Emission or Release Factor: Water : 2 %
Emission or Release Factor: Soil : 0.01 %

Technical conditions and measures / Organizational measures

Exposure time : Continuous use/release
Compartment : Fresh water, Fresh water sediment, Marine water, Marine sediment, Soil, Grassland, Sewage treatment plant

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant : Municipal sewage treatment plant
Flow rate of sewage treatment : 2,000 m³/day
plant effluent
Percentage removed from waste : 87 %
water

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Activity : General exposures, Continuous process, Bulk product storage, Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa

Frequency and duration of use

Exposure duration : > 240 min
Remarks : Inhalation, Dermal
Frequency of use : <= 240 days/year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Outdoor / Indoor : Outdoor

Technical conditions and measures

Local exhaust ventilation is required at any step if there is opportunity for significant exposure.
(Effectiveness (of a measure): 90 %)

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)
Wear suitable protective clothing.

2.3 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity : Equipment maintenance

Product characteristics

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

Amount used

Dermal : 0.2 L/min

Frequency and duration of use

Exposure duration : < 15 min
Remarks : Inhalation
Exposure duration : < 5 min
Remarks : Dermal

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Frequency of use : <= 240 days/year

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Outdoor / Indoor : Outdoor

Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)

Wear a respirator conforming to EN140 with Type A filter or better. (Effectiveness (of a measure): 90 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Ensure that no significant amounts of aerosols or splashes are released during the process

2.4 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Activity : Bulk transfers, Dedicated facility

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : liquid

Amount used

Application rate : 0.002 L/min

Remarks : Dermal

Application rate : 1000 L/min

Remarks : maximum, Inhalation

Frequency and duration of use

Exposure duration : < 8 h

Remarks : Inhalation

Exposure duration : < 10 min

Remarks : Dermal

Frequency of use : <= 240 days/year

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm²)

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Ventilation rate per hour : 1
Remarks : Use in large workrooms only.

Technical conditions and measures

Mechanical ventilation

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

2.5 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Activity : Laboratory activities

Product characteristics

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

Frequency and duration of use

Exposure duration : 15 - 60 min
Remarks : Inhalation, Dermal
Frequency of use : <= 240 days/year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand (240 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Local exhaust ventilation is required at any step if there is opportunity for significant exposure. (Effectiveness (of a measure): 90 %)

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

3. Exposure estimation and reference to its source

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	TGD Excel v. 1.24		Fresh water		0.921 mg/L	0.737
			Fresh water sediment		0.72 mg/kg wet weight	0.735
			Marine water		0.0921 mg/L	0.708
			Marine sediment		0.072 mg/kg wet weight	0.72
			Sewage treatment plant		9.18 mg/L	0.17
			Soil		0.0058 mg/kg wet weight	0.0007
			Grassland		0.0111 mg/kg wet weight	0.0013

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA		Long term inhalation	0.035 mg/m3	0.358
			Long term dermal	0.0003 mg/kg bw/day	0.024
PROC8a	ECETOC TRA	Product sampling	Long term inhalation	0.045 mg/m3	0.45
	RISKOFDERM		Long term dermal	0.0013 mg/kg bw/day	0.098
PROC8b	ART		Long term inhalation	0.047 mg/m3	0.47
	RISKOFDERM		Long term dermal	0.004 mg/kg bw/day	0.286
PROC15	Based on measurements.		Long term inhalation	< 0.03 mg/m3	< 0.3
	ECETOC TRA		Long term dermal	0.0003 mg/kg bw/day	0.024

ERC2: Formulation of preparations

PROC1: Use in closed process, no likelihood of exposure

PROC15: Use as laboratory reagent

PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

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

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

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http://guidance.echa.europa.eu/downstream_users_en.htm

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

1. Short title of Exposure Scenario: Gas-washer formulations, gas sweetening, scrubber

Main User Groups : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental Release Categories : ERC7: Industrial use of substances in closed systems
Process categories : PROC1: Use in closed process, no likelihood of exposure
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

2.1 Contributing scenario controlling environmental exposure for: ERC7: Industrial use of substances in closed systems

Amount used

Regional use tonnage : 2000 ton(s)/year
(tonnes/year):
Fraction of EU tonnage used in : 100 %
region:
Fraction of Regional tonnage used : 100 %
locally:

Environment factors not influenced by risk management

Flow rate : 18,000 m³/day
Dilution Factor (River) : 10

Other given operational conditions affecting environmental exposure

Number of emission days per year : 35
Emission or Release Factor: Air : 0.1 %
Emission or Release Factor: Water : 100 %
Emission or Release Factor: Soil : 0 %
Additional Risk Management : 99.8 %
Measures for water
Remarks : Incineration

Technical conditions and measures / Organizational measures

Exposure time : Continuous use/release
Compartment : Fresh water, Fresh water sediment, Marine water, Marine sediment, Soil, Grassland, Sewage treatment plant
Water : Incineration

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant : Municipal sewage treatment plant
Flow rate of sewage treatment : 2,000 m³/day
plant effluent
Percentage removed from waste : 87 %
water

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Activity : General exposures, Continuous process, Bulk product storage, Closed systems

Product characteristics

Concentration of the Substance in Mixture/Article : Covers percentage substance in the product up to 60%.
Physical Form (at time of use) : liquid

Frequency and duration of use

Exposure duration : > 240 min
Remarks : Inhalation, Dermal
Frequency of use : <= 240 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Outdoor / Indoor : Outdoor

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)
Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

2.3 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Activity : Bulk transfers, Dedicated facility

Product characteristics

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

Amount used

Application rate : 0.002 L/min
Remarks : Dermal
Application rate : 1000 L/min
Remarks : maximum, Inhalation

Frequency and duration of use

Exposure duration : < 8 h
Remarks : Inhalation
Exposure duration : < 10 min
Remarks : Dermal
Frequency of use : <= 240 days/year

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm²)

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Ventilation rate per hour : 1
Remarks : Use in large workrooms only.

Technical conditions and measures

Mechanical ventilation

Organisational measures to prevent /limit releases, dispersion and exposure

Assumes a good basic standard of occupational hygiene is implemented

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

Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. (Effectiveness (of a measure): 99 %)

Use suitable eye protection., Wear suitable coveralls to prevent exposure to the skin.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC7	TGD Excel v. 1.24		Fresh water		0.69 mg/L	0.552
			Fresh water sediment		0.54 mg/kg wet weight	0.551
			Marine water		0.069 mg/L	0.551
			Marine sediment		0.054 mg/kg wet weight	0.54
			Sewage treatment plant		6.83 mg/L	0.127
			Soil		0.0003 mg/kg wet weight	< 0.0001
			Grassland		0.0006 mg/kg wet weight	< 0.0001

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA		Long term inhalation	0.015 mg/m3	0.15
			Long term dermal	0.002 mg/kg bw/day	0.147
PROC8b	ART		Long term inhalation	0.047 mg/m3	0.47
	RISKOFDERM		Long term dermal	0.004 mg/kg bw/day	0.286

PIPERAZINE 68% (PIP-68)

Version 2

Revision Date 30.04.2019

Print Date 06.11.2019

GB / EN

ERC7: Industrial use of substances in closed systems

PROC1: Use in closed process, no likelihood of exposure

PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

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

For further information, please also consult our Internet site: Downstream Users
http://guidance.echa.europa.eu/downstream_users_en.htm