

# Safety data sheet

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BASF Safety data sheet according to Regulation (EC) No. 1907/2006 as amended from time to time.

Date / Revised: 08.04.2020

Version: 8.0

Date previous version: 03.01.2018

Previous version: 7.0

Product: **OASE white**

(ID no. 30544780/SDS\_GEN\_GB/EN)

Date of print 15.01.2024

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

### 1.1. Product identifier

## OASE white

UFI: DUPC-30NQ-S00K-9GYM

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

Relevant identified uses: Chemical used in synthesis and/or formulation of industrial products

Recommended use: gas scrubber absorption aid

For the detailed identified uses of the product see appendix of the safety data sheet.

### 1.3. Details of the supplier of the safety data sheet

Company:

BASF SE

67056 Ludwigshafen

GERMANY

Contact address:

BASF plc

4th and 5th Floors, 2 Stockport Exchange

Railway Road, Stockport, SK1 3GG

UNITED KINGDOM

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Telephone: +44 161 475 3000

E-mail address: [product-safety-uk-and-ireland@basf.com](mailto:product-safety-uk-and-ireland@basf.com)

### 1.4. Emergency telephone number

International emergency number:

Telephone: +49 180 2273-112

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## SECTION 2: Hazards Identification

### 2.1. Classification of the substance or mixture

For the classification of the mixture the following methods have been applied: extrapolation on the concentration levels of the hazardous substances, on basis of test results and after evaluation of experts. The methodologies used are mentioned at the respective test results.

According to Regulation (EC) No 1272/2008 [CLP]

Eye Dam./Irrit. 1	H318 Causes serious eye damage.
Resp. Sens. 1	H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin Sens. 1B	H317 May cause an allergic skin reaction.
Repr. 2	H361f Suspected of damaging fertility.
Repr. 2	H361d Suspected of damaging the unborn child.

For the classifications not written out in full in this section the full text can be found in section 16.

### 2.2. Label elements

Globally Harmonized System, EU (GHS)

Pictogram:



Signal Word:

Danger

Hazard Statement:

H318	Causes serious eye damage.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317	May cause an allergic skin reaction.
H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child.

Precautionary Statements (Prevention):

P280	Wear protective gloves, protective clothing and eye protection or face protection.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.

Precautionary Statements (Response):

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

Precautionary Statements (Storage):

P405 Store locked up.

Precautionary Statements (Disposal):

P501 Dispose of contents and container to hazardous or special waste collection point.

Labeling of special preparations (GHS):

Classification is based on existing data for this particular mixture.

According to Regulation (EC) No 1272/2008 [CLP]

Hazard determining component(s) for labelling: 2,2'-(methylimino)diethanol, piperazine, 2-Piperazin-1-ylethanol

### 2.3. Other hazards

According to Regulation (EC) No 1272/2008 [CLP]

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

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## SECTION 3: Composition/Information on Ingredients

### 3.1. Substances

Not applicable

### 3.2. Mixtures

Chemical nature

preparation

Contains: Water

Hazardous ingredients (GHS)

according to Regulation (EC) No. 1272/2008

| 2,2'-(methylimino)diethanol

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Content (W/W): >= 70 %  
 CAS Number: 105-59-9  
 EC-Number: 203-312-7  
 REACH registration number: 01-2119488970-24  
 INDEX-Number: 603-079-00-5

Eye Dam./Irrit. 2  
 H319

| piperazine

Content (W/W): <= 18 %  
 CAS Number: 110-85-0  
 EC-Number: 203-808-3  
 REACH registration number: 01-2119480384-35  
 INDEX-Number: 612-057-00-4

Flam. Sol. 1  
 Skin Corr./Irrit. 1B  
 Eye Dam./Irrit. 1  
 Resp. Sens. 1  
 Skin Sens. 1  
 Repr. 2 (fertility)  
 Repr. 2 (unborn child)  
 H228, H334, H317, H361fd, H314

Differing classification according to current knowledge and the criteria given in Annex I of Regulation (EC) No. 1272/2008

Flam. Sol. 1  
 Skin Corr./Irrit. 1B  
 Eye Dam./Irrit. 1  
 Resp. Sens. 1  
 Skin Sens. 1B  
 Repr. 2 (fertility)  
 Repr. 2 (unborn child)

| 2-Piperazin-1-ylethanol

Content (W/W): <= 2.5 %  
 CAS Number: 103-76-4  
 EC-Number: 203-142-3  
 REACH registration number: 01-2120734728-45

Skin Corr./Irrit. 2  
 Eye Dam./Irrit. 1  
 H318, H315

| Piperazine-1,4-diethanol

Content (W/W): <= 1.5 %  
 CAS Number: 122-96-3  
 EC-Number: 204-586-0

Eye Dam./Irrit. 1  
 H318

For the classifications not written out in full in this section, including the hazard classes and the hazard statements, the full text is listed in section 16.

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## SECTION 4: First-Aid Measures

### 4.1. Description of first aid measures

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:

Keep patient calm, remove to fresh air, seek medical attention. Immediately administer a corticosteroid from a controlled/metered dose inhaler.

On skin contact:

Immediately wash thoroughly with plenty of water, apply sterile dressings, consult a skin specialist.

On contact with eyes:

Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:

Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

### 4.2. Most important symptoms and effects, both acute and delayed

Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11., Further symptoms are possible

### 4.3. Indication of any immediate medical attention and special treatment needed

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

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## SECTION 5: Fire-Fighting Measures

### 5.1. Extinguishing media

Suitable extinguishing media:

water spray, dry powder, alcohol-resistant foam, carbon dioxide

### 5.2. Special hazards arising from the substance or mixture

nitrogen oxides, carbon oxides

The substances/groups of substances mentioned can be released in case of fire. Under certain conditions in case of fire other hazardous combustion products may be generated.

### 5.3. Advice for fire-fighters

Special protective equipment:

Wear self-contained breathing apparatus and chemical-protective clothing.

Further information:

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Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems.

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## SECTION 6: Accidental Release Measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Avoid inhalation. Avoid contact with the skin, eyes and clothing.

### 6.2. Environmental precautions

Discharge into the environment must be avoided.

### 6.3. Methods and material for containment and cleaning up

For large amounts: Pump off product.

For residues: Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr).

Clean contaminated floors and objects thoroughly with water and detergents, observing environmental regulations. Collect waste in suitable containers, which can be labeled and sealed. Incinerate or take to a special waste disposal site in accordance with local authority regulations.

### 6.4. Reference to other sections

Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

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## SECTION 7: Handling and Storage

### 7.1. Precautions for safe handling

Ensure thorough ventilation of stores and work areas. Handle in accordance with good industrial hygiene and safety practice. When using do not eat, drink or smoke. Hands and/or face should be washed before breaks and at the end of the shift.

Protection against fire and explosion:

Prevent electrostatic charge - sources of ignition should be kept well clear - fire extinguishers should be kept handy.

### 7.2. Conditions for safe storage, including any incompatibilities

Segregate from acids and acid forming substances.

Suitable materials for containers: glass, Stainless steel 1.4301 (V2), Stainless steel 1.4401, High density polyethylene (HDPE), Carbon steel (Iron), tinned carbon steel (Tinplate)

Further information on storage conditions: Store protected against freezing.

### 7.3. Specific end use(s)

See lead substance(s) exposure scenarios attached as annex to the safety data sheet.

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## SECTION 8: Exposure Controls/Personal Protection

### 8.1. Control parameters

#### Components with occupational exposure limits

| 110-85-0: piperazine

TWA value 0.1 mg/m<sup>3</sup> (WEL/EH 40 (UK))

STEL value 0.3 mg/m<sup>3</sup> (WEL/EH 40 (UK))

TWA value 0.1 mg/m<sup>3</sup> (OEL (EU))

indicative

STEL value 0.3 mg/m<sup>3</sup> (OEL (EU))

indicative

#### PNEC

| Data refer to the lead substance

#### Components with PNEC

| 110-85-0: piperazine

freshwater: 1.25 mg/l

marine water: 0.125 mg/l

intermittent release: 1.25 mg/l

sediment (freshwater): 4.5 mg/kg

sediment (marine water): 0.45 mg/kg

soil: 11.5 mg/kg

STP: 54 mg/l

oral (secondary poisoning): 4.6 mg/kg

#### DNEL

| Data refer to the lead substance

#### Components with DNEL

| 110-85-0: piperazine

worker: Long-term exposure- systemic effects, Inhalation: 0.1 mg/m<sup>3</sup>

worker: Long-term exposure- systemic effects, dermal: 0.014 mg/kg

### 8.2. Exposure controls

#### Personal protective equipment

Respiratory protection:

Suitable respiratory protection for lower concentrations or short-term effect: Combination filter for gases/vapours of organic compounds and solid and liquid particles (f.e. EN 14387 Type A-P2)

Suitable respiratory protection for higher concentrations or long-term effect: Self-contained breathing apparatus.

Hand protection:

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Chemical resistant protective gloves (EN 374)

e.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), polyvinylchloride (0.7 mm) and other

Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.

Eye protection:

Tightly fitting safety goggles (splash goggles) (e.g. EN 166)

Body protection:

chemical-protection suit (f.e. according to EN 14605)

General safety and hygiene measures

Avoid contact with eyes. Avoid inhalation of vapour. Wearing of closed work clothing is required additionally to the stated personal protection equipment. Females of childbearing age should not come into contact with the product. Take off immediately all contaminated clothing. Store work clothing separately.

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**SECTION 9: Physical and Chemical Properties**
**9.1. Information on basic physical and chemical properties**

Form:	liquid	
Colour:	colourless to yellow	
Odour:	amine-like	
Odour threshold:	Not determined due to respiratory tract sensitizing properties.	
pH value:	11 - 12 (10 % (m), 20 °C)	
Melting point:	< -10 °C	
Boiling point:	> 100 °C	
Flash point:	approx. 118 °C	(DIN ISO 2592)
	The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.	
Evaporation rate:	Value can be approximated from Henry's Law Constant or vapor pressure.	
Flammability:	not flammable	
Lower explosion limit:	For liquids not relevant for classification and labelling., The lower explosion point may be 5 - 15 °C below the flash point.	



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*Information on: 2,2'-(methylimino)diethanol*

*Lower explosion limit:*

*For liquids not relevant for classification and labelling., The lower explosion point may be 5 - 15 °C below the flash point.*

*Information on: piperazine*

*Lower explosion limit:*

*For solids not relevant for classification and labelling.*

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Upper explosion limit:

*For liquids not relevant for classification and labelling.*

*Information on: 2,2'-(methylimino)diethanol*

*Upper explosion limit:*

*For liquids not relevant for classification and labelling.*

*Information on: piperazine*

*Upper explosion limit:*

*For solids not relevant for classification and labelling.*

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Ignition temperature: 265 °C

*The product has not been tested. The statement has been derived from the properties of the individual components.*

*Information on: 2,2'-(methylimino)diethanol*

*Vapour pressure: 0.0027 hPa (measured)  
(25 °C)  
Literature data.*

*Information on: piperazine*

*Vapour pressure: 0.392 hPa (BASF method)  
(22.5 °C)*

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Density: 1.05 g/cm<sup>3</sup>  
(20 °C)

Relative density: 1.05 (calculated)  
(20 °C)

*Information on: 2,2'-(methylimino)diethanol*

*Partitioning coefficient n-octanol/water (log Kow): -1.08 (OECD Guideline 107)  
(25 °C; pH value: 9.9 - 10.4)  
-1.16 (OECD Guideline 107)  
(23 °C; pH value: 10.5)*

*Information on: piperazine*

*Partitioning coefficient n-octanol/water (log Kow): -1.24 (OECD Guideline 107)  
(25 °C; pH value: 11)*

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Self ignition: The value has not be determined because of the low risk of self-ignition in consequence of the high flash-point.

Thermal decomposition: No decomposition if stored and handled as prescribed/indicated.

Explosion hazard: not explosive (other)

Fire promoting properties: not fire-propagating

## 9.2. Other information

Miscibility with water:

(20 °C)  
miscible

*Information on: piperazine*

*Adsorption/water - soil: KOC: 507; log KOC: 2.71*

*(OECD Guideline 106)*

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Other Information:

If necessary, information on other physical and chemical parameters is indicated in this section.

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## SECTION 10: Stability and Reactivity

### 10.1. Reactivity

No hazardous reactions if stored and handled as prescribed/indicated.

### 10.2. Chemical stability

The product is stable if stored and handled as prescribed/indicated.

### 10.3. Possibility of hazardous reactions

Strong exothermic reaction with acids.

### 10.4. Conditions to avoid

Avoid extreme temperatures.

### 10.5. Incompatible materials

Substances to avoid:

acids, acid chlorides, acid anhydrides

### 10.6. Hazardous decomposition products

Possible thermal decomposition products:

carbon oxides, nitrogen oxides

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## SECTION 11: Toxicological Information

### 11.1. Information on toxicological effects

#### Acute toxicity

Experimental/calculated data:

ATE (oral): 4,320 mg/kg

ATE (by inhalation): > 20 mg/l

Determined for vapor

ATE (dermal): > 5,000 mg/kg

*Information on: 2,2'-methyliminodiethanol*

*Experimental/calculated data:*

*LD50 rat (oral): 4,680 mg/kg (BASF-Test)*

*Information on: piperazine*

*Experimental/calculated data:*

*LD50 rat (oral): approx. 2,600 mg/kg (BASF-Test)*

*Information on: 2,2'-methyliminodiethanol*

*Experimental/calculated data:*

*rat (by inhalation): 8 h (BASF-Test)*

*Inhalation-risk test (IRT): No mortality within 8 hours as shown in animal studies. The inhalation of a highly saturated vapor-air mixture represents no acute hazard.*

*Information on: piperazine*

*Experimental/calculated data:*

*LD50 rabbit (dermal): 8,300 mg/kg (similar to OECD guideline 402)*

#### Irritation

Assessment of irritating effects:

Risk of serious damage to eyes.

Experimental/calculated data:

Skin corrosion/irritation rabbit: non-irritant (OECD Guideline 404)

Serious eye damage/irritation: Irritant. (BCOP)

#### Respiratory/Skin sensitization

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*Information on: piperazine*

*Experimental/calculated data:*

*Mouse Local Lymph Node Assay (LLNA) mouse: skin sensitizing (similar to OECD guideline 429)*

*Guinea pig maximization test guinea pig: skin sensitizing (similar to OECD guideline 406)*

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#### Germ cell mutagenicity

*Information on: 2,2'-(methylimino)diethanol*

*Assessment of mutagenicity:*

*No mutagenic effect was found in various tests with bacteria and mammalian cell culture. The substance was not mutagenic in a test with mammals.*

*Information on: piperazine*

*Assessment of mutagenicity:*

*In the majority of studies performed with microorganisms and in mammalian cell culture, a mutagenic effect was not found. A mutagenic effect was also not observed in in vivo tests. Literature data.*

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#### Carcinogenicity

*Information on: 2,2'-(methylimino)diethanol*

*Assessment of carcinogenicity:*

*The whole of the information assessable provides no indication of a carcinogenic effect. Under certain conditions the substance can form nitrosamines. Nitrosamines are carcinogenic in animal studies.*

*Information on: piperazine*

*Assessment of carcinogenicity:*

*Results from poorly documented long-term studies in rats and mice gave no indication of a carcinogenic potential. No data was available concerning carcinogenic activity. Under certain conditions the substance can form nitrosamines. Nitrosamines are carcinogenic in animal studies.*

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#### Reproductive toxicity

*Information on: 2,2'-(methylimino)diethanol*

*Assessment of reproduction toxicity:*

*The potential to impair fertility cannot be excluded when given at maternally toxic doses. The results were determined in a Screening test (OECD 421/422). The product has not been fully tested. The statements have been derived in parts from products of a similar structure or composition.*

*Information on: piperazine*

*Assessment of reproduction toxicity:*

*The results of animal studies suggest a fertility impairing effect.*

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#### Developmental toxicity

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*Information on: 2,2'-(methylimino)diethanol*

*Assessment of teratogenicity:*

*In animal studies the substance did not cause malformations. The product has not been fully tested. The statements have been derived in parts from products of a similar structure or composition.*

*Information on: piperazine*

*Assessment of teratogenicity:*

*Indications of possible developmental toxicity/teratogenicity were seen in animal studies.*

Specific target organ toxicity (single exposure)

No data available.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

*Information on: 2,2'-(methylimino)diethanol*

*Assessment of repeated dose toxicity:*

*No adverse effects were observed after repeated dermal exposure in animal studies. After repeated exposure the prominent effect is local irritation.*

Aspiration hazard

No aspiration hazard expected.

Other relevant toxicity information

No experimental evidence available for genotoxicity in vitro (Ames test negative). The product has not been tested. The statement has been derived from the properties of the individual components.

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## SECTION 12: Ecological Information

### 12.1. Toxicity

*Information on: 2,2'-methyliminodiethanol*

*Toxicity to fish:*

*LC50 (96 h) 1,466 mg/l, *Leuciscus idus* (DIN 38412 Part 15, static)*

*Nominal concentration. The product will cause changes in the pH value of the test system. The result refers to an unneutralized sample. After neutralization no appreciable reduction in harmful effect can be observed.*

*Information on: piperazine*

*Toxicity to fish:*

*LC50 (96 h) > 1,800 mg/l, *Poecilia reticulata* (Directive 84/449/EEC, C.1, semistatic)*

*Nominal concentration. Literature data.*

*LC50 (96 h) > 391 mg/l, *Cyprinodon variegatus* (OECD 203; ISO 7346; 84/449/EEC, C.1, semistatic)*

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*Nominal concentration. Limit concentration test only (LIMIT test).*

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*Information on: 2,2'-methyliminodiethanol*

*Aquatic invertebrates:*

*EC50 (48 h) 233 mg/l, Daphnia magna (Directive 79/831/EEC, static)*

*Nominal concentration.*

*LC50 (48 h) 45 mg/l, Arcatia tonsa (ISO 14669, static)*

*Nominal concentration.*

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*Information on: 2,2'-methyliminodiethanol*

*Aquatic plants:*

*EC50 (72 h) 176 mg/l (growth rate), Scenedesmus subspicatus (DIN 38412 Part 9)*

*Nominal concentration.*

*EC10 (72 h) 19 mg/l (growth rate), Scenedesmus subspicatus (DIN 38412 Part 9)*

*Nominal concentration.*

*EC50 (72 h) 410 mg/l (growth rate), Skeletonema costatum (ISO/DIS 10253)*

*Nominal concentration.*

*EC50 (72 h) 141 mg/l (growth rate), Skeletonema costatum (ISO/DIS 10253)*

*Nominal concentration.*

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*Information on: 2,2'-methyliminodiethanol*

*Microorganisms/Effect on activated sludge:*

*EC20 (30 min) > 1,000 mg/l, activated sludge, domestic (Directive 88/302/EEC, part C, p. 118, aerobic)*

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## **12.2. Persistence and degradability**

*Information on: 2,2'-methyliminodiethanol*

*Elimination information:*

*96 % DOC reduction (18 d) (OECD 301 A (new version)) (aerobic, activated sludge, domestic)*

*15 % BOD of the ThOD (63 d) (OECD Guideline 306) (aerobic, Seawater)*

*< 1 % BOD of the ThOD (28 d) (OECD Guideline 306) (Seawater)*

*Information on: piperazine*

*Elimination information:*

*65 % BOD of the ThOD (28 d) (OECD Guideline 301 F) (aerobic, activated sludge, domestic)*

*96 % DOC reduction (52 d) (OECD Guideline 302 A) (aerobic, activated sludge, domestic, non-adapted)*

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*1 % BOD of the ThOD (63 d) (OECD Guideline 306) (aerobic, Seawater)*

*3 % BOD of the ThOD (28 d) (OECD Guideline 306) (aerobic, Seawater)*

### **12.3. Bioaccumulative potential**

*Information on: 2,2'-methyliminodiethanol*

*Bioaccumulation potential:*

*Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.*

### **12.4. Mobility in soil**

*Information on: 2,2'-(methylimino)diethanol*

*Assessment transport between environmental compartments:*

*Volatility: The substance will not evaporate into the atmosphere from the water surface. The data refer to the uncharged form of the substance.*

*Adsorption in soil: Adsorption to solid soil phase is not expected. The data refer to the charged form of the substance.*

*Information on: piperazine*

*Assessment transport between environmental compartments:*

*Volatility: The substance will not evaporate into the atmosphere from the water surface.*

*Adsorption in soil: Adsorption to solid soil phase is not expected.*

### **12.5. Results of PBT and vPvB assessment**

According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): Not fulfilling PBT (persistent/bioaccumulative/toxic) criteria.

According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the vPvB criteria (very persistent/very bioaccumulative)

### **12.6. Other adverse effects**

The product does not contain substances that are listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

### **12.7. Additional information**

Adsorbable organically-bound halogen (AOX):

This product contains no organically-bound halogen.

Other ecotoxicological advice:

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Due to the pH-value of the product, neutralization is generally required before discharging sewage into treatment plants. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations. Do not release untreated into natural waters. The product has not been tested. The statement has been derived from the properties of the individual components.

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## SECTION 13: Disposal Considerations

### 13.1. Waste treatment methods

Incinerate in suitable incineration plant, observing local authority regulations.

The UK Environmental Protection (Duty of Care) Regulations (EP) and amendments should be noted (United Kingdom).

This product and any uncleaned containers must be disposed of as hazardous waste in accordance with the 2005 Hazardous Waste Regulations and amendments (United Kingdom)

Contaminated packaging:

Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

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## SECTION 14: Transport Information

### Land transport

ADR

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user	None known

RID

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user	None known



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### **Inland waterway transport**

ADN

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user:	None known

### **Transport in inland waterway vessel**

Not evaluated

### **Sea transport**

IMDG

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user:	None known

### **Air transport**

IATA/ICAO

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user:	None known

#### **14.1. UN number**

See corresponding entries for "UN number" for the respective regulations in the tables above.

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#### **14.2. UN proper shipping name**

See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

#### **14.3. Transport hazard class(es)**

See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

#### **14.4. Packing group**

See corresponding entries for "Packing group" for the respective regulations in the tables above.

#### **14.5. Environmental hazards**

See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.

#### **14.6. Special precautions for user**

See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

#### **14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code**

Regulation:	Not evaluated
Shipment approved:	Not evaluated
Pollution name:	Not evaluated
Pollution category:	Not evaluated
Ship Type:	Not evaluated

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### **SECTION 15: Regulatory Information**

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

##### Prohibitions, Restrictions and Authorizations

Annex XVII of Regulation (EC) No 1907/2006: Number on List: 3

Directive 2012/18/EU - Control of Major Accident Hazards involving dangerous substances (EU):  
Listed in above regulation: no

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

The data should be considered when making any assessment under the Control of Substances Hazardous to Health Regulations (COSHH), and related guidance, for example, 'COSHH Essentials' (United Kingdom).

#### **15.2. Chemical Safety Assessment**

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Lead substance(s) exposure scenarios are attached as annex to the safety data sheet.

## SECTION 16: Other Information

Work limitations for pregnant woman and for woman nursing babies should be observed. Work limitations for youth should be observed.

The product contains a CWC (Chemical Weapon Convention)- relevant substance (schedule 2 or 3). This may result in obligations for your company due to national authority requirements relevant for CWC controlled operations.

Full text of the classifications, including the hazard classes and the hazard statements, if mentioned in section 2 or 3:

Eye Dam./Irrit.	Serious eye damage/eye irritation
Resp. Sens.	Respiratory sensitization
Skin Sens.	Skin sensitization
Repr.	Reproductive toxicity
Flam. Sol.	Flammable solids
Skin Corr./Irrit.	Skin corrosion/irritation
H318	Causes serious eye damage.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317	May cause an allergic skin reaction.
H361fd	Suspected of damaging fertility. Suspected of damaging the unborn child.
H319	Causes serious eye irritation.
H228	Flammable solid.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.

### Abbreviations

ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road.  
 ADN = The European Agreement concerning the International Carriage of Dangerous Goods by Inland waterways. ATE = Acute Toxicity Estimates. CAO = Cargo Aircraft Only. CAS = Chemical Abstract Service. CLP = Classification, Labelling and Packaging of substances and mixtures. DIN = German national organization for standardization. DNEL = Derived No Effect Level. EC50 = Effective concentration median for 50% of the population. EC = European Community. EN = European Standards. IARC = International Agency for Research on Cancer. IATA = International Air Transport Association. IBC-Code = Intermediate Bulk Container code. IMDG = International Maritime Dangerous Goods Code. ISO = International Organization for Standardization. STEL = Short-Term Exposure Limit. LC50 = Lethal concentration median for 50% of the population. LD50 = Lethal dose median for 50% of the population. TLV = Threshold Limit Value. MARPOL = The International Convention for the Prevention of Pollution from Ships. NEN = Dutch Norm. NOEC = No Observed Effect Concentration. OEL = Occupational Exposure Limit. OECD = Organization for Economic Cooperation and Development. PBT = Persistent, Bioaccumulative and Toxic. PNEC = Predicted No Effect Level. PPM = Parts per million. RID = The European Agreement concerning the International Carriage of Dangerous Goods by Rail. TWA = Time Weight Average. UN-number = UN number at transport. vPvB = very Persistent and very Bioaccumulative.

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The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

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Vertical lines in the left hand margin indicate an amendment from the previous version.

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## Annex: Exposure Scenarios

### Index

**1.** Formulation & (re)packing of substances and mixtures

SU3; PROC1, PROC8a, PROC8b, PROC15

**2.** Use in gas treatment

SU3; PROC1, PROC8b

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### 1. Short title of exposure scenario

Formulation &amp; (re)packing of substances and mixtures

SU3; PROC1, PROC8a, PROC8b, PROC15

### Control of exposure and risk management measures

#### Contributing exposure scenario

<b>Use descriptors covered</b>	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
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#### Contributing exposure scenario

<b>Use descriptors covered</b>	PROC1: Use in closed process, no likelihood of exposure. Use domain: industrial
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#### Operational conditions

Concentration of the substance	piperazine Content: >= 0 % - <= 100 %
Physical state	Solid in solution, Solid, Granules or flakes
Vapour pressure of the substance during use	0.39 hPa
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Exposed skin area	Palm of one hand (240 cm <sup>2</sup> )

#### Risk Management Measures

Provide extract ventilation to points where emissions occur (LEV).	Effectiveness: 90 %
Wear chemically resistant gloves in combination with intensive management supervision control.	Effectiveness: 99 %
Wear suitable working clothes. Use suitable eye protection.	
Risk Management Measures are	

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based on qualitative risk characterisation.	
<b>Exposure estimate and reference to its source</b>	
Assessment method	ECETOC TRA v2.0 Worker
	Worker - inhalation, long-term - systemic
Exposure estimate	0.035 mg/m <sup>3</sup>
Risk Characterization Ratio (RCR)	0.358
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: Use of gloves has been considered additionally.
	Worker - dermal, long-term - systemic
Exposure estimate	0.0003 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.024
Assessment method	Qualitative assessment
	Worker - local
	Exposure is considered negligible.
<b>Guidance to Downstream Users</b>	
For scaling see: <a href="http://www.ecetoc.org/tra">http://www.ecetoc.org/tra</a> Please note that a modified version has been used (see exposure estimates)	

<b>Contributing exposure scenario</b>	
<b>Use descriptors covered</b>	PROC8a: Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities Use domain: industrial
<b>Operational conditions</b>	
Concentration of the substance	piperazine Content: >= 0 % - <= 100 %
Physical state	Liquid, low fugacity
Vapour pressure of the substance during use	0.39 hPa
Duration and Frequency of activity	< 15 min 5 days per week Relevant for inhalative exposure estimates
Duration and Frequency of activity	5 min Relevant for dermal exposure estimates
Indoor/Outdoor	Outdoor, Indoor
Exposed skin area	Palm of both hands (480 cm <sup>2</sup> )
Amounts used	Amount per use 0.2 l/min Relevant for dermal exposure estimates
<b>Risk Management Measures</b>	
Local exhaust ventilation	Effectiveness: 90 %
Wear chemically resistant gloves in combination with intensive management supervision control.	Effectiveness: 99 %
Wear suitable respiratory protection.	Effectiveness: 90 %
Wear suitable working clothes. Use	

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suitable eye protection.	
Risk Management Measures are based on qualitative risk characterisation.	
<b>Exposure estimate and reference to its source</b>	
Assessment method	ECETOC TRA v2.0 Worker
	Worker - inhalation, long-term - systemic
Exposure estimate	0.045 mg/m <sup>3</sup>
Risk Characterization Ratio (RCR)	0.448
Assessment method	RISKOFDERM v2.1
	Worker - dermal, long-term - systemic
Exposure estimate	0.001 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.093
Assessment method	Qualitative assessment
	Worker - local
	Exposure is considered negligible.
<b>Guidance to Downstream Users</b>	
For scaling see: <a href="http://www.ecetoc.org/tra">http://www.ecetoc.org/tra</a> For scaling see: <a href="http://www.tno.nl">http://www.tno.nl</a> and search for "riskofderm".	

<b>Contributing exposure scenario</b>	
<b>Use descriptors covered</b>	PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Use domain: industrial
<b>Operational conditions</b>	
Concentration of the substance	piperazine Content: >= 0 % - <= 100 %
Physical state	Liquid, low fugacity
Vapour pressure of the substance during use	0.39 hPa
Duration and Frequency of activity	< 480 min 5 days per week Relevant for inhalative exposure estimates
Duration and Frequency of activity	10 min Relevant for dermal exposure estimates
Indoor/Outdoor	Indoor
	Large workrooms only
Exposed skin area	Palm of both hands (480 cm <sup>2</sup> )
Amounts used	Amount per use 0.002 l/min Relevant for dermal exposure estimates
<b>Risk Management Measures</b>	
Ensure mechanical ventilation is in place. Ensure that task is semi-automated or automated. Ensure material transfers are under containment or extract ventilation	

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Wear chemically resistant gloves in combination with intensive management supervision control.	Effectiveness: 99 %
Use suitable eye protection. Wear suitable working clothes.	
Risk Management Measures are based on qualitative risk characterisation.	
<b>Exposure estimate and reference to its source</b>	
Assessment method	Advanced REACH Tool v1.0
	Worker - inhalation, long-term - systemic
Exposure estimate	0.047 mg/m <sup>3</sup>
Risk Characterization Ratio (RCR)	0.47
	The exposure estimate represents the 90th percentile of the exposure distribution.
Assessment method	RISKOFDERM v2.1
	Worker - dermal, long-term - systemic
Exposure estimate	0.004 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.286
Assessment method	Qualitative assessment
	Worker - local
	Exposure is considered negligible.
<b>Guidance to Downstream Users</b>	
For scaling see: <a href="http://www.tno.nl">http://www.tno.nl</a> and search for "riskofderm". For scaling see: <a href="http://www.advancedreachttool.com">http://www.advancedreachttool.com</a>	

<b>Contributing exposure scenario</b>	
<b>Use descriptors covered</b>	PROC15: Use a laboratory reagent. Use domain: industrial
<b>Operational conditions</b>	
Concentration of the substance	piperazine Content: >= 0 % - <= 100 %
Physical state	Liquid, low fugacity
Vapour pressure of the substance during use	0.44 hPa
Duration and Frequency of activity	15 - 60 min 5 days per week
Indoor/Outdoor	Indoor
Exposed skin area	Palm of one hand (240 cm <sup>2</sup> )
<b>Risk Management Measures</b>	
Provide extract ventilation to points where emissions occur (LEV).	
Wear chemically resistant gloves in combination with intensive management supervision control.	Effectiveness: 99 %
Wear suitable working clothes. Use	



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suitable eye protection.	
Risk Management Measures are based on qualitative risk characterisation.	
<b>Exposure estimate and reference to its source</b>	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalation
Exposure estimate	0.351 mg/m <sup>3</sup>
Risk Characterization Ratio (RCR)	< 0.3
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: Use of gloves has been considered additionally.
	Worker - dermal, long-term - systemic
Exposure estimate	0.0003 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.0085
Assessment method	Qualitative assessment
	Worker - dermal, long-term - local
	Exposure is considered negligible.
Assessment method	Qualitative assessment
	Worker - contact with eyes
	Exposure is considered negligible.
<b>Guidance to Downstream Users</b>	
For scaling see: <a href="http://www.ecetoc.org/tra">http://www.ecetoc.org/tra</a> Please note that a modified version has been used (see exposure estimates)	

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**2. Short title of exposure scenario**Use in gas treatment  
SU3; PROC1, PROC8b**Control of exposure and risk management measures**

<b>Contributing exposure scenario</b>	
<b>Use descriptors covered</b>	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.
<b>Contributing exposure scenario</b>	
<b>Use descriptors covered</b>	PROC1: Use in closed process, no likelihood of exposure. Use domain: industrial
<b>Operational conditions</b>	
Concentration of the substance	piperazine Content: >= 0 % - < 60 %
Physical state	Liquid, low fugacity

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Vapour pressure of the substance during use	0.39 hPa
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor, Outdoor
Exposed skin area	Palm of one hand (240 cm <sup>2</sup> )
<b>Risk Management Measures</b>	
Wear chemically resistant gloves in combination with intensive management supervision control.	Effectiveness: 99 %
Wear suitable working clothes. Use suitable eye protection.	
Risk Management Measures are based on qualitative risk characterisation.	
<b>Exposure estimate and reference to its source</b>	
Assessment method	ECETOC TRA v2.0 Worker
	Worker - inhalation, long-term - systemic
Exposure estimate	0.015 mg/m <sup>3</sup>
Risk Characterization Ratio (RCR)	0.15
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: Use of gloves has been considered additionally.
	Worker - dermal, long-term - systemic
Exposure estimate	0.002 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.147
Assessment method	Qualitative assessment
	Worker - local
	Exposure is considered negligible.
<b>Guidance to Downstream Users</b>	
For scaling see: <a href="http://www.ecetoc.org/tra">http://www.ecetoc.org/tra</a> Please note that a modified version has been used (see exposure estimates)	

<b>Contributing exposure scenario</b>	
<b>Use descriptors covered</b>	PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Use domain: industrial
<b>Operational conditions</b>	
Concentration of the substance	piperazine Content: >= 0 % - <= 100 %
Physical state	Liquid, low fugacity
Vapour pressure of the substance during use	0.44 hPa
Duration and Frequency of activity	< 15 min 5 days per week
Indoor/Outdoor	Indoor

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Exposed skin area	Palm of both hands (480 cm <sup>2</sup> )
<b>Risk Management Measures</b>	
Provide extract ventilation to points where emissions occur (LEV).	
Wear chemically resistant gloves in combination with intensive management supervision control.	Effectiveness: 99 %
Wear suitable working clothes.	
Risk Management Measures are based on qualitative risk characterisation.	
<b>Exposure estimate and reference to its source</b>	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalation
Exposure estimate	0.105 mg/m <sup>3</sup>
Risk Characterization Ratio (RCR)	0.35
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: Use of gloves has been considered additionally.
	Worker - dermal, long-term - systemic
Exposure estimate	0.0041 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.085
Assessment method	Qualitative assessment
	Worker - dermal, long-term - local
	Exposure is considered negligible.
<b>Guidance to Downstream Users</b>	
For scaling see: <a href="http://www.ecetoc.org/tra">http://www.ecetoc.org/tra</a> Please note that a modified version has been used (see exposure estimates)	

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