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

1.1. Product identifier

Trade name : Carbon monoxide, Carbon monoxide N20
SDS no : NOAL_0019
Chemical description : Carbon monoxide
CAS-No. : 630-08-0
EC-No. : 211-128-3
EC Index-No. : 006-001-00-2
Registration-No. : 01-2119480165-39
Chemical formula : CO

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
See the list of identified uses and exposure scenarios in the annex of the safety data sheet.
Contact supplier for more information on uses.
Uses advised against : Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification

AIR LIQUIDE Denmark A/S
Høje Taastrupvej 42
2630 Taastrup - DENMARK
T +45 76 25 25 25
eunordic-sds@airliquide.com

E-Mail address (competent person) : eunordic-sds@airliquide.com

1.4. Emergency telephone number


Emergency telephone number : 112
Availability
(24 / 7)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

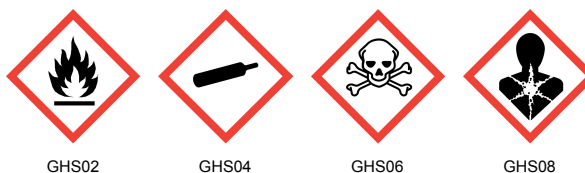
Physical hazards	Flammable gases, Category 1	H220
	Gases under pressure : Compressed gas	H280
Health hazards	Acute toxicity (inhalation:gas) Category 3	H331
	Reproductive toxicity, Category 1A	H360D
	Specific target organ toxicity — Repeated exposure, Category 1	H372

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2.2. Label elements

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

Hazard pictograms (CLP) :



Signal word (CLP) :

Danger

Hazard statements (CLP) :

H220 - Extremely flammable gas..
 H280 - Contains gas under pressure; may explode if heated..
 H331 - Toxic if inhaled..
 H360D - May damage the unborn child..
 H372 - Causes damage to organs through prolonged or repeated exposure..

Precautionary statements (CLP)

- Prevention : P202 - Do not handle until all safety precautions have been read and understood..
 P260 - Do not breathe gas, vapours.
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking..
- Response : P308+P313 - IF exposed or concerned: Get medical advice.
 P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely..
 P381 - In case of leakage, eliminate all ignition sources.
 P304+P340+P315 - IF INHALED : Remove person to fresh air and keep comfortable for breathing. Get immediate medical advice / attention.
- Storage : P403 - Store in a well-ventilated place..
 P405 - Store locked up..

Supplemental information

: Restricted to professional users.

2.3. Other hazards

: None.

SECTION 3: Composition/information on ingredients


3.1. Substances

Name	Product identifier	Composition [V-%]:	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Carbon monoxide	(CAS-No.) 630-08-0 (EC-No.) 211-128-3 (EC Index-No.) 006-001-00-2 (Registration-No.) 01-2119480165-39	100	Flam. Gas 1, H220 Press. Gas (Comp.), H280 Acute Tox. 3 (Inhalation:gas), H331 Repr. 1A, H360D STOT RE 1, H372

Contains no other components or impurities which will influence the classification of the product.

3.2. Mixtures

: Not established.

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SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
Provide oxygen.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

- : Symptoms may include dizziness, headache, nausea and loss of co-ordination.
Delayed adverse effects possible.
Refer to section 11.

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

- : Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media


- Suitable extinguishing media : Water spray or fog.
Dry powder.
- Unsuitable extinguishing media : Carbon dioxide.
Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : None that are more hazardous than the product itself.

5.3. Advice for firefighters

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- : Try to stop release.
- Evacuate area.
- Monitor concentration of released product.
- Consider the risk of potentially explosive atmospheres.
- Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
- Eliminate ignition sources.
- Ensure adequate air ventilation.
- Act in accordance with local emergency plan.
- Stay upwind.

6.2. Environmental precautions

- : Try to stop release.

6.3. Methods and material for containment and cleaning up

- : Ventilate area.


6.4. Reference to other sections

- : See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Safe use of the product
- : The product must be handled in accordance with good industrial hygiene and safety procedures.
 - Only experienced and properly instructed persons should handle gases under pressure.
 - Consider pressure relief device(s) in gas installations.
 - Ensure the complete gas system was (or is regularly) checked for leaks before use.
 - Do not smoke while handling product.
 - Avoid exposure, obtain special instructions before use.
 - Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
 - Installation of a cross purge assembly between the cylinder and the regulator is recommended.
 - Avoid suck back of water, acid and alkalis.
 - Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
 - Purge air from system before introducing gas.
 - Take precautionary measures against static discharge.
 - Keep away from ignition sources (including static discharges).
 - Consider the use of only non-sparking tools.
 - Do not breathe gas.
 - Avoid release of product into atmosphere.
 - Ensure equipment is adequately earthed.
- Safe handling of the gas receptacle
- : Refer to supplier's container handling instructions.

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Do not allow backfeed into the container.

Protect cylinders from physical damage; do not drag, roll, slide or drop.

When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.

Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.

If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.

Never attempt to repair or modify container valves or safety relief devices.

Damaged valves should be reported immediately to the supplier.

Keep container valve outlets clean and free from contaminants particularly oil and water.

Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.

Close container valve after each use and when empty, even if still connected to equipment.

Never attempt to transfer gases from one cylinder/container to another.

Never use direct flame or electrical heating devices to raise the pressure of a container.

Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Suck back of water into the container must be prevented.

Open valve slowly to avoid pressure shock.

7.2. Conditions for safe storage, including any incompatibilities

: Observe all regulations and local requirements regarding storage of containers.

Containers should not be stored in conditions likely to encourage corrosion.

Container valve guards or caps should be in place.

Containers should be stored in the vertical position and properly secured to prevent them from falling over.

Stored containers should be periodically checked for general condition and leakage.

Keep container below 50°C in a well ventilated place.

Store containers in location free from fire risk and away from sources of heat and ignition.

Keep away from combustible materials.

Segregate from oxidant gases and other oxidants in store.

All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.


7.3. Specific end use(s)

: None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Carbon monoxide (630-08-0)		
OEL : Occupational Exposure Limits		
EU	TWA IOELV (EU) 8 h [mg/m ³]	23 mg/m ³
	TWA IOELV (EU) 8 h [ppm]	20 ppm
	STEL IOELV (EU) 15 min [mg/m ³]	117 mg/m ³
	STEL IOELV (EU) 15 min [ppm]	100 ppm
	Notes	SCOEL Recommendations (1995)
Denmark	TWA (DK) OEL 8h [mg/m ³]	29 mg/m ³
	TWA (DK) OEL 8h [ppm]	25 ppm
	Anmærkninger (DK)	(1996)

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Carbon monoxide (630-08-0)	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	100 ppm
Acute - systemic effects, inhalation	100 ppm
Long-term - local effects, inhalation	20 ppm
Long-term - systemic effects, inhalation	20 ppm

PNEC (Predicted No-Effect Concentration) : No data available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- : Product to be handled in a closed system and under strictly controlled conditions.
- Provide adequate general and local exhaust ventilation.
- Preferably use permanent leak-tight installations (e.g. welded pipes).
- Systems under pressure should be regularly checked for leakages.
- Ensure exposure is below occupational exposure limits (where available).
- Gas detectors should be used when toxic gases may be released.
- Consider the use of a work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment

- : A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:
- PPE compliant to the recommended EN/ISO standards should be selected.

• Eye/face protection

- : Wear safety glasses with side shields.
- Standard EN 166 - Personal eye-protection - specifications.

• Skin protection

- Hand protection

- : Wear working gloves when handling gas containers.
- Standard EN 388 - Protective gloves against mechanical risk.

- Other

- : Consider the use of flame resistant anti-static safety clothing.
- Standard EN ISO 14116 - Limited flame spread materials.
- Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.
- Wear safety shoes while handling containers.
- Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• Respiratory protection

- : Never use any kind of filtering respiratory protection equipment when working with this substance due to it having poor or no warning properties.
- Keep self contained breathing apparatus readily available for emergency use.
- Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
- Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

• Thermal hazards

- : None in addition to the above sections.

8.2.3. Environmental exposure controls

- : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

- Physical state at 20°C / 101.3kPa : Gas.
- Colour : Colourless.

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Odour	: Odourless.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH value	: Not applicable for gases and gas mixtures.
Molar mass	: 28 g/mol
Melting point	: -205 °C
Boiling point	: -192 °C
Flash point	: Not applicable for gases and gas mixtures.
Critical temperature [°C]	: -140 °C
Evaporation rate (ether=1)	: Not applicable for gases and gas mixtures.
Flammability range	: 10.9 - 76 vol %
Vapour pressure [20°C]	: Not applicable.
Vapour pressure [50°C]	: Not applicable.
Relative density, gas (air=1)	: 1
Relative density, liquid (water=1)	: 0.79
Solubility in water	: 30 mg/l
Partition coefficient n-octanol/water [log Kow]	: 1.78
Auto-ignition temperature	: 605 °C
Decomposition point [°C]	: Not applicable.
Viscosity [20°C]	: No reliable data available.
Explosive Properties	: Not applicable.
Oxidising Properties	: Not applicable.

9.2. Other information

Other data : No additional information available

SECTION 10: Stability and reactivity**10.1. Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.


10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions: Can form explosive mixture with air.
May react violently with oxidants.**10.4. Conditions to avoid**: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Avoid moisture in installation systems.**10.5. Incompatible materials**: Air, Oxidisers.
For additional information on compatibility refer to ISO 11114.
See also 'EIGA Doc.95: Avoidance of Failure of CO and of CO/CO2 Mixtures Cylinders' at www.eiga.eu.**10.6. Hazardous decomposition products**

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

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11.1. Information on toxicological effects

Acute toxicity : Toxic if inhaled.

LC50 inhalation rat (ppm)	3760 ppm/1h 1300 ppm/4h
---------------------------	----------------------------

Skin corrosion/irritation : No known effects from this product.
Serious eye damage/irritation : No known effects from this product.
Respiratory or skin sensitisation : No known effects from this product.
Germ cell mutagenicity : No known effects from this product.
Carcinogenicity : No known effects from this product.
Reproductive toxicity : No known effects from this product.
May damage the unborn child.
STOT-single exposure : Suppresses the oxygen uptake by red blood cells.
Target organ(s) : Blood.
STOT-repeated exposure : Causes damage to organs through prolonged or repeated exposure.
Target organ(s) : heart.
Aspiration hazard : Not applicable for gases and gas mixtures.

SECTION 12: Ecological information

12.1. Toxicity

Assessment : No ecological damage caused by this product.

EC50 48h - Daphnia magna [mg/l] : Study scientifically unjustified.

EC50 72h - Algae [mg/l] : Study scientifically unjustified.

LC50 96 h - Fish [mg/l] : Study scientifically unjustified.

12.2. Persistence and degradability

Assessment : Will not undergo hydrolysis.
Not readily biodegradable.

12.3. Bioaccumulative potential


Assessment : Not expected to bioaccumulate due to the low log Kow (log Kow < 4).
Refer to section 9.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.
Partition into soil is unlikely.

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

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12.6. Other adverse effects

Other adverse effects : No known effects from this product.
 Effect on the ozone layer : None.
 Effect on global warming : Contains greenhouse gas(es).

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.
 Do not discharge into areas where there is a risk of forming an explosive mixture with air.
 Waste gas should be flared through a suitable burner with flash back arrestor.
 Must not be discharged to atmosphere.
 Ensure that the emission levels from local regulations or operating permits are not exceeded.
 Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.
 Return unused product in original cylinder to supplier.
 List of hazardous waste codes (from Commission Decision 2001/118/EC) : 16 05 04 *: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

14.1. UN number

UN-No. : 1016

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : CARBON MONOXIDE, COMPRESSED
 Transport by air (ICAO-TI / IATA-DGR) : Carbon monoxide, compressed
 Transport by sea (IMDG) : CARBON MONOXIDE, COMPRESSED

14.3. Transport hazard class(es)

Labelling




2.3 : Toxic gases.
 2.1 : Flammable gases.

Transport by road/rail (ADR/RID)

Class : 2.
 Classification code : 1TF.
 Hazard identification number : 263.
 Tunnel Restriction : B/D - Tank carriage : Passage forbidden through tunnels of category B, C, D and E. Other carriage : Passage forbidden through tunnels of category D and E.

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.3 (2.1)
 Emergency Schedule (EmS) - Fire : F-D.

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Emergency Schedule (EmS) - Spillage : S-U.

14.4. Packing group

Transport by road/rail (ADR/RID) : Not established.
 Transport by air (ICAO-TI / IATA-DGR) : Not established.
 Transport by sea (IMDG) : Not established.

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.
 Transport by air (ICAO-TI / IATA-DGR) : None.
 Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200.
 Transport by air (ICAO-TI / IATA-DGR)
 Passenger and Cargo Aircraft : Forbidden.
 Cargo Aircraft only : Forbidden.
 Transport by sea (IMDG) : P200.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
 Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
 Before transporting product containers:
 - Ensure there is adequate ventilation.
 - Ensure that containers are firmly secured.
 - Ensure cylinder valve is closed and not leaking.
 - Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
 - Ensure valve protection device (where provided) is correctly fitted.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

: Not applicable.

SECTION 15: Regulatory information


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

EU-Regulations

Restrictions on use : Restricted to professional users (Annex XVII REACH).
 Seveso Directive : 2012/18/EU (Seveso III) : Covered.

National regulations

National legislation : Ensure all national/local regulations are observed.

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Denmark

Recommendations Danish Regulation : Young people below the age of 18 years are not allowed to use the product
Pregnant/breastfeeding women working with the product must not be in direct contact with the product
The requirements from the Danish Working Environment Authorities regarding work with carcinogens must be followed during use and disposal

15.2. Chemical safety assessment

A CSA has been carried out.

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010.

Abbreviations and acronyms : ATE - Acute Toxicity Estimate
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
EINECS - European Inventory of Existing Commercial Chemical Substances
CAS# - Chemical Abstract Service number
PPE - Personal Protection Equipment
LC50 - Lethal Concentration to 50 % of a test population
RMM - Risk Management Measures
PBT - Persistent, Bioaccumulative and Toxic
vPvB - Very Persistent and Very Bioaccumulative
STOT- SE : Specific Target Organ Toxicity - Single Exposure
CSA - Chemical Safety Assessment
EN - European Standard
UN - United Nations
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
IATA - International Air Transport Association
IMDG code - International Maritime Dangerous Goods
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
WGK - Water Hazard Class

Training advice : Ensure operators understand the flammability hazard.
Users of breathing apparatus must be trained.
Ensure operators understand the toxicity hazard.

Full text of H- and EUH-statements

Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Flam. Gas 1	Flammable gases, Category 1
Press. Gas (Comp.)	Gases under pressure : Compressed gas
Repr. 1A	Reproductive toxicity, Category 1A
STOT RE 1	Specific target organ toxicity — Repeated exposure, Category 1
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
H331	Toxic if inhaled.
H360D	May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
ERC2	Formulation of preparations

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ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC8d	Wide dispersive outdoor use of processing aids in open systems
PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
SU14	Manufacture of basic metals, including alloys
SU15	Manufacture of fabricated metal products, except machinery and equipment
SU3	Industrial uses: Uses of substances as such or in preparations* at industrial sites

DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Details given in this document are believed to be correct at the time of going to press.

Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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1. Exposure scenario EIGA019-1

Industrial uses, closed contained conditions

ES Ref.: EIGA019-1 ES Type: Worker - EIGA Revision date: 01/09/2016

Use descriptors	SU3, SU14, SU15 PROC1, PROC2, PROC3, PROC4, PROC8b, PROC9 ERC2, ERC6a, ERC6b, ERC8d
Processes, tasks, activities covered	Industrial uses, including product transfers and associated laboratory activities within different closed or contained systems
Assessment method	ECETOC TRA 2.0

2. Operational conditions and risk management measures

1.2.1 Contributing scenario controlling environmental exposure (ERC2, ERC6a, ERC6b, ERC8d)

Formulation of preparations, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Wide dispersive outdoor use of processing aids in open systems	
ERC2	Formulation of preparations
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC8d	Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	<= 100 %

Operational conditions

Amounts used	The actual tonnage handled per site is not considered to influence the immissions as such for this scenario as there is practically no release	
Frequency and duration of use	Covers frequency up to:	5 days/week
	Emission Days (days/year)	220
Environmental factors not influenced by risk management	No additional information	

Risk Management Measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Wastewater emission controls are not applicable as there is no direct release to wastewater	
	Soil emission controls are not applicable as there is no direct release to soil	
Organisation measures to prevent/limit release from site	Ensure operatives are trained to minimise releases	
Conditions and measures related to sewage treatment plant	Not applicable as there is no release to wastewater	
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations	
	See section 13 of the SDS	

1.2.2 Contributing scenario controlling worker exposure (PROC1)

Use in closed process, no likelihood of exposure	
PROC1	Use in closed process, no likelihood of exposure

Product characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	<= 100 %

Operational conditions

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Amounts used	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.	
Frequency and duration of use	Exposure duration	<= 8 h/day
	Covers frequency up to:	5 days/week
Other given operational conditions affecting workers exposure	Indoor or outdoor use	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Handle product within a closed system	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposure	
	Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	
Conditions and measures related to personal protection, hygiene and health evaluation	Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.	
	See section 8 of the SDS.	

1.2.3 Contributing scenario controlling worker exposure (PROC2, PROC3, PROC4)

Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises

PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	<= 100 %

Operational conditions

Amounts used	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.	
Frequency and duration of use	Exposure duration	<= 8 h/day
	Covers frequency up to:	5 days/week
Other given operational conditions affecting workers exposure	Indoor or outdoor use	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Handle product within a closed system	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposure	
	Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	
Conditions and measures related to personal protection, hygiene and health evaluation	Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.	
	See section 8 of the SDS.	

1.2.4 Contributing scenario controlling worker exposure (PROC8b, PROC9)

Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)



SAFETY DATA SHEET

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PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics

Physical form of product	See section 9 of the SDS, No additional information
Concentration of substance in product	<= 100 %

Operational conditions

Amounts used	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.	
Frequency and duration of use	Exposure duration	<= 8 h/day
	Covers frequency up to:	5 days/week
Other given operational conditions affecting workers exposure	Indoor or outdoor use	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Handle product within a closed system	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposure	
	Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed	
Conditions and measures related to personal protection, hygiene and health evaluation	Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.	

3. Exposure estimation and reference to its source

3.1. Health

3.2. Environment

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

4.1. Health

Guidance - Health	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see : . http://www.ecetoc.org/tra
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4.2. Environment

Guidance - Environment	Check that RMMs and OCs are as described above or of equivalent efficiency
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