	SAFETY DATA SHEET	Page : 1/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

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

1.1. Product identifier

Trade name : Kalinox

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.
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	Oxidising Gases, Category 1	H270
	Gases under pressure : Liquefied gas	H280
Health hazards	Specific target organ toxicity — Single exposure, Category 3, Narcosis	H336

2.2. Label elements

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

Hazard pictograms (CLP) :




GHS03

GHS04

GHS07

Signal word (CLP) : Danger

	SAFETY DATA SHEET	Page : 2/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

Hazard statements (CLP) : H270 - May cause or intensify fire; oxidiser..
H280 - Contains gas under pressure; may explode if heated..
H336 - May cause drowsiness or dizziness..

Precautionary statements (CLP)

- Prevention : P220 - Keep away from clothing and other combustible materials..
P244 - Keep valves and fittings free from oil and grease..
- Response : P370+P376 - In case of fire: stop leak if safe to do so..
P304+P340+P315 - IF INHALED : Remove person to fresh air and keep comfortable for breathing. Get immediate medical advice..
- Storage : P403 - Store in a well-ventilated place..

2.3. Other hazards

: Contact with liquid may cause cold burns/frostbite.

SECTION 3: Composition/information on ingredients

3.1. Substances

: Not established.

3.2. Mixtures

Name	Product identifier	Composition [V-%]:	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Oxygen	(CAS-No.) 7782-44-7 (EC-No.) 231-956-9 (EC Index-No.) 008-001-00-8 (REACH-no) *1	50	Ox. Gas 1, H270 Press. Gas (Comp.), H280
Nitrous oxide	(CAS-No.) 10024-97-2 (EC-No.) 233-032-0 (EC Index-No.) (REACH-no) 01-2119970538-25	50	Ox. Gas 1, H270 Press. Gas (Liq.), H280 STOT SE 3, H336

Full text of H-statements: see section 16

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

*1: Listed in Annex IV / V REACH, exempted from registration.


*2: Registration deadline not expired.

*3: Registration not required: Substance manufactured or imported < 1t/y.

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. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.

	SAFETY DATA SHEET	Page : 3/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

- Ingestion : Ingestion is not considered a potential route of exposure.

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

: In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.
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.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Specific hazards : Supports combustion.
Exposure to fire may cause containers to rupture/explode.
Hazardous combustion products : Nitric oxide/nitrogen dioxide.


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.
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.

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.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Eliminate ignition sources.
Ensure adequate air ventilation.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Act in accordance with local emergency plan.

	SAFETY DATA SHEET	Page : 4/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

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.
 Keep equipment free from oil and grease. For more guidance, refer to the EIGA Doc. 33 - Cleaning of Equipment for Oxygen Service downloadable at <http://www.eiga.eu>.
 Use no oil or grease.
 Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
 Use only oxygen approved lubricants and oxygen approved sealings.
 Avoid suck back of water, acid and alkalis.
 Do not breathe gas.
 Avoid release of product into atmosphere.

Safe handling of the gas receptacle

: Refer to supplier's container handling instructions.
 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.

	SAFETY DATA SHEET	Page : 5/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

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.
- Segregate from flammable gases and other flammable materials in store.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible materials.

7.3. Specific end use(s)

: None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Nitrous oxide (10024-97-2)		
OEL : Occupational Exposure Limits		
Denmark	TWA (DK) OEL 8h [mg/m ³]	90 mg/m ³
	TWA (DK) OEL 8h [ppm]	50 ppm
	Anmærkninger (DK)	(1994)

Nitrous oxide (10024-97-2)	
DNEL: Derived no effect level (Workers)	
Long-term - systemic effects, inhalation	183 mg/m ³

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

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- : Provide adequate general and local exhaust ventilation.
- Product to be handled in a closed system.
- Systems under pressure should be regularly checked for leakages.
- Ensure exposure is below occupational exposure limits (where available).
- Gas detectors should be used when oxidising 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 goggles when transfilling or breaking transfer connections.
- Standard EN 166 - Personal eye-protection - specifications.

• Skin protection

- Hand protection

- : Wear working gloves when handling gas containers.

	SAFETY DATA SHEET	Page : 6/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

- Other

Standard EN 388 - Protective gloves against mechanical risk.

: Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• Respiratory protection

: Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known.
Use gas filters with full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers.
Consult respiratory device supplier's product information for the selection of the appropriate device.
Gas filters do not protect against oxygen deficiency.
Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks .
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
- Colour

: Gas.
: Mixture contains one or more component(s) which have the following colour(s):
Colourless.

Odour

: Mixture contains one or more component(s) which have the following odour(s):
Sweetish.

Odour threshold

: Odour threshold is subjective and inadequate to warn of overexposure.

pH value

: Not applicable for gases and gas mixtures.

Molar mass

: Not applicable for gas mixtures.

Melting point

: Not applicable for gas mixtures.

Boiling point

: Not applicable for gas mixtures.

Flash point

: Not applicable for gases and gas mixtures.

Evaporation rate (ether=1)

: Not applicable for gases and gas mixtures.

Flammability range

: Non flammable.

Vapour pressure [20°C]

: Not known.

Vapour pressure [50°C]

: No data available

Relative density, gas (air=1)

: Heavier than air.

Solubility in water

: Solubility in water of component(s) of the mixture :
• Oxygen: 39 mg/l • Nitrous oxide: 1500 mg/l

Partition coefficient n-octanol/water [log Kow]

: Not applicable for gas mixtures.

Auto-ignition temperature

: Non flammable.

Decomposition point [°C]

: Not applicable.

Viscosity [20°C]

: No reliable data available.


Explosive Properties

: Not applicable.

Oxidising Properties

: Oxidiser.

9.2. Other information

	SAFETY DATA SHEET	Page : 7/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

Other data : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

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

: Violently oxidises organic material.

10.4. Conditions to avoid

: Avoid moisture in installation systems.

10.5. Incompatible materials

: May react violently with combustible materials.

May react violently with reducing agents.

Keep equipment free from oil and grease. For more guidance, refer to the EIGA Doc. 33 - Cleaning of Equipment for Oxygen Service downloadable at <http://www.eiga.eu>.

For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Classification criteria are not met.

Nitrous oxide (10024-97-2)

LC50 inhalation rat (ppm)	500000 ppm/4h
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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.
No known effects from this product.

STOT-single exposure : May cause drowsiness or dizziness.

STOT-repeated exposure : No known effects from this product.

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] : No data available.

EC50 72h - Algae [mg/l] : No data available.

LC50 96 h - Fish [mg/l] : No data available.

	SAFETY DATA SHEET	Page : 8/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

12.2. Persistence and degradability

Assessment : No data available.

12.3. Bioaccumulative potential

Assessment : No data available.

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.

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 any place where its accumulation could be dangerous.
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 hazardous 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. : 3157

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : LIQUEFIED GAS, OXIDIZING, N.O.S. (Oxygen, Nitrous oxide)
Transport by air (ICAO-TI / IATA-DGR) : Liquefied gas, oxidizing, n.o.s. (Oxygen, Nitrous oxide)
Transport by sea (IMDG) : LIQUEFIED GAS, OXIDIZING, N.O.S. (Oxygen, Nitrous oxide)

	SAFETY DATA SHEET	Page : 9/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

14.3. Transport hazard class(es)

Labelling



2.2 : Non-flammable, non-toxic gases.

5.1 : Oxidizing substances.

Transport by road/rail (ADR/RID)

Class : 2.
Classification code : 20.
Hazard identification number : 25.
Tunnel Restriction : C/E - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage : Passage forbidden through tunnels of category E.

Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) : 2.2 (5.1)

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.2 (5.1)
Emergency Schedule (EmS) - Fire : F-C.
Emergency Schedule (EmS) - Spillage : S-W.

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 : 200.
Cargo Aircraft only : 200.
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.

	SAFETY DATA SHEET	Page : 10/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

- 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 : None.
 Seveso Directive : 2012/18/EU (Seveso III) : Covered.

National regulations

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

Denmark

Recommendations Danish Regulation : Young people below the age of 18 years are not allowed to use the product


15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.

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

	SAFETY DATA SHEET	Page : 11/11
		Revised edition no : 1
		Compilation date : 3 / 12 / 2018
		Supersedes : 18 / 4 / 2016
Kalinox		NOAL_1027
		Country : DK / Language : EN

Training advice : None.

Further information : Classification using data from databases maintained by the European Industrial Gases Association (EIGA).
Classification in accordance with the calculation methods of Regulation (EC) 1272/2008 CLP.

Full text of H- and EUH-statements

Ox. Gas 1	Oxidising Gases, Category 1
Press. Gas (Comp.)	Gases under pressure : Compressed gas
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Narcosis
H270	May cause or intensify fire; oxidiser.
H280	Contains gas under pressure; may explode if heated.
H336	May cause drowsiness or dizziness.

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.