

SAFETY DATA SHEET

(in accordance with Regulation (EU) 2020/878 & with the AnnexII from REACH –
EU 2015/830 & EU 1272/2008/EU, 1907/2006/EU, 648/2004/EU)

R134A-Norflurane

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

1.1 Product identifier.

Product Name:	Norflurane
Product Code:	R134A
Chemical Name:	norflurane
CAS No:	811-97-2
EC No:	212-377-0

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

Refrigerant Gas

1.3 Details of the supplier of the safety data sheet.

Company:
VAT:
Address:
Company:
Telephone
E-mail:

1.4 Emergency telephone number: +30 210 77 93 777 (Available 24 hours)

SECTION 2: HAZARDS IDENTIFICATION.

2.1 Classification of the substance or mixture.

In accordance with Regulation (EC) No 1272/2008:
Press. Gas : Contains gas under pressure; may explode if heated.

2.2 Label elements.

Labelling in accordance with Regulation (EC) No 1272/2008: Pictograms:



GHS04

Signal Word:

Warning

Hazard statements:

H280 Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

Precautionary statements:

P410+P403 Protect from sunlight. Store in a well-ventilated place.

Supplemental information

EIGA0783 Contains fluorinated greenhouse gases

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EIGA0357 Asphyxiant in high concentrations

2.3 Other hazards.

The substance is not PBT
The substance is not vPvB
Substance does not have endocrine disrupting properties.
Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects. Contact with evaporating liquid may cause frostbite or freezing of skin.

2.4 Potential environmental effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS.

3.1 Substances.

Identifiers	Name	Concentrate	(*)Classification - Regulation (EC) No 1272/2008	
			Classification	Specific concentration limits and Acute toxicity estimate
CAS No: 811-97-2 EC No: 212-377-0	norflurane	75 - 100 %	-	-

3.2 Mixtures.

Not Applicable.

SECTION 4: FIRST AID MEASURES.

4.1 Description of first aid measures.

It is recommended to move the affected person out of the exposure area.

Inhalation.

It may cause asphyxia at high concentrations. Asphyxia can lead to loss of consciousness or mobility. Take the victim into open air; keep them warm and calm. If breathing is irregular or stops, perform artificial respiration.

Eye contact.

Remove contact lenses, if present and if it is easy to do. Wash eyes with plenty of clean and cool water for at least 10 minutes while pulling eyelids up, and seek medical assistance.

Skin contact.

Do not rub affected areas. Wash skin vigorously with water and soap or a suitable skin cleaner. NEVER use solvents or thinners.

Ingestion.

This route of exposure is unlikely.

4.2 Most important symptoms and effects, both acute and delayed. No known acute or delayed effects from exposure to the product.

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

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Request immediate medical attention. If respiratory and/or heart failure occurs, perform resuscitation manoeuvres. Never administer anything orally to persons who are unconscious. If the person vomits, clear the respiratory tract.

SECTION 5: FIREFIGHTING MEASURES.

In case of fire, as a general hazard, heat can cause containers to explode.

5.1 Extinguishing media.

Suitable extinguishing media:

Extinguisher powder or CO₂.

Unsuitable extinguishing media:

Do not use a direct stream of water to extinguish. In the presence of electrical voltage, you cannot use water or foam as extinguishing media.

5.2 Special hazards arising from the substance or mixture.

Special risks.

Exposure to combustion or decomposition products can be harmful to your health.

During a fire and depending on its magnitude the following may occur: - Explosions.

5.3 Advice for firefighters.

Use water to cool tanks, cisterns, or containers close to the heat source or fire. Take wind direction into account. Prevent the products used to fight the fire from going into drains, sewers, or waterways. Follow the instructions given in the emergency or fire evacuation plan or plans if available. Move containers away from the area if there is no danger in doing so. Keep away from containers and continue cooling them from a safe place.

Fire protection equipment.

According to the size of the fire, it may be necessary to use protective suits against the heat, individual breathing equipment, gloves, protective goggles or facemasks, and boots. During extinction and depending on the magnitude and proximity to the fire, additional protective equipment such as chemical protection gloves, heat-reflecting suits or gas-tight suits may be required.

SECTION 6: ACCIDENTAL RELEASE MEASURES.

6.1 Personal precautions, protective equipment and emergency procedures.

Isolate the area and ensure adequate ventilation. Stockpiling in basements, pits or any confined space or depressed area can be hazardous. Use a self-contained breathing apparatus when the atmosphere is not suitable to be breathed. For exposure control and individual protection measures, see section 8.

6.2 Environmental precautions.

Product not classified as hazardous for the environment, avoid spillage as much as possible.

6.3 Methods and material for containment and cleaning up.

Use soapsuds to detect small leaks. Stop the leak if this can be done safely. Ensure adequate ventilation to prevent the accumulation of gases or vapours.

En caso de que el gas condense:

Contain and collect spillage with inert absorbent material (earth, sand, vermiculite, Kieselguhr...) and clean the area immediately with a suitable decontaminant. Deposit waste in closed and suitable containers for disposal, in compliance with local and national regulations (see section 13).

6.4 Reference to other sections.

For exposure control and individual protection measures, see section 8.

For later elimination of waste, follow the recommendations under section 13.

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SECTION 7: HANDLING AND STORAGE.

7.1 Precautions for safe handling. For personal protection, see section 8.

In the application area, smoking, eating, and drinking must be prohibited.

Follow legislation on occupational health and safety.

Pressurised gases must be handled by suitably trained and experienced individuals. Use equipment suitable for supply pressure and temperature. Protect containers against physical damage and keep valves clean and in perfect condition. Do not tamper with original packaging.

7.2 Conditions for safe storage, including any incompatibilities.

Store according to local legislation. Observe indications on the label. Store the containers between 5 and 25 °C, in a dry and wellventilated place, far from sources of heat and direct solar light. Keep far away from ignition points. Keep away from oxidising agents and from highly acidic or alkaline materials. Do not smoke. Prevent the entry of non-authorized persons. It must not be stored under conditions conducive to corrosion of the container. Protect containers against physical damage and inspect them regularly to ensure they are in good condition.

The product is not affected by Directive 2012/18/EU (SEVESO III).

7.3 Specific end use(s).

Not available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION.

8.1 Control parameters.

Work exposure limit for:

Name	CAS No.	Country	Limit value	ppm	mg/m ³
norflurane	811-97-2	European Union [1]	Eight hours		4240
			Short term		
		United Kingdom [2]	Eight hours	1000	4240
			Short term		

[1] According both Binding Occupational Exposure Limits (BOELVs) and Indicative Occupational Exposure Limits (IOELVs) adopted by Scientific Committee for Occupational Exposure Limits to Chemical Agents (SCOEL).

[2] According Limit Value (IOELV) list in 2nd Indicative Occupational Exposure adopted by Health and Safety Executive.

The product does NOT contain substances with Biological Limit Values.

8.2 Exposure controls.

Measures of a technical nature:

Provide adequate ventilation, which can be achieved by using good local exhaust-ventilation and a good general exhaust system.

Concentration:	100 %
Uses:	
Breathing protection:	

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PPE:	Filter mask for protection against gases and particles. «CE» marking, category III. The mask must have a wide field of vision and an	
Characteristics:	anatomically designed form in order to be sealed and watertight.	
CEN standards:	EN 136, EN 140, EN 405	
Maintenance:	Should not be stored in places exposed to high temperatures and damp environments before use. Special attention should be paid to the state of the inhalation and exhalation valves in the face adaptor. Read carefully the manufacturer's instructions regarding the equipment's use and maintenance. Attach	
Observations:	the necessary filters to the equipment according to the specific nature of the risk (Particles and aerosols: P1-P2-P3, Gases and vapours: A-B-E-K-AX), changing them as advised by the manufacturer.	
Filter Type needed:	A2	
Hand protection:		

PPE:	Protective gloves against mechanical risks Characteristics: «CE» marking, category II.	
CEN standards:	EN 420, EN 388, EN 374-1, EN 374-2, EN 374-3	
Observations:	Keep in a dry place, away from any sources of heat, and avoid exposure to sunlight as much as possible. Do not make any changes to the gloves that may alter their resistance, or apply paints, solvents or adhesives. The gloves, whether new or used, must be carefully inspected before use, particularly after a Maintenance: cleaning treatment and before putting them on, to ensure that there is no damage present. The gloves must not be left in contaminated conditions if they are to be reused, in which case the gloves must be cleaned as much as possible, provided there is no danger, before taking them off. Gloves should be of the appropriate size and fit the user's hand well, not being too loose or too tight.	
Material:	PVC (polyvinyl chloride)	Material thickness 0,35 (mm):
Breakthrough time	> 480 (min.):	
Eye protection:		

PPE:	Face shield.	
Characteristics:	«CE» marking, category II. Face and eye protector against splashing liquid.	
CEN standards:	EN 165, EN 166, EN 167, EN 168	
Maintenance:	Visibility through lenses should be ideal. Therefore, these parts should be cleaned daily. Protectors should be disinfected periodically following the manufacturer's instructions. Make sure that mobile parts move smoothly. Face shields should offer a field of vision with a dimension in the central line of, at least, 150 mm	
Observations:	vertically once attached to the frame.	
Skin protection:		

PPE:	Protective clothing.	
Characteristics:	«CE» marking, category II. Protective clothing should not be too tight or loose in order not to obstruct the user's movements.	
CEN standards:	EN 340	
Maintenance:	In order to guarantee uniform protection, follow the washing and maintenance instructions provided by the manufacturer.	
Observations:	The protective clothing should offer a level of comfort in line with the level of protection provided in terms of the hazard against which it protects, bearing in mind environmental conditions, the user's level of activity and the expected time of use.	

PPE:	Work footwear.	
Characteristics:	«CE» marking, category II.	
CEN standards:	EN ISO 13287, EN 20347	
Maintenance:	This product adapts to the first user's foot shape. That is why, as well as for hygienic reasons, it should not be used by other people.	
Observations:	Work footwear for professional use includes protection elements aimed at protecting users against any injury resulting from an accident	

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES.

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9.1 Information on basic physical and chemical properties.

Physical state: Gas - compressed

Colour: Not applicable/Not available due to the nature/properties of the product

Odour: Not applicable/Not available due to the nature/properties of the product

Odour threshold: Not applicable/Not available due to the nature/properties of the product

Melting point: Not applicable/Not available due to the nature/properties of the product

Freezing point: Not applicable/Not available due to the nature/properties of the product

Boiling point or initial boiling point and boiling range: -26,1 °C

Flammability: Not applicable/Not available due to the nature/properties of the product

Lower explosion limit: Not applicable/Not available due to the nature/properties of the product Upper

explosion limit: Not applicable/Not available due to the nature/properties of the product Flash point:
43,3 °C

Auto-ignition temperature: Not applicable/Not available due to the nature/properties of the product

Decomposition temperature: Not applicable/Not available due to the nature/properties of the product pH: Not
applicable/Not available due to the nature/properties of the product

Kinematic viscosity: Not applicable/Not available due to the nature/properties of the product

Solubility: Not applicable/Not available due to the nature/properties of the product

Hydrosolubility: Not applicable/Not available due to the nature/properties of the product

Liposolubility: Not applicable/Not available due to the nature/properties of the product

Partition coefficient n-octanol/water (log value): Not applicable/Not available due to the nature/properties of the product

Vapour pressure: Not applicable/Not available due to the nature/properties of the product

Absolute density: Not applicable/Not available due to the nature/properties of the product

Relative density: Not applicable/Not available due to the nature/properties of the product

Relative vapour density: Not applicable/Not available due to the nature/properties of the product Particle characteristics:
Not applicable/Not available due to the nature/properties of the product

9.2 Other information

Not applicable/Not available due to the nature/properties of the product

SECTION 10: STABILITY AND REACTIVITY.

10.1 Reactivity.

If the storage conditions are satisfied, does not produce dangerous reactions.

10.2 Chemical stability.

Stable under the recommended handling and storage conditions (see section 7).

10.3 Possibility of hazardous reactions.

Contains gas under pressure; may explode if heated.

10.4 Conditions to avoid.

Avoid the following conditions:

- Heating.
- Shocks.

10.5 Incompatible materials. Avoid the

following materials:

- Flammable materials.
- Explosives materials.
- Corrosive materials.

10.6 Hazardous decomposition products.

No decomposition if used for the intended uses.

SECTION 11: TOXICOLOGICAL INFORMATION.

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11.1 Information on hazard classes as defined in Regulation (EC) N° 1272/2008. There are no tested data available on the product.

- a) acute toxicity;
Not conclusive data for classification.
- b) skin corrosion/irritation;
Not conclusive data for classification.
- c) serious eye damage/irritation; Not conclusive data for classification.
- d) respiratory or skin sensitisation; Not conclusive data for classification.
- e) germ cell mutagenicity;
Not conclusive data for classification.
- f) carcinogenicity;
Not conclusive data for classification.
- g) reproductive toxicity;
Not conclusive data for classification.
- h) STOT-single exposure;
Not conclusive data for classification.
- i) STOT-repeated exposure;
Not conclusive data for classification.
- j) aspiration hazard;
Not conclusive data for classification.

11.2 Information on other hazards.

Endocrine disrupting properties

This product does not contain components with endocrine-disrupting properties with effects on human health.

Other information

There is no information available on other adverse health effects.

SECTION 12: ECOLOGICAL INFORMATION.

12.1 Toxicity.

No information is available regarding the ecotoxicity.

12.2 Persistence and degradability.

No information is available regarding the biodegradability

No information is available on the degradability

No information is available about persistence and degradability of the product.

The product evaporates quickly and enters the gas phase at room temperature. Information on its persistence and degradability is not relevant.

12.3 Bioaccumulative potential.

No information is available regarding the bioaccumulation.

12.4 Mobility in soil.

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No information is available about the mobility in soil.
Soil or water contamination is unlikely due to high volatility of the product.

12.5 Results of PBT and vPvB assessment.

No information is available about the results of PBT and vPvB assessment of the product.

12.6 Endocrine disrupting properties.

This product doesn't contain components with environmental endocrine disrupting properties.

12.7 Other adverse effects.

No information is available about other adverse effects for the environment.

SECTION 13: DISPOSAL CONSIDERATIONS.

13.1 Waste treatment methods.

Dispose of packaging through the supplier. Transport, unloading, treatment or disposal activities may be subject to additional local/national legislation. Waste and empty containers must be handled and eliminated according to current, local/national legislation.

Follow the provisions of Directive 2008/98/EC regarding waste management.

SECTION 14: TRANSPORT INFORMATION.

Transport following ADR rules for road transport, RID rules for railway, ADN for inner waterways, IMDG for sea, and ICAO/IATA for air transport.

Land: Transport by road: ADR, Transport by rail: RID.

Transport documentation: Consignment note and written instructions

Sea: Transport by ship: IMDG. Transport documentation: Bill of lading

Air: Transport by plane: ICAO/IATA.

Transport document: Airway bill.

14.1 UN number or ID number.

UN No: UN3159

14.2 UN proper shipping name.

Description:

ADR/RID: UN 3159, 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a), 2.2, (C/E)

IMDG: UN 3159, 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a), 2.2 (43,3°C)

ICAO/IATA: UN 3159, 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a), 2.2

14.3 Transport hazard class(es).

Class(es): 2

14.4 Packing group.

Packing group: Not applicable.

14.5 Environmental hazards.

Marine pollutant: No

Transport by ship, FEm – Emergency sheets (F – Fire, S - Spills): F-C,S-V

14.6 Special precautions for user.

Labels: 2.2

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Hazard number: 20 ADR
LQ: 120 ml
IMDG LQ: 120 ml ICAO LQ:
0
Provisions
concerning carriage in bulk
ADR: Not
authorized carriage in bulk
in accordance with
ADR. Proceed in accordance
with point
6.

14.7 Maritime transport in bulk according to IMO instruments. The product is not transported in bulk.

SECTION 15: REGULATORY INFORMATION.

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

The product is not affected by the Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer.

Product classification according to Annex I of Directive 2012/18/EU (SEVESO III): N/A

The product is not affected by Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products.

The product is not affected by the procedure established Regulation (EU) No 649/2012, concerning the export and import of dangerous chemicals.

15.2 Chemical safety assessment.

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

SECTION 16: OTHER INFORMATION.

Classification codes:

Press. Gas : Gases under pressure, Compressed

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008

[CLP]:

Physical hazards	On basis of test data
Health hazards	Calculation method
Environmental hazards	Calculation method

It is advisable to carry out basic training with regard to health and safety at work in order to handle this product correctly.

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Abbreviations and acronyms used:

ADR/RID: European Agreement concerning the International Carriage of Dangerous Goods by Road.

CEN: European Committee for Standardization.

PPE: Personal protection equipment.

IATA: International Air Transport Association.

ICAO: International Civil Aviation Organization.

IMDG: International Maritime Code for Dangerous Goods.

RID: Regulations Concerning the International Transport of Dangerous Goods by Rail.

Key literature references and sources for data:

<http://eur-lex.europa.eu/homepage.html>

<http://echa.europa.eu/> Regulation (EU)

2020/878.

Regulation (EC) No 1907/2006.

Regulation (EC) No 1272/2008.

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The information given in this Safety Data Sheet has been drafted in accordance with COMMISSION REGULATION (EU) 2020/878 of 18 June 2020 amending Annex II to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemical substances and mixtures (REACH).

The information in this Safety Data Sheet on the Preparation is based on current knowledge and on current EC and national laws, as far as the working conditions of the users is beyond our knowledge and control. The product must not be used for purposes other than those that are specified without first having written instructions on how to handle. It is always the responsibility of the user to take the appropriate measures in order to comply with the requirements established by current legislation. The information contained in this Safety Sheet only states a description of the safety requirements for the preparation, and it must not be considered as a guarantee of its properties.

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