

# Safety Data Sheet

**Trade name:** R404a

**Current version :** 1.0.1, issued: 12.06.2023

**Replaced version:** 1.0.0, issued: 16.01.2023

**Region:** USA

## SECTION 1: Identification

### 1.1 Product identifier

**Trade name**

**R404a**

### 1.2 Recommended use of the chemical and restrictions on use

**Recommended use of the chemical and restrictions on use**

Refrigerant for professional use in ultra-low temperature freezers

**Restrictions on use**

No data available.

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

**Address**

Eppendorf North America, Inc.  
175 Freshwater Blvd

Enfield, CT 06082  
United States of America

Telephone no. +1 800 645 3050

Fax no. +1 516 334 7506

**Information provided by / telephone**

email: certificates@eppendorf,.com

**Supplier**

**Address**

Eppendorf SE  
Barkhausenweg 1  
D-22339 Hamburg  
Germany

### 1.4 Emergency phone number

For medical and spill advice:

Phone: 800-451-8346 (Verisk 3E; client ID number: 12919)

## SECTION 2: Hazard(s) identification

### 2.1 Classification of the chemical

**Classification of the chemical in accordance with paragraph (d) of 29 CFR § 1910.1200 "Hazard Communication"**

Gases under Pressure - Liquefied gas

### 2.2 Label elements

**Pictogram(s)**



**Signal word**

Warning

**Hazard Statement(s)**

Physical hazards

Contains gas under pressure; may explode if heated

**Precautionary Statement(s)**

Storage

Protect from sunlight. Store in a well-ventilated place.

### 2.3 Labelling information

No data available

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## 2.4 Hazards not otherwise classified (HNOC)

No data available

## SECTION 3: Composition / information on ingredients

### 3.1 Substances

Not applicable. The product is not a substance.

### 3.2 Mixtures

#### Chemical characterization

Pressurised liquified gas

#### Hazardous ingredients

No	Substance name		
	CAS no.	Concentration	%
1	1,1,1-trifluoroethane		
	420-46-2	>= 50.00 - < 70.00	Vol%
2	pentafluoroethane		
	354-33-6	>= 25.00 - < 50.00	Vol%
3	norflurane		
	811-97-2	< 5.00	Vol%

## SECTION 4: First-aid measures

### 4.1 Description of necessary first-aid measures

#### General information

Remove contaminated clothing and shoes immediately, and launder thoroughly before reusing. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.

#### After inhalation

Ensure supply of fresh air. Remove affected person from the immediate area. Irregular breathing/no breathing: artificial respiration. Take medical treatment.

#### After skin contact

In case of could burns after contact with liquified gas: rinse with plenty of warm water (40°C approx.). If clothing is burnt onto the wound DO NOT pull off. Take for medical treatment.

#### After eye contact

Remove contact lenses. Rinse eye thoroughly under running water keeping eyelids wide open and protecting the unaffected eye (at least 10 to 15 minutes). Get immediate ophthalmic treatment.

#### After ingestion

Do not induce vomiting. Call a doctor. Never give anything by mouth to an unconscious person.

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

#### Symptoms

respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

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

No data available.

## SECTION 5: Fire-fighting measures

### 5.1 Extinguishing media

#### Suitable extinguishing media

Product itself is non-combustible; use fire extinguishing measures in surrounding areas as necessary.

#### Unsuitable extinguishing media

Full water jet

### 5.2 Specific hazards arising from the chemical

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In case of fire: danger of pressure build up, which could result in container rupture. In the event of fire, the following can be released: Carbon monoxide and carbon dioxide; Hydrogen fluoride (HF); Carbonyl fluoride; Fluorinated hydrocarbons; When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.

## 5.3 Special protective equipment and precautions for fire-fighters

Cool endangered containers with water spray jet. As in any fire, wear self-contained breathing apparatus (MSHA/ NIOSH approved or equivalent) and full protective gear.

## SECTION 6: Accidental release measures

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

#### For non-emergency personnel

Refer to protective measures listed in sections 7 and 8. Ensure adequate ventilation. Keep away from ignition sources.

#### For emergency responders

No data available. Personal protective equipment (PPE) - see Section 8.

### 6.2 Methods and materials for containment and cleaning up

Ventilate room.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

#### Precautions for safe handling

Provide good ventilation of working area (local exhaust ventilation if necessary). If workplace exposure limits are exceeded, respiratory protection approved for this particular job must be worn. Risks inherent to handling the product must be minimised by applying appropriate protective and preventive measures. Working processes should - so far as possible, according to the state of the art - be designed to rule out bodily contact or the release of hazardous substances.

#### General protective and hygiene measures

Do not eat, drink or smoke during work time. Keep away from foodstuffs and beverages. Avoid contact with eyes and skin. Remove soiled or soaked clothing immediately. Do not inhale vapours. Wash hands before breaks and after work. Provide eye wash fountain in work area. Hold emergency shower available.

#### Advice on protection against fire and explosion

Isolate from sources of heat, sparks and open flame.

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

#### Technical measures and storage conditions

Keep container tightly closed and dry in a cool, well-ventilated place. Store upright.

#### Requirements for storage rooms and vessels

Containers which are opened must be carefully resealed and kept upright to prevent leakage. Always keep in containers of same material as the original.

#### Incompatible products

Do not store together with: Acids; Oxidizing agents; Magnesium; Zinc; Calcium; Aluminium powder; Alkali metals; Earth alkali metals

## SECTION 8: Exposure controls / personal protection

### 8.1 Control parameters

No parameters available for monitoring.

### 8.2 Exposure controls

#### Appropriate engineering controls

Provide good ventilation of working area (local exhaust ventilation if necessary). Handle substance within a closed system

#### Individual protection measures, such as personal protective equipment

##### Respiratory protection

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If workplace exposure limits are exceeded, a respiration protection approved for this particular job must be worn. In case of aerosol and mist formation, take appropriate measures for breathing protection in the event workplace threshold values are not specified.

## Eye / face protection

Safety glasses (EN 166)

## Hand protection

Sufficient protection is given wearing suitable protective gloves in the event of risk of skin contact with the product. Before use, the protective glove should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties). Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves.

Appropriate Material                      Leather

## Other protection measures

Normal chemical work clothing.

## SECTION 9: Physical and chemical properties

<b>Form/Color</b>			
liquified gas			
colorless			
<b>Odor</b>			
ether-like			
<b>Odor threshold</b>			
No data available			
<b>pH value</b>			
Not applicable			
<b>Boiling point / boiling range</b>			
Value	-46.5	-	-45.7 °C
Reference pressure			1013 hPa
<b>Melting point / melting range</b>			
not determined			
<b>Sublimation point / sublimation range</b>			
Not applicable			
<b>Decomposition point / decomposition range</b>			
Value		728	°C
<b>Flash point</b>			
Not applicable			
<b>Ignition temperature</b>			
not determined			
<b>Auto-ignition temperature</b>			
not determined			
<b>Oxidising properties</b>			
Not applicable			
<b>Explosive properties</b>			
Not applicable			
<b>Flammability</b>			
Not applicable			
<b>Lower flammability or explosive limits</b>			
None			
Method	ASTM E 681		

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Upper flammability or explosive limits			
None			
Method		ASTM E 681	
Vapor pressure			
Value		12546	hPa
Reference temperature		25	°C
Vapor density			
Value		3.45	
Reference temperature		15	°C
Remarks		Air = 1	
Evaporation rate			
Value		> 1	g/h
Relative density			
No data available			
Density			
Value		5.39	kg/m³
Reference temperature		-45.8	°C
Solubility in water			
Remarks		slightly soluble	
Solubility(ies)			
not determined			
Partition coefficient: n-octanol/water			
No data available			
Viscosity			
Not applicable			
Other information			
Other information			
Critical temperature: 72 °C			

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

No data available.

### 10.2 Chemical stability

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

### 10.3 Possibility of hazardous reactions

Dangerous reactions are not to be expected when handling product according to its intended use.

### 10.4 Conditions to avoid

Heat, naked flames or other ignition sources, electrostatic charge and discharge, formation of vapours/aerosols.

### 10.5 Incompatible materials

Aluminium powder; calcium; Zinc; Magnesium; Oxidizing agents; Alkali metals; Earth alkali metals

### 10.6 Hazardous decomposition products

Fluorinated hydrocarbons

## SECTION 11: Toxicological information

### Information on toxicological effects

Acute oral toxicity
No data available

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## Acute dermal toxicity

No data available

## Acute inhalational toxicity

No data available

## Skin corrosion/irritation

No data available

## Serious eye damage/irritation

No data available

## Respiratory or skin sensitisation

No data available

## Germ cell mutagenicity

No data available

## Reproduction toxicity

No data available

## Carcinogenicity

No data available

## NTP Report on Carcinogens (RoC)

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) listed "known" (to be a human carcinogen) or "RAHC" (reasonably anticipated to be a human carcinogen).

## OSHA Standards listing cancer as a health effect (Table VII.6.2)

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) listed as carcinogenic.

## IARC Monographs on the Evaluation of Carcinogenic Risks to Humans

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) classified by the IARC Monographs.

## STOT - single exposure

No data available

## STOT - repeated exposure

No data available

## Aspiration hazard

No data available

## Delayed and immediate effects as well as chronic effects from short and long-term exposure

Product specific toxicological data are not available.

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Toxicity to fish (acute)

No data available

#### Toxicity to fish (chronic)

No data available

#### Toxicity to Daphnia (acute)

No data available

#### Toxicity to Daphnia (chronic)

No data available

#### Toxicity to algae (acute)

No data available

#### Toxicity to algae (chronic)

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No data available

## 12.2 Persistence and degradability

Biodegradability	
No	Product name
1	R404a
Evaluation	The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

Physico-chemical eliminability	
No	Product name
1	R404a
Not applicable	

## 12.3 Bioaccumulative potential

No data available.

## 12.4 Mobility in soil

Mobility in soil	
No	Product name
Remarks	Because of its high volatility, the product is unlikely to cause ground or water pollution.

## 12.5 Other adverse effects

No data available.

## 12.6 Other information

Other information
Do not discharge product unmonitored into the environment.

## SECTION 13: Disposal considerations

### 13.1 Disposal considerations

#### Product

Dispose in accordance with federal, state and local regulations.

#### Packaging

Residuals must be removed from packaging and when emptied completely disposed of in accordance with the regulations for waste removal. Incompletely emptied packaging must be disposed of in accordance with federal, state and local regulations.

## SECTION 14: Transport information

### 14.1 US DOT (Department of Transportation)

Transport hazard class	2.2
UN/NA number	UN3337
UN proper shipping name	Refrigerant gas R 404A
Label code(s)	2.2

### 14.2 Transport IMDG

Class	2.2
UN number	UN3337
Proper shipping name	REFRIGERANT GAS R 404A
EmS	F-C, S-V
Label	2.2

### 14.3 Transport ICAO-TI / IATA

Class	2.2
UN number	UN3337
Proper shipping name	Refrigerant gas R 404A
Label	2.2

### 14.4 Other information

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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 that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place.

## 14.5 Environmental hazards

Information on environmental hazards, if relevant, pls. see 14.1 - 14.3.

## 14.6 Special precautions for user

No data available.

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

Not relevant

## SECTION 15: Regulatory information

### 15.1 US Federal Regulations

#### Toxic Substances Control Act (TSCA)

According to the data available and/or specifications supplied by upstream suppliers, all components of this product are on the TSCA Inventory listed as active or are exempted from notification requirements.

The following substances have EPA regulatory flags in the TSCA Inventory:

No	Substance name	CAS no.	EPA TSCA Regulatory Flags
1	1,1,1-trifluoroethane	420-46-2	PMN
2	pentafluoroethane	354-33-6	PMN

#### CERCLA (Comprehensive Environmental Response, Compensation and Liability Act)

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered being subject to Table 302.4 "List of Hazardous Substances and Reportable Quantities".

#### Clean Air Act (CAA): Hazardous Air Pollutants (HAPS)

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered being "Hazardous Air Pollutants".

#### Clean Water Act (CWA) Section 307 (Toxic Pollutants) and Section 311 (Hazardous Substances)

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered to be "Hazardous Substances".

#### EPCRA SARA Section 313, Toxic Chemical Release Inventory

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered being subject to "SARA Reporting".

#### Emergency Planning & Community Right-to-Know Act (EPCRA) - Sections 302 and 304

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered being subject to reporting requirements.

#### Clean Air Act (CAA) - Section 602 Ozone depleting substances

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) listed as ozone depleting substance.

### 15.2 US State Regulations

#### Pennsylvania State Right to Know Hazardous Substance List

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered to be "Hazardous Substances".

#### New Jersey State Right to Know Hazardous Substance List

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered to be "Hazardous Substances".

#### Massachusetts State Right to Know Hazardous Substance List

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered to be "Hazardous Substances".

#### California Code of Regulations Title 8 §339, Hazardous Substances List



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According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered to be "Hazardous Substances".

## **Right to Know - California State - Proposition 65**

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substance(s) that are considered to be "Hazardous Substances".

## **SECTION 16: Other information, including date of preparation or last revision**

### **16.1 Other information**

No data available.

### **16.2 Date of preparation/revision of the SDS**

Current version	1.0.1	12.06.2023
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### **16.3 Department issuing safety data sheet**

UMCO GmbH  
Georg-Wilhelm-Str. 187, D-21107 Hamburg, Germany  
Tel.: +49 40 / 555 546 300 Fax: +49 40 / 555 546 357 e-mail: umco@umco.de

### **16.4 Conclusions**

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

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Prod-ID 779103

### **16.5 Key / Legend**

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5E - indicates a substance that is the subject of a TSCA section 5(e) order  
5F - indicates a substance that is the subject of a TSCA section 5(f) rule  
ACGIH - American Conference of Governmental Industrial Hygienists  
ATE – Acute Toxicity Estimate  
BOD - Biochemical Oxygen Demand  
CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania\*;  
CAS - Chemical Abstracts Service  
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act  
CFR - Code of Federal Regulations (US)  
CLP - Classification, Labelling, and Packaging  
DOT - Department of Transportation Commission  
ECHA – European Chemicals Agency  
EC / EL – Effective Concentration / Effective Loading  
EPA - Environmental Protection Agency  
IARC - International Agency for Research on Cancer  
IATA - International Air Transport Association  
IBC – Intermediate Bulk Container  
ICAO - International Civil Aviation Organization  
IDL - Ingredient Disclosure List  
IDLH - Immediately Dangerous to Life and Health  
IMDG - International Maritime Dangerous Goods  
IUCILID - International Uniform Chemical Information Database  
Kow - Octanol/water partition coefficient  
LD/LC - Lethal Dose/ Lethal Concentration  
MARPOL – Marine Pollution  
MEL - Maximum Exposure Limits  
NFPA - National Fire Protection Agency  
NIOSH - National Institute for Occupational Safety and Health  
NJTSR - New Jersey Trade Secret Registry  
NOEL/NOEC – No Observed Effect Level / No Observed Effect Concentration  
NTP - National Toxicology Program  
OSHA - Occupational Safety and Health Administration  
PEL- Permissible Exposure Limit  
PMN - indicates a commenced Pre Manufacture Notice substance  
RCRA - Resource Conservation and Recovery Act  
S - indicates a substance that is identified in a final Significant New Use Rule  
SARA - Superfund Amendments and Reauthorization Act  
SP - indicates a substance that is identified in a proposed Significant New Use Rule  
STEL - Short-term Exposure Limit  
STOT – Specific Target Organ Toxicity  
T - indicates a substance that is the subject of a final TSCA section 4 test rule or order  
TDG - Transportation of Dangerous Goods  
TLV - Threshold Limit Value  
TP - indicates a substance that is the subject of a proposed TSCA section 4 test rule or order  
TSCA - Toxic Substances Control Act  
TWA - Time Weighted Average  
UN/NA - United Nations /North American  
US - United States  
VLE - Exposure Limit Value (Mexico)  
VOC – Volatile Organic Compounds  
XU - indicates a substance exempt from reporting under the Chemical Data Reporting Rule