

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

R407C

SDS reference: SDS_R407C

Date of issue: 12/23/2023 Revision date: 6/27/2024

Warning



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

1.1. Product identifier

Trade name : R407C
SDS no : SDS_R407C

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

Relevant identified uses : Use as refrigerant.
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 : BUZWAIR INDUSTRIAL GASES FACTORIES
PO Box 319
Doha - Qatar
T +974 4460 1079
www.buzwairgases.com
gases@buzwairgases.com

1.4. Emergency telephone number

Emergency telephone number : +974 4451 6976

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Physical hazards : Gases under pressure : Liquefied gas H280

2.2. Label elements

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

Hazard pictograms (CLP) :



GHS04

Signal word (CLP) : Warning

Hazard statements (CLP) : H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP)
- Storage : P403 - Store in a well-ventilated place.

Supplemental information : Contains fluorinated greenhouse gases.



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2.3. Other hazards

: Asphyxiant in high concentrations.
Contact with liquid may cause cold burns/frostbite.

SECTION 3: Composition/information on ingredients**3.1. Substances** : Not applicable**3.2. Mixtures**

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Tetrafluoroethane (R134a)	(CAS-No.) 811-97-2 (EC-No.) 212-377-0 (EC Index-No.) (REACH-no) 01-2119459374-33	52 w/w	Press. Gas (Liq.), H280
Difluoromethane (R32)	(CAS-No.) 75-10-5 (EC-No.) 200-839-4 (EC Index-No.) (REACH-no) 01-2119471312-47	23 w/w	Flam. Gas 1, H220 Press. Gas (Liq.), H280
Pentafluoroethane	(CAS-No.) 354-33-6 (EC-No.) 206-557-8 (EC Index-No.) (REACH-no) 01-2119485636-25	25 w/w	Press. Gas (Liq.), H280

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

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

: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.
Refer to section 11.

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

: None.

SECTION 5: Firefighting measures**5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.



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- Unsuitable extinguishing media : 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 : Carbon monoxide. Hydrogen fluoride. Carbonyl fluoride.

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 : In confined space use self-contained breathing apparatus.

Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

: Try to stop release.

Evacuate area.

Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

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.

Stay upwind.

Oxygen detectors should be used when asphyxiating gases may be released.

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



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- 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.
 - Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
 - 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.

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.

7.3. Specific end use(s)

- : None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Tetrafluoroethane (R134a) (811-97-2)

OEL : Occupational Exposure Limits

United Kingdom	WEL - LTEL - UK [mg/m ³]	4240 mg/m ³
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	WEL - LTEL - UK [ppm]	1000 ppm
	Regulatory reference	EH40. HSE

Tetrafluoroethane (R134a) (811-97-2)		
DNEL: Derived no effect level (Workers)		
Long-term - systemic effects, inhalation		14000 mg/m ³

Difluoromethane (R32) (75-10-5)		
DNEL: Derived no effect level (Workers)		
Long-term - systemic effects, inhalation		7035 mg/m ³

Tetrafluoroethane (R134a) (811-97-2)		
PNEC: Predicted no effect concentration		
Aqua (freshwater)		0.1 mg/l
Aqua (marine water)		0.01 mg/l
Aquatic, intermittent releases		1 mg/l
Sediment, freshwater		0.75 mg/kg dwt
Micro-organisms in sewage treatment plant (STP)		73 mg/l

Difluoromethane (R32) (75-10-5)		
PNEC: Predicted no effect concentration		
Aqua (freshwater)		0.142 mg/l
Aquatic, intermittent releases		1.42 mg/l
Sediment, freshwater		0.534 mg/kg dwt

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- : Provide adequate general and local exhaust ventilation.
Systems under pressure should be regularly checked for leakages.
Ensure exposure is below occupational exposure limits (where available).
Oxygen detectors should be used when asphyxiating 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.
Standard EN 388 - Protective gloves against mechanical risk.
Wear cold insulating gloves when transfilling or breaking transfer connections.
Standard EN 511 - Cold insulating gloves.
 - Other
 - : 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.
Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.
Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks .
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.



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

Odour : Ethereal.

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

pH : Not applicable for gases and gas mixtures.

Melting point / Freezing point : Not applicable for gas mixtures.

Boiling point : -44 °C

Flash point : Not applicable for gases and gas mixtures.

Evaporation rate : Not applicable for gases and gas mixtures.

Flammability (solid, gas) : Non flammable.

Explosive limits : Non flammable.

Vapour pressure [20°C] : 16.53 bar(a)

Vapour density : Not applicable.

Relative density, gas (air=1) : Heavier than air.

Water solubility : Solubility in water of component(s) of the mixture :
• Tetrafluoroethane (R134a): 1930 mg/l • Difluoromethane (R32): 280000 mg/l • Pentafluoroethane: 900 mg/l

Partition coefficient n-octanol/water (Log Kow) : Not known.

Auto-ignition temperature : Non flammable.

Decomposition temperature : Not applicable.

Explosive properties : Not applicable.

Oxidising properties : Not applicable.

9.2. Other information

Molar mass : Not applicable for gas mixtures.

Critical temperature [°C] : Not known.

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

: May react violently with alkalis.



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10.4. Conditions to avoid

: Avoid moisture in installation systems.

10.5. Incompatible materials: May react violently with alkalis.
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.**Tetrafluoroethane (R134a) (811-97-2)**

LC50 inhalation rat (ppm) 567000 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.
Toxic for reproduction : Fertility : No known effects from this product.
Toxic for reproduction : unborn child : No known effects from this product.
STOT-single exposure : No known effects from this product.
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 : Classification criteria are not met.

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.

Tetrafluoroethane (R134a) (811-97-2)

EC50 48h - Daphnia magna [mg/l] 930 mg/l

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

LC50 96 h - Fish [mg/l] 450 mg/l

Difluoromethane (R32) (75-10-5)

EC50 48h - Daphnia magna [mg/l] 142 mg/l

EC50 72h - Algae [mg/l] 652 mg/l

LC50 96 h - Fish [mg/l] 1507 mg/l

Pentafluoroethane (354-33-6)

EC50 48h - Daphnia magna [mg/l] > 100 mg/l

EC50 72h - Algae [mg/l] 142 mg/l

LC50 96 h - Fish [mg/l] 109 mg/l

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 fluorinated greenhouse gases.
Calculated GWP of mixture : 1773.83
For quantities refer to cylinder label.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Refer to supplier's waste gas recovery programme.
Contact supplier if guidance is required.
Discharge to atmosphere in large quantities should be avoided.
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.eu> 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) : 14 06 01 *: Chlorofluorocarbons, HCFC, HFC.

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. : 3340

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : REFRIGERANT GAS R 407C

Transport by air (ICAO-TI / IATA-DGR) : Refrigerant gas R 407c

Transport by sea (IMDG) : REFRIGERANT GAS R 407C

14.3. Transport hazard class(es)

Labelling :





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2.2 : Non-flammable, non-toxic gases.

Transport by road/rail (ADR/RID)

Class : 2
Classification code : 2A
Hazard identification number : 20
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

Transport by sea (IMDG)

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

14.4. Packing group

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

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.
- 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



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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) : Not covered.

National regulations

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

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 2015/830.

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
STOT - RE : Specific Target Organ Toxicity - Repeated Exposure

Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training.

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

Flam. Gas 1	Flammable gases, Category 1
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.



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DISCLAIMER OF LIABILITY

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