

**! SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Name of product R 404A  
Art-Nr(n): 0048

**1.2. Relevant identified uses of the substance or mixture and uses advised against  
Recommended intended purpose(s)**

Refrigerant.

**1.3. Details of the supplier of the safety data sheet  
Manufacturer/distributor**

S. Zukauskio str. 11, Ramučiai, Kaunas district,  
LT - 54464, Lithuania  
Phone + 370 37 373248  
Fax. + 370 37 373198  
E-mail: info@brgroup.eu  
www.brgroup.eu

**1.4. Emergency telephone number****Emergency advice**

The Poison Information Bureau  
Siltnamų str. 29, LT-2043 Vilnius  
Phone +370 5 2362052;  
Fax. +370 5 236 21 42,  
E-mail.: info@tox.lt

**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]**

Hazard classes and Hazard categories	Hazard Statements Classification procedure
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Liquef. Gas	H280
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**! Hazard statements for physical hazards**

H280	Contains gas under pressure; may explode if heated.
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**2.2. Label elements****Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]**

GHS04

**! Signal word**

Warning

**! Hazard statements for physical hazards**

H280	Contains gas under pressure; may explode if heated.
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**Precautionary Statements****! Storage**

P403 Store in a well-ventilated place.

**Hazardous ingredients for labeling**

1,1,1-Trifluoroethane (R 143a), 1,1,1,2-Tetrafluoroethane (R 134a), Pentafluoroethane (R 125)

**Supplemental Hazard information (EU)****! Health properties**

Asphyxiant in high concentrations.

**! Environmental properties**

Contains fluorinated greenhouse gases.

**! Special rules for supplemental label elements for certain mixtures**

Withdrawal out of the liquid phase only.

**2.3. Other hazards****Adverse human health effects and symptoms**

Contact with liquid may cause cold burns/frostbite.

The inhalation of gas / vapour in high concentrations may cause cardiac arrhythmia.

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.

**Information pertaining to special dangers for human and environment**

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

Receptacle under pressure.

**Results of PBT and vPvB assessment**

The substances in this mixture do not meet the PBT/vPvB criteria of REACH, annex XIII.

**! SECTION 3: Composition/ information on ingredients****3.1. Substances**

not applicable

**3.2. Mixtures****Hazardous ingredients**

CAS No	EC No	Name	[% weight]	Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]
811-97-2	212-377-0	1,1,1,2-Tetrafluoroethane (R 134a)	2 - 6	Liq. Gas, H280
354-33-6	206-557-8	Pentafluoroethane (R 125)	42 - 46	Liq. Gas, H280
420-46-2	206-996-5	1,1,1-Trifluoroethane (R 143a)	51 - 53	Liq. Gas, H280 / Flam. Gas 1, H220

**REACH**

CAS No	Name	REACH registration number
811-97-2	1,1,1,2-Tetrafluoroethane (R 134a)	01-2119459374-33
354-33-6	Pentafluoroethane (R 125)	01-2119485636-25
420-46-2	1,1,1-Trifluoroethane (R 143a)	01-2119492869-13

**! SECTION 4: First aid measures****4.1. Description of first aid measures****General information**

Remove contaminated soaked clothing immediately.  
In the event of persistent symptoms receive medical treatment.  
Adhere to personal protective measures when giving first aid.

**In case of inhalation**

Remove the casualty into fresh air and keep him immobile.  
In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

**! In case of skin contact**

In case of contact with skin wash off with warm water.  
In case of frostbite rinse with plenty of water. Don't remove clothing.  
In case of frostbite spray with lukewarm (not hot) water for at least 15 minutes. Do not remove clothing frozen to the skin. Thaw it with lukewarm water. Apply a sterile dressing. Obtain medical assistance.

**In case of eye contact**

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
Call for a doctor immediately.

**In case of ingestion**

Ingestion is not considered a potential route of exposure.

**4.2. Most important symptoms and effects, both acute and delayed****Physician's information / possible symptoms**

The following symptoms may occur in case of strong exposition:

Unconsciousness  
Cardiac arrhythmia (disordered cardiac rhythm).  
Headache  
Nausea  
Confusion  
Dizziness  
Contact with liquid may cause cold burns/frostbite.

**Physician's information / possible dangers**

Long-term inhaling of separation products may cause pulmonary oedema.

**4.3. Indication of any immediate medical attention and special treatment needed****! Treatment (Advice to doctor)**

Treat symptoms.  
Do not give any preparations of the adrenalin-ephedrine group.

**! SECTION 5: Firefighting measures****5.1. Extinguishing media****! Suitable extinguishing media**

Product does not burn, fire-extinguishing activities according to surrounding.  
Alcohol-resistant foam  
Dry powder  
Carbon dioxide  
Water spray jet

**Unsuitable extinguishing media**

Full water jet

## 5.2. Special hazards arising from the substance or mixture

In case of fire formation of dangerous gases possible.

Formation of explosive gas mixtures in air.

Carbon monoxide (CO)

Hydrogen fluoride (HF)

Carbonyl fluoride.

## 5.3. Advice for firefighters

### Special protective equipment for fire-fighters

Use breathing apparatus with independent air supply ( isolated ).

Wear full protective clothing.

### Additional information

Cool endangered containers with water spray jet.

Exposure to fire may cause containers to rupture / explode.

## ! SECTION 6: Accidental release measures

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

#### ! For non-emergency personnel

Evacuate area.

Avoid skin contact with running out liquid (risk of frostbites! ).

Use respiratory protection

#### ! For emergency responders

Remove persons to safety.

Personal protection by wearing close-fitting protective clothing and breathing apparatus.

### 6.2. Environmental precautions

If possible, stop flow of product.

Do not discharge into the drains/surface waters/groundwater.

Prevent spread over a wide area (e.g. by containment or oil barriers).

Do not discharge into the subsoil/soil.

### 6.3. Methods and material for containment and cleaning up

Ensure adequate air ventilation.

Allow to vaporise.

### 6.4. Reference to other sections

Safe handling: see section 7

Disposal: see section 13

Personal protection equipment: see section 8

## ! SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

#### ! Advice on safe handling

Use only in thoroughly ventilated areas.

Transfer and handle only in enclosed systems.

The working pressure in the receptacle must not exceed the saturation vapour pressure of the pure product resulting at a temperature of 50 °C.

Provide good room ventilation even at ground level (vapours are heavier than air).

Prevent cylinders from falling over.

Avoid release to the environment.

Ensure valve protection device is correctly fitted.

Ensure valve outlet cap nut or plug (where provided) is correctly fitted.

Open valve slowly to avoid pressure shock.

Do not allow backfeed into the container.  
Suck back of water into the container must be prevented.  
No water to valves, flanges and other fittings.  
Purging of pipes and valves with inert gases - to avoid: water, solvents.

**General protective measures**

Do not inhale gases.

**Hygiene measures**

At work do not eat, drink and smoke.  
Wash hands before breaks and after work.

**! Advice on protection against fire and explosion**

The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air, oxygen or other oxidants, it may become flammable.  
Pay attention to general rules of internal fire prevention.

**7.2. Conditions for safe storage, including any incompatibilities****! Requirements for storage rooms and vessels**

Keep in closed original container.  
Ventilate store-rooms thoroughly.  
Only use containers that are approved specifically for the substance/product.  
Suitable materials: Normalised carbon steel, tempered alloy steel, aluminium alloys, austenitic stainless steels.  
Valve: Suitable materials: Brass, copper alloys, carbon steels, aluminium alloys, austenitic stainless steels.

**! Advice on storage compatibility**

Do not store with spontaneously flammable materials.  
Do not store together with combustible liquids or combustible solids.  
Do not store together with animal feedstuffs.  
Do not store together with explosives.  
Do not store together with infectious substances.  
Do not store together with radioactive material.  
Do not store together with toxic liquids or toxic solids.  
Do not store together with food.  
Do not store together with oxidizing liquids or oxidizing solids.

**! Further information on storage conditions**

Keep container tightly closed.  
Store only in original container at temperature of 50 °C maximum (=122 °F).  
Prevent cylinders from falling over.  
Keep container in a well-ventilated place  
Protect of heat.

**7.3. Specific end use(s)****! Recommendation(s) for intended use**

See section 1.2  
Use in accordance with regulation (EU) No 517/2014 on fluorinated greenhouse gases.

**! SECTION 8: Exposure controls/personal protection****8.1. Control parameters****! Ingredients with occupational exposure limits to be monitored**

CAS No	Name	Code	[mg/m <sup>3</sup> ]	[ppm]	Remark
811-97-2	1,1,1,2-Tetrafluoroethane (HFC 134a)	WEL, 8 hours	4240	1000	EH40, United Kingdom

**DNEL-/PNEC-values****DNEL worker**

CAS No	Substance name	Value	Code	Remark
354-33-6	Pentafluoroethane (R 125)	16444 mg/m <sup>3</sup>	DNEL long-term inhalative (systemic)	Assessment factor 7,5
420-46-2	1,1,1-Trifluoroethane (R 143a)	38800 mg/m <sup>3</sup>	DNEL long-term inhalative (systemic)	
811-97-2	1,1,1,2-Tetrafluoroethane (R 134a)	13936 mg/m <sup>3</sup>	DNEL long-term inhalative (systemic)	Assessment factor 7,5

**DNEL Consumer**

CAS No	Substance name	Value	Code	Remark
354-33-6	Pentafluoroethane (R 125)	1753 mg/m <sup>3</sup>	DNEL long-term inhalative (systemic)	Assessment factor 25
420-46-2	1,1,1-Trifluoroethane (R 143a)	10700 mg/m <sup>3</sup>	DNEL long-term inhalative (systemic)	
811-97-2	1,1,1,2-Tetrafluoroethane (R 134a)	2476 mg/m <sup>3</sup>	DNEL long-term inhalative (systemic)	Assessment factor 15

**PNEC**

CAS No	Substance name	Value	Code	Remark
354-33-6	Pentafluoroethane (R 125)	1 mg/l	PNEC aquatic, intermittent release	Assessment factor 100, Extrapolation
		0,1 mg/l	PNEC aquatic, freshwater	Assessment factor 1000, Extrapolation
		0,6 mg/kg dw	PNEC sediment, freshwater	Extrapolation
420-46-2	1,1,1-Trifluoroethane (R 143a)	0,35 mg/l	PNEC aquatic, freshwater	
811-97-2	1,1,1,2-Tetrafluoroethane (R 134a)	73 mg/l	PNEC sewage treatment plant (STP)	Assessment factor 10, Extrapolation
		0,75 mg/kg dw	PNEC sediment, freshwater	Extrapolation
		1 mg/l	PNEC aquatic, intermittent release	Assessment factor 100, Extrapolation
		0,01 mg/l	PNEC aquatic, marine water	Assessment factor 10000, Extrapolation
		0,1 mg/l	PNEC aquatic, freshwater	Assessment factor 1000, Extrapolation

**8.2. Exposure controls****Respiratory protection**

Breathing apparatus in the event of high concentrations.

Keep self contained breathing apparatus readily available for emergency use.

Do not use any filter apparatus.

Respiratory protection complying with EN 137.

In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of risk of suffocation by edging out of air oxygen

**! Hand protection**

Leather gloves  
Protective gloves complying with EN 374.

**! Eye protection**

safety goggles, in case of increased risk add protective face shield  
Safety goggles with side protection complying with EN 166.

**! Other protection measures**

Safety shoes with steel toe.  
Body covering work clothing, or chemical resistant suit at increased risk.

**! Limitation and surveillance of the environment**

See chapter 7.

**Appropriate engineering controls**

Transfer and handle only in enclosed systems.

**! SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties****Appearance**

Gaseous / liquefied under pressure.

**Colour**

colourless

**Odour**

ethereal

**Odour threshold**

not determined

**Important health, safety and environmental information**

	Value	Temperature	at	Method	Remark
<b>pH value</b>	not applicable				
<b>boiling point</b>	-46,5 - -45,7 °C		1013 hPa		
<b>Melting point / Freezing point</b>	not determined				
<b>Flash point</b>	not determined				
<b>Vapourisation rate</b>	not determined				
<b>Flammable (solid)</b>					not applicable
<b>Flammability (gas)</b>					The mixture does not meet the criteria for classification as a flammable gas.
<b>Ignition temperature</b>	not determined				
<b>Self ignition temperature</b>	not determined				

	Value	Temperature	at	Method	Remark
<b>Lower explosion limit</b>	no			ASTM E-681	
<b>Upper explosion limit</b>	no			ASTM E-681	
<b>Vapour pressure</b>	10980 hPa	20 °C			
<b>Relative density</b>	1,05 g/cm <sup>3</sup>	25 °C			liquid phase
<b>Vapour density</b>	3,45				air = 1
<b>Solubility in water</b>					low soluble
<b>Solubility/other</b>	not determined				
<b>Partition coefficient n-octanol/water (log P O/W)</b>	not determined				
<b>Decomposition temperature</b>	728 °C				
<b>Viscosity</b>	not determined				
<b>Oxidising properties</b>	no				
<b>Explosive properties</b>	no				

**9.2. Other information**

Vapours are heavier than air.

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

See section "Possibility of hazardous reactions".

**10.2. Chemical stability**

Stable under normal conditions.

**10.3. Possibility of hazardous reactions**

May react violently with oxidants.

When pressurised with air, oxygen or other oxidants, the mixture may become flammable.

Reactions with alkali metals.

Reactions with earth alkali metals.

Reactions with metals in powder form.

Reactions with metal salts in powder form.

**10.4. Conditions to avoid**

Heat sources / heat - risk of bursting.

Avoid contact with open flames, glowing metal surfaces, etc..



**10.5. Incompatible materials****Substances to avoid**

Metals in powder form.  
Metallic salts in powder form.  
Strong oxidizing agents.  
Alkali metals.  
Earth alkali metals.

**10.6. Hazardous decomposition products**

Fluorophosgene on contact open flame or glowing objects

**Thermal decomposition**

Remark No decomposition if used as directed.

**! SECTION 11: Toxicological information****11.1. Information on toxicological effects****Acute toxicity/Irritation/Sensitization**

	Value/Validation	Species	Method	Remark
<b>LD50 acute oral</b>	not applicable			
<b>LD50 acute dermal</b>	not applicable			
<b>LC50 acute inhalation</b>	591000 ppm (4 h)	rat	OECD 403	R-143a
<b>Skin irritation</b>	low irritant effect - not necessary to label	rabbit		R-134a
<b>Eye irritation</b>	low irritant - no labeling duty	rabbit eye		R-134a
<b>Skin sensitization</b>	non-sensitizing	Laboratory animals		
<b>Sensitization respiratory system</b>	non-sensitizing			

**Subacute Toxicity - Carcinogenicity**

	Value	Species	Method	Validation
<b>Subchronic Toxicity</b>	NOAEL 40000 ppm (90 d) Inhalation R-143a	Rat	OECD 408	No effects of toxicological significance.
<b>Chronic Toxicity</b>	NOAEL Inhalation R-134a	Rat		No effects of toxicological significance.

	Value	Species	Method	Validation
<b>Mutagenicity</b>		Mouse		No experimental information on genotoxicity in vivo available.
	Inhalation. Information concerns to 1,1,1-Trifluorethane (R143a).			
<b>Reproduction-Toxicity</b>	NOEL 50000 ppm	Mouse	OECD 478	No indications of toxic effects were observed in reproduction studies in animals.
	Inhalation. Information concerns to 1,1,1-Trifluorethane (R143a). 6 h/d			
<b>Carcinogenicity</b>	NOAEL > 300 mg/kg (1 a)	Rat		No indications of carcinogenic effects are available from long-term trials.
	Oral. Information concerns to 1,1,1-Trifluorethane (R143a) 6 h/d, 5 d/w			

**Aspiration hazard**

not applicable

**Experiences made from practice**

Gases have a suffocating effect.

**Additional information**

The product has not been tested. The information is derived from the properties of the individual components.

**! SECTION 12: Ecological information****12.1. Toxicity****Ecotoxicological effects**

	Value	Species	Method	Validation
<b>Fish</b>	LC50 > 40 mg/l (96 h)	Oncorhynchus mykiss	OECD 203	R-143a
<b>Daphnia</b>	EC50 300 mg/l (48 h)	Daphnia magna	OECD 202	R-143a
<b>Algae</b>	NOEC > 44 mg/l (96 h)	Selenastrum capricornutum		R-143a
<b>Bacteria</b>	EC0 > 730 mg/l (6 h)	Pseudomonas putida		R-143a

**12.2. Persistence and degradability**

	Elimination rate	Method of analysis	Method	Validation
<b>Biological degradability</b>				not readily degradable
	The product has not been tested. The information was derived from products of similar structure or composition.			

**12.3. Bioaccumulative potential**

Does not bioaccumulate.

Because of the n-octanol/water distribution coefficient (log K<sub>ow</sub>) accumulation in organisms is not expected.

#### 12.4. Mobility in soil

Adsorption in the soil is not likely.

#### 12.5. Results of PBT and vPvB assessment

The substances in this mixture do not meet the PBT/vPvB criteria of REACH, annex XIII.

#### 12.6. Other adverse effects

GWP: 3922

ODP: 0

#### ! General regulation

Use in accordance with regulation (EU) No 517/2014 on fluorinated greenhouse gases.

Avoid release to the environment.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

##### Waste code No.

14 06 01\*

##### Name of waste

chlorofluorocarbons, HCFC, HFC

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 2008/98/EC on hazardous waste.

#### Recommendations for the product

Dispose of as hazardous waste.

Return to manufacturer.

#### Recommendations for packaging

Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

#### General information

Operators of stationary equipment shall be responsible for putting in place arrangements for the proper recovery.

### ! SECTION 14: Transport information

	ADR/RID	IMDG	IATA-DGR
14.1. UN number	3337	3337	3337
14.2. UN proper shipping name	REFRIGERANT GAS R 404A	REFRIGERANT GAS R 404A	Refrigerant gas R 404A
14.3. Transport hazard class(es)	2.2	2.2	2.2
14.4. Packing group	-	-	-
14.5. Environmental hazards	No	No	No

#### 14.6. Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

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

not applicable

No transport as bulk according IBC - Code.

**Land and inland navigation transport ADR/RID**

Hazard label(s) 2.2  
tunnel restriction code C/E  
Classification code 2A

**Marine transport IMDG**

EmS: F-C, S-V

**! SECTION 15: Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****! Other regulations (EU)**

Regulation (EU) No 517/2014 on fluorinated greenhouse gases.  
Regulation (EU) 2015/2068 establishing, pursuant to Regulation (EU) No 517/2014, the format of labels for products and equipment containing fluorinated greenhouse gases.  
Regulation (EU) 2015/2067 establishing, pursuant to Regulation (EU) No 517/2014, ~ certification ~ as regards stationary refrigeration, air conditioning and heat pump equipment, and ~ containing fluorinated greenhouse gases.

**VOC standard**

**VOC content** >=99 % 20 °C 10980 hPa

**15.2. Chemical Safety Assessment**

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.  
An exposure scenario is not required.  
Chemical safety assessments for substances in this mixture were carried out.

**! SECTION 16: Other information****! Recommended uses and restrictions**

Use in accordance with regulation (EU) No 517/2014 on fluorinated greenhouse gases.  
National and local regulations concerning chemicals shall be observed.

**Further information**

The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

Indication of changes: "!" = Data changed compared with the previous version. Previous version: 11.4

H220 Extremely flammable gas.  
H280 Contains gas under pressure; may explode if heated.