

## SAFETY DATA SHEET

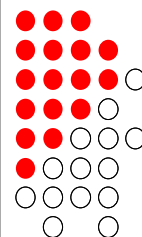
according to Regulation (EC) 1907/2006 and Regulation (EC) 2015/830

### R600a

Issue date: 28. 01. 2015

Revision: 07. 05. 2019

Version: 5.00



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

#### 1.1. Product identifier

Product name:	R600a
Substance/Mixture:	Material
REACH registration name:	Isobutane
REACH registration number:	01-2119474691-32
Material name:	Isobutane
EC number:	200-857-2
CAS number:	75-28-5

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

Identified use:	Refrigerant gas.
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#### 1.3. Details of the supplier of the safety data sheet

Producer/Supplier:	Frigostar Refrigerants Kft.
Address:	H-6763 Szatymaz Kossuth u. 12.
Phone:	+36-62-283-481
Fax:	+36-62-583-550
E-mail:	info@vrec-co.hu

#### 1.4. Emergency telephone number:

Austria tel.: +431 406 43 43, Belgium tel.: 070/245.245, Bulgaria tel.: +359 2 9154 409, Czech Republic tel.: +420 224 919 293, +420 224 915 402, Denmark tel.: 82 12 12 12, Estonia tel.: 112, Finland tel.: (09) 471 977 (direct) or (09) 4711 (exchange), France tel.: ORFILA (INRS) : + 33 (0)1 45 42 59 59, Ireland tel.: 01 809 2166, Lithuania tel.: +370 5 236 20 52, +370 687 53378, Malta tel.: 2545 0000, Medicines & Poisons Info Office tel.: 2545 6504, Norway tel.: 22 59 13 00, Portugal tel.: 808 250 143, Romania tel.: 021.318.36.06 (8:00 – 15:00), Slovakia tel.: +421 2 5477 4166, Spain tel.: + 34 91 562 04 20, Sweden tel.: 112; 08-331231 (9:00-17:00).

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture:

Regulation (EC) No 1272/2008 (CLP):

Physical hazards:	Flammable gases – Category 1 (Flam. Gas. 1, H220)
	Gases under pressure – Liquefied gas (Press. Gas, H280)

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### 2.2 Label elements:

Regulation (EC) No 1272/2008:

Pictograms:



Signal word:

Danger

Hazard statements:

H220

Extremely flammable gas.

H280

Contains gas under pressure; may explode if heated.

Precautionary statements, storage:

P102

Keep out of reach of children.

P210

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P211

Do not spray on an open flame or other ignition source.

P251

Do not pierce or burn, even after use.

P377

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381

Eliminate all ignition sources if safe to do so.

P410+P412

Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122°F.

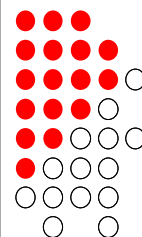
Isobutane; EU-number: 200-857-2; CAS-number: 75-28-5; Index-number: 601-004-00-0.

### 2.3. Other hazards

Physical hazards:

Liquefied gas. Being heavier than air, gases may accumulate in lower and/or confined spaces when released.

The PBT-, and vPvB-assessment see in section 12.



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### SECTION 3: Composition/information on ingredients

#### 3.1. Substances

Components	EU-number	REACH number	CAS-number	Index-number	Weight %	Classification (Regulation (EC) No 1272/2008)
Isobutane	200-857-2	01-2119474691-32	75-28-5	601-004-00-0	> 95	Flam. Gas 1, H220 Press. Gas

H-statements see 16 section below.

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

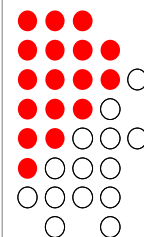
Medical intervention:	Call physician in case of asphyxiation, frostbite or burn.
Inhalation:	Move victim to fresh air and to a safe place and take measures to prevent fire and explosion. Rescue personnel may need breathing apparatus. Let victim lay in rest and muffled. If breathing has stopped, apply artificial breathing or breathing apparatus. If victim is unconscious, lay him on his side in a stable position. Get medical help on site.
Ingestion:	Ingestion is not considered a potential route of exposure.
Skin contact:	Wash affected area with water. Contaminated clothes, rings, watch should be removed only if they are not adhered to the skin. Warm affected area slowly.
– frostbite	
Eye contact:	Immediately flush eyes thoroughly with water for at least 15 minutes. Obtain medical assistance.

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

Inhalation:	The substance has anesthetic effect, 1% (1000 ppm) causes sleepiness within a few minutes. In concentrations higher than 10%: narcotic effect: weakness, headache, nausea, dizziness, confusion, blurred sight, increasing sleepiness. Very high concentrations may cause unconsciousness, spasms and finally asphyxia caused by the absence of oxygen.
Ingestion:	Ingestion is not considered a potential route of exposure.
Skin contact:	Frostbite causes by the liquid state.
Eye contact:	Frostbite causes by the liquid state.
Delayed effects:	Not expected.
General:	No information.

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

Advice for physician:	Symptomatic treatment is recommended .
Special equipments at the workplace:	Not necessary.

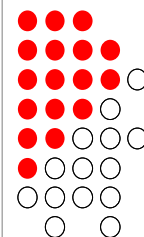


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### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Applicable extinguishing media      Dry chemical powder, foam, carbon dioxide, sand.

Not applicable extinguishing media      High-pressure water jet.

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

Specific risk:      Exposure to fire may cause containers to rupture/explode.  
Special exposure hazards, combustion product, gases formed at combustion: carbon dioxide, carbon monoxide, hydrocarbons.

#### 5.3. Advice for firefighters

Special protective equipment:      Respiratory protective devices. (EN 14593-1), protective clothing against liquid chemicals. (EN 14605).

Advice:      If possible, stop flow of product.  
Move away from the container and cool with water from a protected position.  
Use self-contained breathing apparatus and chemically protective clothing.

### SECTION 6: Accidental release measures

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

Personal emergency procedures:      Evacuate the area.  
Extinguish all ignition sources! Try to stop the release!  
Wear a self-contained breathing apparatus when entering the area unless atmosphere is proved to be safe. The affected area in the direction of the wind and other personnel carrying out damage control does not stay! The evacuation of persons facing the wind to be performed, have to wear respiratory protective device (EN 14593).  
Ensure adequate air ventilation.

#### 6.2. Environmental precautions

Environmental precautions:      Try to stop release. Land of the danger area should be closed. High safety zone must be established.  
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.  
Notify the authorities.

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

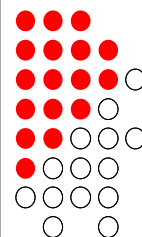
Methods for cleaning up:      Ventilate area.

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### 6.4. Reference to other sections

Personal protective equipment: See the Section 8.  
Waste management: See the Section 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Recommendations for safe handling: This product should be used by properly trained person!  
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.  
See more in Section 8.

Fire and explosion protection: Keep in a well-ventilated place, away from heat and ignition sources, electrostatic sources, strong oxidizers and high pressure oxygen. Prevent electrostatic discharges. Smoking is not allowed!

Hygiene standards: The people in contact with product should be maintained the workplace hygiene standards. After the treatment of the product at breaks, before eating, after work the hot hand and face washing is necessary.

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

Technical measures / Storage conditions: Can only be stored in a closed system, should be checked regularly for tightness. Store only in the original packaging. Tightly closed.  
Protect from sunlight and sources of heat.  
The bottles, containers are stored in an upright position, so as to prevent any contact with the liquid phase from the gas phase designed parts. Do not allow the temperature to rise above 50 ° C.  
After use, close the air outlet of the valve.

Incompatible materials: Strong oxidizing agents, high-oxygen-containing materials.

### 7.3. Specific end use(s)

Special uses: None.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Component	CAS-NUMBER	Limit value, Eight hours (mg/m <sup>3</sup> )	Limit value, Short term ( mg/m <sup>3</sup> )	Country
Isobutane	75-28-5	2400	9600	Germany (AGS)
		2400	9600	Germany (DFG)
		1900	-	Switzerland

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### 8.2. Exposure controls

Engineering measures:

Do not inhale the gas! Avoid contact with liquefied gas with eyes or skin! Provide adequate ventilation! Only in closed, leak-proof network. No smoking, open flames and ignition sources related activities are prohibited!

Hygiene standards:

The people in contact with product should be maintained the workplace hygiene standards. After the treatment of the product at breaks, before eating, after work the hot hand and face washing is necessary.

### Personal protective equipment

Eye and face protection:

Safety glasses with side-shields (EN 166) or face shield recommended to wear.

Skin protection

Hand protection:

Avoid hand contact. Proper contact is recommended to wear gloves to protect against cold (EN 511).

Other:

Long-sleeved clothing and anti-static anti-static footwear (EN ISO 2345) must be wear.

Inhalation protection:

In gas leak case, compressed air breathing apparatus (EN 14593) is recommended.

### Environmental exposure controls

Environmental exposure control : Prevent from entering sewers, surface waters or soil.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical condition (20°C):

Gas

Colour:

Colourless gas

Odour:

Characteristic odor.

#### Properties

#### Value

pH (20°C):

Not applicable.

Melting point / Freezing point:

No information.

Initial boiling point and boiling range:

-11 °C

Fire point:

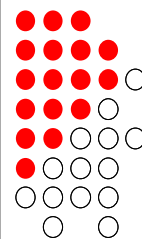
- 60 °C

Evaporating rate:

No information.

Flammability:

Extremely flammable.

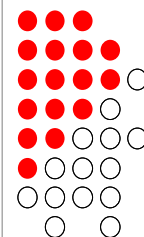


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### Upper / lower flammability or explosive limits

- lower explosive limit: 1.5%
- upper explosive limit: 8.5%

Vapor Pressure (40°C): 5.2 bar

Vapor density:

Relative density, gas: 2.05 (air=1)

Relative density, liquified gas: No information.

### Solubility

- In water: 24-61 mg/l
- Organic solvents: No information.

Partition coefficient: n-octanol/water: Log K<sub>ow</sub>: 2.8

Auto-ignition temperature: 365 °C

Decomposition temperature: No information.

Kinematic viscosity: No information.

Explosive properties: No information.

Oxidizing properties: Not oxidising.

## 9.2. Other information

No information.

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Reactivity: No specific reactivity other than those specified under section 10.5.

### 10.2. Chemical stability

Stability: Stable in the recommended storage conditions.

### 10.3. Possibility of hazardous reactions

Hazardous reactions: There are no under normal conditions of use.

### 10.4. Conditions to avoid

Situations to avoid: Radiating heat, open flame, all ignition sources, sparks.

### 10.5. Incompatible materials

Materials to avoid: Strong oxidizers.

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### 10.6. Hazardous decomposition products

Hazardous decomposition products: By thermal decomposition: Carbon dioxide, carbon monoxide, hydrocarbons.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

#### Acute toxicity:

Acute toxicity: 1%: hypnotic effect, 10%: narcotic effect; higher concentrations: unconsciousness, spasms.

LC<sub>50</sub> (mouse, 2 hours) = 286000 ppm (28.6%)

LC<sub>50</sub> (rat, 4 hours) = 277000 ppm (27.7%)

- Skin: Frostbite/burn may possible.
- Eyes: Frostbite/burn may possible.
- Inhalation: The substance has anesthetic effect, 1% (1000 ppm) causes sleepiness within a few minutes.  
In concentrations higher than 10%: narcotic effect: weakness, headache, nausea, dizziness, confusion, blurred sight, increasing sleepiness.  
Very high concentrations may cause unconsciousness, spasms and finally asphyxia caused by the absence of oxygen.
- Ingestion: Ingestion is not considered a potential route of exposure.

**Skin corrosion/irritation:** Not irritative.

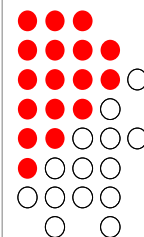
**Serious eye damage/irritation:** Not irritative.

**Respiratory or skin sensitisation:** Not sensitising.

**Germ cell mutagenicity:** Not mutagenic (Ames test).

**Carcinogenicity:** It contains 1,3-butadiene (lower than 0,1%), not carcinogenic.

**Reproductive toxicity:** Not classified as hazardous.



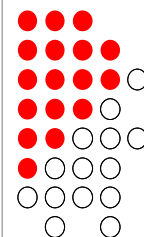


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**STOT-single exposure:** Not classified as hazardous.

**STOT-repeated exposure:** Not classified as hazardous.

**Aspiration hazard:** Not classified as hazardous.

### SECTION 12: Ecological information

#### 12.1. Toxicity

Not classified as hazardous.

**General informations:** According to its physical properties, the substance evaporates quickly from an aqueous environment, thus neither acute nor chronic effects practically could not be observed.

#### 12.2. Persistence and degradability

**General informations:** LPG released into the environment dissipates quickly and undergoes photochemical degradation.

Half-life period: 3.2 days  
Degradable in the soil by bacteria (*Mycobacterium crassa*,  
*Mycobacterium phlei*)

#### 12.3. Bioaccumulative potential

**General informations:** No information.

**log P<sub>ow</sub>** 2.8

#### 12.4. Mobility in soil

- Air: According to its physical properties, the substance evaporates quickly from an aqueous environment, thus neither acute nor chronic effects practically could not be observed.
- Water: Evaporates quickly from water and soil.
- Soil: Evaporates quickly from water and soil.

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

**PBT- and vPvB-assessment:** No information.

#### 12.6. Other adverse effects

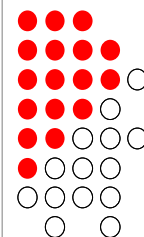
No information.

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### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Should not be released into the environment. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

#### Material:

Avoid discharge to atmosphere.

According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used. Render harmless by incineration.

#### Contaminated packaging:

Empty containers should be taken to an approved waste handling site for recycling or disposal.

### SECTION 14: Transport information

#### 14.1. UN-number

	In small gas cartridges	In cylinders
UN-number:	UN2037	UN1969

#### 14.2. UN proper shipping name

International transport:	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES)	ISOBUTANE
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#### 14.3. Transport hazard class(es)

Classification code:	5F	2F
Labels:	2.1	2.1

#### 14.4. Packing group

None.	None.
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#### 14.5. Environmental hazards

ADR/RID	None.	None.
IMDG	None.	None.
ADN	None.	None.

#### 14.6. Special precautions for user

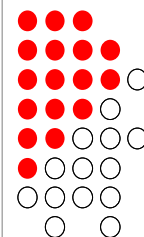
ADR/RID	Transport category: 2 Tunnel restriction code: (D) Hazard identification No.: – Limited quantities: 1 L	Transport category: 2 Tunnel restriction code: (B/D) Hazard identification No.: 23 Limited quantities: 0
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	<p>Excepted quantities: E0 Special provision(s): CV9 CV12 S2</p>	<p>Excepted quantities: E0 Special provision(s): CV9 CV10 CV36 S2 S20</p>
IMDG	<p>EMS Code: F-D, S-U Stowage category: Category B SW2 Properties and notices: Normally contain mixtures of liquefied butane and propane in various proportions for use in camping stoves, etc.</p>	<p>EMS Code: F-D, S-U Stowage category: Category E SW2 Properties and notices: Flammable hydrocarbon. Heavier than air.</p>
ICAO	<p>Limited quantity: 1 KG (Y203) Passanger and Cargo Aircraft: 1 KG (203) Cargo Aircraft only: 15 kg (203)</p>	<p>Limited quantity: PROHIBITED Passanger and Cargo Aircraft: PROHIBITED Cargo Aircraft only: 150 kg (200)</p>

### 14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable.

Not applicable.

## SECTION 15: Regulatory information

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

- REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC
- COMMISSION REGULATION (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
- Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer.
- DIRECTIVE 2012/18/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC  
Hazard categories in accordance with Regulation (EC) No 1272/2008: P5.c  
Qualifying quantity (tonnes) lower-tier requirements: 5000  
Qualifying quantity (tonnes) upper-tier requirements: 50000

### 15.2. Chemical safety assessment

No information.

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### SECTION 16: Other information

**The full H-statements from the Section 2. and 3. :**

H220 Extremely flammable gas.

H280 Contains gas under pressure; may explode if heated .

**Changes:**

Section 14.

**Used evaluation of hazard information:**

According to Regulation (EC) 1272/2008 Article 9 for the classification used paragraph 1. and 5.

This safety data sheet serves to complete but not to replace the technical product sheets. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk. The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity. The user bears sole liability for the precautions required when using the product. The regulatory texts indicated herein are intended to aid the user to fulfill his obligations. This list is not to be considered complete and exhaustive. It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned.

End of safety data sheet.

