


# SAFETY DATA SHEET

## R600a (ISOBUTANE)

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

<b>Product name</b>	R600a, Isobutane
<b>Synonyms</b>	Isobutane, 2-methylpropane, trimethylmethane.
<b>Chemical Formula</b>	C <sub>4</sub> H <sub>10</sub>
<b>CAS No</b>	75-28-5
<b>Use of Substance</b>	Industrial uses as refrigerant. Perform risk assessment prior to use.
<b>Manufacturer</b>	Juhua Group Corporation No. 849 Jiangcheng Rd, Hangzhou, Zhejiang Province, 310009
<b>Contact Number</b>	+86-570-3098687
<b>Emergency Phone Number (24 hr)</b>	+86-570-3097819
<b>SDS Reference Number</b>	SDS-045-R600a

## 2. HAZARDS IDENTIFICATION

Chemical Name	CAS No.	Classification Code	Labeling		
			H-code	Signal Word	Hazard Pictogram
R600	75-28-5	Press. Gas Flam. Gas 1	H 280 H 220	Danger	

**Classification of the substance** Flam. Gas I : Flammable gases category I

Press. Gas : Gases under pressure  
(Liquefied gas)

### Hazard Statement

H 220 : Extremely flammable gas

H 280 : Contains gas under pressure; may explode if heated.

OSHA - H01 : May displace oxygen and cause rapid suffocation.

CGA – HG01 : May cause frostbite.

CGA – HG04 : May form explosive mixtures with air.

### Precautionary Statement

P 202 : Do not handle until all safety precautions have been read and understood.

P 210 : Keeps away from heat/ sparks/ open flames/ hot surfaces – No smoking.

P 271 + P 403 : Use only outdoors or in a well-ventilated area. Store in a well-ventilated place.

P 377 : Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

- P 381 : Eliminate all ignition sources if safe to do so.
  
- P 304, P 340, P 313 : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice /attention.
  
- P 302, P 336, P 315 : IF ON SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.
  
- CGA-PG02 : Protect from sunlight when ambient temperature exceeds 52 °C (125°F).
  
- CGA-PG05 : Use a back flow preventive device in the piping.
- CGA-PG06 : Close valve after each use and when empty.
- CGA-PG11 : Never put cylinders into unventilated areas of passenger vehicles.
  
- CGA-PG12 : Do not open valve until connected to equipment prepared for use.
  
- CGA-PG27 : Read and follow the Safety Data Sheet (SDS) before use.
  
- OSHA-PG01 : DO NOT REMOVE THIS PRODUCT LABEL (or equivalent wording).

**Other Hazards**

Contact with liquid or cold vapor can cause frostbite.

**Classification of the substance**

- Press. Gas : Gases under pressure (Liquefied gas)
  
- Flam. Gas1 : Flammable gases category 1

**Hazard Statement**

- H 220 : Extremely flammable gas
  
- H 280 : Contains gas under pressure; may explode if heated.

**Precautionary Statement**

P210 : Keeps away from heat/ sparks/ open flames/ hot surfaces  
– No smoking.

P377 : Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 : Eliminate all ignition sources if safe to do so.

P403 : Store in a well-ventilated place

Contact with liquid or cold vapor can cause frostbite.  
Forms explosive mixture with air and oxidizing agents.

**Other Hazards**

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Common Name	Ingredient	CAS Number	Specification	OSHA-PEL	TLV-ACGIH
R600a	Isobutane	75-28-5	100% (w/w)	None established.	1000 ppm

\*Contains no other components or impurities which influence the classification of the product.

**4. FIRST AID MEASURES**

**Eye Contact**

Contact with liquid or cold vapor can cause frostbite.  
Immediately flush with water for at least 15 minutes, opening eyelids to ensure flushing.  
Get medical attention if symptoms occur.

**Inhalation**

Victims should be assisted to an uncontaminated area is most important.

Move exposed person to fresh air.

If not breathing, provide artificial respiration or oxygen by trained personnel.

In the event of cardiac arrest apply external cardiac massage.

Further treatment should be symptomatic and supportive.

Keep victim warm and quiet.

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE.

RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

**Skin Contact**

Take off the contaminated clothing / shoes immediately.

Flush the affected area with lukewarm water not exceeds 105°F (40°C) immediately.

Do not use hot water.

If warm water is not available, gently wrap affected parts in blankets.

Get medical attention if symptoms occur.

**Ingestion**

Unlikely route of exposure.

Do not include vomiting.

Get medical attention if symptoms occur.

**Most important symptoms and effects, both acute and delayed**

High concentrations may cause asphyxiation.

Symptoms may include loss of mobility/ consciousness.

Victim may not be aware of asphyxiation.

As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Contact with liquefied gas may cause frostbite.

## 5. FIRE FIGHTING MEASURES

### **Suitable extinguishing media**

Alcohol-resistant foam.  
Carbon dioxide (CO<sub>2</sub>).  
Dry Chemical.

### **Unsuitable extinguishing media**

Water Jet.

### **Special hazards arising from the chemical**

Exposure to fire may cause containers to rupture/explode.  
Vapor is heavier than air, may travel long distances along the ground before reaching a source of ignition and flashing back.  
When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined.  
Sustained fire attack on vessels may result in a boiling liquid expanding vapor explosion (BLEVE).  
DO NOT direct water at source of leak or pressure relief devices, icing may occur.

### **Special protective equipment and precautions for fire fighters**

In case of fire: Stop leak if safe to do so.  
Continue water spray from protected position until container stays cool.  
In confined space use self-contained breathing apparatus (open-circuit positive pressure compressed air type) in combination with fire kit.  
Safety gloves and shoes, or boots, should be worn when handling cylinders.  
Vapors may form explosive air mixtures even at room temperature.  
Prevent buildup of vapors or gases to explosive concentrations.  
Water runoff can cause environmental damage.

## 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions

Ensure suitable personal protection (including respiratory protection) during removal of spillages.  
Evacuate surrounding areas.  
Ensure adequate ventilation.  
Keep unnecessary and unprotected personnel from entering.  
Beware of vapors accumulating to form explosive concentrations.  
Vapors can accumulate in low areas.

### Environmental precautions

If safe to do so: isolate the source of the leak.  
Try to stop release.  
Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous.  
If the product contaminates rivers and lakes or drains inform respective authorities.

## 7. HANDLING AND STORAGE

### Precaution for safe handling

Avoid inhalation of high concentrations of vapors.  
Atmospheric level should be controlled in compliance with the occupational exposure limit. Atmospheric concentrations well below the occupational exposure limit can be achieved by good occupational hygiene practice.  
The vapor is heavier than air, high concentrations may be

## 7. HANDLING AND STORAGE

### Precaution for safe handling

Avoid inhalation of high concentrations of vapors.  
Atmospheric level should be controlled in compliance with the occupational exposure limit. Atmospheric concentrations well below the occupational exposure limit can be achieved by good occupational hygiene practice.  
The vapor is heavier than air, high concentrations may be produced at low levels where general ventilation is poor.  
In such cases, provide adequate ventilation or wear suitable respiratory protective equipment with positive air supply.  
Avoid contact between the liquid and skin and eyes.  
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.  
Suck back of water into the container must be prevented.  
Do not allow back feed into the container.  
Contact your gas supplier if in doubt.  
Never use direct flame or electrical heating devices to raise the pressure of cylinder.  
Valve protection caps must remain in place unless container is secured with valve outlet piped to use point.  
Do not drag, slide or roll cylinders.  
Use a suitable hand truck for cylinder movement.  
Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.  
Use a pressure regulator when connecting cylinder to lower pressure piping or systems.  
Avoid venting to atmosphere.

### Condition for safe storage

Keep away from ignition sources (including static discharges).  
Do not allow the temperature where cylinders are stored to exceed 125°F (52°C).  
Use a “first-in-first out” inventory system to prevent full cylinders from being stored for excessive period of time.  
Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits  
Full and empty cylinders should be segregated.  
Containers should not be stored in conditions likely to encourage corrosion.  
Container should be stored in the vertical position and properly secured to prevent falling over.  
Outside or detached storage is preferred.  
Post “No Smoking” signs in use or storage areas.  
There should be no accidental ignition in areas where this product is being used or stored.  
Avoid storing near to the intake of air conditioning units, boiler units, and open drains.  
Electrical installations / working materials must comply with the technological safety standards.  
Do not store with oxidizers.



## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

Exposure Limit: OSHA-PEL

Chemical Name	Eight-hour time-weighted average airborne concentration	
	ppm	mg/m <sup>3</sup>
R600a (Isobutane)	-	-

Exposure Limit: ACGIH TLV

Chemical Name	Short Term Limit Exposure Limit (STEL)
	ppm
R600a (Isobutane)	1000

### Appropriate controls

#### engineering

Use local exhaust and general ventilation system, not only to control exposure but also to prevent formation of flammable mixtures. Gas detectors should be used when quantities of flammable gases/vapors may be released. Systems under pressure should be released.

### Personal protection equipment

Wear goggles for eye protection.  
 Protective gloves made of any suitable material.  
 Contact lens should not be worn when working.  
 Wear suitable hand, body and head protection.  
 Do not eat, drink or smoke when using the product.  
 For emergency release use a positive pressure NIOSH approved air supplying respirator systems (SCBA or airline/escape bottle).

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	:	Colorless, Liquefied gas
<b>Odour</b>	:	Sweet petroleum odor.
<b>Odour threshold</b>	:	Odour threshold is subjective and inadequate to warn for over exposure.
<b>pH</b>	:	Not applicable
<b>Melting point / Freezing point</b>	:	-159 °C
<b>Boiling point</b>	:	-12 °C
<b>Flash point</b>	:	-87 °C
<b>Evaporation rate</b>	:	Not available
<b>Flammability</b>	:	Extremely flammable
<b>Upper/lower explosive limit</b>	:	<b>UPPER:</b> 8.4 vol% <b>LOWER:</b> 1.8 vol%
<b>Vapour pressure</b>	:	31 psig
<b>Vapour density (Air =1)</b>	:	2.006.
<b>Relative density</b>	:	0.56 ( 15° C)
<b>Solubility (H<sub>2</sub>O)</b>	:	Negligible. (0.008%)
<b>Partition coefficient</b>	:	Log Pow 1.09 - 2.8.
<b>Auto ignition temperature</b>	:	460 °C
<b>Decomposition temperature</b>	:	Not available
<b>Viscosity</b>	:	Not applicable

## 10. STABILITY AND REACTIVITY

<b>Reactivity</b>	No reactivity hazard other than the effects described in subsections below.
<b>Chemical Stability</b>	Stable.
<b>Possibility of hazardous reactions</b>	Not expected to occur. Vapors may form explosive mixture with air.
<b>Condition to avoid</b>	Keep away from heat/sparks/open flames/hot surfaces – No smoking. Oxidizing conditions.
<b>Incompatible materials</b>	Strong oxidizing agents. Acids.
<b>Hazardous decomposition products</b>	Carbon monoxide, volatile hydrocarbon vapors.

## 11. TOXICOLOGICAL INFORMATION

### Information on toxicological effects

<b>Acute toxicity</b>	Oral: LD <sub>50</sub> > No information available. Dermal: LD <sub>50</sub> > No information available. Inhalation: LC <sub>50</sub> > Mouse, 974 mg/l, 2hrs.
<b>Skin corrosion / irritation</b>	Not irritant
<b>Serious eye damage/ irritation</b>	Not irritant
<b>Respiratory or skin sensitization</b>	Not expected to be a sensitizer
<b>Germ cell mutagenicity</b>	Not considered a mutagenic hazard
<b>Carcinogenicity product</b>	Not expected to be carcinogenic
<b>Reproductive toxicity product</b>	Not expected to impair fertility.
<b>Specific target organ toxicity – single exposure product.</b>	Not classified
<b>Specific target organ toxicity – repeated exposure product</b>	Not expected to be a hazard
<b>Aspiration hazard product</b>	Not considered an aspiration hazard.

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity effect

<b>Acute toxicity product</b>	Not expected to be harmful to aquatic organisms.
<b>Additional ecological information</b>	Not available
<b>Persistence and degradability</b>	Not available
<b>Bioaccumulative potential</b>	Not available
<b>Mobility in soil</b>	Not available
<b>Other adverse effects</b>	Not available

## 13. DISPOSAL CONSIDERATIONS

<b>Waste from residue / unused product</b>	Do not attempt to dispose of residual waste or unused quantities. Flare-off at safe location (vapors). Exhaust to atmosphere in safe locations (No open Flames). Contact supplier if guidance is required.
<b>Contaminated packaging</b>	Do not reuse empty containers. Empty remaining contents. Dispose of container and unused contents in accordance with local and national regulation. Return cylinder to supplier

## 14. TRANSPORT INFORMATION

<b>UN Number</b>	UN 1075
<b>UN proper shipping name</b>	ISOBUTANE
<b>Transport hazard class(es)</b>	2.1
<b>Packing group</b>	-
<b>Environmental hazards</b>	Not applicable
<b>Special precautions for user</b>	None
<b>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</b>	Not available

### **Others Information**

Ensure the driver is understand well on the potential hazards of the load and knows what to do in the event of an accident or an emergency.  
Secured the product containers before transporting it.  
Ensure that the cylinder valve is closed and not leaking.  
Container valve guards or caps should be in place.  
Ensure adequate air ventilation.

## 15. REGULATORY INFORMATION

Contact local government authority.

## 16. OTHER INFORMATION

### Legend to the abbreviations and acronyms used

<b>Classification of the substance</b>	Press. Gas	:	Gases under pressure (Liquefied gas)
	Flam. Gas 1	:	Flammable gases category 1
	LC <sub>50</sub>	:	Lethal Concentration
	LD <sub>50</sub>	:	Median Lethal Dose

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