

SAFETY DATA SHEET FOR CHEMICAL PRODUCTS (SDS)

Report No. NB2022075553EN

Date: July 14, 2021

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SECTION 1. Identification of the substance/preparation and company

1.1 Product Identification	:	Isobutane
1.2 Product Code	:	R600a
1.3 Manufacturer Information		
Manufacturer Name	:	NANJING REFINERY CO., LTD
Manufacturer Address	:	388# GANJIAXIANG STREET, QIXIA DISTRICT, NANJING
Manufacturer Tel	:	025-58989858; 025-58988240; 025-58986615 (24h); 025-58989377 (24h)
Manufacturer Fax	:	025-58981027
Manufacturer Email	:	manb.jlsh@sinopec.com; wulei.jlsh@sinopec.com
1.4 Emergency contact information		
Company Name	:	NANJING REFINERY CO., LTD
Company Address	:	388# GANJIAXIANG STREET, QIXIA DISTRICT, NANJING
Company Tel	:	025-58989858; 025-58988240; 025-58986615 (24h); 025-58989377 (24h)
Company Fax	:	025-58981027
Company Email	:	manb.jlsh@sinopec.com; wulei.jlsh@sinopec.com
1.5 Recommended and Limited Uses	:	Is a refrigerant, can replace R12, R134a, etc.

SECTION 2. Hazards identifications

2.1 Hazard Class:

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Rev_9 (part 2~4), classification of risk categories.

Flammable gas, category 1

High pressure gas, compressed gas

2.2 Pictograms:



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2.3 Signal word:

Danger

2.4 Hazard description:

H220 Extremely flammable gas.

H280 Contains gas under pressure; may explode if heated.

2.5 Precautionary statements

Do not operate until you have received specific instructions and have not understood all safety measures.

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

Keep container closed.

Take electrostatic preventive measures, grounding and connecting containers and receiving devices.

Use explosion-proof appliances, ventilation, lighting and other equipment, only use tools that do not generate sparks.

Use ppe as required.

Avoid contact with eyes and skin, avoid inhalation of vapor or spray, avoid ingestion, wash thoroughly after operation.

Do not eat, drink or smoke on site.

2.6 Accident Response:

First cut off all sources of fire and, if possible, quickly move cylinders to safety; Exhaust the residual waste gas or the gas leaked out of the cylinder with an exhaust fan to an empty place or the installation of appropriate gas nozzle to burn. Since there is a risk of reignition, the fire around the air source can be extinguished to prevent expansion before the air source is cut off. But the fire at the leakage of air source shall not be extinguished. Water cooling container, to prevent heat burst, and water to protect the network or plugging personnel, such as leakage is not ignited, can be used to spray water directly to flammable vapor and air mixture, in order to make it away from the source of fire. If it is necessary to speed up the evaporation of the leakage, spray water shall be used to speed up the evaporation under the condition that steam evaporation can be controlled. If it is necessary to extinguish a small amount of fire, spray water, dry powder, carbon dioxide, foam extinguishing agent can be used to extinguish the fire.



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2.7 Safe Storage:

Store in a cool, ventilated warehouse. Keep away from fire and heat source, and keep the container sealed at a temperature of not more than 30°C. It should be stored separately with oxidizer, halogen, strong acid and base, and must not be mixed. Explosion-proof lighting and ventilation facilities are adopted. Mechanical equipment and tools prone to spark generation are prohibited, and leakage emergency treatment equipment and appropriate storage materials should be provided in the storage area.

2.8 Waste disposal:

Refer to national and local laws and regulations before disposal of residual waste gas or gas leaking out of cylinder liquid by exhaust fan to an empty place or installation of appropriate gas nozzle.

2.9 Physical and Chemical hazards:

With air can form explosive mixture, in case of open fire, high heat energy cause combustion explosion. Chemical reaction or combustion in contact with an oxidizer. In a fire, the heated container is in danger of exploding. Steam is heavier than air, diffuses along the ground and is easy to accumulate in low-lying places.

2.10 Health hazards:

This product has anesthetic effect, no irritation to eyes and skin.

Acute poisoning: only varying degrees of dizziness after propane inhalation. Industrial production is often exposed to propane, ethane or butane mixed gas, can cause dizziness, headache, excitement or lethargy, nausea, vomiting, slow pulse and other symptoms, serious manifestations of anesthesia and loss of consciousness. This liquid may cause frostbite on skin contact.

Chronic poisoning: long-term low concentration of propane inhalation, neurasthenia syndrome and hyperhidrosis, pulse instability, enhanced vertical hairy muscle reflex, skin and other autonomic nerve dysfunction phenomenon, and the occurrence of distal limb hypoesthesia.

SECTION 3. Composition / information on ingredients

3.1 Composition:

Composition name: Isobutane

CAS No. : 75-28-5

SECTION 4. First aid measures



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4.1 Emergency measures:

Inhalation: If you feel unwell, move victim to air outlet and seek medical attention.

Skin contact: Remove contaminated clothing immediately. Flush skin with plenty of water for at least 15 minutes. Seek medical advice if you feel unwell.

Eye contact: If in eye, rinse carefully with water for at least 15 minutes. Seek medical attention immediately if an eye injury occurs.

4.2 Acute and chronic symptoms and their effects:

No.

4.3 Symptoms requiring prompt medical attention and special treatment:

Anesthesia and loss of consciousness may occur when exposed to high concentration. Very high concentrations can cause asphyxia.

SECTION 5. Firefighting measures

5.1 Fire Extinguishing agent:

Suitable extinguishing agent: dry powder, chemical foam, carbon dioxide, water mist.

Improper fire extinguishing agent: Do not use direct running water to impact the leak or leak source.

5.2 Special Risks:

Flammable compressed liquid. Combustion produces toxic gases such as carbon monoxide.

5.3 Special Fire extinguishing Methods:

If possible, move containers away from the fire into an open area. Spray water to keep the fire container cool until the end of the fire.

5.3: Protective Equipment for Firefighters:

Firefighters are required to wear gas masks and full-body fire uniforms to fight the fire upwind.

5.4 Harmful combustion products:

Carbon monoxide

SECTION 6. Accidental release measures



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6.1 Protective measures, protective equipment and emergency handling procedures for operators:

Wear appropriate protective measures, refer to section 8.

Beware of vapors accumulating to explosive concentrations.

Ensure adequate ventilation.

Remove all ignition sources.

Evacuate people quickly to a safe area, away from the spill area and upwind.

6.2 Environmental Preventive Measures:

Absorb the leakage to avoid polluting the environment.

Prevent leakage into water bodies, sewers, basements or restricted Spaces.

6.3 Methods and materials for receiving and removing leaks:

Eliminate all ignition sources.

The warning area shall be delimited according to the area affected by the gas, and the irrelevant personnel shall evacuate to the safety area from the crosswind and upwind.

Emergency personnel are advised to wear positive pressure self-contained breathing apparatus and antistatic clothing.

Wear antistatic and cold clothing when liquefied gas leaks.

All equipment used during operation should be connected to the ground.

Do not touch or walk over the spill.

Cut off the source of leakage as much as possible.

If possible, flip the container so that it escapes gas rather than liquid.

Spray water inhibits steam or changes the direction of the vapor cloud, preventing water flow from contacting the leakage.

Do not use water to directly impact the leakage or leakage source.

6.4 Preventive measures to prevent secondary hazards:

Prevent gas diffusion through sewers, ventilation systems and confined Spaces.

Isolate the leak area until the gas dissipates.

SECTION 7. Safe handling and storage

7.1 Precautions for safe operation and disposal:

Operators shall be specially trained and strictly abide by the operating procedures.



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The operation and disposal should be carried out in places with local ventilation or comprehensive ventilation facilities.

Avoid eye and skin contact and avoid inhalation.

See section 8 for individual protective measures.

Keep away from fire and heat source. No smoking in workplace.

Use explosion-proof ventilation systems and equipment.

When filling, the flow rate should be controlled, and there is a grounding device to prevent electrostatic accumulation.

Avoid contact with forbidden compounds such as oxidants and halogens (see section 10 for forbidden compounds).

Handling should be carried lightly to prevent damage to packaging and containers.

Wash hands after use and do not eat or drink in the workplace.

Equipped with the corresponding variety and quantity of fire fighting equipment and leakage emergency treatment equipment.

7.2 Safe Storage conditions:

Store in a cool, ventilated warehouse.

The storage temperature should not exceed 30°C.

They should be stored separately from oxidants and halogens, and should not be mixed (see section 10 for banned compounds).

Keep container sealed.

Keep away from fire and heat source. Lightning protection equipment must be installed in the warehouse.

The exhaust system should be equipped with grounding device to remove static electricity.

Explosion-proof lighting and ventilation facilities are adopted.

Do not use equipment or tools that may cause sparks.

The storage area should be equipped with leakage emergency treatment equipment.

SECTION 8. Exposure controls / personal protection

8.1 Permissible concentration (occupational exposure limit or biological limit, etc.):

Occupational exposure limit:



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Component	Standard Source	Type	Standard Value	Remark
ISOBUTANE	Germany (DFG)	TVL-TWA	4000ppm	-

biological limit:

Component	Standard Source	Biological monitoring indicators	biological limits	sampling time
-	-	-	-	-

8.2 Exposure control methods:

Provide adequate ventilation. Where reasonably practicable, this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and solvent vapour below the OEL, suitable respiratory protection must be worn.

Ensure that eyewash stations and safety showers are proximal to the work-station location.

8.3 Personal Protection:

Respiratory protection: a filter gas mask (half mask) should be worn. Emergency rescue or evacuation, it is recommended to wear air breathing apparatus.

Hand protection: wear rubber gloves.

Eye protection: Wear chemical safety glasses.

Skin and body protection: wear antistatic clothing.

SECTION 9. Physical and chemical properties

Odor threshold (mg/m ³)	No Data
Appearance and Color	Colorless gas
Odour	Odorless
PH value	Neutral
Flammability	Combustible
Density	No Data
Relative steam density (air = 1)	2.01 (20°C)
Vapor pressure(MPa)	304(20°C)
Octanol/water partition coefficient	2.76
Viscosity	Not Applicable



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Flash point(°C,Closed cup)	-82.8
Boiling point(°C)	-11.8
Melting point (°C)	-159.6
Evaporation rate (kg/s)	No Data
UEL %(V/V)	1.4
LEL %(V/V)	8.5
Auto-ignition temperature(°C)	No Data
Decomposition temperature(°C)	No Data
Solubility	slightly soluble in water

SECTION 10. Stability and reactivity

10.1 Stability:

It is stable when stored and used at normal ambient temperature.

10.2 Hazardous reaction:

Danger of fire and explosion in reaction with strong oxidants.

10.3 Conditions to be avoided:

Heat source, fire source, high temperature.

10.4 Incompatible Substances:

Strong oxidant, strong acid, strong base, halogen, etc.

10.5 Dangerous decomposition products:

Under normal storage and use conditions, no hazardous decomposers are produced.

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Skin corrosion or irritation: no data available.

Eye irritation or corrosion: no data available.



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Respiratory or skin irritation: no data available.

Reproductive toxicity: no data available.

Specific target organ system toxicity -- single exposure: no data available.

Specific target organ system toxicity -- repeated exposure: no data available.

Inhalation hazard: No data available.

SECTION 12. Ecological information

12.1 Toxicity:

No data available.

12.2 Persistence and degradability:

In air, the degradation half-life is 6.9d(theoretical) at a light radical concentration of 5.00×10^5 /cm³.

12.3 Bioaccumulative potential:

No data available.

12.4 Mobility in soil

No data available.

12.5 Other Dangers:

No data available.

SECTION 13. Disposal considerations

13.1 Handling method for waste:

Recycle as much as possible. If it cannot be recycled, exhaust the residual waste gas or the gas at the cylinder leakage place with an exhaust fan to an empty place for fire, and set an appropriate gas nozzle to burn.

The product can not be directly discharged into the atmosphere can not be discharged into crowded areas.

13.2 Handling method for uncleaned packaging

Return the empty container to the manufacturer.

13.3 Discards Precautions

National and local laws and regulations should be referred to before disposal.



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See Section 8 for safety precautions for disposal personnel.

SECTION 14. Transport information

14.1 United Nations Dangerous Goods Code (UN NO): 1969

14.2 Technical name: ISOBUTANE

14.3 Transport hazard class: 2.1

14.4 Categories of packing: II

14.5 Marine pollutant: No

14.6 Other special preventive measures related to transport or means:

The product shall be shipped by the tank truck provided by the pressure LPG enterprise during railway transportation and shall be approved by relevant departments before shipment. The safety helmet on the cylinder must be worn when transporting the cylinder. The cylinder is generally flat, and the bottle mouth should be in the same direction, not cross; The height shall not exceed the guardrail board of the vehicle, and the triangular wooden pad is clamped to prevent rolling. Transport vehicles should be equipped with the corresponding variety and quantity of fire fighting equipment. The exhaust pipe of the vehicle carrying the goods must be equipped with fire retardant device. Mechanical equipment and tools that are easy to generate sparks are prohibited to be loaded and unloaded. It is strictly prohibited to mix and transport with strong oxidant, strong acid, strong alkali, halogen, etc. Summer should be transported in the morning and evening to prevent sun exposure. Stay away from fire and heat source during stopover. Road transportation should follow the prescribed route, do not stay in residential and densely populated areas.

SECTION 15. Regulatory information

15.1 Safety, health and environment regulations/regulations governing the chemical:

Work Safety Law of the People's Republic of China (effective December 1, 2014).

Law of the People's Republic of China on Prevention and Control of Occupational Diseases
(Presidential Order No. 48, effective from September 1, 2016);

Regulations on the Safety Management of Hazardous Chemicals (Order No. 591 of The State Council, effective from December 7, 2013);

Regulations on Labor Protection in Workplaces where Toxic Substances Are Used (adopted at the 57th Executive meeting of The State Council on April 30, 2002);

General Principles for Classification and Hazard Notification of Chemicals (GB13690-2009)



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Series standard for Classification and Label Of Chemicals (GBGB 300000.2-2013 ~30000.29-2013)
Contents and Project Sequence of Technical Specifications for Chemical Safety (GB/T16483-2008)
Guide to Preparation of Technical Instructions for Chemical Safety (GB/T 17519-2013)
Occupational exposure limits to harmful factors in the workplace -- Part 1: Chemical harmful factors (GBZ2.1-2019)
Occupational exposure limits to harmful factors in the workplace - Part 2: Physical factors (GBZ2.2-2007)

15.2 Safety assessment of chemical substances

Not evaluated

SECTION 16. Other information

References:

1. Hazardous Chemicals Safety Technology Complete Book, Chemical Industry Press, 1st edition, July 1997
2. New Hazardous Materials Safety Manual, Chemical Industry Press, 1st edition, April 2001
3. Regulations on The Safety Management of Hazardous Chemicals
4. Journal of Hazardous Chemicals Safety Technology (Volume 1) organized by Qingdao Safety Engineering Research Institute of Sinopec and Chemical Registration Center of State Administration of Work Safety, edited by Zhang Haifeng.

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