

SAFETY DATA SHEET FOR CHEMICAL PRODUCTS (SDS)

Report No. NB2022075553EN

Date: July 15, 2022

Page: 1/11

Applicant Name : NANJING REFINERY CO., LTD

Applicant Address : 388# GANJIAXIANG STREET, QIXIA DISTRICT, NANJING

Product Name : Refrigerant R600a (isobutane)

Received Date : July 12, 2021

Compilation Period : July 12, 2021 to July 15, 2022

Regulatory Requirements : As requested by the applicant, the Safety Data Sheet is prepared according to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Rev_9 (2021) .



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SECTION 1. Identification of the substance/preparation and company

1.1 Product Identification	: Refrigerant R600a (isobutane)
1.2 Model No.	: R600a
1.3 Recommended Use	: /
1.4 Manufacturer Name	: NANJING REFINERY CO., LTD
1.5 Manufacturer Address	: 388# GANJIAXIANG STREET, QIXIA DISTRICT, NANJING
1.6 Manufacturer Tel	: 025-58989858
1.7 Manufacturer Fax	: /
1.8 Manufacturer Email	: /
1.9 Emergency Phone	: 025-85477110

SECTION 2. Hazards identifications

2.1 Hazard Class:

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Rev_8 (part 2~4), classification of risk categories.

Flammable gas, category 1

High pressure gas, compressed gas

2.2 Pictograms:



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 description:

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

2.6 Precautionary statements

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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.

2.7 Other hazards

PBT andvPVB: None

SECTION 3. Composition / information on ingredients

Ingredient(s) of the product: Pure

Substance name	Conc. (%)	CAS. No
Isobutane	≥99.9	75-28-5

SECTION 4. First aid measures

General advice: Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.

4.1 Following inhalation:

If feeling uncomfortable, victim should be moved into fresh air. Seek medical attention.

4.2 Following skin contact:

Take off contaminated clothing and shoes immediately. Wash off with plenty of water for at least 15 minutes and consult a physician if feeling uncomfortable.

4.3 Following eye contact:

In case of contact may cause irritation, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician immediately if eyes are hurt.



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4.4 Following ingestion:

If it is ingested, Seek medical attention.

SECTION 5. Firefighting measures

5.1 Hazardous Characteristics:

Flammable gas.

Will form explosive mixtures with air.

Containers exposed to fire may release the contents through pressure relief valves thereby increasing fire intensity and/ or vapour concentration.

Vapours may travel to source of ignition and flash back.

5.2 Extinguishing Media:

Dry powder, Chemical foam, Carbon dioxide, water mist.

5.3 Firefighting procedures:

As in any fire, wear self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) and full protective gear.

Extinguish fire in a safe distance with enough protection

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

If possible, move containers from the fire to an open area.

Spray water to keep the fire container cool until the end of the fire.

If the container in the fire suddenly makes abnormal sound or appears abnormal phenomenon, evacuate immediately.

Isolate the accident site and forbid irrelevant personnel to enter.

5.4 Hazardous combustion products:

Carbon monoxide

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Wear appropriate protective measures (SEE SECTION 8).

Beware of vapours accumulating to form explosive concentrations.



Ensure adequate ventilation.

Remove all sources of ignition.

Evacuate personnel to safe areas. Keep people away from upwind of spill/leak.

6.2 Environmental precautions:

Absorb the leakage to avoid polluting the environment.

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

6.3 Cleaning method:

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.

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 Handling Notes:

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

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.



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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 Storage Notes:

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 Occupational Exposure Limit:

Substance	Country/Region	Occupational exposure limit (8h)		Occupational exposure limit (short time)	
		ppm	mg/m ³	ppm	mg/m ³
Isobutane	Germany(AGS)	1000	1800	/	/

8.2 Engineering Control:



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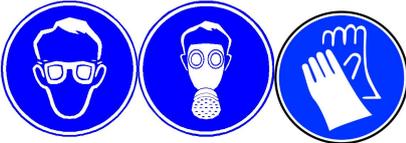
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Provide adequate ventilation. Where reasonably practicable, this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and solvent vapour below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

General requirement:	
Respiratory:	If exposure limits are exceeded or if irritation or other symptoms are experienced, use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges.
Eyes:	Wear protective goggle (Conform to EC EN 166 or US-NIOSH).
Hands:	Wear antifreeze gloves.
Skin and body protection:	wear antistatic clothing.

8.4 Sanitary Measure:

Forbid smoking, eating and drinking in working places. Washing hands after handling products.

SECTION 9. Physical and chemical properties

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	No Data
Viscosity	Not Applicable
Flash point(°C,Closed cup)	-82.8



Boiling point(°C)	-12
Melting point (°C)	-160
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	Insoluble in water

SECTION 10. Stability and reactivity

10.1 Stability:

Stable under recommended storage and handling conditions (See section 7).

10.2 Material for avoiding:

Danger of fire and explosion in reaction with strong oxidants.

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

10.3 Contact conditions for avoiding:

Heat source, high temperature, open flame.

10.4 Hazardous decomposition products:

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11. Toxicological information

11.1 Acute toxicity:

There was no toxic reaction when mice inhaled 50000mg/m3.

11.2 Skin corrosion/irritation:

Based on available data, the classification criteria are not met.

11.3 Serious eye damage/irritation:

Based on available data, the classification criteria are not met.



11.4 Respiratory or skin sensitisation:

Based on available data, the classification criteria are not met.

11.5 Germ cell mutagenicity:

Based on available data, the classification criteria are not met.

11.6 Carcinogenicity:

Based on available data, the classification criteria are not met.

11.7 Reproductive toxicity:

Based on available data, the classification criteria are not met.

11.8 STOT-single exposure:

Based on available data, the classification criteria are not met.

11.9 STOT-repeated exposure:

Based on available data, the classification criteria are not met.

11.10 Aspiration hazard.:

Based on available data, the classification criteria are not met.

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.

After the packaging is emptied, there may still be residue hazards. It should be kept away from heat and fire sources and returned to the supplier for recycling if possible.

13.3 Discards Precautions

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

See Section 8 for safety precautions for disposal personnel.

SECTION 14. Transport information

Packaging Label	
UN NO	1969
Technical name	ISOBUTANE
Transport hazard class	2.1
Subsidiary hazard class	None
Packing group	Not Applicable
Marine pollutant	No

Transportation Precautions: Shipment of the goods vehicle exhaust pipe must be equipped with fire retardant devices, prohibit using mechanical equipment and toolsof which easy to produce sparks. Strictly prohibited shipping or transportation with oxidants, halogens etc. Height shall not exceed the vehicle fence board, and with a triangular wooden pad cards firmly to prevent rolling. Cylinders generally flat, and the bottles should be in the same direction, should not cross. A safety helmet must be fitted for cylinder transport. Transport vehicles should be equipped with the appropriate variety and quantity of fire equipment



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and emergency equipment leakage during transport. Before transport, should be preceded by checking whether container integrity, sealing. The transport unit must be placarded and marked in accordance with relevant transporting

SECTION 15. Regulatory information

15.1 Safety, health and environmental regulations / laws for pure substances or mixtures

Catalogue of hazardous chemicals (2015 Edition)

Catalog number of hazardous chemicals: 139

CAS No.: 74-98-6

English name: propane

15.2 Safety assessment of chemical substances

Not evaluated

SECTION 16. Other information

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the result of its use, this information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

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