

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

SECTION 1. IDENTIFICATION

Product name : R-600a
SDS-Identcode : 130000145157

Manufacturer or supplier's details

Company name of supplier : ICOR International
Address : 10640 E 59th St
Indianapolis, IN 46236 United States of America (USA)
Telephone : 1-800-497-6805 (Monday – Friday, 7:30 am – 4:30 pm ET)
Emergency telephone : CHEMTREC 1-800-424-9300 (24 Hours/Day, 7 Days/Week)

Recommended use of the chemical and restrictions on use

Recommended use : Refrigerant
Restrictions on use : For professional users only.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Flammable gases : Category 1
Gases under pressure : Liquefied gas
Specific target organ systemic toxicity - single exposure : Category 3
Simple Asphyxiant

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H336 May cause drowsiness or dizziness.
May displace oxygen and cause rapid suffocation.

Precautionary Statements : **Prevention:**

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261 Avoid breathing gas.
P271 Use only outdoors or in a well-ventilated area.

Response:

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.

Storage:

P405 Store locked up.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.
Rapid evaporation of the product may cause frostbite.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance
Substance name : Isobutane
CAS-No. : 75-28-5

Components

Chemical name	CAS-No.	Concentration (% w/w)
Isobutane	75-28-5	100

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.

In case of skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area.
In case of contact, immediately flush skin with plenty of water.

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

Get medical attention immediately.

In case of eye contact : Get medical attention immediately.

If swallowed : Ingestion is not considered a potential route of exposure.

Most important symptoms and effects, both acute and delayed : May cause drowsiness or dizziness.
Contact with liquid or refrigerated gas can cause cold burns and frostbite.

Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.

Notes to physician : Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Water spray
Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry chemical

Unsuitable extinguishing media : None known.

Specific hazards during fire fighting : Vapors may form flammable mixture with air
Exposure to combustion products may be a hazard to health.
If the temperature rises there is danger of the vessels bursting due to the high vapor pressure.

Hazardous combustion products : Carbon oxides

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Fight fire remotely due to the risk of explosion.
Use water spray to cool unopened containers.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

Special protective equipment for fire-fighters : In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Evacuate personnel to safe areas.
Only trained personnel should re-enter the area.
Remove all sources of ignition.
Stop gas leak if it is safe to do so.

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

Avoid skin contact with leaking liquid (danger of frostbite).
Ventilate the area.
Follow safe handling advice and personal protective equipment recommendations.

Environmental precautions : Prevent further leakage or spillage if safe to do so.
Retain and dispose of contaminated wash water.

Methods and materials for containment and cleaning up : Ventilate the area.
Non-sparking tools should be used.
Suppress (knock down) gases/vapors/mists with a water spray jet.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures : Use equipment rated for cylinder pressure. Use a backflow preventative device in piping. Close valve after each use and when empty.

Local/Total ventilation : Use with local exhaust ventilation.
Use only in an area equipped with explosion-proof exhaust ventilation if advised by assessment of the local exposure potential

Advice on safe handling : Do not breathe gas.
Do not swallow.
Avoid contact with eyes.
Avoid prolonged or repeated contact with skin.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment
Keep container tightly closed.
Wear cold insulating gloves/ face shield/ eye protection.
Prevent backflow into the gas tank.
Open the valves slowly to prevent pressure surges.
Close valve after each use and when empty. Do NOT change or force fit connections.
Prevent the intrusion of water into the gas tank.
Keep away from heat and sources of ignition.
Take precautionary measures against static discharges.
Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage : Keep in properly labeled containers.
Store locked up.
Keep tightly closed.
Keep in a cool, well-ventilated place.
Keep away from direct sunlight.

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

- Store in accordance with the particular national regulations.
Keep away from heat and sources of ignition.
- Materials to avoid : Do not store with the following product types:
Self-reactive substances and mixtures
Organic peroxides
Oxidizing agents
Flammable liquids
Flammable solids
Pyrophoric liquids
Pyrophoric solids
Self-heating substances and mixtures
Substances and mixtures which in contact with water emit flammable gases
Explosives
Acutely toxic substances and mixtures
Substances and mixtures with chronic toxicity
- Further information on storage stability : Keep container tightly closed in a dry and well-ventilated place.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Isobutane	75-28-5	TWA	800 ppm 1,900 mg/m ³	NIOSH REL
		STEL	1,000 ppm	ACGIH

- Engineering measures** : Minimize workplace exposure concentrations.
Use only in an area equipped with explosion-proof exhaust ventilation if advised by assessment of the local exposure potential
Use with local exhaust ventilation.

Personal protective equipment

- Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

- Material : Chemical-resistant gloves
- Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Take note that the product is flammable, which may impact the selection of hand protection. Take note that the product is extremely cold, which may impact the selection of hand protection. Wash hands before breaks and at the end of workday.
- Eye protection : Wear the following personal protective equipment:
Chemical resistant goggles must be worn.
Face-shield
- Skin and body protection : Wear the following personal protective equipment:
Flame retardant antistatic protective clothing, unless assessment demonstrates that the risk of explosive atmospheres or flash fires is low
- Protective measures : Wear cold insulating gloves/ face shield/ eye protection.
- Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.
-

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : Liquefied gas
- Color : colorless
- Odor : odorless
- Odor Threshold : No data available
- pH : No data available
- Melting point/freezing point : -254 °F / -159 °C
- Initial boiling point and boiling range : 10.9 °F / -11.7 °C
- Flash point : -117 °F / -83 °C
- Evaporation rate : Not applicable
- Flammability (solid, gas) : Flammable

SAFETY DATA SHEET

R-600a



Version	Revision Date:	SDS Number:	Date of last issue: 10/22/2018
4.0	11/27/2018	3147828-00004	Date of first issue: 09/07/2018

Upper explosion limit / Upper flammability limit	:	8.4 %(V)
Lower explosion limit / Lower flammability limit	:	1.8 %(V)
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Solubility(ies) Water solubility	:	0.054 g/l
Partition coefficient: n-octanol/water	:	No data available
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity Viscosity, kinematic	:	Not applicable
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable if used as directed. Follow precautionary advice and avoid incompatible materials and conditions.
Possibility of hazardous reactions	:	Vapors may form flammable mixture with air Can react with strong oxidizing agents. Extremely flammable gas.
Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Skin contact
Eye contact

Acute toxicity

Not classified based on available information.

Components:

Isobutane:

Acute inhalation toxicity : LC50 (Rat): 570000 ppm
Exposure time: 15 min
Test atmosphere: gas

Skin corrosion/irritation

Not classified based on available information.

Serious eye damage/eye irritation

Not classified based on available information.

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

Germ cell mutagenicity

Not classified based on available information.

Components:

Isobutane:

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative
Remarks: Based on data from similar materials

Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo
cytogenetic assay)
Species: Rat
Application Route: inhalation (gas)
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

No data available

Persistence and degradability

Components:

Isobutane:

Biodegradability : Result: Readily biodegradable.
Remarks: Based on data from similar materials

Bioaccumulative potential

Components:

Isobutane:

Partition coefficient: n-octanol/water : log Pow: 2.8

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
Empty pressure vessels should be returned to the supplier.
If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number : UN 1075
Proper shipping name : PETROLEUM GASES, LIQUEFIED
Class : 2.1
Packing group : Not assigned by regulation
Labels : 2.1

IATA-DGR

UN/ID No. : UN 1075

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

Proper shipping name : Petroleum gases, liquefied
Class : 2.1
Packing group : Not assigned by regulation
Labels : Flammable Gas
Packing instruction (cargo aircraft) : 200
Packing instruction (passenger aircraft) : Not permitted for transport

IMDG-Code

UN number : UN 1075
Proper shipping name : PETROLEUM GASES, LIQUEFIED

Class : 2.1
Packing group : Not assigned by regulation
Labels : 2.1
EmS Code : F-D, S-U
Marine pollutant : no

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

Not applicable for product as supplied.

Domestic regulation

49 CFR

UN/ID/NA number : UN 1075
Proper shipping name : Petroleum gases, liquefied

Class : 2.1
Packing group : Not assigned by regulation
Labels : FLAMMABLE GAS
ERG Code : 115
Marine pollutant : no

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Gases under pressure
Flammable (gases, aerosols, liquids, or solids)
Simple Asphyxiant
Specific target organ toxicity (single or repeated exposure)

SAFETY DATA SHEET

R-600a



Version 4.0 Revision Date: 11/27/2018 SDS Number: 3147828-00004 Date of last issue: 10/22/2018
Date of first issue: 09/07/2018

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Pennsylvania Right To Know

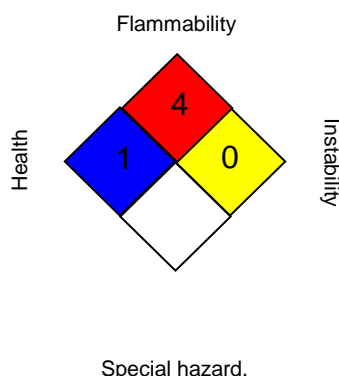
Isobutane

75-28-5

SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



HMIS® IV:

HEALTH	/	0
FLAMMABILITY		4
PHYSICAL HAZARD		3

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Before use read Chemours safety information.
For further information contact the local Chemours office or nominated distributors.

Full text of other abbreviations

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL : USA. NIOSH Recommended Exposure Limits
ACGIH / STEL : Short-term exposure limit
NIOSH REL / TWA : Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals

SAFETY DATA SHEET

R-600a



Version	Revision Date:	SDS Number:	Date of last issue: 10/22/2018
4.0	11/27/2018	3147828-00004	Date of first issue: 09/07/2018

in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

Revision Date : 11/27/2018

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

US / Z8