MATERIAL SAFETY DATA SHEET

mk R600a

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	mk R600a
Supplier	MK Chemical Co., Ltd.
	11-7, Tancheonsaneopdanji-gil, Tancheon-myeon, Gongju-si, Chungcheongnam-do, Korea
	Telephone : + 82 044 867 9850
	Fax.: + 82 044 867 9854
	Website : www.mkchemical.co.kr
EMERGENCY TELEPHONE NUMBER	**+ 82 044 867 9850**

2. HAZARDS IDENTIFICATION

GHS Classification	H220 – Flammable Gases – Category 1
	H280 - Gas under Pressure - Liquefied gas
Signal Word	Danger
Hazard Statement	Extremely flammable gas, Contains gas under pressure, may explode if heated
Label Elements	
Precautionary Statements	P210: Keep 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.
	P410 + P403: Protect from sunlight. Store in a well-ventilated place.
US NFPA Classification	Health: 2 Flammability: 4 Reactivity: 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	ISOBUTANE
Chemical Formula	C4H10
Component/Impurities	Contains no other components/impurities that will affect the classification of this product
CAS No.	75-28-5
Concentration(%)	100

4. FIRST AID MEASURES

Inhalation	In high concentrations may cause asphyxiation.
	Symptoms may include loss of mobility and consciousness.
	Victim may not be aware of asphyxiation.
	In low concentrations may cause narcotic effects.
	Symptoms may include dizziness, headache, nausea and loss of coordination.
	Move victim to well ventilated area.
	Keep victim warm and rested. Call for medical help.
	Apply artificial respiration if breathing has stopped.
Skin Contact	Frostbite: treat as thermal burns by flushing with lukewarm water
	for at least 15 minutes.
Eye Contact	Wash immediately, abundantly and thoroughly with lukewarm water
	for at least 15 minutes.
	If irritation persists, consult an ophthalmologist.
Ingestion	Not applicable

5. FIRE FIGHTING MEASURES

Specific Hazards	Exposure to fires may cause cylinders to rupture or explode
Suitable Extinguishing Media	carbon dioxide, regular dry chemical
Large fire	Flood with fire water spray
Hazardous Decomposition Products	Incomplete combustion may produce carbon monoxide
Other Information	If possible during a fire, stop the flow of product.
	Move container away or cool with water spray.
	Do not extinguish a leaking gas flame unless absolutely necessary.
	Spontaneous/explosive re-ignition may occur.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection	Wear self-contained breathing apparatus.
	Evacuate area.
	Ensure adequate air ventilation.
	Eliminate all sources of ignition.
Environmental Precautions	Try to prevent release of substance.
	Do not allow to enter drains or water courses
	or anywhere where dangerous accumulations can occur.
Methods for Cleaning Up	Isolate spill area. Ventilate the area.

7. HANDLING AND STORAGE

Handling	Use only in well ventilated areas.
	Ensure that all equipment is adequately earthed.
	Use only correctly specified equipment which is suitable
	for use with the product, its supply pressure and temperature.
	Keep away from all sources of ignition.
	Separate from oxidant gases and other oxidants in storage area
Storage	Separate from oxidant gases and other oxidants in store.
	Store in a dry well ventilated place away from sources
	of heat and direct sunlight.
	Do not store in ambient temperatures of more than 50℃.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure Limits	
ISOBUTANE	800ppm(1900mg/m^3) NIOSH recommended TWA 10hour(s)
Personal Protection	Ensure adequate ventilation.
	Do not smoke

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Mass	58.12
Color	colorless gas
Odor	sweetish
Boiling Point	11F(-11.6℃) at atmospheric pressure
Freezing Point	-254F(-159℃) : calculated
Flash Point	<-83.0℃
Autoignition Temperature	860F(460℃)
Explosive Properties	vapor may form explosive mixtures with air
Flammability Limits	1.8 to 8.4 vol.% in air
Vapor Pressure	3.0 bar at 20℃
Liquid Density	556.9 kg/m^3 at 20℃
Specific Gravity(water=1)	0.56 at 20℃
Solubility	slightly soluble
Other Data	Gas is heavier than air. May accumulate
	in confined space, particularly at or below ground level.

10. STABILITY AND REACTIVITY

Stability	Can form explosive mixtures with air.
Reactivity	May react violently with oxidants.

11. TOXICOLOGICAL INFORMATION

General	No known toxicological effects from this product

12. ECOLOGICAL INFORMATION

General	No known ecological damage caused by this product.

13. DISPOSAL CONSIDERATIONS

Disposal of Product	Do not discharge into areas where there is a risk of forming explosive mixture with air. Waste gas should be flared through a suitable burner with a flash back arrestor. Do not discharge into any place where its accumulation could be dangerous.
Disposal of Containers	Return all sized containers to supplier.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101

Proper Shipping Name	ISOBUTANE
ID Number	UN 1969
Hazard Class or Division	2.1
Labeling Requirements	2.1
Quantity Limitations	Passenger Airport or Railcar : Forbidden Cargo Airport Only : 150kg

Canadian Transportation of Dangerous Goods

Shipping Name	ISOBUTANE
UN Number	1969
Class	2.1

15. REGULATORY INFORMATION

U.S. Regulation

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES(40 CFR 302.4) : Not regulated

SARA TITLE Ⅲ SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES(40 CFR 355.30) : Not regulated

SARA TITLE Ⅲ SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES(40 CFR 355.40) : Not regulated

SARA TITLE Ⅲ SECTIONS 311/312 HAZARDOUS CATEGORIES(40 CFR 370.21)

ACUTE	Yes
CHRONIC	No
FIRE	Yes
REACTIVE	No
SUDDEN RELEASE	Yes

SARA TITLE Ⅲ SECTION 313(40 CFR 372.65) : Not regulated

OSHA PROCESS SAFETY(29 CFR 1910.119) : Not regulated

State Regulations	California Proposition 65 : Not regulated
Canadian Regulations	WHMIS CLASSIFICATION : A, B1
National Inventory Status	U.S. INVENTORY(TSCA) : Listed on inventory
TSCA 12(b) Export Notification	Not listed
Canada Inventory(DSL/NDSL)	Listed on inventory

16. OTHER INFORMATION

RECOMMENDED USES	Refrigerant
ATTENTION	Flammability hazard
NOTE	Ensure all national/local regulations are observed. Ensure operators understand the flammability hazard. Contact with liquid may cause cold burns/frost bite.

Contact with liquid may cause cold burns/frost bite.

The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new processor experiment, a through material compatibility and safety study should be carried out. Details given in this document are believed to be correct at the time of going to press.

Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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