



# SRF LIMITED

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## SAFETY DATA SHEET

FLORON-R600a

### SECTION 1: IDENTIFICATION OF SUBSTANCE OR MIXTURE AND COMPANY

- 1.1 Product Name** : FLORON-R600a
- Trade Names / Synonyms** :  
: 2-Methyl propane, ISO butane, R600a, HC-600a.
- CAS Number** : 75-28-5
- 1.2 Manufacturer/supplier** : SRF Limited, D-2/1 GIDC Phase-II, PCPIR, Dahej, Tal. Vagra, Dist. Bharuch 392 130, Gujarat (India)
- Further information obtainable from:** : Vikas Yadav  
e-mail: vikas.yadav1@srf.com  
Mobile no. +91-9978445120
- 1.3 Emergency Call**
- Emergency Contact** : Balwada Ashish +91-9099002602
- Primary Contact** : Prabhat Kumar +91-7069057087
- SDS Contact** : Sharma Anil Kumar +91-9687694067
- 1.4 Relevant Identified Uses Of The Substance Or Mixture And Uses Advised Against**
- Identified Uses:** : Refrigerant, Raw material for the chemical industries.
- Uses advised against:** : Do not use product for anything outside of the above specified uses

### SECTION 2: HAZARDS IDENTIFICATION

**2.1 Classification according to Regulation (EC) No 1272/2008**

**Physical Hazard**

Flamable Gas	Catagory1	H220: Extremely flammable gas
Gases under pressure	Liquefied gas	H280: Contains gas under pressure; may explode if heated.

- Other hazards** : May displace oxygen and cause rapid suffocation  
: Rapid evaporation of the product may cause frostbite



**Precautionary statement(s)**

Prevention:	P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Response: P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381: In case of leakage, eliminate all ignition sources. Storage. P403: Store in a well-ventilated place. Disposal: None.
Response	P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381: In case of leakage, eliminate all ignition sources

Storage	P403: Store in a well-ventilated place. Disposal: None.
Disposal	None

**Label elements**

Labelling according Regulation (EC) No 1272/2008:

- Pictogram** :  
- Signal Word** : Danger
- Supplemental label information** : EIGA-0783: Contains fluorinated greenhouse gases covered by the Kyoto protocol.  
EIGA-As: Asphyxiant in high concentrations

**SECTION 3: COMPOSITION & INFORMATION ON INGREDIENTS**

Chemical name	Common name and synonyms	Formula	CAS No.	EC No.	Concentration % (w/w)
Floron-R600a	2-Methyl propane, ISO butane, R600a, HC-600a.	C4F10	75-28-5	601-004-01-8	>= 99.9 - <= 100

**SECTION 4. FIRST AID MEASURES**

**4.1 Description of first aid measures**

- General advice** : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.  
  
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
- Inhalation** : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped. Get medical attention if symptoms occur.
- Skin contact** : Contact with evaporating liquid may cause frostbite or freezing of skin. Treat for frostbite if necessary by gently warming affected area. Do not rub affected area. Get medical attention immediately.

- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately
- Ingestion** : Ingestion is not considered a potential route of exposure.

**4.2 Most Important Symptoms And Effects, Both Acute And Delayed:**

Anaesthetic effects Light-headedness irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.

**4.3 Indication of any immediate medical attention and special treatment needed**

- Hazards** : Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
- Treatment** : Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention
- Protection of first-aiders** : If potential for exposure exists, refer to Section 8 for specific personal protective equipment.
- Notes to physician** : Treat symptomatically and supportively.  
Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution. Avoid administration of adrenaline or other simpatomimeticas similar, as it can produce a cardiac arrhythmia with possible later heart failure.

**SECTION 5. FIRE FIGHTING MEASUR**

- General Fire Hazards : Heat may cause the containers to explode.
- 5.1 **Extinguishing media Suitable extinguishing media:** : Use an extinguishing agent suitable for the surrounding fire.  
  
Apply water from a safe distance to cool container and protect surrounding area.  
  
If involved in fire, shut off flow immediately if it can be done without risk. Contains gas under pressure. Extremely flammable liquefied gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
- 5.2 **Special hazards arising from the substance or mixture** : Cylinders are equipped with pressure and temperature relief devices, but may still rupture under fire conditions. Decomposition may occur. Contact of welding or soldering torch flame with high concentrations of this substance can result in visible changes in the size and colour of the torch flame. This flame effect will only occur in concentrations of this substance well above the recommended exposure limit. Therefore stop all work and ventilate to disperse vapours

- from the work area through flame arrestor or flare before using any open flames.
- 5.3 **Hazardous Combustion Products** : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: carbon monoxide ; Carbonyl difluoride ; Hydrogen fluorid
  
  - 5.4 **Advice for firefighters Special fire fighting procedures** : In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire. Exposure to decomposition products may be a hazard to health.
    - : In case of fire: Stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguisher to contain the fire. Isolate the source of the fire or let it burn out. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.
  
  - 5.5 **Special protective equipment for firefighters** : Fire-fighters must use standard protective equipment including flame retardant coat, helmet with face shield, Gloves, rubber boots, and in enclosed spaces, SCBA.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

- 6.1 **Personal precautions, protective equipment and emergency procedures** : Evacuate area. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
  
- 6.2 **Environmental Precautions** : Prevent further leakage or spillage if safe to do so.
  
- 6.3 **Methods and material for containment and cleaning up** : Provide adequate ventilation. Eliminate source of ignition. Avoid open flames and high temperatures
  
- 6.4 **Reference to other sections** : Refer to sections 8 and 13.

## SECTION 7: HANDLING & STORAGE

- 7.1 **Precautions for safe handling** : Only experienced and properly instructed persons should handle gases under pressure. Handle in accordance with good industrial hygiene and safety practice.

Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck etc. Secure cylinders in an upright position at all times, close all valves



when not in use. Provide adequate ventilation. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. When using do not eat, drink or smoke. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Never attempt to lift cylinder by its cap. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place. The product should not be mixed with air for leak testing or used with air for any other purpose above atmospheric pressure. Contact with chlorine or other strong oxidizing agents should also be avoided.

- 7.2 **Conditions for safe storage, including any incompatibilities** : Observe all regulations and local requirements regarding storage of containers. Protect from sunlight. Store in a well-ventilated place. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.
- 7.3 **Storage temperature** : Protect from sunlight. Store in a cool and well-ventilated place.
- 7.4 **Storage period** : No data available

## SECTION 8 : EXPOSURE CONTROL / PERSONAL PROTECTION CONTROL PARAMETERS

### 8.1 Control Parameter

Components with workplace control parameters

Derived No Effect Level (DNEL)

USA TVL-TWA =1000 ppm

800 ppm (1900 mg/m3) NIOSH recommended TWA 10 hours(s)

Ingediant	Original IDLH	Revised IDLH
R600a	Not Available	Not Available

## 8.2 Exposure controls

**Engineering controls** : Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:  
 Process controls, which involve changing the way a job activity or process is done to reduce the risk.  
 Enclosure and/or isolation of emission source, which keeps a selected hazard "physically" away from the worker, and ventilation that strategically "adds" and "removes" air in the work environment.

### Personal protective equipment

**Respiratory protection** : For rescue and maintenance work in storage, tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

**Hand protection** : Additional protection: Wear approved gloves that are suitable for the task and have been shown to be impervious for the duration of their use

**Eye protection** : Wear safety glasses with side shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

**Protective measures** : When using do not smoke. Self-contained breathing apparatus (SCBA) is required if a large release occurs

**Environmental exposure controls** : Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Handle in accordance with good industrial hygiene and safety practice. No smoking in the working area. Avoid long-time contact.

## SECTION 9 : PHYSICAL & CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

Appearance : Clear, colourless liquified gas

Physical state : Liquified gas

Colour : Colourless

Odor : Faintly sweet odour

Molecular Weight : 58.14 g/mol

pH (15 aqueous solution) : Neutral

Melting point/freezing point : -159.6°C at 1.013,25 hPa) freezing point

Initial boiling point and boiling range : -11.8°C at 1.013,25 hPa

Flash point : None (Does not Flash)

Flammability (solid, gas) : Flammable



Ozone Depletion Potential	: Nil (Source: as per schedule- 1 of ozone legislation ,Ozone cell-Management of environment forest & climate change)
Global Warming Potential	: 3 (Source:IPCC-AR4 Report)
Vapour pressure	: 31 psig at 20.0 °C
Vapour density	: 2.006 (Air = 1.0)
Reletive density	gas 0.5572 lb / cu ft
Flammability Range	: 1.8 to 8.4 % in air
Auto-ignition temperature	: No data available
Water solubility	: 0.024 – 0.061 g/l (20°C )
Decomposition temperature	: No data available

**SECTION 10: STABILITY & REACTIVITY**

10.1 <b>Reactivity</b>	: This product is stable
10.2 <b>Chemical stability</b>	: Stable under recommended storage conditions
10.3 <b>Possibility of hazardous reactions</b>	: Polymerization will not occur
10.4 <b>Conditions to avoid:</b>	: The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Protect from physical damage and heat. Containers may rupture or explode if exposed to heat.
10.5 <b>Incompatible materials:</b>	: Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts
10.6 <b>Hazardous decomposition products:</b>	: Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride., These materials are toxic and irritating., Avoid contact with decomposition products

**SECTION 11 : TOXICOLOGICAL INFORMATION**

**11.1 Information on toxicological effects**

Actuate Toxicity Not Classified

LC50 inhalation rat (mg/l)	658 mg/l/4h
LC50 inhalation rat (ppm)	285000 ppm/1h
ATE US (vapors)	658 mg/l/4h
ATE US (dust, mist)	658 mg/l/4h
Skin corrosion/irritation	Not classified pH :Not applicable
Serious eye damage/irritation	Not classified pH :Not applicable
Respiratory or skin sensitization	Not classified
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
Specific target organ toxicity-single exposure	Not classified

Specific target organ toxicity – repeated exposure  
Aspiration hazard

Not classified  
Not classified

## 12. ECOLOGICAL INFORMATION

### 12.1- Toxicity

Ecology - general

No Known ecological damage caused by this product.

### 12.2-Persistence and degradability

Persistence and degradability

The substance is biodegradable. Unlikely to persist.

### 12.3-Bioaccumulative potential

BCF fish	1 1.57 - 1.97
Log Pow	2.76
Log Kow	Not applicable.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

### 12.4-Mobility in Soil

Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution

### 12.5-Other adverse effect

Effect on ozone layer	None
Effect on the global warming	No known effects from this product

## SECTION 13: DISPOSAL CONSIDERATIONS




### 13.1 Waste Treatment Methods

- Product** :
- 1) Mechanical recovery
  - 2) Flare-Off at safe location (Vapours)
  - 3) Exhaust to atmosphere in safe location (No open flames)
- Comply with applicable Federal, State/Provincial and Local Regulations
- Contaminated packaging** :
- Evaporate or incinerate residue at an approved site. Return empty containers to supplier.
  - Ensure damaged or non-returnable cylinders are gas-free before disposal.

## SECTION 14: TRANSPORT INFORMATION

ITEM	ADR	IMDG	IATA
UN number	1969	1969	1969
Proper shipping name	ISOBUTANE	ISOBUTANE	ISOBUTANE



Transport hazard class(es)/ Labelling Number	 2.1	 2.1	 2.1
Packaging Instruction	P 200	P 200	P 200
Environmental hazards	No	No	No

**Additional information**

Emergency Response Guide (ERG) Number	:115 (UN1075)
Other information	:No supplementary information available
MFAG-No	:115
Special transport precautions	:Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: <ul style="list-style-type: none"> <li>- Ensure there is adequate ventilation.</li> <li>- Ensure that containers are firmly secured.</li> <li>- Ensure cylinder valve is closed and not leaking.</li> <li>- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.</li> <li>- Ensure valve protection device (where provided) is correctly fitted.</li> </ul>

**15. REGULATORY INFORMATION**

Isobutane (75-28-5) is found on the following regulatory list

**15.1 US Federal regulations**

Listed on the United States TSCA (Toxic Substances Control Act) inventory	
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard

**15.2 International regulations**

Australia Inventory of Chemical Substances (AICS)	International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines	Y
USA TSCA	Y
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No



State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List
Legend	Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory

## SECTION 16: OTHER INFORMATION

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. SRF Limited-Chemical business shall not be held liable for any damage resulting from handling or from contact with the above product.