



SRF LIMITED

Issue No: 01

Rev: 01

Revision Date: 06.10.2018

MATERIAL SAFETY DATA SHEET FLORON-600a

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

1.1 Product Name	FLORON-600a
Trade Names / Synonyms	2-Methyl propane, ISO butane, R600a, HC-600a.
1.2 Manufacturer/Marketing by	SRF Limited, D-2/1 GIDC Phase-II, PCPIR, Dahej, Tal. Vagra, Dist. Bharuch 392 130, Gujarat (India)
1.3 Emergency Call	02641 289 201 / 202

Relevant Identified Uses Of The Substance Or Mixture And Uses Advised Against

Identified Uses: Raw material for the chemical industry and manufacturing of polymers, fuel, aerosol propellants, Cleaning/washing agents and disinfectants, intermediates, solvents, blowing agents for foams

Uses advised against: Flammable gas. Liquid under high pressure.

2. HAZARDS IDENTIFICATION

2.1-Classification of the substance or mixture

According to the Hungarian Public Act No. XXV. of 2000 on chemical safety, and Regulation 44/2000(XII. 27.) as modified by the ESZCSM Regulation 33/2004 (IV.26) the substance is classified as hazardous:F+, Extremely flammable, R12, R12, S-(2)-9-16-33

Physicochemical hazards: Extremely flammable

Health hazards: Not hazardous under normal conditions. Accidental release of high pressure liquid hydrocarbons may result in increased exposure. High evaporation rate of the liquid may lead to frostbites. Acute toxicity is low. Being heavier than air, gases may accumulate in lower and/or confined spaces when released.

The substance has anaesthetic effect, 1% (1000 ppm) causes sleepiness within a few minutes. In concentrations higher than 10%: narcotic effect: weakness, headache, nausea, dizziness, confusion, blurred sight, increasing sleepiness. Very high concentrations may cause unconsciousness, spasms and finally asphyxia caused by the absence of oxygen.

Environmental hazards: Evaporates quickly, does not represent any hazard for soil and water environment.

2.2-Label elements

Labelling according Regulation

Pictogram



3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1-Substance

Synonyms Isobutane, R-600a, Floron-600a ,Supertron-600a

Formula C₄H₁₀ (liquefied)

Molecular weight 58.14 g/mol

Ingredient(s)	EC No.	CAS No.	Classification	Weight %
Floron-600a (C ₄ H ₁₀)	601-004-01-8	75-28-5	Flammable gas, Compressed Gas	≥ 99.5 %

4. FIRST AID MEASURES

4.1-Description of first aid measures

Inhalation: Move victim to fresh air and to a safe place and take measures to prevent fire and explosion. Rescue personnel may need breathing apparatus. Let victim lay in rest and muffled. If breathing has stopped, apply artificial breathing or breathing apparatus. If victim is unconscious, lay him on his side in a stable position. Get medical help on site.

Skin contact: Wash affected area with water. Contaminated clothes, rings, watch should be removed only if they are not adhered to the skin. Warm affected area slowly.

Eye contact: In the case of eye contact, rinse eyes with plenty of running water for at least 15 minutes. Cover eyes by sterilized dressing material. Call doctor immediately.

Ingestion: DO NOT induce vomiting unless instructed to do so by a physician.

General Advice : Consult a physician. Show this safety data sheet to the doctor in attendance.

Advice to Physician or First-Aiders: If unconscious place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician.

5. FIRE FIGHTING MEASURES

5.1-Extinguishing media: Suitable extinguishing media	Dry chemical powder, foam, carbon dioxide, sand
5.2-Special hazards arising from the substance or mixture	Carbon dioxide, carbon monoxide, hydrocarbons
5.3-Advice for fire-fighters	Self-contained breathing apparatus. Full protective clothing.
5.4-Further information	Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency

Personal precautions: Wear protective clothing. Keep persons not involved in rescue at a distance.

Environmental precautions: Prevent from entering sewers, surface waters or soil. In the case of an environmental pollution notify appropriate authorities. Spilled material entering drainage systems may represent explosion hazard. Eliminate all lower and remote ignition sources. Involve experts.

Methods and material for containment and cleaning up: Gas release: Notify fire-brigade, eliminate all ignition sources. If there is a hazard of overexposure to high gas concentrations, use self-contained breathing apparatus. Stop leakage, if this can be done safely. Decrease gas concentration by using water spray. Restrict access to area until gases dissipate. Monitor gas concentration in the hazardous area.

7. HANDLING & STORAGE

7.1-Precautions For Safe Handling Engineering measures: The product should be used in a closed system. Avoid contact with material, eye contact and the inhalation of vapours. Use natural or artificial ventilation to keep airborne vapour concentration below the occupational limit level.



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7.2-Conditions for safe storage, including any incompatibilities:

Keep in a well-ventilated place, away from heat and ignition sources, strong oxidizers and high pressure oxygen. Prevent electrostatic discharges. Use spark-proof ventilation system, certified explosion-proof equipment and an electric system with intrinsic safety. Keep regulations concerning the storage tanks and containers of flammable materials, as well as those for the buildings, rooms, maximal allowed quantities and minimal storing distance. Store material away from working processes, production areas, elevators, buildings, exits of rooms and main corridors leading to exits. Do not keep combustible material on storing places. Have an appropriate fire-extinguisher in the storing room (such as an automatic fire extinguishing apparatus, portable extinguishers). All storing and filling units should have an emergency plan.

8. EXPOSURE CONTROL / PERSONAL PROTECTION CONTROL PARAMETERS

8.1-Control parameters

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)

8.2-Exposure controls

Engineering Controls: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

Eye / face protection: Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Hand protection Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

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Body protection: Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. Any supplied---air respirator with a full face piece that is operated in pressure---demand or other positive pressure mode. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

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.

9. PHYSICAL & CHEMICAL PROPERTIES

Appearance	Clear, colourless liquefied gas
Odour	Faintly sweet odour
Odour Threshold	No data available
pH	not applicable
Freezing point	:-159.6°C at 1.013,25 hPa
Boiling point	-11.8°C at 1.013,25 hPa
Flash point	-85°C (-18°F) - closed cup
Evaporation rate	> 1 (Ethyl Ether = 1.0)
Flammability (solid, gas)	Extremely flammable in the presence of ignition sources or oxidizing materials
Upper/lower flammability or explosive limits	Upper explosion limit: 8.4 % Lower explosion limit: 1.8 %
Vapour pressure	31 psig at 20,0 °C
Vapour density	2.006 (Air = 1.0)
Relative density	gas 0.5572 lb / cu ft
Water solubility	0.024 – 0.061 g/l (20°C)
Partition coefficient: noctanol/water	Log Kow : 2.8



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Auto-ignition temperature	460°C / 860°F
Decomposition temperature	No data available
Viscosity	Not applicable
Explosive properties	Not explosive, In use may form flammable/explosive vapour-air mixture.
Oxidizing properties	Not oxidising

10. STABILITY & REACTIVITY

10.1-Reactivity:	This product is stable
10.2-Chemical stability:	Under normal temperature and pressure conditions the material is stable.
10.3-Possibility of hazardous reactions:	No data available
10.4-Conditions to avoid:	Radiating heat, open flame, all ignition sources, sparks.
10.5-Incompatible materials:	Strong oxidizing agents, Acids
10.6-Hazardous decomposition products:	No decomposition occurs at proper storage and use.

11. TOXICOLOGICAL INFORMATION

11.1-Information on toxicological effects

Acute toxicity	LD50 Oral - Acute oral is not expected on the basis of physical properties. LC50 Inhalation (mouse, 2 hours) - 286000 ppm (28.6%) LC50 Inhalation (mouse, 4 hours) = 277000 ppm (27.7%) LD50 Dermal - Acute dermal is not expected on the basis of physical.
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Skin corrosion/irritation

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

Serious eye damage /eye irritation

Eyes - Eye contact with the rapidly evaporation liquid may cause frostbite.

Respiratory or skin sensitisation

Skin contact with the rapidly evaporation liquid may cause frostbite. Frostbite effects are a change in colour of the skin to grey or white, followed by blistering.

Germ cell mutagenicity

Ames test- Result: negative

Carcinogenicity

As other and unsaturated hydrocarbons: content is below 0.5%, the substance is not carcinogenic.

Not listed by NTP, IARC, or NIOSH

Reproductive toxicity

No toxicity to reproduction

Specific target organ toxicity - single exposure

May cause drowsiness or dizziness. - Nervous system

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard

No aspiration toxicity classification

12. ECOLOGICAL INFORMATION

12.1-Toxicity

12.1-Ecotoxicity

According to its physical properties, the substance evaporates quickly from an aqueous environment, thus neither acute nor chronic effects practically could not be observed.

12.2. Mobility:

No toxicity to reproduction

Toxicity to algae

EC50 - Daphnia magna (Water flea) - 382 mg/l - 24 h



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12.2-Persistence and degradability

Degrades in the troposphere initiated by sunlight

Half-life period: 3.2 days

Degradable in the soil by bacteria (*Mycobacterium crassa*, *mycobacterium phlei*)

12.3-Bioaccumulative potential

logK Log Pow 2.8

BCF: no data available

12.4-Mobility

Known or predictable distribution in environmental compartments: LPG released into the environment dissipates quickly and undergoes photochemical degradation.

- **Surface tension:** No data available.

- **Adsorption/desorption:** No data available.

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)

Contaminated packaging Recommendation: Dispose of observing national or local regulations.
Suitable cleaning agents: Dispose of as unused product.

OTHER DISPOSAL CONSIDERATIONS: Disposal must comply with federal, state, and local disposal laws.



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14. TRANSPORT INFORMATION

14.1-UN number:	ADR/RID: 1969	IMDG: 1969	IATA: 1969
14.2-UN proper shipping name:	ADR/RID ISO BUTANE	IMDG ISO BUTANE	IATA ISO BUTANE
14.3-Transport hazard class(es)	ADR/RID: 2.1	IMDG:2.1	IATA:2.1
14.4-Packaging group	ADR/RID: II	IMDG:II	IATA:II
14.4-Packaging method	ADR/RID: Steel cylinders	IMDG:Steel cylinders	IATA:Steel cylinders
14.5-Environmental hazards	ADR/RID: no	IMDG: no marine pollutant	IATA: no
14.6-Special precautions for user	No data available		

15. REGULATORY INFORMATION

The ingredients listed in section 2 are reported/included in the U.S. TSCA inventory and Canadian domestics substance list.

The product is defined by OSHA in 29 CFR 1910.1200c as a flammable gas. Use of this product may require compliance with 29 CFR 1910.119, process safety management of highly hazardous chemicals.



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16. OTHER INFORMATION

HMIS Classification: Health – 1, Flammability – 4, Reactivity – 0

-R phrases:

R: 12: Extremely flammable

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-Fluoro Chemical business expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.