**Standard Operating Procedures**

Laboratory Specific

**Chemical:** **ISOFLURANE**

aka 2-chloro-2-(difluoromethoxy)-1,1,1-trifluoro-ethane

Please fill out the form completely.  Print a copy and insert into your

 *Laboratory Safety Manual and Chemical Hygiene Plan*.

Refer to instructions for assistance.

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Department:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_                        Date when SOP was written:\_\_\_\_\_\_\_

Date when SOP was approved by the lab supervisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Principal Investigator:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Internal Laboratory Safety Coordinator/Lab Manager:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Laboratory Phone:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Office Phone:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Emergency Contact:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

                                    *(Name and Phone Number)*

Location(s) covered by this SOP:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

                                                *(Building/Room Number)*

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**Type of SOP:** Process Hazardous Chemical Hazardous Class

**Purpose**

Isoflurane (2-chloro-2-(difluoromethoxy)-1,1,1-trifluoro-ethane) is a [halogenated ether](http://en.wikipedia.org/wiki/Halogenated_ether) used for inhalational [anesthesia](http://en.wikipedia.org/wiki/Anesthesia). The name for isoflurane comes from its structural isomer of enflurane. It is a racemic mixture of (R) and (S) optical isomers. Its use in human medicine is now starting to decline, being replaced with [sevoflurane](http://en.wikipedia.org/wiki/Sevoflurane), [desflurane](http://en.wikipedia.org/wiki/Desflurane) and the intravenous anaesthetic [propofol](http://en.wikipedia.org/wiki/Propofol). Isoflurane is still frequently used for [veterinary anaesthesia](http://en.wikipedia.org/wiki/Veterinary_anaesthesia).

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: 26675-46-7

Class: **CAUTION! Anesthetic Agent. Central Nervous System depression.**

Molecular formula: C3H2ClF5O

Boiling Point: 48.5°C (119.3°F)

Melting Point:N/A



**Potential Hazards/Toxicity**

**EMERGENCY OVERVIEW**: A clear or colorless liquid that has a pungent or musty smell. Used as an anesthetic agent for animals. Causes central nervous system depression!

**Target Organs: Nervous System. Heart. Liver**

**Potential Health Effects:**

**Eye:** May cause eye irritation.

**Skin:** May cause skin irritation.

**Ingestion:** Practically non-toxic if swallowed. No specific hazards other than therapeutic

effects. See inhalation. Oral LD50 Mouse = 5080 μL/kg. Oral LD50 Rat = 4770 μL/kg.

**Inhalation:** Practically non-toxic by inhalation. Cardiovascular effects (may include fluctuations in heart rate, changes in blood pressure, chest pain). Respiratory effects (may include shortness of breath, bronchospasms, laryngospasms, respiratory depression). Gastrointestinal effects (may include nausea, upset stomach, loss of appetite). Nervous System effects (may include ataxia, tremor, disturbance of speech, lethargy, headache, dizziness). Inhalation LC50 Rat = 15300 ppm

Inhalation LC50 Mouse = 16800 ppm.

**Chronic: Long term effect on the n**ervous system, heart and liver.Adverse effects will include: drowsiness/fatigue mental confusion/disorientation Unconsciousness

**Personal Protective Equipment (PPE)**

**Eyes:** Safety glasses. Goggles, face shield, or other full-face protection if potential exists

for direct exposure to aerosols or splashes.

**Skin:** Use chemical resistant, nitrile gloves.

**Clothing:** Wear long pants, closed toed shoes and a lab coat. Work uniform or laboratory coat. Additional body garments should be used based upon the task being performed (e.g., sleevelets, apron, gauntlets, disposable suits).

**Respirators:**

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**Engineering Controls**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use process enclosures, local exhaust ventilation, or other engineering controls to

keep airborne levels below recommended exposure limits. It is never to be used outside of the fume hood.

In regards to the Isoflurane anesthetic machines, they come in many shapes and sizes. Be sure to follow recommended machine calibration times indicated by your owner’s manual. It is very important to have a scavenging system to evacuate waste gases. Available options include: 1. F-air charcoal canister – be sure that you replace the canister when weight has increased by 50 grams. 2. Fume hood or vent – these can be used, but precaution should be used.

**First Aid Procedures**

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

**Ingestion:** Call the poison control center at 1-800-222-1222. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician: Treat symptomatically and supportively.**

**Special Handling and Storage Requirements**

**Handling:** Wash thoroughly after handling. Keep container tightly closed. Keep in a dry, cool and well-ventilated place. Store between 15-30°C (59 to 86°F).

**Storage** Keep container tightly closed. Keep in a dry, cool and well-ventilated place. Store between 15-30°C (59 to 86°F). No special restrictions on storage with other products.

**Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

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# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

**For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure**

*(Add specific description of procedure.)*

**Note:** Any deviation from this SOP requires written approval from PI.

**Documentation of Training** (signature of all users is required)

* Prior to conducting any work with Isoflurane, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

I have read and understand the content of this SOP:

**Name Signature Date**

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