STANDARD OPERATING PROCEDURE – FLAMMABLE GASES

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| **CONTACT INFORMATION** |
| **Location** | Building: | Room: |
| **Street Address:** |  |
| **Lab Safety Contact:** | Name: |
| Lab Phone: | Office Phone: |
| **Emergency Contact** | Name: | Phone: |
| **TYPE OF STANDARD OPERATING PROCEDURE** |
| Indicate which type of Standard Operating Procedure applies[ ]  Specific Process or Equipment [ ]  Specific Hazardous Chemical[x]  Hazard Class for a Group of Chemicals |
| **DESCRIBE PROCESS/EQUIPMENT, HAZARDOUS CHEMICAL or HAZARD CLASS** |
| **Flammable Gases (Examples: Propane, Hydrogen, Butane, Methane, Ethylene, Acetylene, Ammonia, Ethane, Hydrogen Sulfide, Carbon Monoxide, and Silane)**The United States Department of Transportation (DOT) defines flammable gas as: A material that is a gas at 20º C or below and 101.3 kPa of pressure (ambient temperature and pressure), i.e. the material has a boiling point of 20º C at sea level and is ignitable when in a mixture of 13 percent or less by volume with air or has a flammability range with air of at least 12% regardless of the lower limit. |
| **HAZARD SUMMARY** |
| Flammable gases pose a risk of burns, fire, and explosions. Some flammable gases may self-ignite without an obvious ignition source. Some flammable gases are heavier than air and may settle in low areas and flash back on contact with an ignition source. |
| **SPECIAL HANDLING AND STORAGE REQUIREMENTS** |
| **Precautions:**Keep a minimal inventory. Make sure a working safety shower and eyewash are nearby. Open cylinders only when connected to apparatus or equipment. Use only approved tubing and connections for the gas type. Consider a leak detector.**Storage:**Follow requirements for compressed gas storage. Store in a well-ventilated place. Storage in a gas cabinet connected to laboratory ventilation will prevent leaks from escaping into the room. Secure cylinder to a solid support. Remove regulators and cap when not in use. Segregate gases by hazard class. Keep at least 20 feet from oxidizing gases, or separate by a fire wall with at least a 30-minute rating and at least 5 feet high. Keep away from sources of ignition. Store away from paths of egress. |
| **ENGINEERING AND VENTILATION CONTROLS** |
| Use in a chemical fume hood or glove box. Use a glove box when a controlled atmosphere, product purity protection, or complete containment is needed. Snorkels over equipment will prevent flammable gases from escaping into the room. Inspect connections regularly for leaks and check condition of piping and regulators. Use a flash arrestor. Ground cylinders to prevent static buildup. Emergency eyewash fountains and safety showers should be available in the immediate vicinity of any potential exposure.  |
| **PERSONAL PROTECTIVE EQUIPMENT** |
| **PPE Requirements:** [x]  Long pants or clothing that covers all skin below the waist[x]  Shoes that cover the entire foot[x]  Gloves; indicate type: Heavy chemical resistant gloves (neoprene, butyl, or flame resistant) or leather work gloves/welding gauntlets that extend past the wrist. Refer to a chemical glove compatibility chart to choose appropriate chemical resistant gloves specific to the chemical being used. Inspect gloves before use. Use proper glove removal technique to avoid skin contact with outer surface of glove. Wash hands after removing gloves.[x]  Safety goggles [ ]  Safety glasses[ ]  Face shield [ ]  Lab coat[x]  Flame-resistant lab coat [ ]  Other: Click here to enter text.If the use of an N95, half mask, or full face respirator is requested, the individual and/or their supervisor must first contact Environmental Health & Safety for a consultation to determine if respirator use is necessary. If EH&S determines the use of a respirator is necessary, the individual must participate in the University’s respirator program. This includes a medical evaluation; respirator fit test, and training. |
| **EMERGENCY PROCEDURES** |
| In case of fire or large and/or extremely hazardous chemical releases pull the fire alarm and evacuate the area  If someone is seriously injured or unconscious**CALL 911 or CAMPUS POLICE AT <enter your campus PD #>**From a safe place, provide as much information as possible to the emergency responders including chemical name, volume, hazards, injuries, and location. **Chemical Exposure**: Remove any contaminated clothing, and IMMEDIATELY flush contaminated skin with water for at least 15 minutes following any skin contact. For eye exposures, IMMEDIATELY flush eyes with water for at least 15 minutes. Consult SDS for guidance on appropriate first aid. Where medical attention is required, bring the SDS(s) of chemical(s) to aid medical staff in proper diagnosis and treatment. **Inhalation:** Remove person to fresh air and loosen tight clothing if needed. Give artificial respiration if necessary. Do not use mouth-to-mouth resuscitation. Consult a doctor/medical service if cough or other symptoms appear.**Evacuation Procedure*** Immediately evacuate the building via the nearest exit when the fire alarm is activated.
* If unable to evacuate due to a disability, shelter in the area of rescue / refuge, typically a stairwell landing, and wait for assistance from drill volunteers or emergency responders.
* Instruct visitors and students to evacuate and assist them in locating the nearest exit.
* Do not use elevators to exit the building during an evacuation as they may become inoperable.
* Carry only those personal belongings that are within the immediate vicinity.
* Close doors to limit the potential spread of smoke and fire.
* Terminate all hazardous operations and power off equipment.
* Close all hazardous materials containers.
* Remain outside of the building until the building is released for reentry.
* Do not restrict or impede the evacuation.
* Convene in the designated grassy gathering area and await instruction from emergency responders or drill volunteers. Avoid parking lots.
* Report fire alarm deficiencies, (e.g., trouble hearing the alarm) to facilities personnel for repair.
* Notify evacuation drill volunteers or emergency responders of persons sheltering in the areas of rescue/ refuge.
* **Never assume that an alarm is a “false alarm”. Treat all fire alarm activations as emergencies. Get out of the building!**

**Incident and Near Miss Reporting**: Report any incident that occurs in any University of South Florida affiliated teaching or research laboratory/studio or field research project. An incident means any unplanned event within the scope of a procedure that causes, or has the potential to cause, an injury or illness and/or damage to equipment, buildings, or the natural environment. Due to medical privacy concerns, no personal medical information of the person involved in the incident shall be entered on or submitted with the form. <http://www.usf.edu/administrative-services/environmental-health-safety/reporting/index.aspx>**Workers’ Compensation Procedure:** Supervisor and employee (if possible) call AmeriSys at 800-455-2079 to report a work-related injury or illness. Complete the [Consolidated Injury/Illness Reporting Form](https://www.usf.edu/administrative-services/environmental-health-safety/reporting/injury-illness-reporting.aspx), and send it to EH&S within 24 hours. |
| **WASTE DISPOSAL** |
| Return empty full-sized cylinders to the vendor and place a request for pickup by EH&S using HITS for lecture bottles. All chemical waste generated within USF System laboratories is considered hazardous waste and must be disposed of as hazardous waste in accordance with the USF Hazardous Waste Management Procedure, the U.S. EPA, and the FDEP. The USF Hazardous Waste Management Procedure can be found using the following link, <https://www.usf.edu/administrative-services/environmental-health-safety/documents/hazwaste-managementprocedure.pdf> |
| **TRAINING REQUIREMENTS** |
| All individuals working with chemicals in USF laboratories must take EH&S’s Laboratory & Research Safety Training. To register for Laboratory & Research Training, please use the following link, <https://www.usf.edu/administrative-services/environmental-health-safety/training/course-descriptions.aspx#labsafety>This procedure may warrant additional safety training per the PI, EH&S, or an authorizing unit such as the Biosafety or Radiation Safety programs. Check training requirements for this activity below:[x] Research Specific Training from the PI/Lab Supervisor or their designee[x] EH&S Laboratory & Research Safety Training [ ] EH&S Safety and Compliance in the Arts[ ] EH&S Respirator Fit Test[ ] EH&S Biomedical Waste[ ] EH&S Hazardous Waste Pharmaceutical Training[x] EH&S Fire Prevention Safety[ ] EH&S Slips, Trips, and Falls[ ] RIC Biosafety Core Course[ ] RIC Shipping Biohazardous Materials[ ] RIC BSL 3[ ] RIC Radiation Safety[ ] RIC Laser Safety[ ] RIC Boating Safety[ ] RIC Scientific Diving[ ] Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **PRIOR APPROVALS** |
| [ ]  This activity requires prior approval from the PI/designee.[x]  If this box is checked, working alone is not allowed. |

By signing and dating here the Principal Investigator/ or a designee certifies that the Standard Operating Procedure (SOP) for ***Flammable Gases*** is accurate and effectively provides safe standard operating procedures for employees and students in this lab who will handle this hazardous chemical.

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Signature Printed Name Date

I affirm that I have read and understand the Standard Operating Procedure for ***Flammable Gases*** and have undergone the EH&S Laboratory & Research training and any lab specific training regarding this SOP.

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| Printed Name | Signature | Date |
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