

University of Delaware
Department of Occupational Health and Safety
Laboratory Process/Experiment/Equipment Standard Operating Procedure (SOP)
Pressure and Vacuum Processes and Experiments

SOP #: _____

SOP Title: _____

Author: _____	
Signature: _____	Date: _____

Principal Investigator: _____	
Signature: _____	Date: _____

OHS Approver (if necessary): _____	
Signature: _____	Date: _____

1.0 Introduction

2.0 Purpose

3.0 Scope

4.0 Responsibilities

Please select the general categories of personnel who could obtain approval to perform the process or experiment:

1. <input type="checkbox"/> Principal Investigator	2. <input type="checkbox"/> Graduate Students	3. <input type="checkbox"/> Undergraduates
4. <input type="checkbox"/> Technical Staff	5. <input type="checkbox"/> Post Doctoral Employees	
6. <input type="checkbox"/> Other (Describe): _____		

Please list the specific personnel and their approval level (Attach an addendum to this form for additional personnel):

1. _____	<input type="checkbox"/> Trained	Initial Training Date: _____
----------	----------------------------------	------------------------------

2. _____	<input type="checkbox"/> Trained	Initial Training Date:
3. _____	<input type="checkbox"/> Trained	Initial Training Date:
4. _____	<input type="checkbox"/> Trained	Initial Training Date:
5. _____	<input type="checkbox"/> Trained	Initial Training Date:

The Principal Investigator will update this section when any personnel changes occur. If changes occur, document the changes (include the record of training of additional personnel) in the laboratory's files and submit an addendum to the University Chemical Hygiene Officer with all training documentation.

5.0 Hazards

6.0 Hazard Control Measures and Limitations

Process or experiment shall be performed only in the following designated areas.

Check all that apply:

1. <input type="checkbox"/> Demarcated Area in Lab (Describe): _____	
2. <input type="checkbox"/> Fume Hood	3. <input type="checkbox"/> Glove Box
4. <input type="checkbox"/> Other (Describe): _____	

7.0 Personal Protective Equipment

All personnel are required to wear the following personal protective equipment whenever performing the process or experiment:

1. Proper Laboratory Attire (Pants or dresses/shorts below the knees, sleeved shirt, closed-toe shoes)
2. Safety Glasses
3. Lab Coat

Personnel may be required to wear other Personal Protective Equipment when working with this material. The Principal Investigator should contact the University Chemical Hygiene Officer to discuss the selection of chemical protective clothing (aprons, suits and gloves) and respirators. Please check all that apply:

1. <input type="checkbox"/> Chemical Safety Splash Goggles	2. <input type="checkbox"/> Face Shield
3. <input type="checkbox"/> Chemical Protective Gloves (Describe): _____	

4.	<input type="checkbox"/> Chemical Protective Clothing (Describe): _____
5.	<input type="checkbox"/> Chemical Protective Splash Apron (Describe): _____
6.	<input type="checkbox"/> Respirator (Type): _____
7.	<input type="checkbox"/> Other (Describe): _____

8.0 Procedural Steps

9.0 Training Requirements

1. Review of current MSDS
2. Review of the OSHA Lab Standard
3. Review of the Chemical Hygiene Plan
4. Special training provided by the department/supervisor (Right to Know)
5. Review of the departmental safety manual if applicable
6. Safety meetings and seminars
7. One-on-One hands-on training with the Principal Investigator or other knowledgeable laboratory personnel.
8. Other required training topics:
 - a.

10.0 Emergency Procedures

11.0 Special Procedures and Precautions

Equipment under Pressure and/or Vacuum

		Yes	No	N/A
1.	Source of pressure/vacuum (+/-):			
2.	Maximum source pressure: PSIG			
	Maximum operating pressure: PSIG			
	Maximum allowable working pressure: PSIG			
	Pressure relief device set point: PSIG			

		Yes	No	N/A
3.	Is a pressure vessel involved?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, has the pressure vessel been tested, approved and rated for the operation and experiments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, attached the applicable documentation			
4.	Are the equipment's Materials of Construction compatible with all process materials?			
	Valves/Reliefs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Seals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Gauges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Hoses/Tubing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fittings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Gaskets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Vessel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Have calculations been done to assure adequate headspace for expansion/decomposition during operations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, INCLUDE calculations with this review.				
6.	Are all components (valves, gauges, piping, hoses, etc.) rated above pressure relief device set point?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If no, list components and pressure ratings:			
7.	Are there any pressure safety interlocks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, describe:			
	If yes, location of quarterly log:			
8.	What precautions have been taken in the event of a pressure system failure?			
9.	Are rotameters shielded?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, how?			
10.	Is a barricade or shield required to protect personnel from a catastrophic release?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, describe:			
11.	Are gauges located properly (i.e. facing operator, correct position in line)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Are gauges the proper range for the application?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Are gauges compatible with material (e.g. corrosive)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Yes	No	N/A
14.	Any mismatched fittings or tubing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, describe:			
	If yes, is the mismatch approved by the manufacturer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Describe management of change process for future fitting changes.			
15.	Are relief device outlets pointed in a safe direction and unrestricted to vent?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Is the relief device suitable for dual phase (gas and liquid) operations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	At what temperature will relief devices be operated?			
	Are relief devices rated for this temperature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	Have relief devices been inspected/tested?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, date of the most recent inspection:			
19.	Have the consequences of potential leaks been considered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, describe:			

* Additional Comments:

Use of Gasses in the Process/Experiment

One Gas per Sheet, Submit Multiple Pages as Necessary

		Yes	No	N/A	
1.	Name of gas (no abbreviations):				
	Potential Hazards:				
2.	Gas source:				
	House Supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Vendor Cylinder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Dewar	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Gas Generator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	University Owned Cylinder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Has the cylinder been inspected?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3.	Maximum supply pressure: PSIG				
4.	Maximum operating pressure: PSIG				
5.	Maximum allowable working pressure: PSIG				
6.	Pressure relief device set point: PSIG				
7.	Are all components (valves, gauges, hoses, etc.) rated above pressure relief device set point?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If no, list components and pressure ratings:				
8.	Are all components compatible with this gas?				
	Valves/Reliefs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Seals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Gauges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Regulators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Hoses/Tubing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Fittings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Gaskets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Reactor/Vessel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9.	Does the process require cleaning before use (e.g. oxygen)?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Are there any gas safety interlocks?		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, describe:				

		Yes	No	N/A
	If yes, location of quarterly log:			
11.	Are there any gas sensors/detectors?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, describe:			
	If yes, what is the calibration schedule:			
12.	What precautions have been taken in the event of a pressure system failure?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Are gauges located properly (i.e. facing operator, correct position in line)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Are gauges the proper range for the application?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Are check valves needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, explain:			
16.	Is there a potential for cross contamination?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, explain:			
17.	Are lines properly installed and labeled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	Are there any mismatched fittings or tubing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, explain:			
19.	Inspection frequency of pressure regulators:			
	6 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2 years	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No scheduled tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Date of the most recent inspection:			
20.	Are relief device outlets pointed in a safe direction and unrestricted to vent?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	At what temperature will relief devices be operated?			
	Are relief devices rated for this temperature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	Have relief devices been inspected/tested?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, date of the most recent inspection:			
23.	Is gas flammable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, also complete the flammables checklist.			
24.	Is gas corrosive/toxic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If yes, what precautions have been taken? Attach any Highly Toxic and Carcinogenic Material Procedures and Approvals.			

		Yes	No	N/A
	Is a scrubber or pollution control device required?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25.	Is the cylinder protected from exposure to heat sources or flammable liquids?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	Where is gas cylinder kept and how is it secured when in service?			
27.	Where is gas cylinder kept and how is it secured when not in use?			

* Additional Comments:

12.0 Attachments