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**Standard Operating Procedure
for
Gas Cylinder Handling**

REVISION

Rev No.	DCN No.	Change Summary	Release Date	DCN Initiator	Document Owner
5	DCN1489	Minor editorial changes plus clarification of limited ops graduate students may perform, clarification regarding disposal of calibration cylinders and addition of safety practices needed for stuck caps or valves.	1-16-18	E. Timlin	T. Diamond

Prior revision history, if applicable, is available from the Document Control Office.

1 PURPOSE AND SCOPE

Due to pressurization gas cylinders have the potential for uncontrolled releases which can result in physical injuries (such as cylinders becoming projectiles and striking people or equipment) and/or exposure to hazardous materials. This procedure establishes minimum safety measures to be taken for handling gas cylinders. For a particular task, additional measures may be deemed necessary based upon a task-specific risk assessment.

2 REQUIREMENTS FOR PERSONNEL HANDLING GAS CYLINDERS

- 2.1 SUNY Poly personnel who are required to receive transport, or install gas cylinders shall complete the SUNY Poly training course on “Compressed Gas Cylinder Safety”. Refer to **EHS-00027** EHS Training Requirements. Additionally training appropriate to the task is required (e.g. respiratory protection).
- 2.2 Contracted employees must receive training that meets or exceeds the training required in paragraph 2.1.
- 2.3 Personnel, who are required to receive, transport, or install gas cylinders must wear the appropriate personal protective equipment (PPE). The type of equipment required depends upon the classification of the gas. Refer to EHS specification **EHS-00010** Personal Protective Equipment Requirements.
- 2.4 Students (other than graduate students) are not to perform cylinder change outs. Graduate students may change out cylinders containing inert gases where mechanical exhaust ventilation is present.

3 RECEIVING GAS CYLINDERS

- 3.1 All personnel receiving compressed gas cylinders must wear their safety glasses and safety shoes.
- 3.2 A compressed gas cylinder shall be accepted only if its contents are legibly identified by name (not formula). Cylinders may be identified in multiple ways: tags, decals, stencils or labels.
- 3.3 The receiver shall confirm that all of the identifiers agree and correspond to the material ordered. If they do not, the cylinder shall not be accepted.
- 3.4 Under no circumstances shall identification markings or tags be obliterated or removed from any compressed gas cylinder.
- 3.5 All compressed gas cylinders must be inspected prior to acceptance. Below is a list to be used when receiving cylinders. If any item is not satisfactory, the cylinder shall not be accepted.

- Vent cap is in place
 - Shrink wrap on valve
 - RFO present (if required) – can't see with the shrink wrap on it
 - Cylinder and valve free from damage, burn marks, corrosion
 - No odors, visible vapors or hissing noise are noted
- 3.6 Once accepted, a cylinder status tag shall be affixed to the cylinder(s). The tag should indicate the cylinder is "FULL".

4 STORAGE OF CYLINDERS

- 4.1 While in storage, the cylinder cap must be kept tightly in place at all times.
- 4.2 In the designated storage area, the cylinder(s) must be secured by a restraint system (i.e. strap, rack, chain) capable of preventing the cylinder(s) from falling. In some situations, multiple sets of restraints or adjustable restraints may be necessary. [When non-rigid restraints \(e.g. flexible straps\) are used, they must be affixed about the top 1/3 of the cylinder height to prevent tipping.](#)
- 4.3 Dollied cylinders (DOT 4L and similar) which are used to contain and transport liquid nitrogen are exempted from complying with paragraph 4.2.
- 4.4 SCBA cylinders may be stored on their sides provided that they are restrained from rolling.

5 TRANSPORTING COMPRESSED GAS CYLINDERS

- 5.1 During transport, the cylinder valve must be protected from impact. This can be achieved by the cylinder valve covers or a device which provides equivalent protection (clamshell covers over regulators).
- 5.2 Cylinders shall be moved by means of a hand truck or cart. Hand trucks used at SUNY Poly shall have rear wheels, braces to support the cylinder, and a strap or chain [arranged to firmly](#) restrain the cylinder.
- 5.3 Gas cylinders which are less than 25" in height and less than 50 lbs. are exempted from Section 5.2 above, provided that all the following conditions are met:
- The cylinder is not handled in a rough manner,
 - Only one cylinder is carried at a time [and the cylinder cap is in place.](#)
 - SCBA cylinders: a maximum of 2 SCBA cylinders may be carried at one time.

- 5.4 Cylinders shall never be dragged, rolled, or slid even for short distances. (Hand movement is allowed between the cart and cabinet).
- 5.5 Individuals may only handle one cart at a time and the carts shall be pushed ahead rather than pulled by the employee.
- 5.6 Transport of compressed gas cylinders on elevators must be done in accordance with procedures in **EHS-00005** – Chemical Handling and Storage Requirements.
- 5.7 If a cylinder begins to fall, DO NOT attempt to catch. This can result in serious injury.

6 RETURNING THE USED CYLINDER

- 6.1 When a cylinder is empty, the user should contact the following to return and replace the cylinder:
- Academic Engineering Support: AcademicESG@sunypoly.edu
 - Chem Services: CHEMSERVICE@LISTSERV.SUNYPOLY.EDU
- 6.2 Remove the "IN SERVICE" section of the cylinder status tag so only the "EMPTY" section remains. The cylinder status tag shall be attached to the outside of the cylinder cap so that the tag is visible.

7 INSTALLATION OF COMPRESSED GAS CYLINDERS

- 7.1 Installation of cylinders is a hazardous work activity. These tasks shall be carefully evaluated for potential hazards and standard operating procedures determined for specific tools, gases and/or equipment. During installation the following must be implemented:
- 7.1.1 **Implement** Buddy System, in accordance with **EHS-00045** -Work Alone Policy.
- 7.1.2 Only those personnel who have been trained on cylinder changes are to change cylinders.
- 7.1.3 Establish Restricted Area: Only employees performing the cylinder change are to be in the work area. Restrict access by: closing a door(s) or roping off the area with caution tape and posting signage stating cylinder change in progress. Verbally notify others in the area that a cylinder change is occurring. All signs and caution tape shall be removed after the cylinder change has been completed.
- 7.1.4 Perform a leak check on the cylinder to be installed. Refer to Appendix 1 – CNSE Cylinder Leak Test Procedure

- 7.1.5 Install the [cylinder cap](#) and then remove the existing cylinder per [your](#) task specific SOP. Remove the "IN SERVICE" section of the cylinder status tag so that only the "EMPTY" section remains. Attach tag to the outside of the cylinder cap so that the tag is visible.
- 7.1.6 Install the new cylinder per task-specific SOP. Secure the cylinder in the cabinet (or designated location).
- 7.1.7 Leak test the gas panel/connection. See Leak Test Procedure in Appendix 1 – CNSE Cylinder Leak Test Procedure
- 7.1.8 Remove the "FULL" portion of the cylinder status tag. The "IN SERVICE" and "EMPTY" portions remain.
- 7.1.9 Store the cylinder valve covers with the cylinder inside the gas cabinet.
- 7.1.10 Return the empty cylinder to the appropriate storage area for return to the manufacturer.

8 LEAKING GAS CYLINDERS

- 8.1 Call [518-437-8600](tel:518-437-8600), state your name, problem, gas type, location, beeper or telephone number that you can be reached. Tell Security to contact ERT.
- 8.2 Remain in the nearest safe area to be contacted by the ERT.
- 8.3 The ERT will handle and dispose of the leaking cylinder.
- 8.4 If the cylinder is in [an exhausted](#) gas cabinet, do not remove.

9 RUSTY OR STUCK CYLINDER CAP OR VALVE

- 9.1 Do not use a [wrench](#) or [hammer](#) to force a valve open or remove a [cylinder cap](#) that is stuck. Do not use [WD-40](#) or other lubricants to loosen the material.
- 9.2 [Safe cylinder cap removal process-for graduate students when changing out inerts](#)
 - 9.2.1 Use a [cylinder wrench](#) such as shown in the photos below (e.g., Airgas part # [SGD90003](#) or Matheson TW-5 (Photos courtesy of M.I.T.)
 - 9.2.2 Tap cap gently to loosen threads and then turn cap using the purpose made [cylinder wrench](#)
 - 9.2.3 If you still cannot loosen cap or valve, seek out onsite help from Academic Equipment Support Group, or Air Liquide personnel.



10 DISPOSAL OF CALIBRATION GAS CYLINDERS

10.1 DOT 39 Non-Refillable Cylinders regardless of chemical contents are to be disposed by the user in the following manner:

10.1.1 Verify the cylinder is labeled or stamped with the DOT 39 designation.

10.1.2 Trained personnel should release the remaining pressure in an exhausted hood .

10.1.3 Dispose of the cylinder in a general trash Dumpster **if the cylinder was previously devalved or punctured; otherwise label as waste and place in waste accumulation area.**

11 ASSOCIATED DOCUMENTS

11.1 **EHS-00005:** Chemical Handling and Storage Requirements

11.2 **EHS-00010:** Personal Protective Equipment Requirements

11.3 **EHS-00027:** EHS Training Requirements

11.4 **EHS-00045:** Work Alone Policy















12 APPENDIX

Appendix 1 - CNSE Cylinder Leak Test Procedure

Appendix 1 CNSE Cylinder Leak Test Procedure

CNSE Cylinder Leak Check WI

This task requires two-person verification (also known as Call & Confirm) to complete. Critical call outs have been marked in Bold Text.

Date:		Time:	Leak Checker:				
Gas Type:		<i>New Container</i>					
Part Number:							
Lot Number:							
Expiration Date:							
Serial Number:							
Rev	Icon	Step	Procedure	Initials			
		1.	Prepare the appropriate leak checker to perform the inspection.				
		2.	Record the cylinder information above.				
		3.	Properly identify area as leak check in progress.				
		4.	Place the cylinder to be tested in the leak checker cabinet and secure the cylinder.				
		5.	Prior to donning breathing air both techs must test breathing air supply with personal O2 monitor. Hold monitor in the supply stream for 15 seconds, if it alarms, do not don breathing air. Escalate to supervisor immediately.				
		6.	Don PPE per Job Hazard Analysis.				
		7.	Remove cylinder cap.				
		8.	Loosen the dust cap on the cylinder valve. If you hear a release of gas, retighten the dust cap immediately, and reject the cylinder by placing a nonconforming tag on the cylinder.				
		9.	If no release of gas occurs when you loosen the dust cap, test the area around the dust cap with the appropriate leak checker to see if there is a leak. If any gas is the detected, the cylinder fails. <i>Circle one:</i> <div style="display: flex; justify-content: space-around; width: 100%;"> Pass Fail </div>				
		10.	If a leak is detected, reconnect the dust cap, reject the cylinder by placing a nonconforming tag on the cylinder, and escalate to supervisor immediately.				
		11.	If no leak is detected reconnect the dust cap, remove breathing air, replace the cylinder cap, and prepare cylinder for transport.				
		12.	This WI will remain with the cylinder until the cylinder change is complete, and will be submitted along with the cylinder change out.				
		13.	If a cylinder is rejected log the information in the pass down. Send out an email to the group informing everyone of the cylinder information listed above so appropriate investigation can be done on the cylinder when it is returned for nonconformance.				
Comments:							
1st Technician:		<i>Print:</i>	<i>Signature:</i>				
2nd Technician:		<i>Print:</i>	<i>Signature:</i>				
Review By:			<i>Date:</i>				
Icon Legend							
<input checked="" type="checkbox"/>	Verify or Check		Close		Open		Make a written record
	Label		Critical Step		Wear appropriate PPE		Notify or Contact